MEC Consulting Group

FLOOD RISK & DRAINAGE

Chalk Road, Higham
Flood Risk Assessment
August 2025

Report Ref: 29524-FLD-0101 Rev B

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REPORT REF: 29524-FLD-0101 Rev B

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REGISTRATION OF AMENDMENTS

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August 2025	A	Updated layout plan	**Alexander Bennett** BSc (Hons) MCIHT MTPS Managing Director		
August 2025	B	Updated Flood Extents Plan	**Ben Oyston** **MSc, BSc (Hons)** Assistant Flood Risk Engineer	**Ryan Chafer** **BSc (Hons)** Principal Flood Risk Engineer	**Alexander Bennett** **BSc (Hons), MCIHT, MTPS** Managing Director

EXECUTIVE SUMMARY

Site Address	Chalk Road, Higham. Grid Reference E:571119, N:172997.
Site Description and Setting	The site is located on Chalk Road, Higham. The current site area is formed of former agricultural buildings and open green space. The site is bounded to the north and west by green space, to the east by the railway line and to the south by Chalk Road.
Proposed Development	Outline application for the demolition of existing buildings and erection up to 40 residential dwellings, public open space and associated works. Approval is sought for the principal means of vehicular access from Chalk Road and all other matters are reserved.
Flood Risk Information	The Environment Agency Flood Map for Planning shows most of the site is located within FZ1, with the north of the site located in FZ2 and FZ3. It should be noted that the Flood Map for Planning does not consider the effect of flood defences on flood risk. The site is shown to be in an area mapped to be at a reduced risk of flooding due to flood defences. While the EA Flood Map for Planning does not consider the effect of flood defences on flood risk, the EA have produced the Risk of Flooding from Rivers and Seas datasets, which does consider the impact of flood defences on flood risk. The Risk of Flooding from Rivers and Seas mapping shows the site to be at very low risk of flooding when the defence is considered. Product 6 Data was acquired from the Environment Agency. The Product 6 information shows that during a tidal event and with the defences in place, the site is not at risk from the 1 in 200 year event and the 1 in 1000 year event. Given the above, the site is at low risk of tidal flooding. The Environment Agency Flood Risk from Surface Water Map indicates the site to be mostly at low risk from surface water flooding. The map shows three areas within the site at low to high risk of surface water flooding, along the northern boundary, within the northern central area, over the existing pond on-site and within the western edge where the existing farm buildings are located. Groundwater was encountered during soakage testing in two trial pits at depths of 1.80m bgl and 2.00m bgl in the northeastern corner of the site. Given the above the risk of groundwater flooding to the site is considered medium All other sources of flooding is considered low.
Surface Water Drainage Strategy	In accordance with the National SuDS Standards, the strategy involves conveying surface water flows to multiple geo-cellular tanks and an attenuation basin before discharging to the existing culvert to the north. A total storage volume of 774.26m^3 will be available within the proposed attenuation features to manage flows generated for all events up to and including the 1%AEP45CC event. Additional drainage features, including water butts, rain gardens and permeable paving will be used across the site to provide extra storage on site and act as a first treatment stage of treatment for any run-off.
Foul Drainage Strategy	Sewer records and a Developer Enquiry have been obtained from Southern Water. The records show the presence of a 175mm foul sewer located to the south of the site along Chalk Road; there is a further 100mm foul sewer to the east of the site. There is an existing pumping station located along the southwestern boundary of the site that has a foul rising main leading to the south. Given the levels on site, it is proposed that foul water flows generated on site will need to be pumped first to allow for a gravity connection to be made. It is proposed and has been agreed with Southern Water that foul flows generated on site will discharge into the existing foul sewer along Chalk Road at MH1902. Southern Water has confirmed that improvement works will be required to accommodate the proposed discharge rate of 0.36l/s.
Conclusions	With the above measures in place, the development of the site will not create any flood risk issues within the wider area.
This summary should be read in conjunction with the full report and reflects an assessment of the site based on information received by MEC at the time of production.	

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APPENDICES

1.0 INTRODUCTION

1.1 MEC Consulting Group Ltd (MEC) has been commissioned by Richborough (hereafter referred to as 'the Client') to undertake a Flood Risk Assessment for a proposed residential development at Chalk Road, Higham (hereafter referred to as 'the Site'). A site location plan is provided in **Appendix A**.

1.2 The development proposals comprise;

Outline application for the demolition of existing buildings and erection up to 40 residential dwellings, public open space and associated works. Approval is sought for the principal means of vehicular access from Chalk Road and all other matters are reserved.

1.3 An illustrative development framework plan is presented in **Appendix B.**

1.4 The proposed development will take place on former agricultural buildings and open space. The site is located to the north of Lower Higham at Grid Reference E:571119, N:172997.

1.5 The assessment has been undertaken to ascertain the constraints of the development to the site and assess the impact of the design, concerning flood risk.

1.6 The Local Planning Authority for the site is Gravesham Borough Council and the Lead Local Flood Authority is Kent Count Council (KCC). The site falls within the Southern Water (SW) Catchment.

1.7 Pre-Application Advice was received from KCC on the 8*th* of July 2025. The response can be seen within **Appendix C**. Further email communications were also undertaken with KCC and can also be seen within **Appendix C**. A summary of the points raised within the advice has been listed out below;

- The site is located within Flood Zones 2 and 3 in regards to an undefended scenario.
- Mapping for Flood Risk from Rivers and Seas with defences places the site outside of flood extents, the site benefits from defences against tidal flood risk.
- Areas of medium or greater surface water risk are most likely associated with topographical low points and areas adjacent to the existing buildings on site.
- Given the site is defined as defended, the proposed location of the attenuation basin will not raise concerns.
- Discharging solely via infiltration has been ruled out, it is still recommended however to use opportunities for inception losses via the inclusion of suitable SuDs devices to meet with national standards.
- It is recommended that drainage modelling be based on a CV value of 1.
- The existing highway drain on site needs to be accommodated or diverted as part of the proposals for the development.

1.8 The assessment has been prepared using our best engineering judgement however, there are levels of uncertainty implicit in the historical data and methods of analysis. The report is based on the following information:

- British Geological Survey (BGS);
- The Flood Map for Planning and the Long-term Flood Risk Map from the Environment Agency and .gov.uk websites; and
- The Gravesham Local Plan Core Strategy, September 2014
- The Kent Thameside Delivery Board Strategic Flood Risk Assessment of Kent Thameside, December 2005
- The Kent County Council Preliminary Flood Risk Assessment Report, September 2011
- The Kent Local Flood Risk Management Strategy 2024-2034, June 2024
- The Kent County Council Flood Risk to Communities Gravesham, September 2017
- Thameside Stage 1 Surface Water Management Plan

Disclaimer

1.9 MEC has completed this report for the benefit of the individuals referred to in paragraph 1.1 and any relevant statutory authority which may require reference in relation to approvals for the proposed development. Other third parties should not use or rely upon the contents of this report unless explicit written approval has been gained from MEC.

1.10 MEC accepts no responsibility or liability for:

- The consequence of this documentation being used for any purpose or project other than that for which it was commissioned;
- The issue of this document to any third party with whom approval for use has not been agreed.

2.0 POLICY CONTEXT

National Planning Policy Framework

2.1 The National Planning Policy Framework (NPPF) was published and updated most recently in December 2024 by the Department for Levelling Up, Housing, and Communities.

2.2 The NPPF is the primary source of national planning guidance in England, setting out the Governments planning policies for England, and how they are expected to be applied by local councils.

2.3 'Chapter 14: Meeting the challenge of climate change, flooding, and coastal change' outlines the guiding principles for managing flood risk as part of the planning process, notable paragraphs 170-182.

2.4 The Planning Practice Guidance (PPG) sets out the vulnerability to flooding of different land uses. It encourages development to be in areas of lower flood risk where possible and stresses the importance of preventing increases in flood off site to the wider catchment.

2.5 The PPG also states that alternative sources of flooding, other than fluvial (river flooding), should be considered when preparing an FRA. The document also includes a series of tables that define Flood Zones, the flood risk vulnerability classification of development land use, and 'compatibility' of development within the defined Flood Zones.

2.6 Therefore, this FRA has been completed in line with the guidance and requirements of the NPPF and PPG.

Local Plan

2.7 The Gravesham Local Plan Core Strategy was adopted by in September 2014. The Local Plan Core Strategy sets out how land within the authorities' boundaries can be used and developed, providing policies which the Council uses to determine planning applications. The plan aims to ensure future growth and changes to the district are appropriate to local needs now and in the future.

2.8 More generally, the lists policies that guide the design and principles of all development within the authority's land. Those relevant to this FRA are summarised as follows;

- Policy CS18: Climate Change

Local SFRA

2.9 The Kent Thameside Delivery Board Strategic Flood Risk Assessment of Kent Thameside (SFRA) was published in December 2005. The SFRA was produced to provide an appropriate evidence base for the Local Plan and provide a summary of flood risk across the district.

2.10 Appropriate background information has been used to inform this FRA and will be referenced accordingly.

Local PFRA

2.11 The Kent County Council Preliminary Flood Risk Assessment Report (PFRA) was published in September 2011 and was prepared to assist Kent County Council meet its duties to manage local flood risk and deliver any legal requirements placed on it as Lead Local Flood Authority (LLFA) under the Flood Risk Regulations 2009.

2.12 Appropriate background information has been used to inform this FRA and will be referenced accordingly.

Local Flood Risk Management Strategy

2.13 The Kent Local Flood Risk Management Strategy 2024-2034 (LFRMS) was published in June 2024 to comply with Section 9 of the Flood and Water Management Act 2010 and aims to provide a framework for meeting its requirements to develop, maintain, apply, and monitor a local strategy for flood risk management and how Kent County Council aim to achieve this.

2.14 The FRMS provides further information regarding surface water runoff, groundwater and sewer flooding and flood risk around the County and the introduction of flood risk alleviation schemes at various scales, including SuDS.

Supplementary Planning Documents

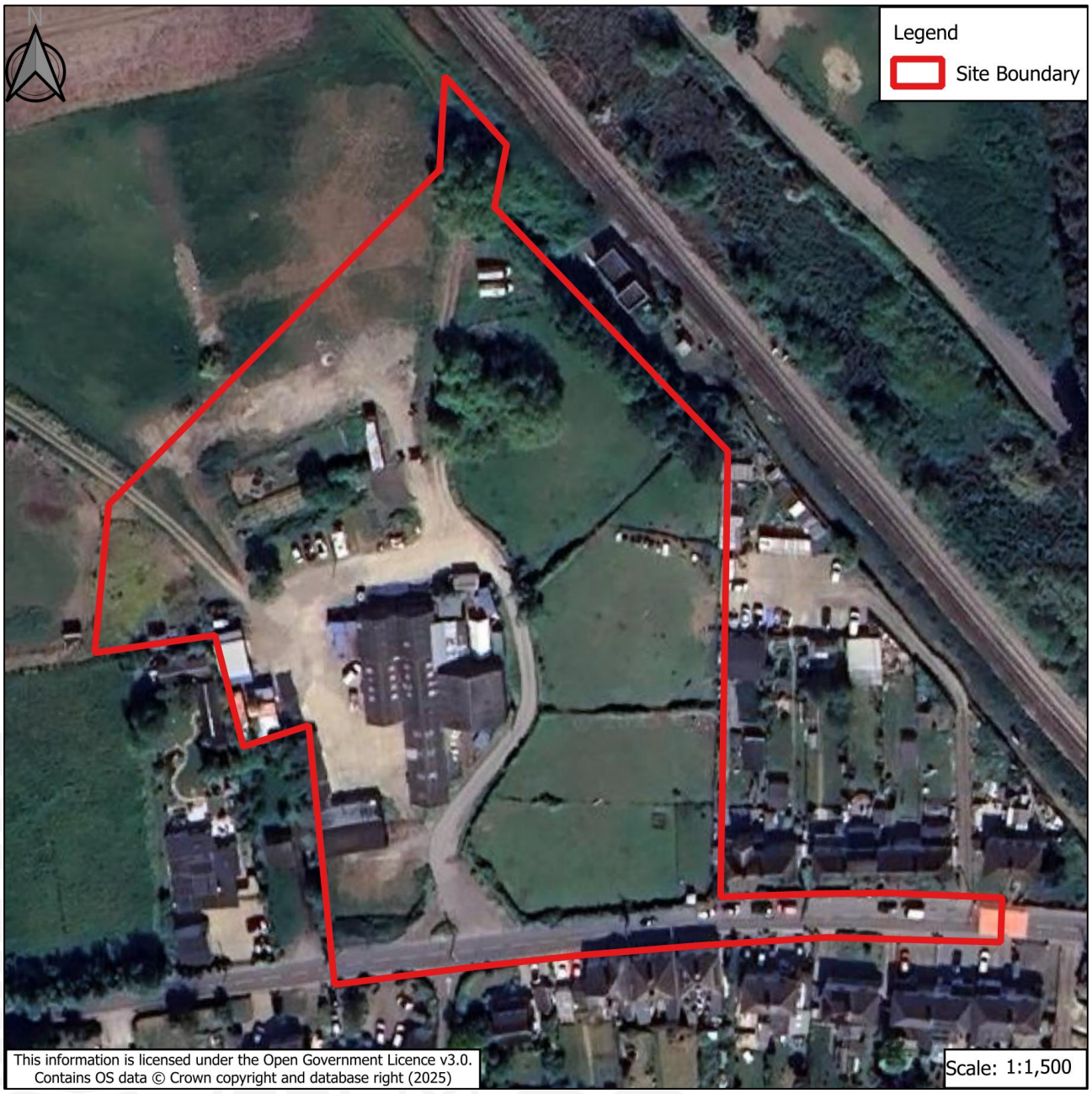
2.15 The Kent County Council Flood Risk to Communities Gravesham was published in September 2017. This report aims to provide a summary of the main flood risks to the county, the key flood risk management assets/structures and any flood risk management plans or strategies that are in place for the area of Gravesham.

3.0 SITE DESCRIPTION

Site Location and Features

3.1 The Ordnance Survey National Grid Reference (NGR) for the site is E:57119, N:172997. The site measures approximately 1.56ha in size. The site is located on Chalk Road, Higham. The current site area is formed of former agricultural buildings and open green space. The site is bounded to the north and west agricultural land, to the east by a railway line and to the south by Chalk Road.

Figure 3.1: Site Location Plan



Topographic Data

3.2 Full details of the topographical survey are included in **Appendix D.** The site survey indicates that the site falls from south to north. Levels on site range from 7.61m AOD to 4.18m AOD.

Flood Zone Maps and Flood Defence Data

3.3 Information relating to the current flood risk to the application site has been obtained from the Environment Agency and.gov.uk websites. There are multiple flood defences located near the site, the majority of these are labelled to be Natural High Ground. There is Natural High Ground running along the Thames and Medway Canal to the east of the site. The natural high ground was last assessed in November 2022 and is maintained by the Environment Agency. There is a flood defence located along the southern edge of the River Thames, this is an embankment defence. The defence was last assessed in November 2024 and is maintained as well by the Environment Agency.

Watercourses & Hydrology

3.4 The closest designated watercourse is the Thames and Medway Canal located 0.2km to the east of the site. The River Thames is located 2.4km to the north of the site.

Historic Flooding

3.5 The EA Map for historical flooding shows no historic flooding has occurred within close proximity to the site. There are historic flood outlines located to the north of the site surrounding the River Thames and Thames and Medway Canal upstream from the site.

Geological Data

3.6 The 1:50,000 British Geological Survey (BGS) viewer shows the site is underlain by a bedrock geology of the Thanet Formation, comprising sand, silt, and clay. There are superficial Head deposits comprising clay, silt, sand, and gravel within the north-western corner of the site. There are no other recorded superficial deposits within the site.

Sewers

3.7 Sewer records have been obtained from Southern Water (SW) see **Appendix E**. The records show the presence of a 175mm foul sewer located to the south of the site along Chalk Road; there is a further 100mm foul sewer to the east of the site. There is an existing pumping station located along the southwestern boundary of the site that has a foul rising main leaving to the south.

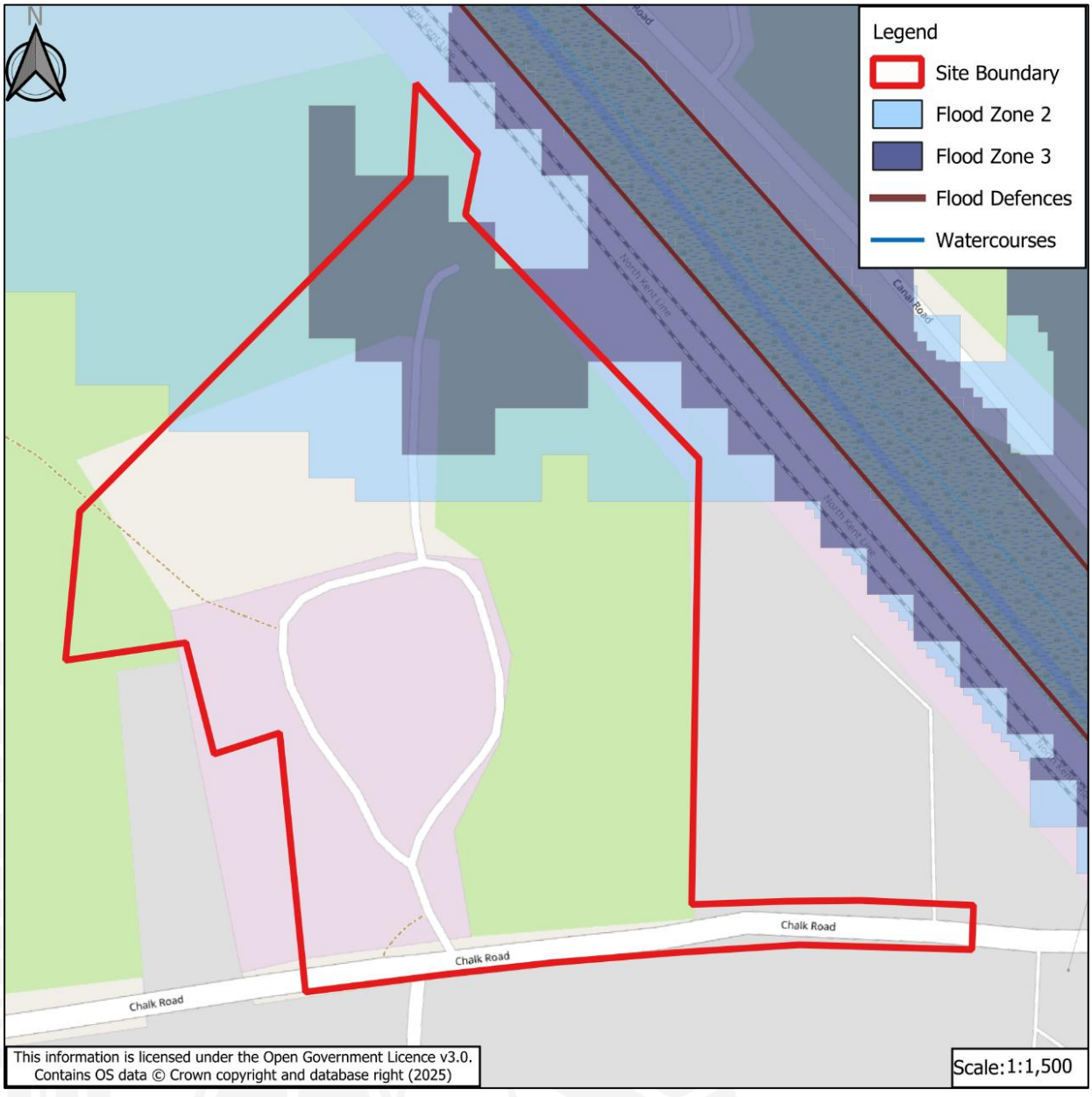
3.8 A CCTV Survey was undertaken by Aquatech Drain Services in July 2025 (**Appendix F**). During the survey, the presence of an existing 225mm highway drain through the site was determined. The survey showed the drain flows from Chalk Road along the south of the site through the existing farm buildings up to the northeast corner of the site where it becomes culverted under the railway and out into the Thames and Medway Canal. The plan for the drain can be seen within **Appendix F**.

4.0 FLOOD RISK TO SITE

Fluvial Flood Risk

4.1 The Environment Agency's Flood Map for Planning is shown in Figure 4.1. The map shows that most of the site is located within Flood Zone 1 (FZ1). There is an area in the north of the site located in Flood Zone 2 (FZ2) and Flood Zone 3 (FZ3). FZ1 is defined as land assessed as having an annual probability of river flooding of less than 1%. FZ2 is defined as land assessed as having an annual probability of river flooding between 0.1% and 1%. FZ3 is defined as land assessed as having an annual probability of flooding greater than 1%. It should be noted that the Flood Map for Planning does not consider the effect of flood defences on flood risk.

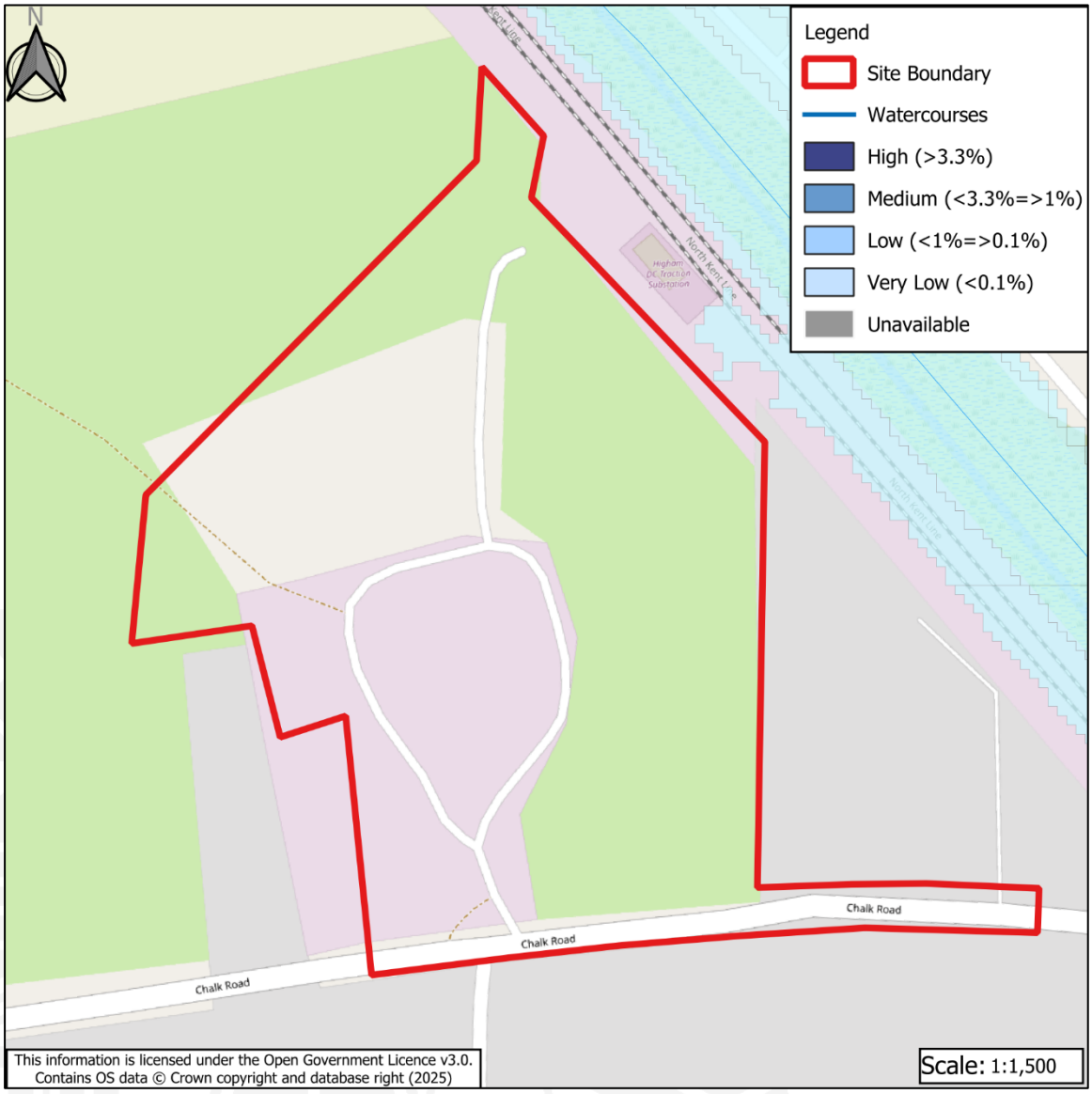
Figure 4.1: Environment Agency's Flood Map for Planning.



4.2 The site is shown to be in an area mapped to be at a reduced risk of flooding due to flood defences in the area. The flood defence found to the north of the site consists of natural high ground (ID 72621) and measures approximal 461.29m in length. The flood defence was last inspected in November 2022 and was assessed to be in Condition 3 (Fair: The defence shows some signs of deterioration, but still functions as intended). The flood defence is expected to be reassessed in November 2025. This defence is under the Kent South London and East Sussex water management area, but is owned and maintained by the Environment Agency.

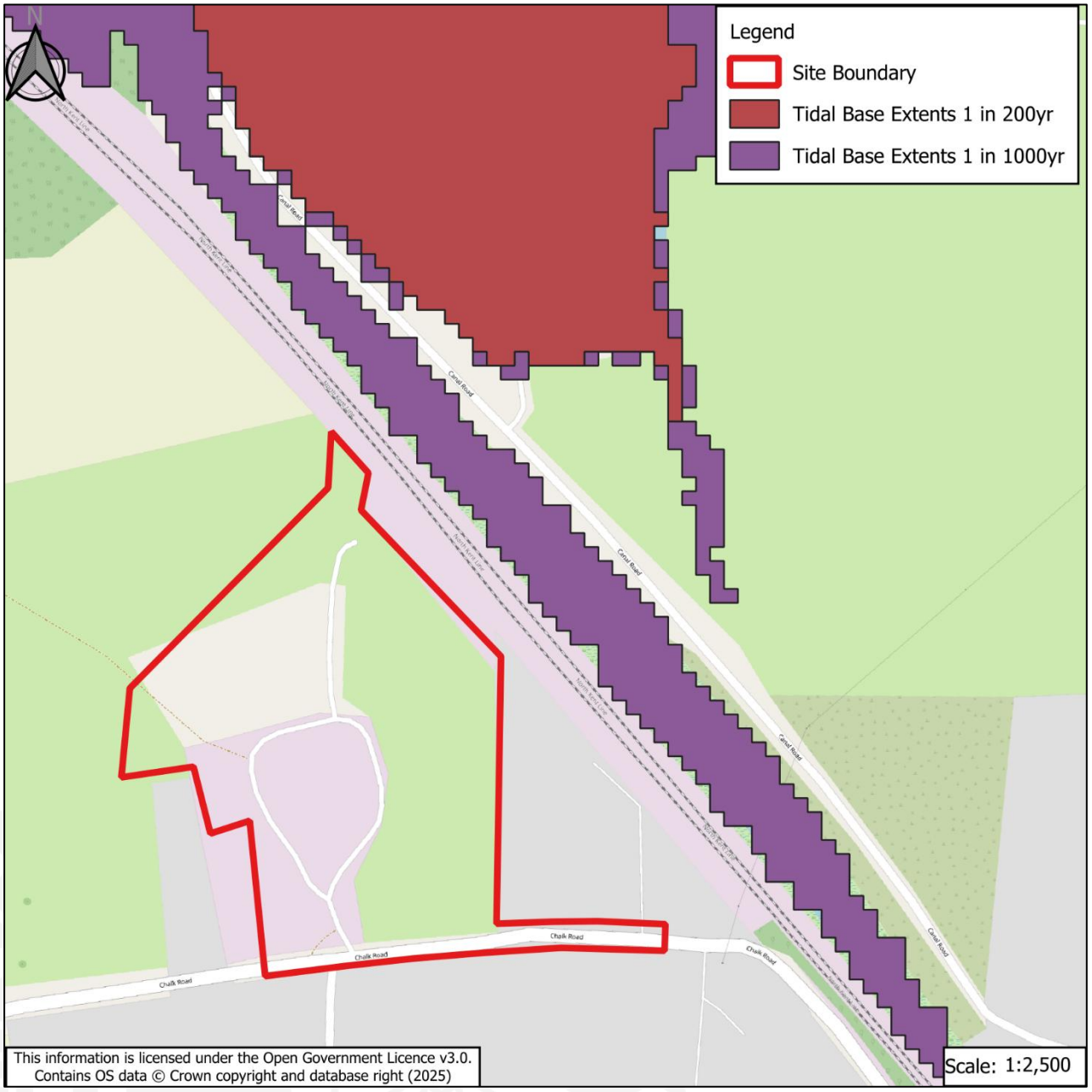
4.3 While the EA Flood Map for Planning does not consider the effect of flood defences on flood risk, the EA have produced the Risk of Flooding from Rivers and Seas datasets, which consider the impact of flood defences on flood risk. The Risk of Flooding from Rivers and Seas mapping shows the site to be at very low risk of flooding when the defence is considered. An extract of this mapping is included as Figure 4.2.

Figure 4.2: Environment Agency's Risk of Flooding from Rivers and Seas.



4.4 Product 4 data was requested from the EA, however, the EA stated that they do not have any Product 4 information for this area. The EA did provide Product 6 information, which includes the modelled Tidal Extents from the River Thames. The Product 6 information shows that during a tidal event and with the defences in place, the site is not at risk from the 1 in 200 year event and the 1 in 1000 year event. Given the above, the site is at low risk from tidal flooding. An extract of this tidal flood mapping is included as Figure 4.3 below.

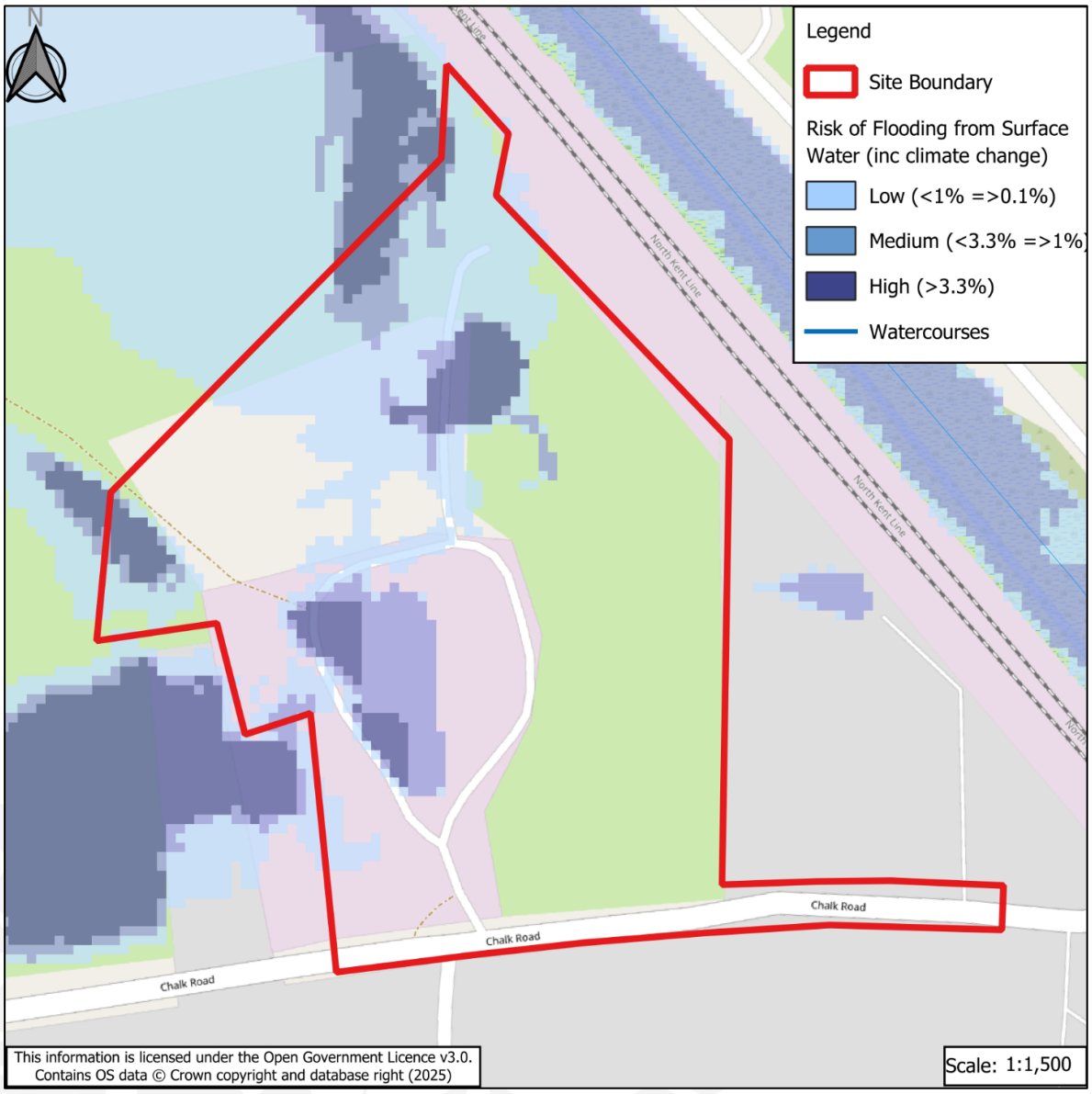
Figure 4.3: Product 6 Tidal Flood Extents



Surface Water Flooding Risk Allocation

4.5 The Environment Agency Flood Risk from Surface Water Map, refer to Figure 4.4, indicates that the majority of the site is designated to be at low risk from surface water flooding. The map shows three areas within the site at low to high risk of surface water. One is located along the northern boundary. The second is within the northern central area, this area of risk is located over the existing pond on-site. The third area is located along the western edge, where the existing farm buildings are located.

Figure 4.4: Environment Agency's Flood Risk from Surface Water Map (including 2050s epoch climate change)



4.6 Modelled surface water depths, provided by the EA, are shown in Figure 4.5 and Figure 4.6 below. Figure 4.5 indicates that the areas located by the existing pond and buildings to the southwest have a high risk of surface water levels reaching up to 0.2m and 0.3m depth on site. Figure 4.6 shows that the existing pond has a high risk for surface water flood depths reaching 0.6m. There is a low risk across the whole site for surface water depths to be greater than 0.6m.

Figure 4.5: Modelled Surface Water Flood Depths of 0.2m and 0.3m

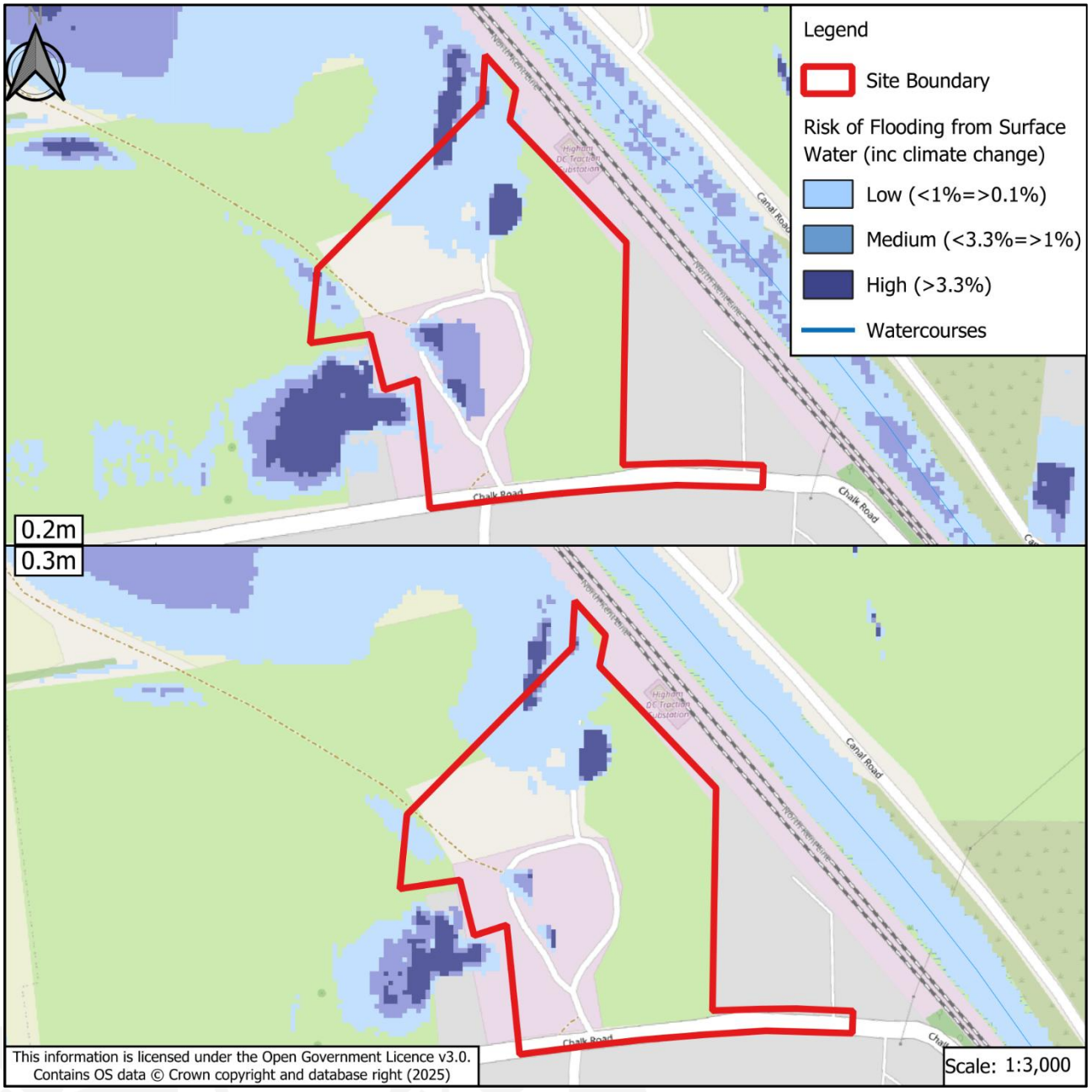
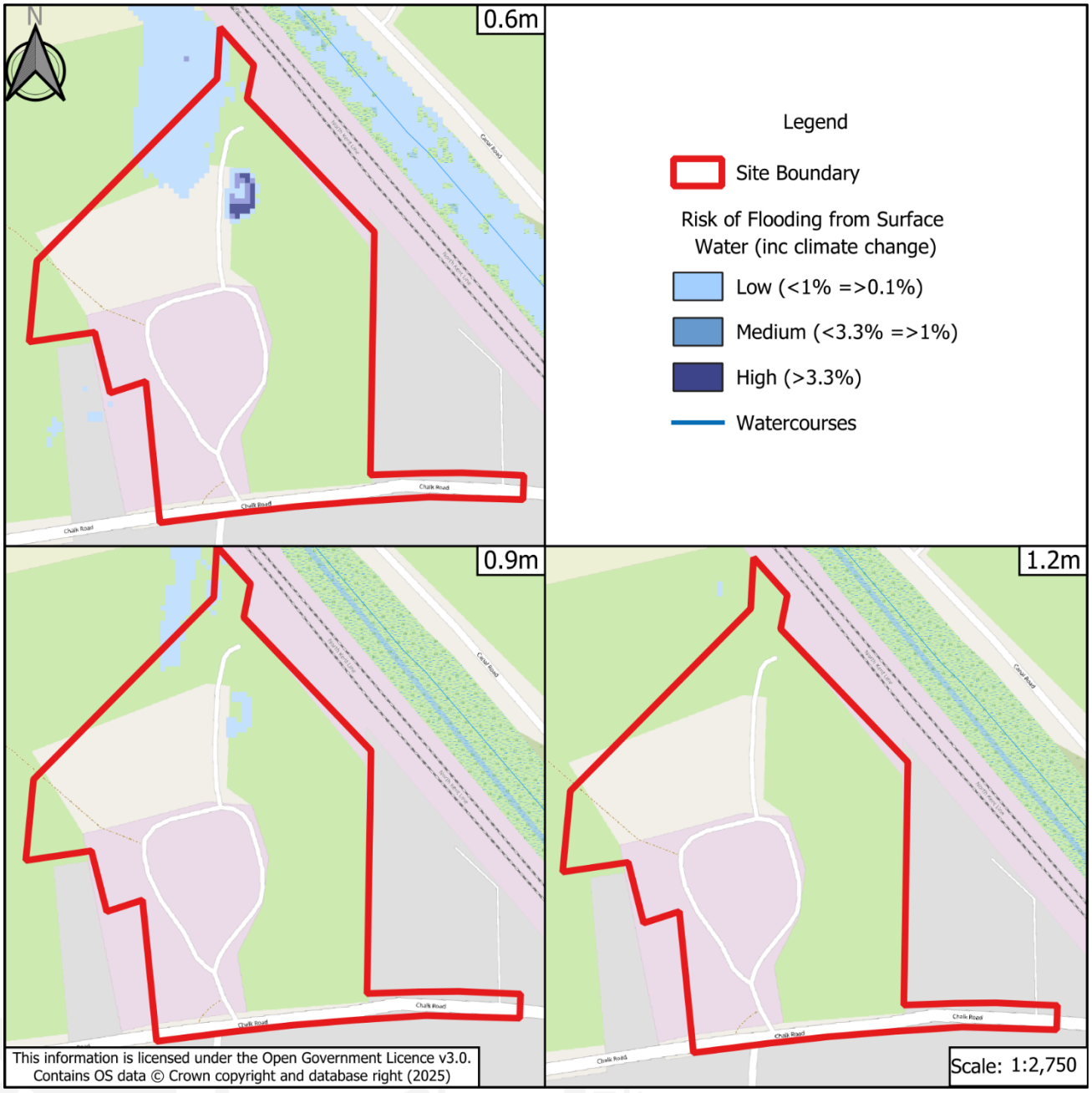


Figure 4.6: Modelled Surface Water Flood Depths of 0.6m, 0.9m and 1.2m



4.7 All proposed built development, in line with the requirements of Paragraph 175 of the NPPF, has been situated in areas of lowest risk. This ensures consistency with prevailing national and local guidance.

4.8 It should be noted, this mapping produced by the EA to provide the risk of flooding from surface water does not consider continual losses to the ground through infiltration or the impact of drainage features, including culverts. Underlying geology suggests that whilst any infiltration is likely to be at a low rate, there may be a slight reduction in flows across the site.

Groundwater Flood Risk

4.9 During soakage testing undertaken by MEC in April 2025 (**Appendix G**) groundwater was encountered in two trial pits. Groundwater seepages were encountered at depths of 1.80m bgl and 2.00m bgl in the northeastern corner of the site. The site is not located within a groundwater Source Protection Zone (SPZ) and there are no groundwater abstractions recorded within 500m.

4.10 Given the above the risk of groundwater flooding to the site is considered medium.

Other Flooding Risk

4.11 The Environment Agency Mapping shows that the site is not at risk of reservoir flooding, as such, the risk of flooding from reservoirs is low.

4.12 In line with the Thameside Stage 1 Surface Water Management Plan Watercourses and Drainage Systems Plan there appears to be no recorded sewer flooding incidents within the site area. In line with this sewer flooding will be regarded as low risk.

5.0 FLOOD RISK ASSESSMENT

Flood Risk Assessment Methodology & Objectives

5.1 It is recognised that developments that are designed without regard to flood risk may endanger lives, damage property, cause disruption to the wider community, damage the environment, be difficult to insure and require additional expense on remedial works. Current guidance on development and flood risk identifies several key aims for development to ensure that it is sustainable in flood risk terms.

5.2 These aims are as follows:

- The development should not be at significant risk of flooding and should not be susceptible to damage due to flooding;
- The development should not be exposed to flood risk such that the health, safety and welfare of the users of the development, or the population elsewhere, are threatened;
- Safe access/egress to and from the development should be possible during flood events;
- The development should not increase flood risk elsewhere;
- The development should not prevent safe maintenance of watercourses or maintenance and operation of flood defences;
- The development should not be associated with an onerous or difficult operation and maintenance regime to manage flood risk. The responsibility for any operation and maintenance required should be clearly defined;
- Future users of the development should be made aware of any flood risk issues relating to the development;
- The development should not lead to the degradation of the environment; and
- The development should meet all of the above criteria for its entire lifetime, including consideration of the potential effects of climate change.

5.3 This Flood Risk Assessment is undertaken with due consideration of these sustainability aims and has been prepared to inform the proposed scheme.

Project Scope

5.4 In order to achieve the aims outlined above, this Flood Risk Assessment has been undertaken in accordance with current best-practice guidance, including the PPG. A scoping study was initially undertaken to identify all potential sources of flooding at the site, which may warrant further consideration. Any potential flooding issues identified in the scoping study have subsequently been considered within this Flood Risk Assessment. The aim of the scoping study is to review all available information and provide a qualitative assessment of the flood risk to the site and the impact of the site on flood risk elsewhere. The report has been undertaken with due regard to the EA's National Standing Advice on Development and Flood Risk.

Scoping Study

5.5 All potential sources of flooding must be considered for any proposed development.

5.6 Using the EA Flood Zone mapping, topographical survey and Ordnance Survey maps, a summary of the potential sources of flooding and a review of the potential risk posed by each source on the development area of the application site is presented in Table 5.1.

Table 5.1: Potential Risks posed by Flooding Sources in accordance with the gov.uk Long-Term Flood Risk Map

Source	Risk		
	High	Medium	Low
Fluvial			✓*
Tidal			✓
Surface Water			✓
Groundwater		✓	
Sewer			✓
Artificial water bodies			✓

While the Flood Map for Planning locates the site within Flood Zones 2 and 3, the site is at low risk due to the flood defence protecting the area, as shown within the Rivers and Seas mapping.

Flood Risk Mitigation

5.7 It is vital that the correct mitigation is put in place to minimise the flood risk to the development. In accordance with the NPPF, this includes preventing harm from occurring to the users of the site as well as ensuring the development itself is protected. The below outlines further building mitigation measures that are recommended.

Fluvial Flood Risk Mitigation

5.8 The Environment Agency Flood Map for Planning shows most of the site is located within FZ1, with the north of the site located in FZ2 and FZ3. It should be noted that the Flood Map for Planning does not consider the effect of flood defences on flood risk.

5.9 The site is shown to be in an area mapped to be at a reduced risk of flooding due to flood defences. The site is protected by natural high ground (ID 72621) which is not considered as part of the flood map for planning. While the EA Flood Map for Planning does not consider the effect of flood defences on flood risk, the EA have produced the Risk of Flooding from Rivers and Seas datasets, does consider the impact of flood defences on flood risk. The Risk of Flooding from Rivers and Seas mapping shows the site to be at very low risk of flooding when the defence is considered.

5.10 Given the above, no further additional mitigation measures are required to address the low risk of fluvial flooding.

Surface Water Flood Risk Mitigation

5.11 The Environment Agency Flood Risk from Surface Water Map indicates the site to be mostly at low risk from surface water flooding. The map shows three areas within the site at low to high risk of surface water flooding. One is located along the northern boundary. The second is within the northern central area, this area of risk is located over the existing pond on-site. The third area is located along the western edge where the existing farm buildings are located.

5.12 The modelled flood depths indicate that the areas located by the existing pond and buildings to the southwest have a high risk of surface water levels reaching up to 0.2m and 0.3m depth on site. While the area of the existing pond has a high risk for surface water flood depths reaching 0.6m.

5.13 A large proportion of the surface water flows noted on site are generated by the site itself and therefore the areas at risk from surface water will be managed with by the proposed on-site drainage system post development.

5.14 Permeable paving and positive drainage networks will be utilised to avoid any ponding of surface water above the ground. Surface water is likely to be collected by the proposed site-wide drainage infrastructure and conveyed to a proposed discharge point.

5.15 The risk of flooding will be managed at the development site post-development and the remaining risk will be low.

Groundwater Flood Risk Mitigation

5.16 Groundwater was encountered during soakage testing undertaken by MEC in April 2025 (**Appendix G**). Groundwater seepages were encountered within the northeastern corner of the site at depths of 1.80m bgl and 2.00m bgl.

5.17 To mitigate against potential groundwater levels, suspended floor slabs will be used to create a void beneath the floor which will flood before the water rises to the houses. All drainage features will be lined with an impermeable membrane to prevent any groundwater ingress.

Vulnerability Classification of Proposed Development

5.18 The National Planning Practice Guidance: Flood Zone and Flood Risk Tables provide information on the vulnerability classification of various developments. The proposed residential development end use of this site falls in the “more vulnerable” classification. A comparison of the ‘more vulnerable’ use with the development proposals within Flood Zone 1 areas shows development proposals are acceptable and in accordance with NPPF, as shown in Table 5.2.

Table 5.2: Flood risk vulnerability and flood zone 'compatibility' from Flood Risk and Coastal Change – Planning Practice Guidance

Flood Risk Vulnerability classification		Essential Infrastructure	Water compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test required	✓	x	Exception Test Required	✓
	Zone 3b 'Functional Floodplain'	Exception Test Required	✓	x	x	x

Key:✓Development is appropriate X Development should not be permitted

Sequential Test

5.19 According to National Planning Practice Guidance: Flood Zone and Flood Risk, the Sequential Test gives preference for locating new developments in low-risk areas from all sources of flooding. However, if there is no allocated land within the low-risk areas that meets the policy aims of the published Local Authority Local Plan or Local Development Framework then other sites in higher flood risk categories can be considered for that development.

5.20 Paragraph 175 of the NPPF states:

"… ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding".

5.21 The site has been sequentially designed to stay out of the area at medium to high risk from surface water flooding to the north of the site. While the site is a very low risk form of fluvial flooding due to the flood defence, the site has been designed to be set outside the area allocated as Flood Zones 2 and 3, in addition to the surface water risk. An overly of the flood risks associated with the site against the proposed layout can be seen on drawing 29524_01_203_02a in **Appendix H**.

Exception Test

5.22 Given that the proposed development is located outside the principle areas subject to medium and high risk surface water flooding and at very low risk from fluvial flooding, the proposed development is in accordance with NPPF and the exception test is not required.

6.0 SURFACE WATER MANAGEMENT STRATEGY

6.1 It is essential that the proposed development does not increase flood risk to adjacent land or downstream of the site and protects the development from flooding itself. To ensure that the flood risk is minimised, the drainage design will incorporate the following flood mitigation measures:

- The proposed development will include a surface water drainage system that will intercept runoff generated within the development. This will minimise the risk of flooding to the new buildings and also reduce the incidence of overland flows.
- The surface water drainage system will convey flows to the attenuation features on site. The surface water flows generated within the development up to and including a 1%AEP45CC will be stored on-site and discharged at a controlled rate of 2.0l/s.

Surface Water Outfall

6.2 Surface water arising from developed sites should, as far as practical, be managed in a sustainable manner to mimic the surface water flows arising from the undeveloped site. When considering the surface water discharge the SuDS hierarchy needs to be adhered to. The SuDS hierarchy states that the options below must be adhered to in order of sustainability or evidenced otherwise before moving down to a less sustainable discharge method;

- Water Reuse
- Discharge at source (soakaway)
- Watercourse or waterbody
- Public Sewer

Water Reuse

6.3 Consideration should be given to the implementation of rainwater harvesting systems, including but not limited to; water butts on residential dwellings, and rain gardens to ensure water re-use.

6.4 The first 5mm of rainfall will be collected via rainwater techniques. However, given the scale of development, and attenuation requirements calculated, it is, at this stage, not considered feasible to have collection of rainwater for non-potable uses to provide a wholesale means of surface water runoff attenuation within the site boundary.

6.5 As such, an alternative method of disposal should be investigated, with non-potable use further considered within the detailed designed of the proposed development.

Discharge at Source

6.6 The 1:50,000 British Geological Survey (BGS) viewer shows the site is underlain by a bedrock geology of the Thanet Formation, comprising sand, silt, and clay. There are superficial Head deposits comprising clay, silt, sand, and gravel within the north-western corner of the site. There are no other recorded superficial deposits within the site.

6.7 Soakage testing was undertaken on site by MEC in April 2025 (**Appendix G**) in accordance with BRE365 Standards. Testing was undertaken in four locations and within the Thanet Formation. During testing insufficient soakage was recorded within all pits to enable a calculation of a representative infiltration rate. Seepages of groundwater were also encountered within two locations in the northeastern corner at depths of 1.80m bgl in SA03 and 2.00m bgl at SA04. Given the above it is deemed soakage is not a viable form of surface water outfall. An alternative method will be required.

Discharge to Watercourse

6.8 The closest designated watercourse is the Thames and Medway Canal located 0.2km to the east of the site. During the CCTV Survey undertaken by Aquatech Drain Services as seen in **Appendix F** it was confirmed that the existing highway drain that flows through the site culverts underneath the railway to the northeast of the site and into the Medway and Thames Canal. The culvert was shown to be overgrown during the survey, clearance works will be required.

Discharge to Sewers

6.9 In accordance with the drainage hierarchy, surface water will be discharged via an existing culvert to the north of the site.

Land Use

6.10 In order to calculate the drainage requirements an understanding of the land use on-site needs to be known. Table 6.2, below summarises the proposed land uses within the site. The current site area is formed of former agricultural buildings and open green space. The current land use has been calculated using the existing site plan and the post-development land use has been measured from the proposed layout.

Table 6.2: Land Use Summary

Land Use Type	Existing Site Areas		Proposed Site Areas	
	ha	%	ha	%
Impermeable Areas	0.39	34	0.58	37
Green Landscape / Permeable areas	1.17	66	0.99	63
Total	**1.56**	**100**	**1.56**	**100**

Climate Change Allowances

6.11 The influence of climate change on rivers and watercourses is likely to increase the frequency of flood events and the overall volume of water that passes the site. When considering surface water runoff from the site, the increase in peak rainfall intensity varies over the lifetime of the development. Where residential developments with a lifetime beyond the 2070s are proposed, the Flood Risk Assessments: Climate Change Allowances Guidance requires the use of the Upper-End Allowance for the 2070s epoch (2061 to 2125). However, in some locations, the allowance for the 2050s epoch is higher than that for the 2070s epoch. If

the 2050s epoch is higher than that for the 2070s epoch then the higher of the two allowances should be applied.

6.12 For the Medway Management Catchment, the 2050s epoch is higher than that for the 2070s for the 1%AEP and as such a 45% allowance will be applied with the design, see Table 6.3.

Table 6.3: Peak Rainfall intensity allowance in small and urban catchments from the Flood Risk Assessments: Climate Change Allowances Guidance

	Total potential change anticipated for the '2050s' (2022 to 2060)		Total potential change anticipated for the '2070s' (2061 to 2125)	
Annual Exceedance Probability	Central	Upper End	Central	Upper End
3.3 % AEP	20%	35%	20%	35%
1 % AEP	20%	45%	20%	40%

Urban Creep Allowances

6.13 Urban creep is the conversion of permeable surfaces to impermeable ones over time, e.g., extensions to existing buildings. It has been shown that, over the lifetime of development, urban creep can increase impermeable areas by as much as 10%. An allowance of 10% for increases in the impermeable area due to urban creep over the lifetime of the development will be included in the drainage calculations and the total calculated impermeable area will be 0.64ha based on a 10% increase to proposed values, this value does not include urban creep for the school area, community area and care home.

Discharge Rate

6.14 Existing runoff conditions have been calculated using the Modified Rational Method to calculate the Brownfield discharge rate. For the existing impermeable area of 0.39ha, the peak discharge rate has been calculated as 48.8l/s based on a rainfall intensity of 50mm/hr.

6.15 Greenfield runoff conditions have been calculated using the FEH module within Causeway Flow. For the proposed impermeable area of 0.58ha, the peak discharge rate has been calculated as 0.3l/s. As this is a low rate that could cause blockages in the system, surface water flows will discharge at a controlled rate of 2.0l/s. This is a 95% betterment of the Brownfield Discharge Rate.

Drainage Strategy

6.16 The overall drainage strategy has been based on the land use table, discharge rates and an illustrative framework plan presented in **Appendix B.** In accordance with the National SuDS Standards, the strategy involves conveying surface water flows to multiple geo-cellular tanks and an attenuation basin before discharging to the existing culvert to the north.

6.17 The proposed drainage strategy is shown on drawing 29524_01_230_01a in **Appendix I** and supporting calculations can be found in **Appendix J**.

6.18 Storage on site has been divided into three geo-cellular tanks and an attenuation basin; the storage requirements are broken down below.

Geo-Cellular Tank 1

6.19 Surface water flows for an impermeable area of 0.14ha (including urban creep) will be conveyed to the proposed geo-cellular tank 1 on site. A maximum storage volume of 87.21m^3 is required within the geo-cellular tank to allow sufficient for all surface water within the tank to discharge at a maximum rate of 2.0l/s and cater for all events up to and including the 1%AEP45CC event.

Geo-Cellular Tank 2

6.20 Surface water flows for an impermeable area of 0.06ha (including urban creep) will be conveyed to the proposed geo-cellular tank 2 on site. A maximum storage volume of 68.25m^3 is required within the geo-cellular tanks to allow sufficient for all surface water within the tank to discharge at a maximum rate of 2.0l/s and cater for all events up to and including the 1%AEP45CC event.

Geo-Cellular Tank 3

6.21 Surface water flows for an impermeable area of 0.06ha (including urban creep) will be conveyed to the proposed geo-cellular tank 3 on site. A maximum storage volume of 28.92m^3 is required within the geo-cellular tank to allow sufficient for all surface water within the tank to discharge at a maximum rate of 2.0l/s and cater for all events up to and including the 1%AEP45CC event.

Attenuation Basin

6.22 Surface water flows for an impermeable area of 0.38ha (including urban creep) and flows from geo-cellular tanks 1, 2 and 3 will be conveyed to the proposed attenuation basin on site. A maximum storage volume of 589.88m^3 is required within the attenuation basin to allow sufficient for all surface water within the tank to discharge at a maximum rate of 2.0l/s and cater for all events up to and including the 1%AEP45CC event.

6.23 A total storage volume of 774.26m^3 will be available within the proposed attenuation features to manage flows generated for all events up to and including the 1%AEP45CC event, see table 6.4 for a breakdown of the drainage features.

Table 6.4: Drainage Features

Structures	Impermeable Area (plus urban creep)	Proposed Discharge Rate	Max Storage Requirements (1%AEP+45CC)
Geo-Cellular Tank 1	0.14ha	2.0l/s	87.21m^3
Geo-Cellular Tank 2	0.06ha	2.0l/s	68.25m^3
Geo-Cellular Tank 3	0.06ha	2.0l/s into the attenuation basin	28.92m^3
Attenuation Basin	0.38ha plus flows from geo-cellular tanks 1, 2 and 3	2.0l/s	589.88m^3
Total	**0.64ha**	**2.0l/s**	**774.26m^3**

Applicable SuDS Techniques

6.24 The National Standards for Sustainable Drainage Systems that deal with SuDS cover a whole range of sustainable approaches to surface water drainage management including:

- source control measures including rainwater recycling and drainage;
- filter strips and swales, which are vegetated features that hold and drain water downhill mimicking natural drainage patterns;
- filter drains and porous pavements to allow rainwater and run-off to infiltrate into permeable material below ground and provide storage if needed; and
- basins and ponds to hold excess water after rain and allow controlled discharge that avoids flooding.

6.25 Each of the five SuDS considerations listed above is discussed below in Table 6.5, with reference to their suitability for the proposed development.

Table 6.5: Suitability of SuDS techniques

	COMPONENT	SUITABILITY	REASON
Source Control	Rainwater Harvesting	Yes	Water butts could be used to store run-off from roofs before discharge into the drainage system. Any storage is not to be included in calculations.
	Green Roofs	No	This would not be appropriate given the scope and scale of the development.
	Bio-retention Systems/ Rain Gardens	Yes	Rain Gardens could be used as standalone SuDS across the site but offer limited attenuation capacity. Therefore, they have not been included within the drainage strategy at this stage.
Proprietary Systems	Proprietary bio-retention systems	No	More appropriate SuDS features can be accommodated within the development and are preferred.
Infiltration Devices	Permeable Paving	Yes	Permeable paving is suitable for the proposed development within parking spaces.
	Infiltration trenches/ Soakaways	No	Soakage testing proved that infiltration was not feasible.
Filtration	Open Swales, Filter Strips/ Drains	Yes	Multiple swales will be used to convey surface water flows across the site.
Retention/ Detention	Detention Basin, Attenuation Pond/ Tanks	Yes	The proposed attenuation basin and geo-cellular tanks will provide surface water storage prior to discharge from the site.

Surface Water Quality

6.26 The SuDS Manual CIRIA document C753, indicates the minimum treatment indices appropriate for contributing pollution hazards for different land use classifications. To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant) that equals or exceeds the pollution hazard index.

6.27 When using more than one SuDS component in series, the mitigation indices are multiplied by a factor of 0.5. This is to account for the reduced performance of secondary or tertiary components associated with the already reduced inflow concentrations. The SuDS Mitigation Index from the additional components will be added together up to a maximum value of 0.95, regardless of components in series.

6.28 Surface water runoff from residential roofs will have a very low pollution hazard level, while the residential parking areas will have a low pollution hazard level, and all other traffic will have a medium pollution hazard level. The exact pollution hazard levels are shown in Table 6.6.

Table 6.6: SuDS Mitigation Indices (from CIRIA SuDS Manual)

SuDS Component	Mitigation Indices		
	Total Suspended Solids	***Metal***	***Hydrocarbons***
Residential Roofs	0.2	0.2	0.05
Individual property driveways, residential car parks and low traffic roads.	0.5	0.4	0.4
Permeable Paving	0.7	0.6	0.7
Attenuation Basin	0.5	0.5	0.6
SuDS Mitigation Index	**0.85**	**0.8**	**0.95**
Mitigation Requirement Met?	**Yes**	**Yes**	**Yes**

6.29 For the very low to low pollution hazard levels generated at the site, the proposed attenuation basin and permeable paving would provide sufficient treatment in accordance with the Simple Index Approach.

Exceedance and Flow Routing

6.30 The risk of overland flooding from adjacent land to dwellings is very low. The design of levels and features on the site will follow best practice by ensuring any overland flow on the site is routed safely away from dwellings and to areas of lowest risk on site. Any surcharging and subsequent flooding of sewers on or in the vicinity of the site will also be mitigated by the flood routing described above. As such the risk of flooding on site from exceedance events and flood flow routes is very low.

Maintenance and Management

6.31 An integrated approach to the maintenance and management of SuDS systems is a requirement of the NPPF and by the Flood & Water Management Act 2010. The aim of a maintenance and management plan is to ensure that there is a clear understanding of drainage responsibilities and that a maintenance regime is implemented for all new drainage systems for the lifetime of the development, so they can continue to function as required.

6.32 The surface water drainage network is to be offered for adoption. The attenuation basins and geo-cellular tanks are likely to remain within private ownership and under a management company. However, this will be considered further at the detailed design stage.

6.33 All private drainage systems, including the SuDS features, will be maintained by landowners or by an appointed management company.

6.34 A proposed maintenance schedule which breaks down the maintenance requirements of the various proposed assets is shown in **Appendix K**.

7.0 FOUL WATER STRATEGY

7.1 According to The Building Regulations (2010), foul water drainage from new developments should be discharged into the following in order of priority:

- A public sewer, or;
- A private sewer communicating with a public sewer, or;
- A septic tank which has an appropriate form of secondary treatment, or;
- A cesspool.

7.2 Sewer records and a Developer Enquiry have been obtained from SW see **Appendix E**. The records show the presence of a 175mm foul sewer located to the south of the site along Chalk Road; there is a further 100mm foul sewer to the east of the site. There is an existing pumping station located along the southwestern boundary of the site that has a foul rising main leaving to the south.

7.3 Given the levels on site, it is proposed that foul water flows generated on site will have to be pumped first to allow for a gravity connection to be made. It is proposed and has been agreed with Southern Water that foul flows generated on site will discharge into the existing foul sewer along Chalk Road at MH1902. Southern Water has confirmed that improvement works, funded by infrastructure charges, will be required to accommodate the flows at 0.36l/s.

7.4 The proposed foul water drainage can be seen on drawing 29524_01_230_01a in **Appendix J**.

8.0 CONCLUSION AND SUMMARY

8.1 MEC has been commissioned by Richborough to undertake a Flood Risk Assessment for a proposed development on Chalk Road, Higham. This assessment has been undertaken to ascertain the constraints of the development to the site and to assess the impact of the design, with respect to flood risk.

- The Environment Agency Flood Map for Planning shows most of the site is located within FZ1, with the north of the site located in FZ2 and FZ3. It should be noted that the Flood Map for Planning does not consider the effect of flood defences on flood risk.
- The site is shown to be in an area mapped to be at a reduced risk of flooding due to flood defences. The site is protected by natural high ground (ID 72621), which is not considered part of the flood map for planning. While the EA Flood Map for Planning does not consider the effect of flood defences on flood risk, the EA have produced the Risk of Flooding from Rivers and Seas datasets, which does consider the impact of flood defences on flood risk. The Risk of Flooding from Rivers and Seas mapping shows the site to be at very low risk of flooding when the defence is considered.
- Product 6 Data was acquired from the Environment Agency. The Product 6 information shows that during a tidal event and with the defences in place, the site is not at risk from the 1 in 200 year event and the 1 in 1000 year event. Given the above, the site is at low risk of tidal flooding.
- The Environment Agency Flood Risk from Surface Water Map indicates the site to be mostly at low risk from surface water flooding. The map shows three areas within the site at low to high risk of surface water flooding, along the northern boundary, within the northern central area, over the existing pond on-site and within the western edge where the existing farm buildings are located.
- The modelled flood depths indicate that the areas located by the existing pond and buildings to the southwest have a high risk of surface water levels reaching up to 0.2m and 0.3m depth on site. While the area of the existing pond has a high risk for surface water flood depths reaching 0.6m.
- A large proportion of the surface water flows noted on site are generated by the site itself and therefore the areas at risk from surface water will be managed with by the proposed on-site drainage system post development.
- During soakage testing undertaken by MEC in April 2025 groundwater was encountered in two trial pits. Groundwater seepages were encountered at depths of 1.80m bgl and 2.00m bgl in the northeastern corner of the site
- All other sources of flooding is considered low.
- All drainage features will be lined with impermeable membranes to stop groundwater ingress.
- An existing culvert to the north of the site was discovered during on-site visits. A CCTV survey has been issued to confirm the connectivity of the culvert. Once complete this report will be updated.
- Greenfield runoff conditions have been calculated using the FEH module within Causeway Flow. For the proposed impermeable area of 0.58ha, the peak discharge rate has been calculated as 0.3l/s. As this is a low rate that could cause blockages in the system, surface water flows will discharge at a controlled rate of 2.0l/s. This is a 95% betterment of the Brownfield Discharge Rate.
- In accordance with the National SuDS Standards, the strategy involves conveying surface water flows to multiple geo-cellular tanks and an attenuation basin before discharging to the existing culvert to the north.
- A total storage volume of 774.26m^3 will be available within the proposed attenuation features to manage flows generated for all events up to and including the 1%AEP45CC event.

- Additional drainage features including rain gardens and permeable paving will be used across the site and will provide extra storage on site and will act as a first treatment stage for any run-off and will ensure adequate surface water treatment is provided.
- Given the levels on site, it is proposed that foul water flows generated on site will have to be pumped first to allow for a gravity connection to be made. It is proposed and has been agreed with Southern Water that foul flows generated on site will discharge into the existing foul sewer along Chalk Road at MH1902.

8.2 With the above measures in place, the development of the site will not create any flood risk issues to the wider area.

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APPENDICES

APPENDIX A

NOTES

No dimensions should be scaled during construction and any missing dimensions required should be requested and confirmed before proceeding. All dimensions must be checked on site and agreed with the client prior to construction.

The scale bar provided is for use so that the drawings can be Scaled during the planning application process.

0 50

Scale bar 50mm at 1:1

SITE BOUNDARY

A 18.07.2025 RLB UPDATED TO INCL VIS SPLAYS. KB

Project

LAND OFF CHALK ROAD
LOWER HIGHAM
GRAVESHAM

Title

LOCATION PLAN

Scale	Date
1:1250 @A3	APRIL 2025
Drawn	Checked
JT	MB

Drawing Number 8990/P100

Revision A

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APPENDICES

APPENDIX B

NORTH

SP

MP 28.25

Atlantis

7.3m

Cuckold's Corner

Michele Cottages

Avonlea

8.5m

Haselden Cottages

Orchard View

Whitebread House

Cherrydene

The Hedgerows

16

9

NOTES

This drawing to be read in accordance with the specification/Bills of Quantities and related drawings. No Dimensions to be scaled from this drawing. All stated dimensions to be verified on site and the Architect notified of any discrepancies.

0 50

Scale bar 50mm at 1:1

KEY

- Site Boundary
- Railway line
- Proposed access/egress for all modes (subject to detailed design)
- Proposed location of SuDs/Attenuation features
- Proposed Green Amenity Space (including existing pond, children's play provision, footpaths, community orchard and drainage)
- Proposed Residential Development
- Proposed area for unallocated parking
- Focal space
- Recreational footpath
- Existing Trees
- Indicative proposed trees
- Proposed location for community orchard
- Proposed location for children's play

A 22.07.2025 MINOR AMENDMENTS FOLLOWING CLIENT COMMENTS. KB

Project

LAND OFF CHALK ROAD
LOWER HIGHAM
GRAVESHAM

Title

ILLUSTRATIVE DEVELOPMENT FRAMEWORK PLAN

Scale	Date
1:1000 @A3	JULY 2025
Drawn	Checked
KB	MB

Drawing Number	Revision
8990/P103	A

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APPENDICES

APPENDIX C

Ben Oyston
Sent via email

Flood and Water Management
Invicta House
Maidstone
Kent
ME14 1XX
Website: www.kent.gov.uk/flooding
Email: suds@kent.gov.uk
Tel: 03000 41 41 41
Our Ref: NON/2025/105762
Date: 8 July 2025

Application No: PRE APP

Location: Chalk Road, Higham, ME3 7JY

Proposal: Development comprising of up to 40 residential dwellings.

Thank you for your enquiry in relation to the above site.

We have reviewed our records that we hold for your site and we can provide you with the following information:

Site Conditions
The proposed development is located to the north of Chalk Road and is bounded on one side by the railway and by a field along the northwestern boundary. Parts of the site are located within Flood Zones 2 and 3 according to the gov.uk Flood Map for Planning, but this represents an undefended scenario. Mapping for flood risk from rivers and the sea with defences places the site outside of any mapped flood extent, as this area appears to benefit from defences against tidal flood risk.

The Risk of Flooding from Surface Water map suggests that parts of the site would be at risk of flooding from overland surface water flow originating off-site in the low chance (between 0.1% and 1% AEP) scenario. Medium chance or greater (>1% AEP) scenarios highlight some flooding extents, which may be associated with topographical low points or areas adjacent to existing buildings. A review of Google Earth imagery indicates that these areas flood regularly and to a significant extent.

Historic Flood Events
There are no reports of highway flooding occurring on Chalk Road local to the site occurring within the last 5 years.

Local Surface Water Features and Drainage Assets
As mentioned previously, it is unclear whether any existing surface water drainage infrastructure is present to serve the existing buildings on the site. A review of highway drainage records notes the presence of an assumed highway drain crossing the site and outfalling local to the pond or culvert. A copy of the sketch plan we hold is included in the mapped information attached to this letter.

It is considered that an existing culvert may be present outside the site boundary to the north, but we have no records to confirm the onward connectivity of any culverts present heading towards the local watercourses. There is also the possibility that this culvert may be blocked, which could explain the extent of flooding visible in Google Earth imagery. This also could be indicative of the ground having a low permeability.

Other Identified Flood Issues or Ground Conditions
British Geological Survey mapping indicates that the site is underlain by the Thanet Formation, with some areas of superficial Head Deposits. This geology generally offers low to moderate permeability. Given that the area is relatively low-lying, it is also likely that groundwater is relatively shallow.

A site-specific ground investigation will be essential for developing a drainage strategy, to assess the infiltration potential of the soils and identify the depth to the groundwater level. Ongoing groundwater level monitoring is strongly recommended to establish the highest seasonal groundwater level beneath the site.

Recommendations on Surface Water Management
New national standards for sustainable drainage systems (SuDS) were released by DEFRA on 19 June 2025. KCC is currently reviewing these standards for incorporation into a future update of its Drainage and Planning Policy Statement. In the interim, we strongly recommend referencing these standards during the development of the Drainage Strategy.

At present, it is proposed to utilise a controlled outflow towards an existing off-site culvert. However, given the considerable uncertainties and potential issues with flooding downstream, we would be unable to support discharge to the culvert as things stand. Additionally, we presume the asset is outside the applicant's control, and using this point as an outfall would require drainage to be installed outside the redline boundary of the development.

In line with the drainage hierarchy in Standard 1 of the latest technical standards, we recommend prioritising water reuse and source control features. These will be essential to promote infiltration of surface water close to the source where it cannot be reused.
As outlined above, infiltration constraints are likely, and site-specific ground investigation will be essential to inform the drainage strategy. It may be possible to maximise the use of permeable surfaces (e.g. permeable driveways, parking areas, etc.) to serve hard standings and roofs. These features can be used successfully in lower permeability soils while maintaining an unsaturated zone above the groundwater.

For other areas, shallow open infiltration features such as roadside swales and shallow infiltration basins may be suitable, subject to ground conditions. Combined with other source control features, it may be possible to manage all surface water within the site boundary, including interception of the first 5mm of rainfall (as noted in Standard 2 of the new national standards), while also providing water quality, amenity, and biodiversity benefits where suitably detailed.

Should infiltration not be viable for the discharge of all surface water generated by the development, it appears that an alternative outfall may not be feasible without further investigation and securing drainage rights in perpetuity.

We would also note that the existing drain present, assumed to be a highways drain, would need to be accommodated or diverted as part of the proposals for the development. It should be noted that it is an offence to alters, obstructs or interferes with a drain or barrier which has been constructed, laid or erected for the purposes of highway drainage without the consent of the highway authority, Kent County Council. In this instance, a connection to the highway drain would not be permitted, given the issues downstream.

We would also recommend contacting Network Rail and Environment Agency to determine if they have any records of culverts crossing the railway into the nearby canal, which is designated a 'main river'.

For modelling drainage systems, we recommend using a Cv value of 1 when modelling the impermeable area drained to the proposed SuDS. We also refer you to Table S3.1 – *Factors of Safety for Use in the Hydraulic Design of Infiltration Systems* (RP 156, CIRIA) when considering safety factors for sizing infiltration features.

Consideration must also be given to the management of overland flows originating off-site. Any flooding from off-site sources for the 1% AEP event should be managed on-site or safely routed through the site, ensuring that downstream risks are not increased compared to the pre-development scenario.

Climate Change Allowances
As of 10 May 2022, the Environment Agency's climate change allowances have been updated. This includes revisions to the *Peak Rainfall Intensity Allowances* used in applying climate change percentages to new drainage schemes.

The LLFA now seeks that the 'upper end' allowance is applied for both the 30-year (3.3%) and 100-year (1%) storm scenarios. The latest information and maps can be found at the following link:

https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

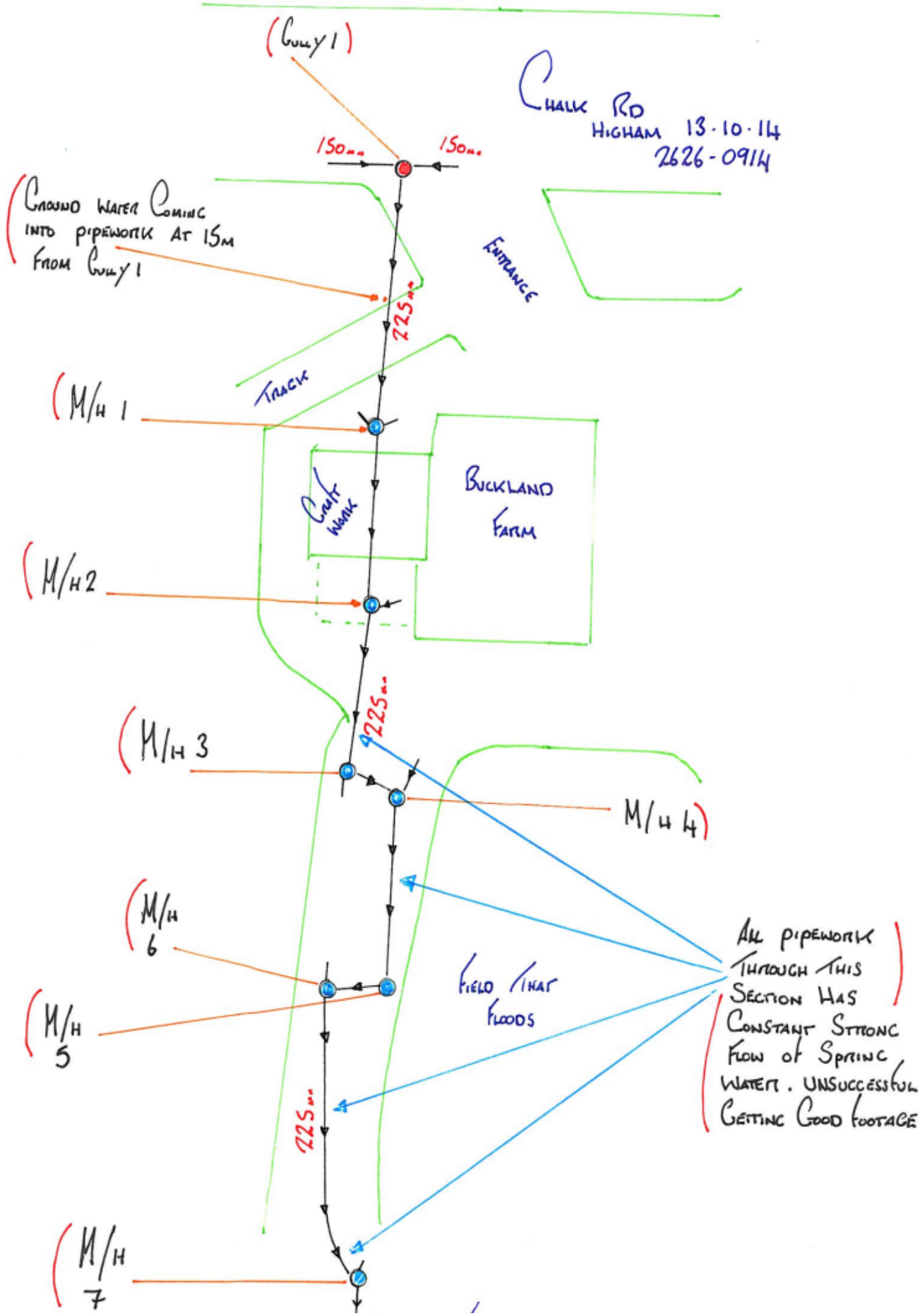
Please note that if the allowance for the 2050s epoch is higher than that for the 2070s epoch for the 100-year (1%) storm scenario, we would expect the higher of the two to be used for developments with a lifetime beyond 2061.

I trust this information assists with your enquiries.

Yours faithfully,

Alex Brauninger
Senior Flood Risk Officer
Flood and Water Management

Enc. Sketch map of highway drainage dated 13/10/2014


Gully 1
Chalk Rd
Higham 13·10·14
2626-0914
150mm
150mm
Ground water coming into pipework at 15m from Gully 1
225mm
Entrance
Track
M/H 1
Craft Work
Buckland Farm
M/H 2
225mm
M/H 3
M/H 4
M/H 6
M/H 5
Field that floods
All pipework through this section has constant strong flow of spring water. Unsuccessful getting good footage
225mm
M/H 7

Ben Oyston

From: SUDS@kent.gov.uk
Sent: 09 July 2025 16:46
To: Ben Oyston
Subject: RE: Response To Application Number PRE APP at Chalk Road, Higham, ME3 7JY

Dear Ben

Thanks for your email.

In terms of the location of the basin, given the location is defended, we would not raise concern as to the siting of the basin. Our primary concern would be with being able to secure an effective outfall for the development for its lifetime. If the culvert can be cleared by the responsible parties, and outfall to it secured in perpetuity of the development, then it may be an alternative.

Anecdotally it appears that flooding north of the site has been an issue for at least a decade or longer, but not sure to what degree this would be within your client's control to resolve. If you have commissioned surveys, then this may help with assessing the issue further and the viability of connection via culverts or watercourse.

For that reason, our response sought to promote an infiltration first approach. It appears you have already ruled out infiltration, or at least solely infiltration, but we would still recommend seeking opportunities for inception losses via inclusion of suitable SuDs devices to meet with the expected upcoming national standards which promote this further, accepting they may need overflow to a wider network.

Best Regards

Alex Brauninger | Senior Flood Risk Officer | Kent County Council | Invicta House, County Hall, Maidstone, ME14 XQ | Phone: 03000 41 81 81 | www.kent.gov.uk/flooding | @KCC_FWM

From: Ben Oyston <ben.oyston@m-ec.co.uk>
Sent: 09 July 2025 15:40
To: SUDS - GT <SUDS@kent.gov.uk>
Subject: RE: Response To Application Number PRE APP at Chalk Road, Higham, ME3 7JY

Hi Alex,

Thank you for sending this across.

I just had a couple of quick follow up questions if that is okay.

The first one is regarding the location of the proposed basin. The location of the basin I have sent across to you in the preliminary drainage strategy sketch shows part of the basin to lie within Flood Zone 2. Within your response you discuss the fact that the site is defended and under these defended conditions the site is outside an area of risk. With these parameters would that location of the basin be acceptable?

The second query is regarding the proposed outfall. Works have been instructed to understand the condition and connectivity of the culvert located to the north. If it is deemed that the culvert has connectivity and can be cleared, assuming land ownership is agreed too, would this be a viable outfall from your perspective? Soakage testing was undertaken on site and deemed soakage to not be a viable form of outfall.

Kind regards,

MEC
Consulting Group

APPENDICES

APPENDIX D

Level Datum:	O.S (G.P.S Verified)
Grid Orientation:	O.S (G.P.S Verified)

Station Information:

Station	Easting (m)	Northing (m)	Level (m)	Description
ST1	571142.255	173009.801	5.114	Nail
ST2	571106.234	172995.911	5.775	Nail
ST3	571115.190	172960.110	6.151	Nail
ST4	571136.712	172940.959	6.616	Nail
ST5	571153.236	172974.216	5.969	Nail
SJ1	571249.561	172931.923	7.596	Nail
SJ2	571291.890	172924.651	8.100	Nail
SJ3	571348.507	172857.105	9.911	Nail
SJ4	571407.630	172775.961	12.651	Nail
SJ5	571459.719	172710.564	12.360	Nail
SJ6	571452.261	172643.205	14.163	Nail

N

SURVEY NOTES

1. THIS PLAN SHOULD BE USED FOR ITS ORIGINAL PURPOSE ONLY. MEC CONSULTING GROUP ACCEPTS NO RESPONSIBILITY FOR ITS DRAWINGS IF THEY ARE SUPPLIED TO ANY OTHER PARTY OTHER THAN THE ORIGINAL CLIENT.
2. THE INFORMATION SHOWN HAS BEEN SURVEYED IN ACCORDANCE TO THE ACCURACY OUTLINED WITHIN THE ORIGINAL FEE QUOTATION.
3. BOUNDARIES SHOWN ARE PHYSICAL SITE FEATURES AND MAY NOT REPRESENT LEGALLY CONVEYED OWNERSHIP.
4. ALL FEATURES SHOWN WERE CURRENT AT THE TIME OF SURVEY. SOME FEATURES MAY HAVE BEEN MISSED OR OMITTED DUE TO ACCESS, PARKED VEHICLES, TEMPORARY STRUCTURES OR DENSE VEGETATION.
5. ALL GLOBAL NAVIGATION AND SATELLITE SYSTEM (GNSS) DETAIL AND REFERENCE STATIONS HAVE BEEN CAPTURED AND TRANSFORMED ONTO ORDNANCE SURVEY NATIONAL GRID AND DATUM OSGB35 USING THE O.S. ACTIVE NETWORK (OS NET) TRANSFORMATION AND GEOID MODEL OSTN15 & OSGM15.
6. THE LEVELS SHOWN ARE RELATIVE TO THE GNSS REFERENCE STATION LEVELS CAPTURED AT SURVEY CONTROL STATIONS.
7. ALL LEVELS ARE REPRESENTATIVE TO METRES ABOVE ORDNANCE DATUM.
8. PLEASE REFER TO THE SURVEY STATION TABLE TO ENABLE ESTABLISHMENT OF THE ON SITE GRID.
9. PLEASE NOTE THAT THE 3D TOPOGRAPHICAL SURVEY CAN BE ACCESSED BY TURNING ON 3D LAYERS VIA THE LAYER FILTER IN THE LAYER MANAGER.
10. REFERENCE GRID IS 20m X 20m.
11. ALL UNITS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
12. SURVEY SHOWN UNDERTAKEN BY MEC CONSULTING GROUP IN JULY 2025.
13. NOT ALL LEGEND DETAIL MAY BE APPLICABLE IN THIS DRAWING. IF ANY CLARIFICATION IS REQUIRED, PLEASE INFORM MEC CONSULTING GROUP.
14. PLEASE NOTE THE ADDITIONAL SCHOOL LANE TOPOGRAPHICAL SURVEY CAN BE VIEWED ON SHEET 8.

TOPOGRAPHICAL LEGEND

ABBREVIATIONS

BUILDING HEIGHTS:
E: EAVES LEVEL
F: FLAT ROOF LEVEL
R: RIDGE LEVEL

FENCE TYPES:
BWF BARBED WIRE
CLF CHAIN LINK
CPF CONCRETE PANEL
IRF IRON RAILING
MF METAL FENCE
PIF POST & IRON RAIL
PRF POST AND RAIL
PWF POST & WIRE
SPF STEEL PALISADE
WMF WIRE MESH FENCE
WPF WOOD PANEL FENCE

TREE/VEGETATION:
G TREE GIRTH (METRES)
MG MULTI GIRTH TREE
TC AVG TREE CANOPY
TCL: TREE CANOPY LEVEL
VL AVG VEG LEVEL

OTHER:
CRW CONCRETE RETAINING WALL
FFL FINISHED FLOOR LVL
GW GABION WALL
LBOX LETTER BOX
RW RETAINING WALL
SP SIGN POST
SRW STONE RETAINING WALL
STL STILE
THL THRESHOLD LEVEL
TRW TIMBER RETAINING WALL
TW TOP OF WALL LEVEL

UTILITIES:
AV AIR VALVE
BO BOLLARD
BT BRITISH TELECOM
BUS BUS STOP
CCTV CLOSED CIRCUIT CAMERA
CTV CABLE TELEVISION
DP DOWN PIPE
ER EARTH ROD
EP ELECTRIC POST
FH FIRE HYDRANT
FL FLOODLIGHT
GMK GAS MARKER POST
GV GAS VALVE
IB ILLUMINATED BOLLARD
JB JUNCTION BOX
LP LAMP POST
MKR MARKER POST
MW MONITORING WELL
PM PARKING METER
RE RODDING EYE
ST STOP TAP
SV SLUICE VALVE
TL TRAFFIC LIGHT
TP TELEGRAPH POST
VP VENT PIPE
WM WATER METER
WO WASH OUT
WSC WATER SERVICE COVER

WATERCOURSE:
B.L BED LEVEL
WL WATER LEVEL

DRAINAGE

250Ø PIPE DIAMETER (mm)
BG BACK GULLY
CL COVER LEVEL
DP DOWN PIPE
GY GULLY
IC INSPECTION CHAMBER
IL INVERT LEVEL
MH MANHOLE
SO SOFFIT LEVEL

SYMBOLS

SERVICE COVER
GATE
TREE/BUSH/SAPLING
BH BOREHOLE
TH TRIAL HOLE
P1 STAKEOUT
WOODLAND
VEGETATION
PLANTED FOREST

FEATURE LINES

BOTTOM OF BANK
BUILDING
CANOPY
CHANNEL
DROP KERB
EDGE OF TREES
EDGE OF VEG
FENCE
GATE
LINE MARKING
OVERHEAD LINES
PIPELINE
RIVER EMBANKMENT
ROOTLINE
STEPS
TOP OF BANK
TOP OF KERB
TRACK
VERGE
WALL
WATER LINE

STATIONS

100.000m STATION LEVEL
MEC1 STATION AND NAME

SURFACE KEY

BP BLOCK PAVING
CPS CONCRETE PAVING SLABS
TT TACTILE PAVING

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
D	HIGHWAY EXTENSION & SCHOOL LANE	DG	GS	AB	08.08.25
C	ADDITION OF NEWLY FOUND MANHOLES	GS	GS	AB	28.07.25
B	ADDITIONAL SURVEY EXTENTS ADDED	SJ	GS	AB	24.07.25
A	BUILDING VOLUMES ADDED	DG	GS	AB	23.04.25
–	FIRST ISSUE	SJ	DG	AB	04.04.25

PROJECT:
CHALK ROAD,
HIGHAM

DRAWING TITLE:
TOPOGRAPHICAL SURVEY
OVERVIEW

CLIENT:
RICHBOROUGH

DRAWING NUMBER: 29524_06_170_01

REVISION: D | SHEET SIZE: A0 | SCALE: NTS

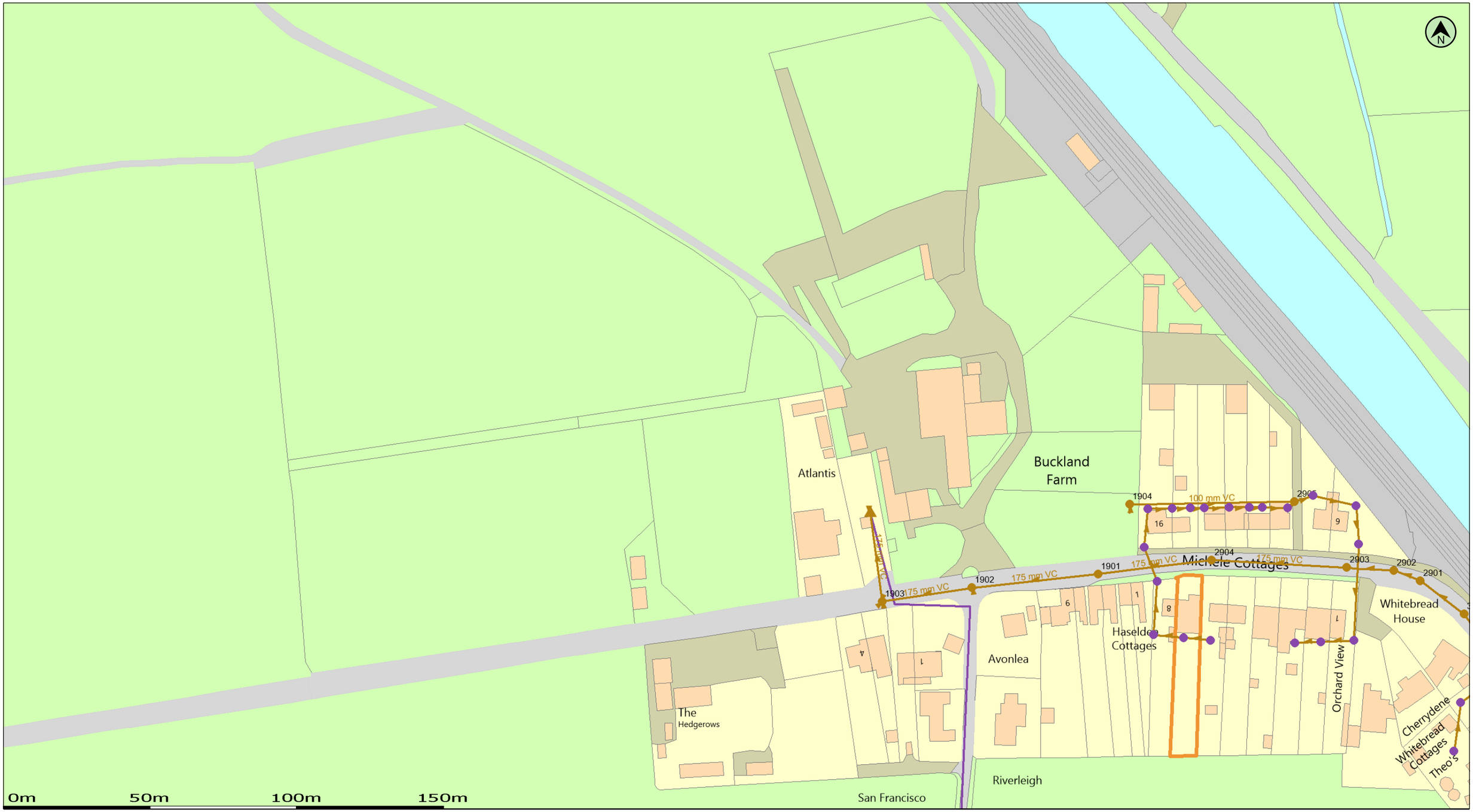
STATUS: FOR INFORMATION

MEC Consulting Group
Birmingham | Brighton | Leicester
Telephone: 01530 264 753
Email: group@m-ec.co.uk
Website: www.m-ec.co.uk

MEC
Consulting Group

APPENDICES

APPENDIX E



Date: 14/03/25

Scale: 1:1250

Map Centre: 571054,172983

Data updated: 26/02/25

Our Ref: 1716756 - 1

Wastewater Plan A3
Powered by digdat

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2025 Ordnance Survey AC0000808122 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Foul Gravity Sewer
Combined Gravity Sewer
Culverted Water Course or Treated Effluent
Surface Water Gravity Sewer
Rising Main, Vacuum or Syphon
Combined Outfall
Surface Water Outfall
Foul Outfall
Surface Water Inlet
Combined Pumping Station
Surface Water Pumping Station
Foul Pumping Station
WWTW Water Treatment Works
Section 104 Area
Building Over Agreement Area
Foul Manhole
Combined Manhole
Surface Water Manhole
Side Entry Manhole, Demarcation Chamber, Dummy Manhole or Surface Water Soakaway

emma.harris@m-ec.co.uk

29524

WATER for LIFE from Southern Water

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
1901	F	7.46	5.90	
1902	F	7.32	5.66	
1903	F	7.36	4.63	
1904	F	0.00	0.00	
2901	F	7.85	0.00	
2902	F	0.00	0.00	
2903	F	7.54	6.18	
2904	F	7.60	6.01	
2905	F	0.00	0.00	
3901	F	8.09	6.59	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

from Southern Water

Emma Harris
The Old Chapel
Hugglescote
Leicestershire
LE67 2GB

Your ref
19603

Our ref
DSA000041866

Date
31 March 2025

Contact
Tel 0330 303 0119

Dear Mrs Harris,

Level 1 Capacity Check Enquiry: Chalk Road, Higham, Gravesham, ME3 7JY.

We have completed the capacity check for the above development site and the results are as follows:

Foul Water

The enquiry has been reassessed to determine the capacity available for 0.36 l/s at manhole reference TQ71721902 (Grid Reference: 571134, 172921).

There is currently inadequate capacity within the foul sewerage network to accommodate a foul flow of 0.36 l/s for the above development at manhole reference TQ71721902. The proposed development would increase flows to the public sewerage system which may increase the risk of flooding to existing properties and land. Additional off-site sewers or improvements to existing sewers will be required to provide sufficient capacity to service the development. Southern Water has a duty to provide Network capacity from the point of practical connection (point of equivalent or larger diameter pipe) funded by the New Infrastructure Charge.

Southern Water aim to provide this within 24 months following the date that planning has been granted for developments not identified as strategic sites in our current business plan. Strategic sites are larger developments and will often take longer than 24 months for a full solution to be provided.

The nearest point where capacity is currently available is at Whitewall Creek WwTW. Rights are not issued for a direct connection to Wastewater Treatment Works (WTW). Please note that connection to the WTW will have to be agreed by Southern Water Services before being carried out.

New Infrastructure Charging

Please note as of 1st April 2018 we have moved to the “New Connections Services Charging Arrangements”. We understand that this may cause uncertainty for customers, particularly where they may have already committed to a development based on previous charging arrangements. We have worked with our stakeholders and Water UK to agree a set of principles by which we will base our charges. Please read through our new charging arrangement documents available at the following link: Connecting Charging Arrangements - Southern Water

Alternatively, New Appointees and Variations (NAVs), also known as ‘inset’ companies, can provide new connection services or take ownership of the new water and wastewater connection

infrastructure provided for a new development. NAVs are appointed by Ofwat and replace the regional water company. It is for the developer to choose whether to use a NAV or the regional water company to supply services for new sites, according to certain legal criteria.

Connecting to our network

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal Sewer Connection (S106) application is required to be completed and approved by Southern Water Services. To make an application visit: developerservices.southernwater.co.uk

Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

Please get in touch via the Get Connected customer dashboard if you have any queries.

Yours sincerely,

Future Growth Planning Team
Developer Services

southernwater.co.uk/developing-building/planning-your-development

MEC
Consulting Group

APPENDICES

APPENDIX F

Aquatech Drain Services Ltd
Holmbush Lane, Woodmancote
Tel. 01273 933705
contact@aquatechdrains.co.uk

WEB PROJECT
CLICK TO OPEN THIS PROJECT

Project

Project Name:	Chalk Road
Project Description:	CCTV Survey, Trace & Map
Project Status:	Complete
Project Date:	25/07/2025
Inspection Standard:	MSCC5 Sewers & Drainage GB (SRM5 Scoring)

AQUATECH
DRAIN SERVICES

Aquatech Drain Services Ltd
Holmbush Lane, Woodmancote
Tel. 01273 933705
contact@aquatechdrains.co.uk

Table of Contents

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Aquatech Drain Services Ltd
Holmbush Lane, Woodmancote
Tel. 01273 933705
contact@aquatechdrains.co.uk

Project Information

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Client

Company: MEC Consulting Group
Department: The Old Chapel
Street: Station Road
Town or City: Hugglescote
County: Leicestershire
Post Code: LE67 2GB
Phone: 01530 264753

Site

Street: Chalk Lane
Town or City: Higham
County: Kent
Post Code: ME3 7JY

Contractor

Company: Aquatech Drain Services Ltd
Description: Drainage Contracor
Contact: Connor
Street: Holmbush Lane
Town or City: Woodmancote
County: East Sussex
Post Code: BN5 9TL
Phone: 01273 933705
Email: contact@aquatechdrains.co.uk

Aquatech Drain Services Ltd
Holmbush Lane, Woodmancote
Tel. 01273 933705
contact@aquatechdrains.co.uk

Project Information

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Project Drawing, Page 'Chalk Road'

Aquatech Drain Services Ltd
Holmbush Lane, Woodmancote
Tel. 01273 933705
contact@aquatechdrains.co.uk

Scoring Summary

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Structural Defects

Grade 3: Best practice suggests consideration should be given to repairs in the medium term.

Grade 4: Best practice suggests consideration should be given to repairs to avoid a potential collapse.

Grade 5: Best practice suggests that this pipe is at risk of collapse at any time. Urgent consideration should be given to repairs to avoid total failure.

Item No.	PLR	Grade	Description
4	SW4X	3	Joint displaced, 5mm displacement, 5% - 10% of diameter

Service / Operational Condition

Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.

Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.

Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

Item No.	PLR	Grade	Description
4	SW4X	5	Multiple defects
5	SW5X	5	Roots, mass, 80% cross-sectional area loss
6	SW1AX	3	Multiple defects

Abandoned Surveys

Item No.	PLR	Description
2	SW2X	Survey abandoned
4	SW4X	Survey abandoned
5	SW5X	Survey abandoned

Information

These scoring summaries are based on the SRM grading from the WRc.

Aquatech Drain Services Ltd
Holmbush Lane, Woodmancote
Tel. 01273 933705
contact@aquatechdrains.co.uk

Project Pictures

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

SW1

SW3

SW4

SW5

Aquatech Drain Services Ltd
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Tel. 01273 933705
contact@aquatechdrains.co.uk

Project Summary

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Pipe Summary

No.	Type	PLR	Upstream Node	Downstream Node	Road	Town	Use	Mat.	Profile	Length
1	SEC	SW1X	SW1	SW2	Chalk Road	Higham	S	VC	Circular 225mm	3.00 m
2	SEC	SW2X	SW2	SW3	Chalk Road	Higham	S	VC	Circular 225mm	15.70 m
3	SEC	SW3X	SW3	SW4	Chalk Road	Higham	S	PVC	Circular 225mm	0.70 m
4	SEC	SW4X	SW4	SW5	Chalk Road	Higham	S	CO	Circular 225mm	23.50 m
5	SEC	SW5X	SW5	A	Chalk Road	Higham	S	CO	Circular 450mm	0.30 m
6	SEC	SW1AX	SW1A	SW1	Chalk Road	Higham	S	CO	Circular 225mm	28.80 m
									Total:	**72.00 m**

Pipe Levels

No.	PLR	Upstream Node	Upstream C.L.	Upstream I.L.	Upstream I.D.	Downstream Node	Downstream C.L.	Downstream I.L.	Downstream I.D.
1	SW1X	SW1			1.130 m	SW2			0.000 m
2	SW2X	SW2			0.000 m	SW3			1.240 m
3	SW3X	SW3			1.240 m	SW4			1.250 m
4	SW4X	SW4			1.250 m	SW5			1.250 m
5	SW5X	SW5			0.000 m	A			0.000 m
6	SW1AX	SW1A			0.000 m	SW1			1.130 m

Pipe Summary by Profile

Profile		Total Length	No. Pipes
Circular 225mm Circular 225mm Circular 225mm Circular 225mm Circular 225mm		3.00 m 15.70 m 0.70 m 23.50 m 28.80 m	
Circular 225mm	=	71.70 m	5
Circular 450mm		0.30 m	
Circular 450mm	=	0.30 m	1

Aquatech Drain Services Ltd
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Project Summary

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Profile		Total Length	No. Pipes
Total	**=**	**72.00 m**	**6**

Inspection Summary

Pipe No.	Insp. No.	Upstream Node	Downstream Node	Dir.	Operator	Insp. Date	Insp. Time	Str	Ser	Final Observation	Length
1	1	SW1	SW2	DS	Gg	16/07/2025	9:52	1	1	MHF, Buried	3.00 m
2	**1**	**SW2**	**SW3**	**US**	**Gg**	**16/07/2025**	**10:23**	**1**	**1**	**SA, Unable to proceed with crawler camera due to lose**	**15.70 m**
3	1	SW3	SW4	DS	Gg	16/07/2025	10:43	1	1	MHF	0.70 m
4	**1**	**SW4**	**SW5**	**DS**	**Gg**	**16/07/2025**	**14:42**	**3**	**5**	**SA, Unable to remove roots to proceed.**	**23.50 m**
5	**1**	**SW5**	**A**	**DS**	**Gg**	**25/07/2025**	**13:17**	**1**	**5**	**SA, Unable to remove roots to survey.**	**0.30 m**
6	1	SW1A	SW1	US	Gg	16/07/2025	15:12	1	3	MHF, No access.	28.80 m
										Total:	**72.00 m**

Inspection Summary by Profile

Profile		Total Length	No. Inspections
Circular 225mm		3.00 m	
Circular 225mm		15.70 m	
Circular 225mm		0.70 m	
Circular 225mm		23.50 m	
Circular 225mm		28.80 m	
Circular 225mm	=	71.70 m	5
Circular 450mm		0.30 m	
Circular 450mm	=	0.30 m	1
Total	**=**	**72.00 m**	**6**

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Project Summary

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Defect Summary

				CCTV Drainage Survey Observation Count																				
				General				Structural Condition									Service Condition						Misc	
Sect. No.	Insp. No.	Upstream Node	Downstream Node	Insp. Length (m)	No. Grade 4/5 Obs.	Survey Abandoned	Camera Under Water	Cracks	Fractures	Broken	Deformed	Collapsed	Holes	Surface Damage	Displaced Joints	Open Joints	Roots	Infiltration	Encrustation	Silt	Grease	Obstruction	Water Level	Line Deviates
1	1	SW1	SW2	3.0																			1	
2	**1**	**SW2**	**SW3**	**15.7**		**1**	**2**																**2**	
3	1	SW3	SW4	0.7																			1	
4	**1**	**SW4**	**SW5**	**23.5**	**3**	**1**									**1**		**8**			**2**		**1**	**2**	
5	**1**	**SW5**	**A**	**0.3**	**1**	**1**											**1**						**1**	
6	1	SW1A	SW1	28.8															16				1	
			Total:	**72.0**	**4**	**3**	**2**										**9**		**16**	**2**		**1**	**8**	

Aquatech Drain Services Ltd
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contact@aquatechdrains.co.uk

Cleaning Summary

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Pipe Summary

No.	Type	PLR	Upstream Node	Downstream Node	Road	Town	Use	Mat.	Profile	Length
1	SEC	SW1X	SW1	SW2	Chalk Road	Higham	S	VC	Circular 225mm	3.00 m
2	SEC	SW2X	SW2	SW3	Chalk Road	Higham	S	VC	Circular 225mm	15.70 m
3	SEC	SW3X	SW3	SW4	Chalk Road	Higham	S	PVC	Circular 225mm	0.70 m
4	SEC	SW4X	SW4	SW5	Chalk Road	Higham	S	CO	Circular 225mm	23.50 m
5	SEC	SW5X	SW5	A	Chalk Road	Higham	S	CO	Circular 450mm	0.30 m
6	SEC	SW1AX	SW1A	SW1	Chalk Road	Higham	S	CO	Circular 225mm	28.80 m
									Total:	**72.00 m**

Pipe Summary by Profile

Profile		Total Length	No. Pipes
Circular 225mm Circular 225mm Circular 225mm Circular 225mm Circular 225mm		3.00 m 15.70 m 0.70 m 23.50 m 28.80 m	
Circular 225mm	=	71.70 m	5
Circular 450mm		0.30 m	
Circular 450mm	=	0.30 m	1
Total	**=**	**72.00 m**	**6**

Cleaning Summary

Pipe No.	Cln. No.	Dir.	Operator	Cln. Date	Cln. Time	Method	Contamination	Scale	No. Clns	Complete	Comments	Cln. Length
1	1	DS	Gg	16/07/2025	9:52	Y				Yes		3.00 m
2	**1**	**US**	**Gg**	**16/07/2025**	**10:23**	**Y**				**No**		**15.70 m**
3	1	DS	Gg	16/07/2025	10:43	Y				Yes		0.70 m
4	**1**	**DS**	**Gg**	**16/07/2025**	**14:42**	**Y**				**No**		**23.50 m**
5	**1**	**DS**	**Gg**	**25/07/2025**	**13:17**	**Y**				**No**		**0.30 m**

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Cleaning Summary

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Pipe No.	Cln. No.	Dir.	Operator	Cln. Date	Cln. Time	Method	Contamination	Scale	No. Clns	Complete	Comments	Cln. Length
6	1	US	Gg	16/07/2025	15:12	Y				Yes		28.80 m
											Total:	**72.00 m**

Cleaning Summary by Profile

Profile		Total Length	No. Cleans
Circular 225mm Circular 225mm Circular 225mm Circular 225mm Circular 225mm		3.00 m 15.70 m 0.70 m 23.50 m 28.80 m	
Circular 225mm	=	71.70 m	5
Circular 450mm		0.30 m	
Circular 450mm	=	0.30 m	1
Total	**=**	**72.00 m**	**6**

Aquatech Drain Services Ltd
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Defect Grade Description (Section)

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

1:	Brick: Minor structural defects. Other: Minor structural defects, i.e. open or displaced joints without additional characteristics. **Acceptable structural condition.**
2:	Brick: Circumferential cracking. Single longitudinal crack. Surface mortar loss (depth missing < 15 mm). Surface damage - spalling slight (breaking away of small fragments from the surface). Surface damage - wear slight (increased roughness). Other: Circumferential cracking. Surface damage - spalling slight (breaking away of small fragments from the surface). Surface damage - wear slight (increased roughness). **Minimal collapse likelihood in the short term but potential for further deterioration.**
3:	Brick: Total mortar loss (depth missing > 50 mm) without other defects. More than one longitudinal crack (at a single location). Multiple cracking. Single bricks displaced. Deformation < 5%, no fracture and only moderate mortar loss. Surface damage - spalling medium (large areas of chipped brick). Surface damage - wear medium (entire surface of brick is missing). Other: Fracture with no deformation or deformation < 5%. Longitudinal cracking or multiple cracking. Minor loss of level. Severe joint defects i.e. Surface damage - spalling medium. Surface damage - wear medium. **Collapse unlikely in the near future but further deterioration likely.**
4:	Brick: Total mortar loss (depth missing > 50mm) with deformation > 10%; deformation up to 10% and fractured; displaced or hanging brickwork; small number of missing bricks; dropped invert (drop > 20mm); moderate loss of level; surface damage - large spalling (entire surface of brick is missing); surface damage - large wear (entire surface of brick is missing). Other: Broken; deformation up to 10% and broken; fracture with deformation 5-10%; multiple fractures; serious loss of level; serious joint defects with voids or soil visible (open joint with > 50mm soil or void visible or joint displacement > 25% of diameter); surface damage - entire area of pipe surface is missing or severly worn. **Collapse likely in the foreseeable future.**
5:	Brick: Already collapsed; missing Invert; deformation > 10% and fractured; displaced or hanging brickwork and deformation < 10%; extensive areas of missing brickwork. Other: Already collapsed; deformation > 10% and broken; extensive areas of pipe fabric missing; fractures with deformation > 10% **Collapsed or collapse imminent.**

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Section Profile - 16/07/2025 - SW1X

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Circular, 225 mm, 0 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
1	SW1	SW2	16/07/2025	Chalk Road	Vitrified clay	3.00 m	3.00 m
2	SW2	SW3	16/07/2025	Chalk Road	Vitrified clay	15.70 m	15.70 m
3	SW3	SW4	16/07/2025	Chalk Road	Polyvinyl chloride	0.70 m	0.70 m
4	SW4	SW5	16/07/2025	Chalk Road	Concrete	23.50 m	23.50 m
6	SW1A	SW1	16/07/2025	Chalk Road	Concrete	28.80 m	28.80 m

Total: 5 Inspections x Circular 225 mm, 0 mm = 71.70 m Total Length and 71.70 m Inspected Length

Circular, 450 mm, 0 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
5	SW5	A	25/07/2025	Chalk Road	Concrete	0.30 m	0.30 m

Total: 1 Inspection x Circular 450 mm, 0 mm = 0.30 m Total Length and 0.30 m Inspected Length

Total: 6 Inspections = 72.00 m Total Length and 72.00 m Inspected Length

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Section Summary

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

Number of sections	6
Total length of sections	72.00 m
Total length of inspected sections	72.00 m
Total length of not inspected sections	0.00 m
Number of abandoned inspections	3
Number of section inspection photos	39
Number of section inspection videos	5
Number of section inspection scans	0
Number of section inclination measurements	0

PLR:	SW1X	**Upstream Node:**	SW1
Inspection Direction:	Downstream	**Downstream Node:**	SW2
Inspected Length:	3.00 m	**Dia/Height:**	225 mm
Total Length:	3.00 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: SW1
2	0.00	WL	Water level, 0% of the vertical dimension
3	3.00	MHF	Finish node, manhole, reference: SW2

PLR:	SW2X	**Upstream Node:**	SW2
Inspection Direction:	Upstream	**Downstream Node:**	SW3
Inspected Length:	15.70 m	**Dia/Height:**	225 mm
Total Length:	15.70 m	**Material:**	Vitrified clay

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SW3
2	0.00	WL	Water level, 20% of the vertical dimension
3	7.00	WL	Water level, 25% of the vertical dimension
4	10.30	CUW	Loss of vision, camera under water, start
5	15.70	CUW	Loss of vision, camera under water, finish
6	15.70	SA	Survey abandoned

PLR:	SW3X	**Upstream Node:**	SW3
Inspection Direction:	Downstream	**Downstream Node:**	SW4
Inspected Length:	0.70 m	**Dia/Height:**	225 mm
Total Length:	0.70 m	**Material:**	Polyvinyl chloride

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SW3
2	0.00	WL	Water level, 10% of the vertical dimension

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Section Summary

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

No.	m+	Code	Observation
3	0.70	MHF	Finish node, manhole, reference: SW4

PLR:	SW4X	**Upstream Node:**	SW4
Inspection Direction:	Downstream	**Downstream Node:**	SW5
Inspected Length:	23.50 m	**Dia/Height:**	225 mm
Total Length:	23.50 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SW4
2	0.00	WL	Water level, 0% of the vertical dimension
3	1.70	JD	Joint displaced, 5mm displacement, 5% - 10% of diameter
4	15.10	RFJ	Roots, fine at joint
5	16.30	RFJ	Roots, fine at joint
6	17.90	RMJ	Roots, mass at joint, 10% cross-sectional area loss
7	18.90	RMJ	Roots, mass at joint, 10% cross-sectional area loss
8	19.30	DES	Settled deposits, fine, 10% cross-sectional area loss, start
9	19.90	DES	Settled deposits, fine, 10% cross-sectional area loss, finish
10	20.50	RMJ	Roots, mass at joint, 30% cross-sectional area loss
11	21.60	OBX	Other obstacles, other object in invert from 3 o'clock to 9 o'clock, 30% cross-sectional area loss
12	21.80	RMJ	Roots, mass at joint, 10% cross-sectional area loss
13	21.90	WL	Water level, 10% of the vertical dimension
14	22.50	RFJ	Roots, fine at joint
15	23.50	RMJ	Roots, mass at joint, 90% cross-sectional area loss
16	23.50	SA	Survey abandoned

PLR:	SW5X	**Upstream Node:**	SW5
Inspection Direction:	Downstream	**Downstream Node:**	A
Inspected Length:	0.30 m	**Dia/Height:**	450 mm
Total Length:	0.30 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	MH	Start node, manhole, reference: SW5
2	0.00	WL	Water level, 0% of the vertical dimension
3	0.30	RM	Roots, mass, 80% cross-sectional area loss
4	0.30	SA	Survey abandoned

PLR:	SW1AX	**Upstream Node:**	SW1A
Inspection Direction:	Upstream	**Downstream Node:**	SW1
Inspected Length:	28.80 m	**Dia/Height:**	225 mm
Total Length:	28.80 m	**Material:**	Concrete

No.	m+	Code	Observation
1	0.00	CP	Start node, catchpit, reference: SW1
2	0.00	WL	Water level, 0% of the vertical dimension
3	0.50	DEEJ	Attached deposits, encrustation at joint from 2 o'clock to 10 o'clock, 5% cross-sectional area loss
4	1.40	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 10% cross-sectional area loss
5	2.40	DEEJ	Attached deposits, encrustation at joint from 3 o'clock to 10 o'clock, 10% cross-sectional area loss
6	3.10	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 10% cross-sectional area loss

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Section Summary

Project Name	Project Number	Project Date
Chalk Road		25/07/2025

No.	m+	Code	Observation
7	4.00	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 15% cross-sectional area loss
8	4.80	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 10% cross-sectional area loss
9	5.90	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 20% cross-sectional area loss
10	6.70	DEEJ	Attached deposits, encrustation at joint from 2 o'clock to 10 o'clock, 5% cross-sectional area loss
11	7.50	DEEJ	Attached deposits, encrustation at joint from 2 o'clock to 6 o'clock, 10% cross-sectional area loss
12	12.80	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 5% cross-sectional area loss
13	13.60	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 10% cross-sectional area loss
14	14.80	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 5% cross-sectional area loss
15	15.60	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 15% cross-sectional area loss
16	16.50	DEEJ	Attached deposits, encrustation at joint from 6 o'clock to 10 o'clock, 5% cross-sectional area loss
17	19.90	DEEJ	Attached deposits, encrustation at joint from 6 o'clock to 10 o'clock, 5% cross-sectional area loss
18	23.20	DEEJ	Attached deposits, encrustation at joint from 2 o'clock to 6 o'clock, 10% cross-sectional area loss
19	28.80	MHF	Finish node, manhole, reference: SW1A

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Completed section inspection

WEB PROJECT CLICK TO OPEN THIS SECTION

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
1	1	16/07/25	9:52	Not Specified	No Rain Or Snow	Yes	SW1X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
GG	MJ74 TOU	Pearpoint P333	Not Specified	Highways Drainage	Not Specified

Town or Village:	Higham	**Inspection Direction:**	Downstream	**Upstream Node:**	SW1
Road:	Chalk Road	**Inspected Length:**	3.00 m	**Upstream Pipe Depth:**	1.130 m
Location:	Fields, farmland etc	**Total Length:**	3.00 m	**Downstream Node:**	SW2
Surface Type:	Gravel	**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Routine inspection	**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:50

Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	CP	Start node, catchpit, reference: SW1	00:00:00		
0.00	WL	Water level, 0% of the vertical dimension	00:00:03		
3.00	MHF	Finish node, manhole, reference: SW2: Buried	00:00:44		

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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Section Pictures - 16/07/2025 - SW1X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
1	Downstream	SW1X		

SW1X_0855b435-6cff-4ebe-9a31-8e6177e215a8_20250725_125305_287.jpg, 00:00:03, 0.00 m
Water level, 0% of the vertical dimension

SW1X_81faa2e2-a65e-488f-b42d-fb6c0e98a586_20250725_125400_388.jpg, 00:00:44, 3.00 m
Finish node, manhole, reference: SW2, Buried

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Abandoned section inspection

WEB PROJECT CLICK TO OPEN THIS SECTION

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
2	1	16/07/25	10:23	Not Specified	No Rain Or Snow	Yes	SW2X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
GG	MJ74 TOU	Pearpoint P333	Not Specified	Highways Drainage	Not Specified

Town or Village:	Higham	**Inspection Direction:**	Upstream	**Upstream Node:**	SW2
Road:	Chalk Road	**Inspected Length:**	15.70 m	**Upstream Pipe Depth:**	
Location:	Fields, farmland etc	**Total Length:**	15.70 m	**Downstream Node:**	SW3
Surface Type:	Gravel	**Joint Length:**		**Downstream Pipe Depth:**	1.240 m

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Vitrified clay
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Routine inspection	**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:136

Position [m]		Code	Observation	MPEG	Photo	Grade
0.00		MH	Start node, manhole, reference: SW3	00:00:00		
0.00		WL	Water level, 20% of the vertical dimension	00:00:02		
7.00		WL	Water level, 25% of the vertical dimension	00:01:30		
10.30	S02	CUW	Loss of vision, camera under water, start	00:02:19		
15.70	F02	CUW	Loss of vision, camera under water, finish	00:02:57		
15.70		SA	Survey abandoned: Unable to proceed with crawler camera due to lose of vision.	00:02:57		

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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Section Pictures - 16/07/2025 - SW2X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
2	Upstream	SW2X		

SW2X_2dd868ed-2634-4f6c-b619-9d7eee09f9cd_20250725_125450_740.jpg, 00:00:02, 0.00 m
Water level, 20% of the vertical dimension

SW2X_06134f88-0cfb-48ce-86b8-16c43289cae0_20250725_125627_995.jpg, 00:01:30, 7.00 m
Water level, 25% of the vertical dimension

SW2X_ab64c2b8-7e04-4511-a04c-7b33e26424b5_20250725_125805_885.jpg, 00:02:19, 10.30 m
Loss of vision, camera under water, start

SW2X_c881d720-2966-4b77-a816-d1c63ea308b2_20250725_125944_450.jpg, 00:02:57, 15.70 m
Survey abandoned, Unable to proceed with crawler camera

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Completed section inspection

WEB PROJECT CLICK TO OPEN THIS SECTION

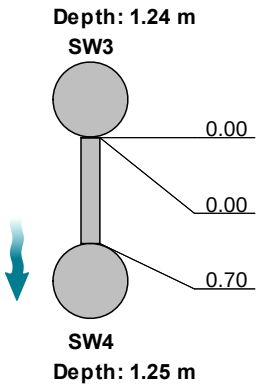
Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
3	1	16/07/25	10:43	Not Specified	No Rain Or Snow	Yes	SW3X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
GG	MJ74 TOU	Pearpoint P333	Not Specified	Highways Drainage	Not Specified

Town or Village:	Higham	**Inspection Direction:**	Downstream	**Upstream Node:**	SW3
Road:	Chalk Road	**Inspected Length:**	0.70 m	**Upstream Pipe Depth:**	1.240 m
Location:	Fields, farmland etc	**Total Length:**	0.70 m	**Downstream Node:**	SW4
Surface Type:	Gravel	**Joint Length:**		**Downstream Pipe Depth:**	1.250 m

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Polyvinyl chloride
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Routine inspection	**Lining Material:**	No Lining

Comments:
Recommendations:



Scale: 1:50 Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	MH	Start node, manhole, reference: SW3	00:00:00		
0.00	WL	Water level, 10% of the vertical dimension	00:00:02		
0.70	MHF	Finish node, manhole, reference: SW4	00:00:38		

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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Section Pictures - 16/07/2025 - SW3X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
3	Downstream	SW3X		

SW3X_bf7640f8-40f4-46dc-b646-70954f421e66_20250725_130109_255.jpg, 00:00:02, 0.00 m
Water level, 10% of the vertical dimension

SW3X_10ca92eb-3f92-4d79-bb41-39ab0d5f036b_20250725_130157_576.jpg, 00:00:38, 0.70 m
Finish node, manhole, reference: SW4

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Abandoned section inspection

WEB PROJECT CLICK TO OPEN THIS SECTION

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
4	1	16/07/25	14:42	Not Specified	No Rain Or Snow	Yes	SW4X

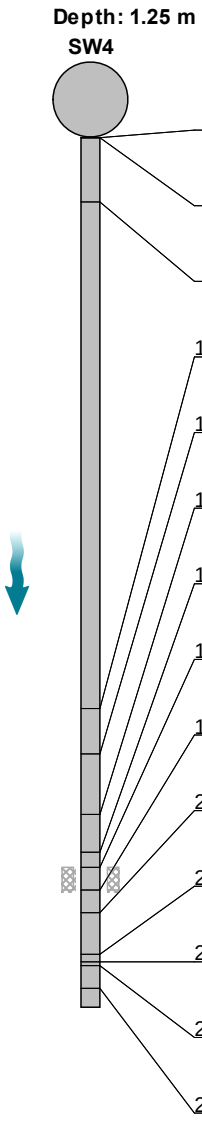
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
GG	MJ74 TOU	Pearpoint P333	Not Specified	Highways Drainage	Not Specified

Town or Village:	Higham	**Inspection Direction:**	Downstream	**Upstream Node:**	SW4
Road:	Chalk Road	**Inspected Length:**	23.50 m	**Upstream Pipe Depth:**	1.250 m
Location:	Fields, farmland etc	**Total Length:**	23.50 m	**Downstream Node:**	SW5
Surface Type:	Gravel	**Joint Length:**		**Downstream Pipe Depth:**	1.250 m

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Routine inspection	**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:200



Position [m]		Code	Observation	MPEG	Photo	Grade
0.00		MH	Start node, manhole, reference: SW4	00:00:00		
0.00		WL	Water level, 0% of the vertical dimension	00:00:00		
1.70		JD	Joint displaced, 5mm displacement, 5% - 10% of diameter	00:00:19		3 / 3
15.10		RFJ	Roots, fine at joint	00:02:30		2
16.30		RFJ	Roots, fine at joint	00:02:44		2
17.90		RMJ	Roots, mass at joint, 10% cross-sectional area loss	00:02:58		3
18.90		RMJ	Roots, mass at joint, 10% cross-sectional area loss	00:03:08		3
19.30	S01	DES	Settled deposits, fine, 10% cross-sectional area loss, start	00:03:16		
19.90	F01	DES	Settled deposits, fine, 10% cross-sectional area loss, finish	00:04:44		3
20.50		RMJ	Roots, mass at joint, 30% cross-sectional area loss	00:04:47		5
21.60		OBX	Other obstacles, other object in invert from 3 o'clock to 9 o'clock, 30% cross-sectional area loss: Bottle	00:05:03		5
21.80		RMJ	Roots, mass at joint, 10% cross-sectional area loss	00:05:12		3
21.90		WL	Water level, 10% of the vertical dimension	00:05:14		
22.50		RFJ	Roots, fine at joint	00:05:23		2

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Abandoned section inspection

WEB PROJECT
CLICK TO OPEN THIS SECTION

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
4	1	16/07/25	14:42	Not Specified	No Rain Or Snow	Yes	SW4X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
GG	MJ74 TOU	Pearpoint P333	Not Specified	Highways Drainage	Not Specified

Scale: 1:200

Position [m]	Code	Observation	MPEG	Photo	Grade
23.50	RMJ	Roots, mass at joint, 90% cross-sectional area loss	00:05:39		5
23.50	SA	Survey abandoned: Unable to remove roots to proceed.	00:05:53		

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
1	40.0	1.7	40.0	3.0	11	20.0	2.6	61.0	5.0

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Section Pictures - 16/07/2025 - SW4X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
4	Downstream	SW4X		

SW4X_ce955ff4-5be9-4f94-b302-402b60b879a6_20250725_130507_233.jpg, 00:00:00, 0.00 m
Water level, 0% of the vertical dimension

SW4X_ca6f9206-c86e-412f-9611-c3b1676462bd_20250725_130535_541.jpg, 00:00:19, 1.70 m
Joint displaced, 5mm displacement, 5% - 10% of diameter

SW4X_f4d62431-5ee5-4893-a2da-e91bbe1cf3e2_20250725_130905_383.jpg, 00:02:30, 15.10 m
Roots, fine at joint

SW4X_ac5a04dc-91ee-4295-8dcd-cb64130294d6_20250725_130929_214.jpg, 00:02:44, 16.30 m
Roots, fine at joint

SW4X_a2754265-661c-482a-b8d5-c56cbf39fe06_20250725_130955_263.jpg, 00:02:58, 17.90 m
Roots, mass at joint, 10% cross-sectional area loss

SW4X_c9914e6f-c70a-4ee6-8c6b-75634d33c5db_20250725_131014_251.jpg, 00:03:08, 18.90 m
Roots, mass at joint, 10% cross-sectional area loss

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Section Pictures - 16/07/2025 - SW4X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
4	Downstream	SW4X		

SW4X_912faf42-13a5-4abb-a7af-21d6e609b3e6_20250725_131340_865.jpg, 00:04:44, 19.90 m
Settled deposits, fine, 10% cross-sectional area loss, finish

SW4X_9c8f3424-4aff-4de4-9b91-76d5d866e796_20250725_131414_802.jpg, 00:04:47, 20.50 m
Roots, mass at joint, 30% cross-sectional area loss

SW4X_4a979614-84cf-42ff-b27d-023b8439d9a4_20250725_131526_597.jpg, 00:05:03, 21.60 m
Other obstacles, other object in invert from 3 o'clock to 9

SW4X_c4eb77fc-b768-4756-b29b-c941eae37023_20250725_131606_852.jpg, 00:05:14, 21.90 m
Water level, 10% of the vertical dimension

SW4X_50947d19-cdbb-40ef-94bf-9614e49c9dab_20250725_131649_311.jpg, 00:05:39, 23.50 m
Roots, mass at joint, 90% cross-sectional area loss

SW4X_4b542ec1-e649-4268-be88-48eda2aea131_20250725_131723_581.jpg, 00:05:53, 23.50 m
Survey abandoned, Unable to remove roots to proceed.

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Abandoned section inspection

WEB PROJECT CLICK TO OPEN THIS SECTION

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
5	1	25/07/25	13:17	Not Specified	No Rain Or Snow	Yes	SW5X

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
GG	MJ74 TOU	Pearpoint P333	Not Specified	Highways Drainage	Not Specified

Town or Village:	Higham	**Inspection Direction:**	Downstream	**Upstream Node:**	SW5
Road:	Chalk Road	**Inspected Length:**	0.30 m	**Upstream Pipe Depth:**	
Location:	Fields, farmland etc	**Total Length:**	0.30 m	**Downstream Node:**	A
Surface Type:	Overgrown	**Joint Length:**		**Downstream Pipe Depth:**	

Use:	Surface water	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sewer	**Dia/Height:**	450 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Routine inspection	**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:50 Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m SW5					
0.00	MH	Start node, manhole, reference: SW5			
0.00	WL	Water level, 0% of the vertical dimension			
0.30	RM	Roots, mass, 80% cross-sectional area loss			5
0.30	SA	Survey abandoned: Unable to remove roots to survey.			

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	1	20.0	66.7	20.0	5.0

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Section Pictures - 25/07/2025 - SW5X

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
5	Downstream	SW5X		

SW5X_c50b7dfd-15bc-46f2-bff4-4b311e3f055a_20250725_132425.jpg, 0.30 m
Roots, mass, 80% cross-sectional area loss

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Completed section inspection

WEB PROJECT CLICK TO OPEN THIS SECTION

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
6	1	16/07/25	15:12	Not Specified	No Rain Or Snow	Yes	SW1AX

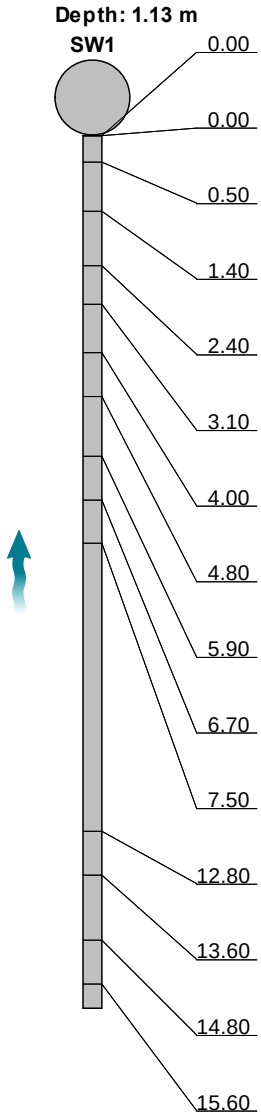
Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
GG	MJ74 TOU	Pearpoint P333	Not Specified	Highways Drainage	Not Specified

Town or Village:	Higham	**Inspection Direction:**	Upstream	**Upstream Node:**	SW1A
Road:	Chalk Road	**Inspected Length:**	28.80 m	**Upstream Pipe Depth:**	
Location:	Fields, farmland etc	**Total Length:**	28.80 m	**Downstream Node:**	SW1
Surface Type:	Gravel	**Joint Length:**		**Downstream Pipe Depth:**	1.130 m

Use:	Surface w ater	**Pipe Shape:**	Circular
Type of Pipe:	Gravity drain/sew er	**Dia/Height:**	225 mm
Flow Control:	No flow control	**Material:**	Concrete
Year Constructed:	Not Specified	**Lining Type:**	No Lining
Inspection Purpose:	Routine inspection	**Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:139 **Position [m]**



Position [m]	Code	Observation	MPEG	Photo	Grade
0.00	CP	Start node, catchpit, reference: SW1	00:00:00		
0.00	WL	Water level, 0% of the vertical dimension	00:00:00		
0.50	DEEJ	Attached deposits, encrustation at joint from 2 o'clock to 10 o'clock, 5% cross-sectional area loss	00:00:09		3
1.40	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 10% cross-sectional area loss	00:00:19		3
2.40	DEEJ	Attached deposits, encrustation at joint from 3 o'clock to 10 o'clock, 10% cross-sectional area loss	00:00:31		3
3.10	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 10% cross-sectional area loss	00:00:44		3
4.00	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 15% cross-sectional area loss	00:00:54		3
4.80	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 10% cross-sectional area loss	00:01:09		3
5.90	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 20% cross-sectional area loss	00:01:25		3
6.70	DEEJ	Attached deposits, encrustation at joint from 2 o'clock to 10 o'clock, 5% cross-sectional area loss	00:01:37		3
7.50	DEEJ	Attached deposits, encrustation at joint from 2 o'clock to 6 o'clock, 10% cross-sectional area loss	00:01:45		3
12.80	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 5% cross-sectional area loss	00:02:33		3
13.60	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 10% cross-sectional area loss	00:02:46		3
14.80	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 5% cross-sectional area loss	00:03:04		3
15.60	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 15% cross-sectional area loss	00:03:20		3

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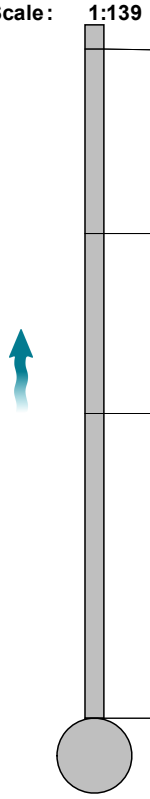
Completed section inspection

WEB PROJECT CLICK TO OPEN THIS SECTION

Item No.	Insp. No.	Date	Time	Client`s Job Ref	Weather	Pre Cleaned	PLR
6	1	16/07/25	15:12	Not Specified	No Rain Or Snow	Yes	SW1AX

Operator	Vehicle	Camera	Preset Length	Legal Status	Alternative ID
GG	MJ74 TOU	Pearpoint P333	Not Specified	Highways Drainage	Not Specified

Scale: 1:139



Position [m]	Code	Observation	MPEG	Photo	Grade
16.50	DEEJ	Attached deposits, encrustation at joint from 6 o'clock to 10 o'clock, 5% cross-sectional area loss	00:03:32		3
19.90	DEEJ	Attached deposits, encrustation at joint from 6 o'clock to 10 o'clock, 5% cross-sectional area loss	00:04:08		3
23.20	DEEJ	Attached deposits, encrustation at joint from 2 o'clock to 6 o'clock, 10% cross-sectional area loss	00:04:40		3
28.80	MHF	Finish node, manhole, reference: SW1A: No access.	00:05:52		

STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	16	2.0	1.1	32.0	3.0

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Section Pictures - 16/07/2025 - SW1AX

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
6	Upstream	SW1AX		

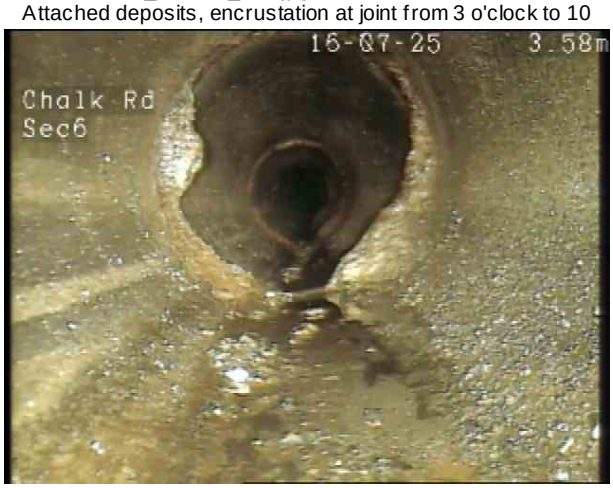
SW1AX_0cf915f7-7ec4-4db5-a4cc-a4781e8b27d2_20250725_132642_560.jpg, 00:00:00, 0.00 m
Water level, 0% of the vertical dimension

SW1AX_9eb4e2d5-8a46-406b-bfb7-429fa7d84ddd_20250725_132735_570.jpg, 00:00:09, 0.50 m
Attached deposits, encrustation at joint from 2 o'clock to 10

SW1AX_f4cfc597-a243-4a1d-af56-ecb7cdf0f259_20250725_132758_269.jpg, 00:00:19, 1.40 m
Attached deposits, encrustation at joint from 12 o'clock to 12

SW1AX_fdb3f9d8-27bb-48f3-9dce-ada41a5fc1a5_20250725_132823_531.jpg, 00:00:31, 2.40 m
Attached deposits, encrustation at joint from 3 o'clock to 10

SW1AX_c73c694e-add2-4a94-8c46-028ac5980726_20250725_132846_514.jpg, 00:00:44, 3.10 m
Attached deposits, encrustation at joint from 12 o'clock to 12



SW1AX_9fc44344-6ee2-4eb1-99c6-bb8b1bb80b1f_20250725_132908_245.jpg, 00:00:54, 4.00 m
Attached deposits, encrustation at joint from 12 o'clock to 12

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Section Pictures - 16/07/2025 - SW1AX

Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
6	Upstream	SW1AX		

SW1AX_de1c2ee6-7125-4cfd-95b5-97974f47360f_20250725_132932_230.jpg, 00:01:09, 4.80 m
Attached deposits, encrustation at joint from 12 o'clock to 12

SW1AX_81adb980-3daa-4b09-8e9e-78d2143d5e0a_20250725_132956_855.jpg, 00:01:25, 5.90 m
Attached deposits, encrustation at joint from 12 o'clock to 12

SW1AX_12a60236-8313-442c-bda0-f23d4ee2e27d_20250725_133030_977.jpg, 00:01:37, 6.70 m
Attached deposits, encrustation at joint from 2 o'clock to 10

SW1AX_06463711-dad9-4da7-819f-180eb47705db_20250725_133050_737.jpg, 00:01:45, 7.50 m
Attached deposits, encrustation at joint from 2 o'clock to 6

SW1AX_875143cf-d41d-4b0d-8ebf-4691ed5f60f8_20250725_133155_368.jpg, 00:02:33, 12.80 m
Attached deposits, encrustation at joint from 12 o'clock to 12

SW1AX_78ef7943-7ea3-4577-b7c6-e02583b00763_20250725_133216_802.jpg, 00:02:46, 13.60 m
Attached deposits, encrustation at joint from 12 o'clock to 12

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Section Pictures - 16/07/2025 - SW1AX

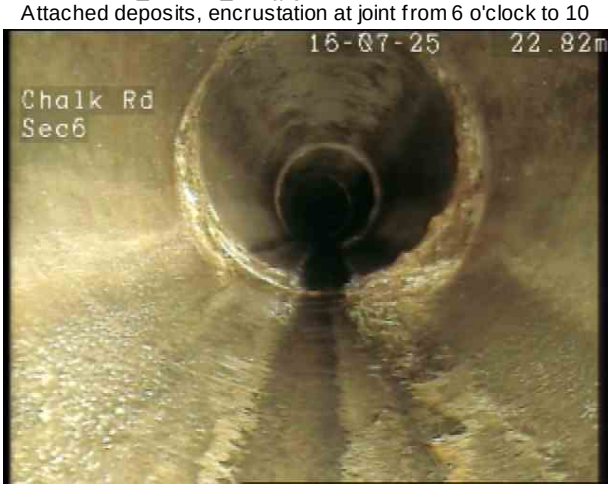
Item No.	Inspection Direction	PLR	Client`s Job Ref	Contractor`s Job Ref
6	Upstream	SW1AX		

SW1AX_1d74f1d9-a415-452a-823f-047ce9fcdc24_20250725_133244_424.jpg, 00:03:04, 14.80 m
Attached deposits, encrustation at joint from 12 o'clock to 12

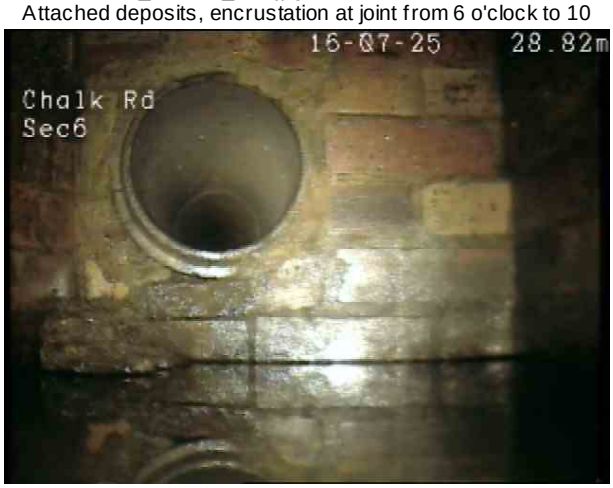
SW1AX_077864cf-e47f-44fb-addc-cfddb2ea511b_20250725_133310_966.jpg, 00:03:20, 15.60 m
Attached deposits, encrustation at joint from 12 o'clock to 12

SW1AX_e8e15e58-7ff4-45b7-a7f5-8028a4b795cb_20250725_133338_576.jpg, 00:03:32, 16.50 m
Attached deposits, encrustation at joint from 6 o'clock to 10

SW1AX_42ec5fb4-e355-4b6f-88dd-4f2bc68befc7_20250725_133419_801.jpg, 00:04:08, 19.90 m
Attached deposits, encrustation at joint from 6 o'clock to 10



SW1AX_cb0eb336-4a0e-4983-81be-5d2653769a74_20250725_133503_567.jpg, 00:04:40, 23.20 m
Attached deposits, encrustation at joint from 2 o'clock to 6



SW1AX_a5cb16d0-7298-49c1-87a4-4ccd9ae49394_20250725_133710_745.jpg, 00:05:52, 28.80 m
Finish node, manhole, reference: SW1A, No access.

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Disclaimer

Although every effort has been made to produce a thorough and precise report, Aquatech Drain Services Ltd cannot be held liable for any
discrepancies or omissions. Furthermore Aquatech Drain Services Ltd cannot be held responsible for any actions taken based on the information supplied within this report.

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APPENDICES

APPENDIX G

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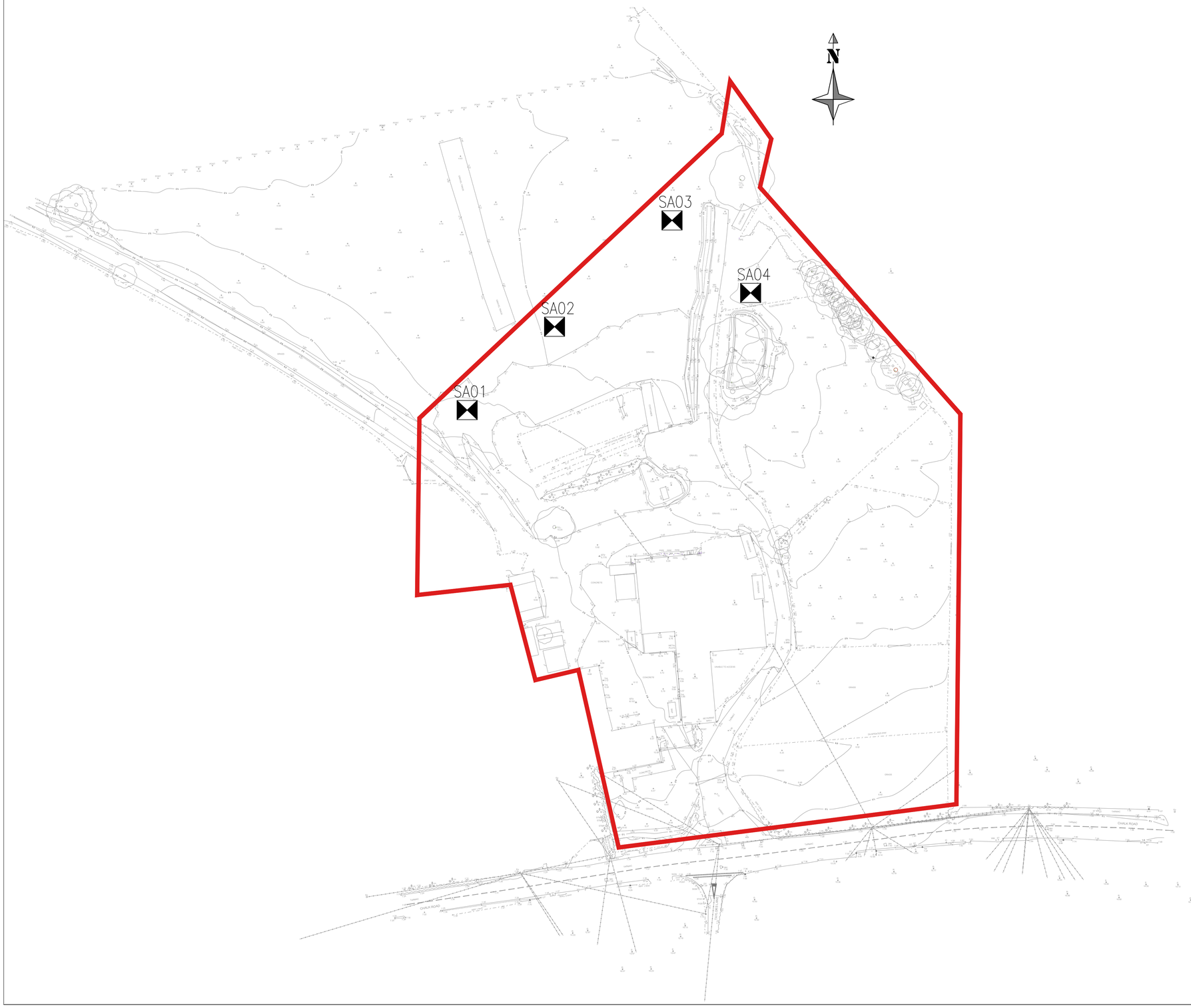
MEC Consulting Group

Doc. Ref.	29524-CALC-0401
Sheet	1 of 10
Engineer	AL
Date	16.04.25
Revision	-

SOIL INFILTRATION CALCULATIONS FRONT SHEET

SCHEME	Chalk Road, Higham
CLIENT	Richborough
ASPECTS OF SCHEME TO BE DESIGNED	Soil Infiltration Rate Testing
CODES OF PRACTICE, DESIGN SPECIFICATIONS & BRITISH STANDARDS	Soil Infiltration Rate testing and calculations completed in general accordance with BRE Digest 365 utilising the gravel fill pit method.
NOTES	The soil infiltration rate test results reported below applies to the specific test depth range as stated on the calculation sheet. Testing was undertaken in four locations (SA01-SA04) and within the Thanet Formation. The locations of the soil infiltration test pits are shown on the exploratory hole location plan. Insufficient soakage was recorded within the four soakaway locations tested to enable the calculation of a representative infiltration rate in accordance with BRE 365. Seepages of groundwater were also recorded in SA03 at 1.80m bgl and SA04 at 2.00m bgl. Based on the results and the presence of shallow groundwater, it is considered that a soakaway drainage system will not provide a consistent and viable drainage option at the locations tested.

INDEX



GENERAL NOTES

1. DO NOT SCALE THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALIST DESIGN DRAWINGS AND DETAILS.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
4. THIS DRAWING IS FOR STRATEGY PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.

KEY

SA01 SOIL INFILTRATION TEST PIT LOCATION

SITE BOUNDARY

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
-	FIRST ISSUE.	JM	CW	DT	11/04/25

PROJECT:
CHALK ROAD
HIGHAM

DRAWING TITLE:
EXPLORATORY HOLE
LOCATION PLAN

CLIENT:
RICHBOROUGH ESTATES LTD

DRAWING NUMBER:
29524_04_140_01

REVISION:	SHEET SIZE:	SCALE:
-	A1	1:500

STATUS:
FOR INFORMATION / APPROVAL

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Consulting Group
Birmingham | Brighton | Leicester

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Website: www.m-ec.co.uk

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Scheme	**Chalk Road, Higham**	**Page No.**	3
Client	**Richborough**	**Calcs by**	AL
Job ref.	**29524**	**Checked By**	DT
		Date	16/04/24

Soil Infiltration Test - Gravel Filled Method

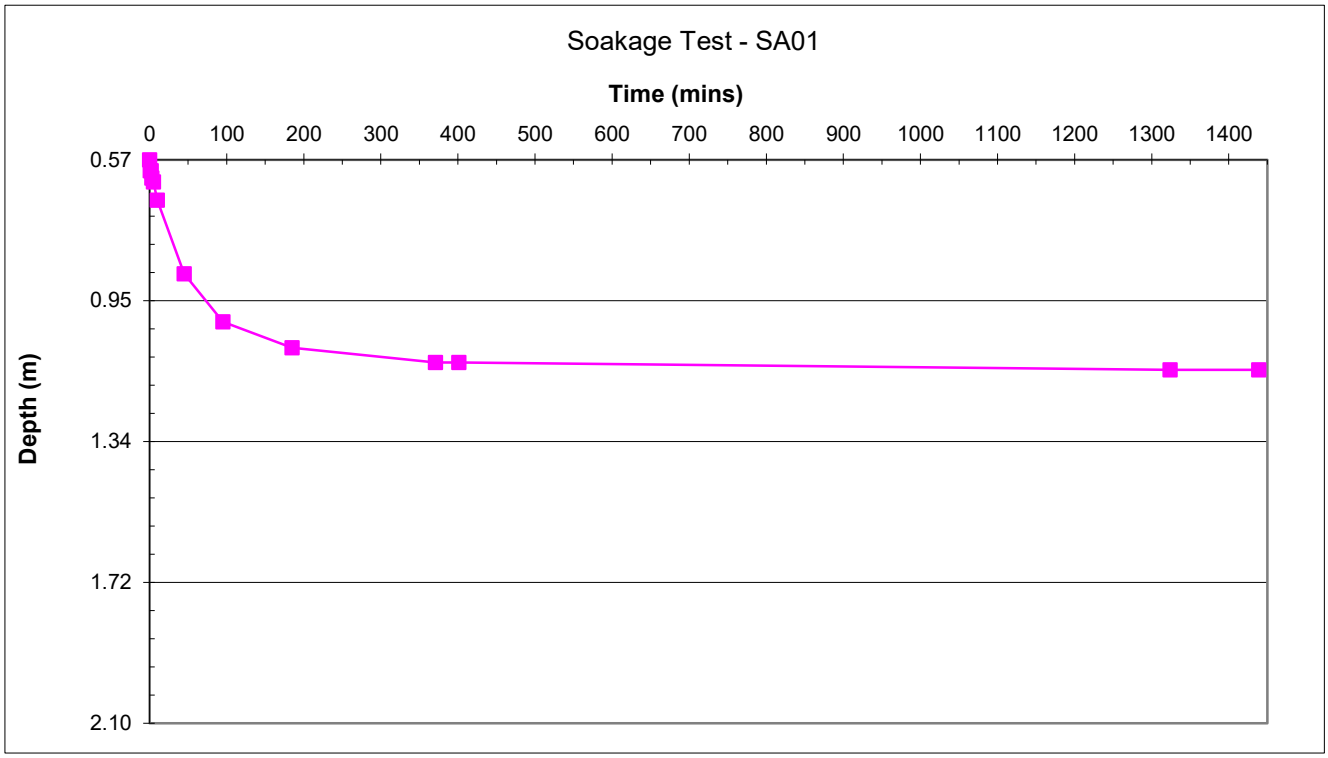
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref.	**SA01**	**Test** 1
Length	**1.70** m	
Width	**0.45** m	
Depth	**2.10** m	
Ground water level	**N/A** m	
Ground conditions	**0.00-0.30m**	**MADE GROUND: Grass over dark brown sandy, silty clay topsoil with occasional gravel sized fragments of quartzite, chert and brick, and rare cobble sized fragments of brick.**
	0.30-2.10m	**Brown becoming orangish brown, silty CLAY. (THANET FORMATION)**

Time (mins)	Depth to water (m bgl)
0	0.57
1	0.60
2	0.60
3	0.62
5	0.63
10	0.68
45	0.88
95	1.01
185	1.08
371	1.12
401	1.12
1324	1.14
1439	1.14

Effective storage depth =	1.53	m
75% effective storage depth =	1.15	m
(ie depth below GL) =	0.95	m
25% effective storage depth =	0.38	m
(ie depth below GL) =	1.72	m
effective storage depth 75%-25% =	0.77	m
Time to fall to 75% effective depth =	70	mins
Time to fall to 25% effective depth =	N/A	mins
Void Ratio =	40%	
V (75%-25%) =	0.23	m^3
a (50%) =	4.05	m^2
t (75%-25%) =	N/A	mins

Insufficient soakage to derive an infiltration rate.



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Scheme	**Chalk Road, Higham**	**Page No.**	4
Client	**Richborough**	**Calcs by**	AL
Job ref.	**29524**	**Checked By**	DT
		Date	16/04/24

Soil Infiltration Test - Gravel Filled Method

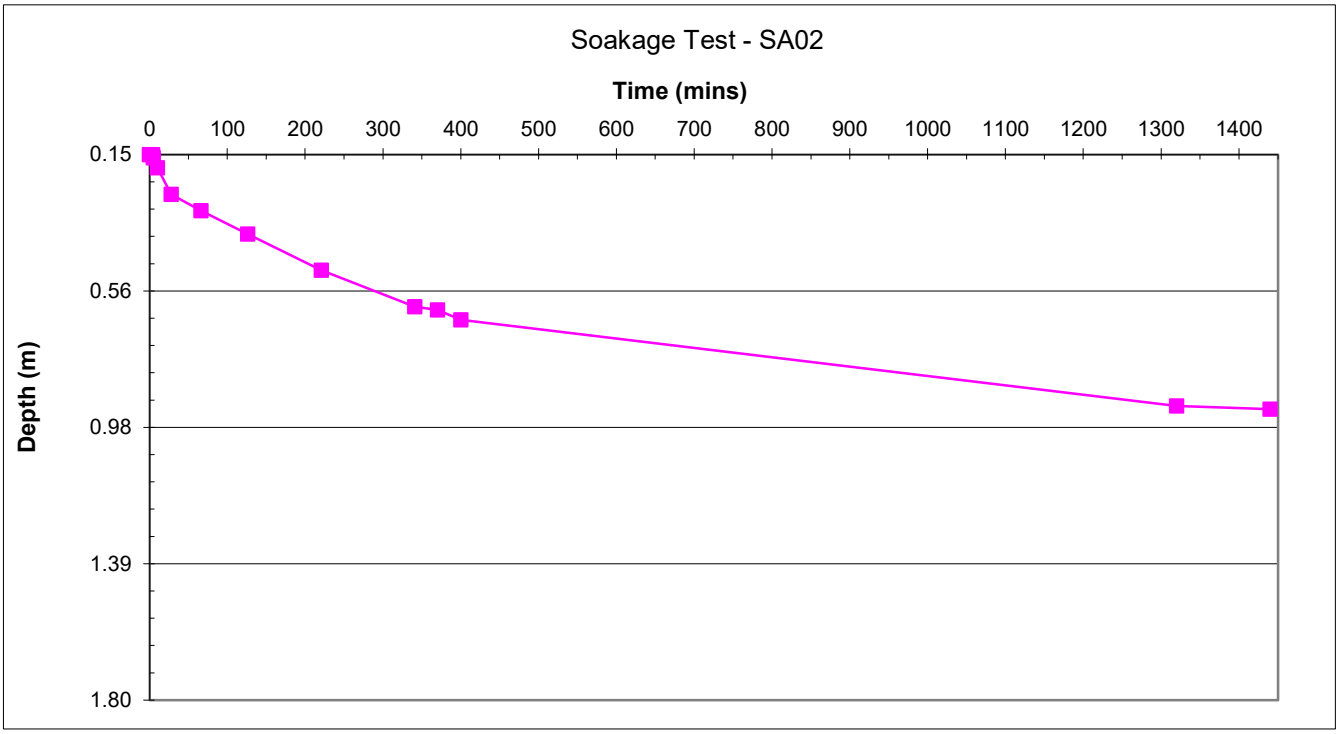
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref.	**SA02**	**Test** 1
Length	**1.90** m	
Width	**0.45** m	
Depth	**1.80** m	
Ground water level	**N/A** m	
Ground conditions	**0.00-0.35m**	**MADE GROUND: Grass over dark brown sandy, silty clay topsoil with occasional gravel sized fragments of quartzite, chert, and brick, and rare cobble sized fragments of brick.**
	0.35-1.80m	**Brown to yellowish brown, slightly sandy, slightly gravelly, silty CLAY. Gravels comprise, subrounded, fine to medium, chert. (THANET FORMATION)**

Time (mins)	Depth to water (m bgl)
0	0.15
4	0.15
5	0.16
10	0.19
28	0.27
66	0.32
126	0.39
221	0.50
341	0.61
370	0.62
400	0.65
1320	0.91
1440	0.92

Effective storage depth =	1.65	m
75% effective storage depth =	1.24	m
(ie depth below GL) =	0.56	m
25% effective storage depth =	0.41	m
(ie depth below GL) =	1.39	m
effective storage depth 75%-25% =	0.83	m
Time to fall to 75% effective depth =	290	mins
Time to fall to 25% effective depth =	N/A	mins
Void Ratio =	40%	
V (75%-25%) =	0.28	m^3
a (50%) =	4.73	m^2
t (75%-25%) =	N/A	mins

Insufficient soakage to derive an infiltration rate.



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Scheme	**Chalk Road, Higham**	**Page No.**	5
Client	**Richborough**	**Calcs by**	AL
Job ref.	**29524**	**Checked By**	DT
		Date	16/04/25

Soil Infiltration Test - Gravel Filled Method

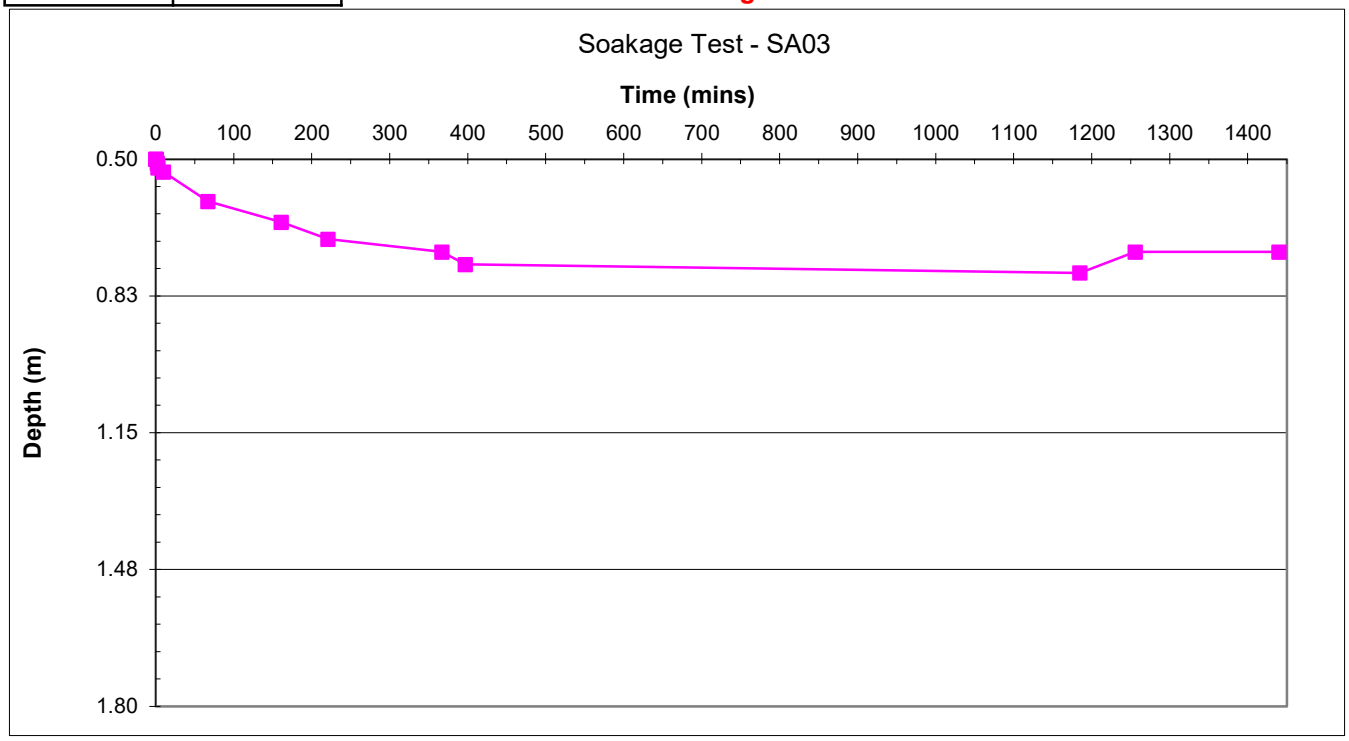
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref.	**SA03**	**Test** 1
Length	**1.90** m	
Width	**0.45** m	
Depth	**1.80** m	
Ground water level	**1.80** m	
Ground conditions	**0.00-0.30m**	**Grass over dark brown, sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and chert.**
	0.30-1.80m	**Yellowish brown becoming orangish and greyish brown, slightly sandy, slightly gravelly, silty CLAY. Gravels comprise subangular to subrounded, fine to medium chert. (THANET FORMATION)**

Time (mins)	Depth to water (m bgl)
0	0.5
1	0.50
2	0.51
3	0.52
10	0.53
67	0.60
161	0.65
221	0.69
367	0.72
397	0.75
1185	0.77
1256	0.72
1440	0.72

Effective storage depth =	1.30	m
75% effective storage depth =	0.98	m
(ie depth below GL) =	0.83	m
25% effective storage depth =	0.33	m
(ie depth below GL) =	1.48	m
effective storage depth 75%-25% =	0.65	m
Time to fall to 75% effective depth =	N/A	mins
Time to fall to 25% effective depth =	N/A	mins
Void Ratio =	40%	
V (75%-25%) =	0.22	m^3
a (50%) =	3.91	m^2
t (75%-25%) =	N/A	mins

Insufficient soakage to derive an infiltration rate.



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Scheme	**Chalk Road, Higham**	**Page No.**	6
Client	**Richborough**	**Calcs by**	AL
Job ref.	**29524**	**Checked By**	DT
		Date	16/04/25

Soil Infiltration Test - Gravel Filled Method

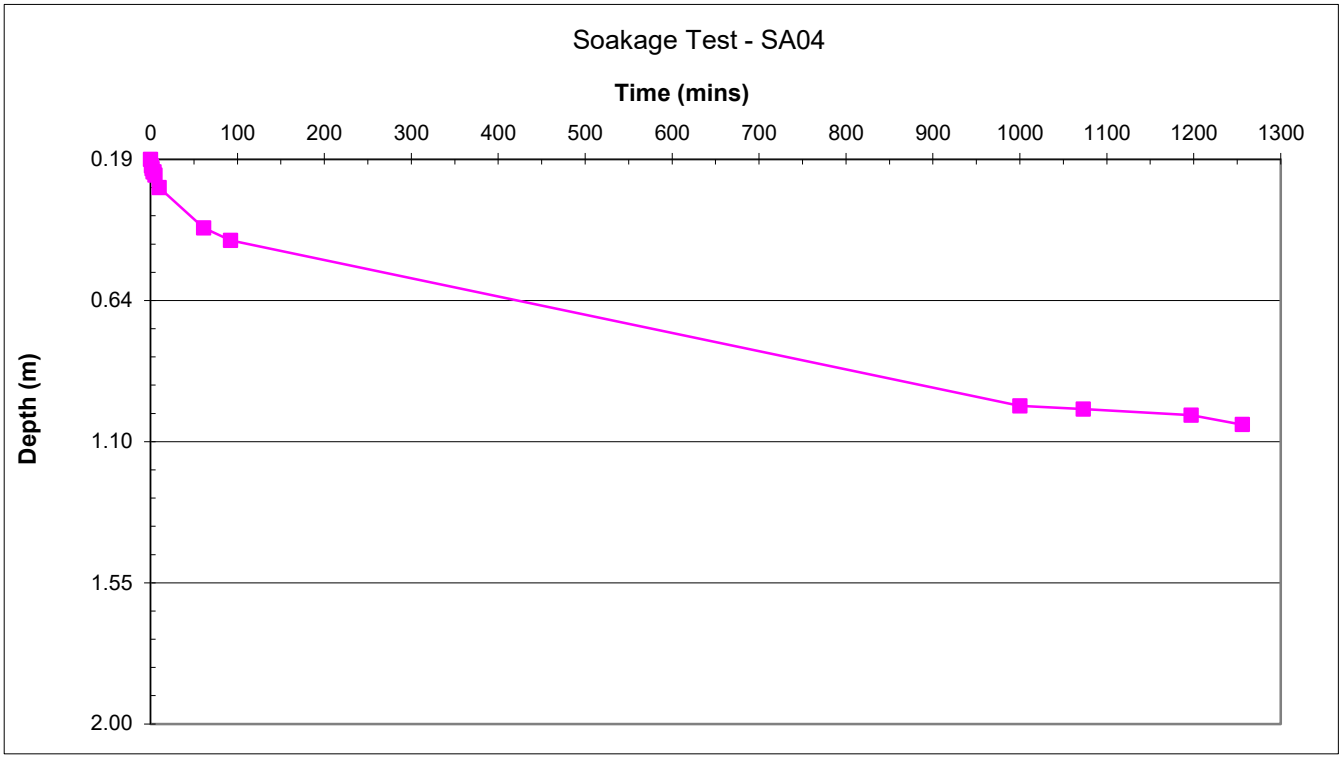
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Soakaway pit ref.	**SA04**	**Test** 1
Length	**2.10** m	
Width	**0.45** m	
Depth	**2.00** m	
Ground water level	**2.00** m	
Ground conditions	**0.00-0.45m**	**MADE GROUND: Grass over brown, silty, sandy gravel sized fragments of chert, brick, and concrete, with cobble sized fragments of brick and concrete.**
	0.45-2.00m	**Light brown, slightly sandy, silty CLAY with some fine rootlets. (THANET FORMATION)**

Time (mins)	Depth to water (m bgl)
0	0.19
1	0.21
2	0.22
3	0.23
4	0.23
5	0.24
10	0.28
61	0.41
92	0.45
1000	0.98
1073	0.99
1197	1.01
1256	1.04

Effective storage depth =	1.81	m
75% effective storage depth =	1.36	m
(ie depth below GL) =	0.64	m
25% effective storage depth =	0.45	m
(ie depth below GL) =	1.55	m
effective storage depth 75%-25% =	0.91	m
Time to fall to 75% effective depth =	415	mins
Time to fall to 25% effective depth =	N/A	mins
Void Ratio =	40%	
V (75%-25%) =	0.34	m^3
a (50%) =	5.56	m^2
t (75%-25%) =	N/A	mins

Insufficient soakage to derive an infiltration rate.



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The Old Chapel, Station Road
Hugglescote, Leicestershire
LE67 2GB

Exploratory Hole ID:	**SA01**
	Sheet 1 of 1

Project:	Chalk Road	Project No. 29524	Start Date: 10/04/2025	End Date: 10/04/2025	Plant Used: JCB 3CX
Location:	Higham	Logged By: CC	Easting and Northing Co-ordinates: 571073.82 173031.72		Elevation (m AOD): 5.00
Client:	Richborough	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
MADE GROUND: Grass over dark brown sandy, silty clay topsoil with occasional gravel sized fragments of quartzite, chert and brick, and rare cobble sized fragments of brick.		0.30	4.70				
Brown becoming orangish brown, silty CLAY. THANET FORMATION							
Becoming greyish black below 2.00m bgl							
End of Trial Pit		2.10	2.90				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 1.70m
Width: 0.45m
Depth: 2.10m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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LE67 2GB

Exploratory Hole ID:	**SA02**
	Sheet 1 of 1

Project:	Chalk Road	Project No. 29524	Start Date: 10/04/2025	End Date: 10/04/2025	Plant Used: JCB 3CX
Location:	Higham	Logged By: CC	Easting and Northing Co-ordinates: 571095.24 173052.12		Elevation (m AOD): 4.40
Client:	Richborough	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
MADE GROUND: Grass over dark brown sandy, silty clay topsoil with occasional gravel sized fragments of quartzite, chert, and brick, and rare cobble sized fragments of brick.							
		0.35	4.05				
Brown to yellowish brown, slightly sandy, slightly gravelly, silty CLAY. Gravels comprise, subrounded, fine to medium, chert. THANET FORMATION							
End of Trial Pit		1.80	2.60				

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater was not encountered.
Visual or olfactory evidence of contamination was not observed.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 1.90m
Width: 0.45m
Depth: 1.80m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Exploratory Hole ID:	SA03
	Sheet 1 of 1

Project:	Chalk Road	Project No. 29524	Start Date: 10/04/2025	End Date: 10/04/2025	Plant Used: JCB 3CX
Location:	Higham	Logged By: CC	Easting and Northing Co-ordinates: 571124.03 173078.17		Elevation (m AOD): 4.20
Client:	Richborough	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
Grass over dark brown, sandy, silty clay TOPSOIL with gravel sized fragments of quartzite and chert.		0.30	3.90				
Yellowish brown becoming orangish and greyish brown, slightly sandy, slightly gravelly, silty CLAY. Gravels comprise subangular to subrounded, fine to medium chert. THANET FORMATION							
End of Trial Pit		1.80	2.40				1.80 ▼

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater seepage at 1.80m bgl.
Visual or olfactory evidence of contamination was not observed.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 1.90m
Width: 0.45m
Depth: 1.80m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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Hugglescote, Leicestershire
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Exploratory Hole ID:	SA04
	Sheet 1 of 1

Project:	Chalk Road	Project No. 29524	Start Date: 10/04/2025	End Date: 10/04/2025	Plant Used: JCB 3CX
Location:	Higham	Logged By: CC	Easting and Northing Co-ordinates: 571143.28 173060.40		Elevation (m AOD): 4.55
Client:	Richborough	Approved By: DT			

Strata Description	Legend	Depth (m)	Level (m AOD)	Samples Type	Samples Depth	Tests	Groundwater (m)
MADE GROUND: Grass over brown, silty, sandy gravel sized fragments of chert, brick, and concrete, with cobble sized fragments of brick and concrete.							
Light brown, slightly sandy, silty CLAY with some fine rootlets. THANET FORMATION		0.45	4.10				
End of Trial Pit		2.00	2.55				2.00 ▼

Remarks:

Exploratory hole location scanned with Cable Avoidance Tool and Signal Generator.
Descriptions based on visual inspection by a Geo-environmental engineer.
Groundwater seepage encountered at 2.00m bgl.
Visual or olfactory evidence of contamination was not observed.
Co-ordinates and elevations estimated from the topographical survey.

Stability: Stable

Dimensions:

Length: 2.10m
Width: 0.45m
Depth: 2.00m

Key:

B - Bulk Sample
D - Disturbed Sample
ES - Environmental Sample
W - Water Sample
PID - PID Reading
HSV - Hand Shear Vane Reading

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APPENDICES

APPENDIX H

KEY

- SITE BOUNDARY
- CANAL
- FLOOD ZONE 2
- FLOOD ZONE 3
- SURFACE WATER FLOODING MEDIUM RISK (1 IN 100 YEAR)
- SURFACE WATER FLOODING HIGH RISK (1 IN 30 YEAR)

1:500

10m 0 10m 20m 30m 40m 50m

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
A	UPDATED SITE LAYOUT	BO	RC	AB	20.08.25
-	FIRST ISSUE	ZJ	RC	AB	28.07.25

PROJECT:
CHALK ROAD
HIGHAM

DRAWING TITLE:
FLOOD EXTENTS

CLIENT:
RICHBOROUGH

DRAWING NUMBER:
29524_01_230_02

REVISION:	SHEET SIZE:	SCALE:
A	A2	1:500

STATUS:
FOR INFORMATION / APPROVAL

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APPENDICES

APPENDIX I

N

Track

THE EXISTING HIGHWAY DRAIN OUTFALLS INTO A CULVERT TO THE NORTH. DURING THE CCTV SURVEY THE CULVERT WAS SHOWN TO FLOW UNDER THE RAILWAY AND CONNECT TO THE MEDWAY AND THAMES CANAL. THE CULVERT WAS OVERGROWN, FURTHER CLEARANCE WOULD BE REQUIRED.

ATTENUATION BASIN
DESIGN BASED ON AN IMPERMEABLE AREA OF 0.38ha PLUS FLOWS FROM GEO-CELLULAR TANKS 1, 2 AND 3, INCLUDING A 10% ALLOWANCE FOR URBAN CREEP.

COVER LEVEL = 4.65m
INVERT LEVEL = 3.35m
MAXIMUM DEPTH OF WATER = 0.98m
FREEBOARD DEPTH = 0.32m
PLAN AREA = 827.70m²

STORAGE VOLUME OF 589.88m³ TO ACCOMMODATE STORAGE FOR ALL STORM EVENTS UP TO AND INCLUDING A 1 IN 100 YEAR RETURN PERIOD WITH A 45% CLIMATE CHANGE ALLOWANCE.

FLOW CONTROL 3
COVER LEVEL = 4.65m
INVERT LEVEL = 3.29m
DESIGN DEPTH = 1.06m
DESIGN FLOW = 2.00l/s

INTERNAL EMBANKMENTS TO BE CONSTRUCTED AT A MAXIMUM 1 IN 3 GRADIENT

SURFACE WATER FLOWS GENERATED ON-SITE WILL DISCHARGE TO EXISTING HIGHWAY DRAIN SYSTEM ON SITE AS CONFIRMED BY CCTV SURVEY.

COVER LEVEL = 4.40m
INVERT LEVEL = 3.16m

FLOW CONTROL 2
COVER LEVEL = 5.06m
INVERT LEVEL = 3.85m
DESIGN DEPTH = 0.84m
DESIGN FLOW = 2.00l/s

GEO-CELLULAR TANK 3 DETAILS
DESIGN BASED ON AN IMPERMEABLE AREA OF 0.06ha, INCLUDING A 10% ALLOWANCE FOR URBAN CREEP.

GEO-CELLULAR TANK DETAILS
COVER LEVEL = 5.29m
TOP OF TANK = 4.69m
INVERT OF TANK = 3.89m
DEPTH OF TANK = 0.80m
COVER DEPTH = 0.60m
PLAN AREA = 60.00m²

A STORAGE VOLUME OF 28.92m³ IS REQUIRED TO ACCOMMODATE FOR ALL STORM EVENTS UP TO AND INCLUDING A 1 IN 100 YEAR RETURN PERIOD WITH A 45% CLIMATE CHANGE ALLOWANCE.

PROPOSED FOUL WATER PUMPING STATION WITH 15m CORDON SANITAIRE.

FOUL WATER WILL BE PUMPED VIA THE PROPOSED RISING MAIN BEFORE CONNECTING INTO THE EXISTING FOUL WATER SEWER ALONG CHALK ROAD AT MH1902 AS AGREED WITH SOUTHERN WATER.

EXACT POSITION AND LAYOUT OF PUMPING STATION TO BE CONFIRMED AT DETAIL DESIGN STAGE. VEHICHLE ACCESS AND ROAD CONNECTION WILL BE REQUIRED.

EXISTING HIGHWAY DRAIN THROUGH SITE TO BE REDIRECTED AS TO NOT CLASH WITH PROPOSED DEVELOPMENTS.

Atlantis

Buckland Farm

Michele Cottages

Whitebread House

Orchard View

Cherrydene

Avonlea

Cuckoo Hall

MP 28.25

GEO-CELLULAR TANK 1 DETAILS
DESIGN BASED ON AN IMPERMEABLE AREA OF 0.14ha, INCLUDING A 10% ALLOWANCE FOR URBAN CREEP.

GEO-CELLULAR TANK DETAILS
COVER LEVEL = 5.72m
TOP OF TANK = 5.12m
INVERT OF TANK = 4.32m
DEPTH OF TANK = 0.80m
COVER DEPTH = 0.60m
PLAN AREA = 115.00m²

A STORAGE VOLUME OF 87.21m³ IS REQUIRED TO ACCOMMODATE FOR ALL STORM EVENTS UP TO AND INCLUDING A 1 IN 100 YEAR RETURN PERIOD WITH A 45% CLIMATE CHANGE ALLOWANCE.

MH1902
COVER LEVEL = 7.32m
INVERT LEVEL = 5.66m

PROPOSED FOUL WATER POINT OF CONNECTION INTO MH1902 AS AGREED BY SOUTHERN WATER AT 0.36l/s.

FLOW CONTROL 1
COVER LEVEL = 5.75m
INVERT LEVEL = 4.21m
DESIGN DEPTH = 0.91m
DESIGN FLOW = 2.00l/s

MH1901
COVER LEVEL = 7.46m
INVERT LEVEL = 5.90m

GEO-CELLULAR TANK 2 DETAILS
DESIGN BASED ON AN IMPERMEABLE AREA OF 0.06ha, INCLUDING A 10% ALLOWANCE FOR URBAN CREEP.

GEO-CELLULAR TANK DETAILS
COVER LEVEL = 5.83m
TOP OF TANK = 5.23m
INVERT OF TANK = 4.43m
DEPTH OF TANK = 0.80m
COVER DEPTH = 0.60m
PLAN AREA = 90.00m²

A STORAGE VOLUME OF 68.25m³ IS REQUIRED TO ACCOMMODATE FOR ALL STORM EVENTS UP TO AND INCLUDING A 1 IN 100 YEAR RETURN PERIOD WITH A 45% CLIMATE CHANGE ALLOWANCE.

1:500
10m 0 10m 20m 30m 40m 50m

NOTES:

1. DO NOT SCALE THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS, ARCHITECTS AND SPECIALIST DESIGN DRAWINGS AND DETAILS.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
4. THIS DRAWING IS FOR STRATEGY PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.
5. DESIGN BASED ON EXISTING LEVELS AND SUBJECT TO CHANGE WITH EXTERNAL WORKS DESIGN / CONFIRMATION OF FFLS.
6. DRAINAGE STRATEGY IS SUBJECT TO AGREEMENT WITH RELEVANT THIRD PARTIES, INCLUDING ENVIRONMENT AGENCY, LOCAL PLANNING AUTHORITY, IDB, LEAD LOCAL FLOOD AUTHORITY AND WATER AUTHORITY.
6. CONCRETE PROTECTION TO BE PROVIDED TO ANY PIPES WITH LOW COVER.
7. THE DRAINAGE STRATEGY WILL NEED UPDATING IF THE LAYOUT IS REVISED.
8. SOAKAGE TESTING WAS UNDERTAKEN ON-SITE AND DEEMED INFILTRATION WAS NOT VIABLE.
9. SURFACE WATER FLOWS ON-SITE WILL BE STORED AND CONVEYED BY A SERIES OF GEO-CELLULAR TANKS AND AN ATTENUATION BASIN.
10. SURFACE WATER FLOWS WILL OUTFALL VIA EXISTING HIGHWAY DRAINAGE ON SITE.
11. FOUL WATER FLOWS WILL BE PUMPED TO ALLOW A CONNECTION INTO THE EXISTING FOUL WATER SEWER ALONG CHALK ROAD.
12. PERMEABLE PAVING WILL BE USED ACROSS THE SITE IN DRIVEWAYS AND PARKING AREAS.

KEY

- SITE BOUNDARY
- PROPOSED SURFACE WATER SEWER
- PROPOSED FOUL WATER SEWER
- PROPOSED FOUL RISING MAIN
- EXISTING HIGHWAY DRAIN
- PROPOSED ABANDONED HIGHWAY DRAIN
- PROPOSED REDIRECTED HIGHWAY DRAIN
- EXISTING FOUL WATER SEWER
- EXISTING FOUL RISING MAIN
- CANAL
- EXISTING CULVERT
- PROPOSED ATTENUATION BASIN
- PROPOSED GEO-CELLULAR TANK
- PROPOSED PERMEABLE PAVING
- PROPOSED FOUL PUMPING STATION
- EXISTING FOUL PUMPING STATION

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
A	UPDATED BASED ON NEW LAYOUT	HW	RC	AB	15.08.25
-	FIRST ISSUE	BO	RC	AB	28.07.25

PROJECT:
CHALK ROAD
HIGHAM

DRAWING TITLE:
DRAINAGE STRATEGY

CLIENT:
RICHBOROUGH

DRAWING NUMBER:
29524_01_230_01

REVISION:	SHEET SIZE:	SCALE:
-	A1	1:500

STATUS:
FOR INFORMATION / APPROVAL

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APPENDICES

APPENDIX J

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Doc. Ref.	29524-CALC-0101
Sheet	1 of 10
Engineer	B. Oyston
Date	28 Jul 25
Revision	-

DESIGN CALCULATIONS FRONT SHEET

SCHEME	Chalk Road, Higham.
CLIENT	Richborough.
ASPECTS OF SCHEME TO BE DESIGNED	• Greenfield Calculations • Brownfield Calculations • Surface Water Sewer Design • 1 in 2, 1 in 30 year +35% climate change and 1 in 100 year +45% climate change design simulations
CODES OF PRACTICE, DESIGN SPECIFICATIONS & BRITISH STANDARDS	• Design and analysis of urban storm drainage. Wallingford Procedure Vol. 1. • Sustainable Drainage Systems – Non-statutory technical standards for sustainable drainage systems – 2015. • The SuDS Manual – CIRIA C753.
NOTES	• In accordance with the National SuDS Standards, the strategy involves conveying surface water flows to multiple geo-cellular tanks and an attenuation basin before discharging into the existing highway drainage on site at a controlled rate of 2.0l/s. • Existing runoff conditions have been calculated using the Modified Rational Method to calculate the Brownfield Discharge Rate. For the existing impermeable area of 0.39ha, the peak discharge rate has been calculated as 48.8l/s, based on a rainfall intensity of 50mm/hr. • Existing greenfield runoff conditions have been calculated using the FEH module within Flow Causeway. For the proposed impermeable area of 0.58ha, the QBAR Greenfield Rate has been calculated as 0.3l/s. As this is a low discharge rate, that may create blockages in the system, a minimum discharge rate of 2.0l/s has been applied. This rate is an 95% betterment from the Brownfield Rate. • Drainage calculations were carried out within Flow Causeway.

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Brownfield Run-off Calculation

Project: **Chalk Road, Higham**

File Ref: **29524**

O.S. Grid Ref: **571119, 172997**

The Rational Method equation used to calculate peak stormwater runoff rate is:

$$Q = 2.78\ CiA$$

Where;

Q = The peak stormwater runoff rate from the drainage area (L/S).

2.78 = Conversion factor to use standard units.

C = Runoff coefficient for drainage area (A).

i= The intensity of the design storm for peak runoff calculation (mm/hr).

A = The area of the watershed that drains to the point for which the peak runoff rate is calculated (ha).

The following figures will be used to calculate the peak runoff for the site;

C = 0.9, as not all run-off will discharge from the site.

i= 50 mm/hr

A = 0.39 ha

Peak run-off for the site;

$$Q = 2.78\ X\ 0.9\ X\ 50\ X\ 0.39$$

$$\boldsymbol{Q = 48.8\ l/s}$$

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	100.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
Basin	0.380	5.00	4.650	1200	1.300
Flow Control 3			4.650	1200	1.362
Tank 1	0.140	5.00	5.720		1.400
Tank 2	0.060	5.00	5.780		1.460
Tank 3	0.060	5.00	5.290		1.400
Flow Control 1			5.750	1200	1.541
Flow Control 2			5.290	1200	1.444
SM1			5.060	1200	1.281
Outfall			4.400	1200	1.240

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Tank 1	Flow Control 1	20.000	0.600	4.320	4.209	0.111	180.2	300	5.29	100.0
2.000	Tank 2	Flow Control 1	25.000	0.600	4.320	4.209	0.111	225.0	300	5.40	100.0
1.001	Flow Control 1	SM1	30.000	0.600	4.209	3.779	0.430	69.8	300	5.66	100.0
3.000	Tank 3	Flow Control 2	10.000	0.600	3.890	3.846	0.044	225.0	300	5.16	100.0
3.001	Flow Control 2	SM1	15.000	0.600	3.846	3.779	0.067	225.0	300	5.40	100.0
1.002	SM1	Basin	40.000	0.600	3.779	3.350	0.429	93.2	300	6.07	100.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.168	82.6	50.6	1.100	1.241	0.140	0.0
2.000	1.044	73.8	21.7	1.160	1.241	0.060	0.0
1.001	1.884	133.2	72.3	1.241	0.981	0.200	0.0
3.000	1.044	73.8	21.7	1.100	1.144	0.060	0.0
3.001	1.044	73.8	21.7	1.144	0.981	0.060	0.0
1.002	1.628	115.1	94.0	0.981	1.000	0.260	0.0

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.003	Basin	Flow Control 3	10.000	0.600	3.350	3.288	0.062	160.0	225	6.24	100.0
1.004	Flow Control 3	Outfall	20.000	0.600	3.288	3.160	0.128	156.3	225	6.56	100.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.003	1.031	41.0	231.3	1.075	1.137	0.640	0.0
1.004	1.043	41.5	231.3	1.137	1.015	0.640	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	20.000	180.2	300	Circular	5.720	4.320	1.100	5.750	4.209	1.241
2.000	25.000	225.0	300	Circular	5.780	4.320	1.160	5.750	4.209	1.241
1.001	30.000	69.8	300	Circular	5.750	4.209	1.241	5.060	3.779	0.981
3.000	10.000	225.0	300	Circular	5.290	3.890	1.100	5.290	3.846	1.144
3.001	15.000	225.0	300	Circular	5.290	3.846	1.144	5.060	3.779	0.981
1.002	40.000	93.2	300	Circular	5.060	3.779	0.981	4.650	3.350	1.000
1.003	10.000	160.0	225	Circular	4.650	3.350	1.075	4.650	3.288	1.137
1.004	20.000	156.3	225	Circular	4.650	3.288	1.137	4.400	3.160	1.015

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Tank 1		Manhole	Adoptable	Flow Control 1	1200	Manhole	Adoptable
2.000	Tank 2		Manhole	Adoptable	Flow Control 1	1200	Manhole	Adoptable
1.001	Flow Control 1	1200	Manhole	Adoptable	SM1	1200	Manhole	Adoptable
3.000	Tank 3		Manhole	Adoptable	Flow Control 2	1200	Manhole	Adoptable
3.001	Flow Control 2	1200	Manhole	Adoptable	SM1	1200	Manhole	Adoptable
1.002	SM1	1200	Manhole	Adoptable	Basin	1200	Manhole	Adoptable
1.003	Basin	1200	Manhole	Adoptable	Flow Control 3	1200	Manhole	Adoptable
1.004	Flow Control 3	1200	Manhole	Adoptable	Outfall	1200	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
Basin	4.650	1.300	1200	1		1.002	3.350	300
				◯				
				0		1.003	3.350	225
Flow Control 3	4.650	1.362	1200	1		1.003	3.288	225
				◯				
				0		1.004	3.288	225

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Tank 1	5.720	1.400		0	1.000	4.320	300
Tank 2	5.780	1.460		0	2.000	4.320	300
Tank 3	5.290	1.400		0	3.000	3.890	300
Flow Control 1	5.750	1.541	1200	1	2.000	4.209	300
				2	1.000	4.209	300
				0	1.001	4.209	300
Flow Control 2	5.290	1.444	1200	1	3.000	3.846	300
				0	3.001	3.846	300
SM1	5.060	1.281	1200	1	3.001	3.779	300
				2	1.001	3.779	300
				0	1.002	3.779	300
Outfall	4.400	1.240	1200	1	1.004	3.160	225

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	x	2 year (l/s)	0.2
Summer CV	1.000	Drain Down Time (mins)	240	30 year (l/s)	0.5
Winter CV	1.000	Additional Storage (m³/ha)	0.0	100 year (l/s)	0.7
Analysis Speed	Normal	Check Discharge Rate(s)	✓	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	35	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Region	1
Greenfield Method	FEH	QBar/QMed conversion factor	1.111
Positively Drained Area (ha)	0.580	Growth Factor 2 year	0.90
SAAR (mm)	571	Growth Factor 30 year	1.95
Host	1	Growth Factor 100 year	2.48
BFIHost	0.829	Betterment (%)	0

Pre-development Discharge Rate

QMed	0.2	Q 30 year (l/s)	0.5
QBar	0.3	Q 100 year (l/s)	0.7
Q 2 year (l/s)	0.2		

Node Flow Control 3 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	3.288	Product Number	CTL-SHE-0066-2000-1062-2000
Design Depth (m)	1.062	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Flow Control 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	4.209	Product Number	CTL-SHE-0069-2000-0911-2000
Design Depth (m)	0.911	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Flow Control 2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	3.846	Product Number	CTL-SHE-0070-2000-0844-2000
Design Depth (m)	0.844	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node Basin Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	3.350
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	466.2	0.0	1.000	735.8	0.0	1.300	827.7	0.0

Node Tank 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.320
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	115.0	0.0	0.800	115.0	0.0	0.801	0.0	0.0

Node Tank 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	4.320
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	90.0	0.0	0.800	90.0	0.0	0.801	0.0	0.0

Node Tank 3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	3.890
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	62

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	60.0	0.0	0.800	60.0	0.0	0.801	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	Basin	690	3.585	0.235	9.2	117.1905	0.0000	SURCHARGED
600 minute winter	Flow Control 3	615	3.593	0.305	3.9	0.3449	0.0000	SURCHARGED
240 minute summer	Tank 1	172	4.435	0.115	7.7	12.5215	0.0000	OK
240 minute summer	Tank 2	168	4.435	0.115	4.3	9.8028	0.0000	OK
120 minute summer	Tank 3	76	3.961	0.071	4.8	4.0624	0.0000	OK
240 minute summer	Flow Control 1	168	4.435	0.226	3.5	0.2551	0.0000	OK
120 minute summer	Flow Control 2	76	3.961	0.115	1.9	0.1303	0.0000	OK
120 minute summer	SM1	80	3.816	0.037	3.8	0.0419	0.0000	OK
15 minute summer	Outfall	1	3.160	0.000	1.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
720 minute winter	Basin	1.003	Flow Control 3	4.0	0.224	0.096	0.3977	
600 minute winter	Flow Control 3	Hydro-Brake®	Outfall	1.9				77.0
240 minute summer	Tank 1	1.000	Flow Control 1	3.5	0.176	0.042	0.8151	
240 minute summer	Tank 2	2.000	Flow Control 1	-1.3	0.080	-0.018	1.0195	
120 minute summer	Tank 3	3.000	Flow Control 2	1.9	0.204	0.026	0.1884	
240 minute summer	Flow Control 1	Hydro-Brake®	SM1	2.0				
120 minute summer	Flow Control 2	Hydro-Brake®	SM1	1.8				
120 minute summer	SM1	1.002	Basin	3.8	0.667	0.033	0.7360	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Basin	1680	4.066	0.716	13.9	403.9103	0.0000	SURCHARGED
1440 minute winter	Flow Control 3	1680	4.066	0.778	3.6	0.8801	0.0000	SURCHARGED
360 minute winter	Tank 1	352	4.811	0.491	11.0	53.6521	0.0000	SURCHARGED
360 minute winter	Tank 2	352	4.811	0.491	6.0	41.9878	0.0000	SURCHARGED
120 minute summer	Tank 3	96	4.209	0.319	15.0	18.1585	0.0000	SURCHARGED
360 minute winter	Flow Control 1	352	4.811	0.602	3.5	0.6809	0.0000	SURCHARGED
120 minute summer	Flow Control 2	96	4.209	0.363	2.5	0.4100	0.0000	SURCHARGED
1440 minute winter	SM1	1680	4.066	0.287	3.6	0.3251	0.0000	OK
15 minute summer	Outfall	1	3.160	0.000	1.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
1440 minute winter	Basin	1.003	Flow Control 3	3.6	0.283	0.089	0.3977	
1440 minute winter	Flow Control 3	Hydro-Brake®	Outfall	1.9				158.4
360 minute winter	Tank 1	1.000	Flow Control 1	3.5	0.211	0.042	1.4084	
360 minute winter	Tank 2	2.000	Flow Control 1	-1.3	0.082	-0.017	1.7605	
120 minute summer	Tank 3	3.000	Flow Control 2	2.5	0.232	0.034	0.7042	
360 minute winter	Flow Control 1	Hydro-Brake®	SM1	2.0				
120 minute summer	Flow Control 2	Hydro-Brake®	SM1	2.0				
1440 minute winter	SM1	1.002	Basin	3.6	0.473	0.031	2.7969	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.79%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Basin	1470	4.333	0.983	19.2	589.8820	0.0000	SURCHARGED
1440 minute winter	Flow Control 3	1530	4.341	1.053	4.2	1.1911	0.0000	SURCHARGED
720 minute winter	Tank 1	690	5.118	0.798	9.5	87.2117	0.0000	SURCHARGED
720 minute winter	Tank 2	690	5.118	0.798	5.2	68.2500	0.0000	SURCHARGED
120 minute winter	Tank 3	118	4.397	0.507	14.3	28.9206	0.0000	SURCHARGED
720 minute winter	Flow Control 1	690	5.118	0.909	3.4	1.0283	0.0000	SURCHARGED
120 minute winter	Flow Control 2	118	4.397	0.551	2.4	0.6236	0.0000	SURCHARGED
1440 minute winter	SM1	1470	4.333	0.554	3.8	0.6271	0.0000	SURCHARGED
15 minute summer	Outfall	1	3.160	0.000	1.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
1440 minute winter	Basin	1.003	Flow Control 3	4.2	0.307	0.102	0.3977	
1440 minute winter	Flow Control 3	Hydro-Brake®	Outfall	2.0				173.5
720 minute winter	Tank 1	1.000	Flow Control 1	3.0	0.175	0.036	1.4084	
720 minute winter	Tank 2	2.000	Flow Control 1	-1.1	0.064	-0.015	1.7605	
120 minute winter	Tank 3	3.000	Flow Control 2	2.4	0.255	0.033	0.7042	
720 minute winter	Flow Control 1	Hydro-Brake®	SM1	2.0				
120 minute winter	Flow Control 2	Hydro-Brake®	SM1	2.0				
1440 minute winter	SM1	1.002	Basin	3.8	0.508	0.033	2.8168	

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APPENDICES

APPENDIX K

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MAINTENANCE AND MANAGEMENT

A proposed maintenance plan is shown in the table below and breaks down the maintenance requirements of the various proposed assets in accordance with the CIRIA C753 SuDS Manual guidance.

Table 1.1: Proposed Maintenance Regime

Drainage Asset	Responsible Organisation	Maintenance Work	Frequency
Pipework / Manholes	Canal and Rivers Trust / Southern Water	Inspect pipework and clear blockages	Annually or after severe storms.
		Inspect manholes and clear blockages	
		Repair any defects in the network	
		Inspect flow control, ensure operating freely and pivoting bypass door and penstock valve operating correctly	
Headwalls	Private Ownership	Inspect the structure and remove any debris/litter on the structure.	Annually or after severe storms
		Replace malfunctioning parts or structures	As required
Gullies	Highway Authority	Inspect structure and remove any debris/litter on structure	Annually or after severe storms
		Replace malfunctioning parts or structures	As required
Foul Pumping Station	Southern Water	Inspect wet well, kiosk and valve chamber	Annually or after severe storms
		Inspect structure and remove any debris from the wet well	
		Replace malfunctioning parts or structures	As required
Flow Control Chamber	Private Ownership	Inspect structure and remove excessive silt build-up	Monthly during construction and then annually or after severe storms
		Inspect pipework and manholes also clear blockages	Annually or after severe storms
		Inspect manholes and clear blockages	
		Inspect flow control, ensure operating freely and pivoting bypass door and penstock valve operating correctly	
		Replace malfunctioning parts or structures	
		Inspect for evidence of poor operation	6 monthly
		Inspect sediment accumulation rates and establish appropriate removal frequencies	
		Test control structure to ensure operating as per original design	5 yearly
Rainwater Harvesting	Private Ownership / Management Company	Inspection of the tank for debris and sediment build-up, inlets/outlets/withdrawal devices, overflow areas, pumps and filters	Annually (and following poor performance)
		Cleaning of the tank, inlets, outlets, gutters, withdrawal devices and roof drain filters of silts and other debris	

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		Cleaning and/or replacement of any filters	3 monthly (or as required)
		Repair of overflow erosion damage or damage to the tank	As required
		Pump repairs	
Permeable Pavements	Private Ownership / Management Company	Brushing and vacuuming (standard cosmetic sweep over the whole surface)	Once a year after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging of manufacturer's recommendations.
		Stabilise and mow contributing and adjacent areas	As required
		Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than sweeping	
		Remediate any landscaping which, through vegetation maintenance of soil slip, has been raised to within 50 mm of the level of the paving	
		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	
		Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required
		Initial inspection	Monthly for 3 months after installation
		Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	3 monthly, 48 hours after large storms in first 6 months
		Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
		Monitor inspection chambers	
Attenuation Storage Tanks	Management Company	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months then annually
		Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
		For systems where rainfall infiltrates into the tank from above, check the surface of the filter for blockages by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
		Remove the sediment from pre-treatment structures and/or internal forebays	
		Repair/rehabilitate inlets, outlets, overflows and vents	As required
		Inspect/check all inlets, outlets, vents and overflows to ensure that they are	Annually

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		in good condition and operating as designed	
		Survey inside of the tank for sediment build-up and remove if necessary	Every 5 years or as required
Attenuation/Detention Basins	Management Company	Remove litter and debris	Monthly
		Cut grass – for spillways and access routes	
		Cut grass – meadow grass in and around the basin	
		Manage other vegetation and remove nuisance plants	
		Inspect inlets, outlets and overflows for blockages, and clean if required	
		Inspect banksides, structures for silt accumulation. Establish appropriate silt removal frequencies	
		Check any penstocks and other mechanical devices	Annually
		Tidy all dead growth before the start of the growing season	
		Remove the sediment from inlets, outlets and forebay	
		Manage wetland plants in outlet pool – where provided	

- CIVIL ENGINEERING
- TRANSPORT
- FLOOD RISK & DRAINAGE
- STRUCTURES
- GEO-ENVIRONMENTAL
- ACOUSTIC AIR
- UTILITIES
- GEOMATICS
- LIGHTING
- EXPERT WITNESS

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