Flood Risk Assessment

Great Cauldham Park, Capel Le Ferne

18-027-006 Rev C

February 2024

Charles & Associates

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1 Introduction

1.1 Overview

1.1.1 Charles & Associates Consulting Engineers Ltd (C&A) have been commissioned by Quinn Estates to prepare a Flood Risk Assessment (FRA) for the proposed residential development of land between Cauldham Lane and Capel Street, Dover, Kent know as Great Cauldham Park.

1.2 Purpose

1.2.1 The purpose of this report is to support an outline planning application for the erection of up to 90 dwellings with associated parking and infrastructure following demolition of an existing dwelling; with all matters reserved except access. Refer to **Appendix A** for the Illustrative Masterplan.

1.2.2 This report has been prepared as a means of demonstrating that flooding from surface water and foul water drainage concerns would not constrain the development of the site. Nor would the development have any adverse effects on the existing surface/foul water drainage system or watercourses and groundwater source protection zones.

1.2.3 The provisions of the National Planning Policy Framework (NPPF) (Ref 1) have been considered in preparing this Flood Risk Assessment, together with the Flood & Water Management Act 2010 (Ref 2). In addition, attention has been paid to the National Planning Practice Guidance (NPPG) (Ref 3) and policies within the Kent County Council (KCC) Drainage and Planning Policy Statement (Ref 4), Dover Surface Water Management Plan, August 2011 (Ref 5), Dover District Adopted Core Strategy, February 2010 (Ref 6) Dover District Local Plan to 2040 Regulation 19 Submission, October 2022 (Ref 7) and Dover District Council's Strategic Flood Risk Assessment (SFRA), March 2019 (Ref 8).

1.2.4 With regards to surface water drainage and potential for flooding, it examines the site's suitability with respect to the planning policy and physical characteristics to allow suggested solutions to deal with drainage following development, thus ensuring the site is drained in a sustainable manner and not impacting the surrounding area. The Sustainable Drainage Systems (SuDS Scheme) will be designed to conform to non-statutory Technical Guidance for an outline application and the CIRIA SuDS Manual (Ref 9).

1.2.5 Foul drainage discharge emanating from the site, has also been reviewed and will be designed to the current Sewerage Sector Guidance (SSG) (Ref 10).

1.3 Report Limitation

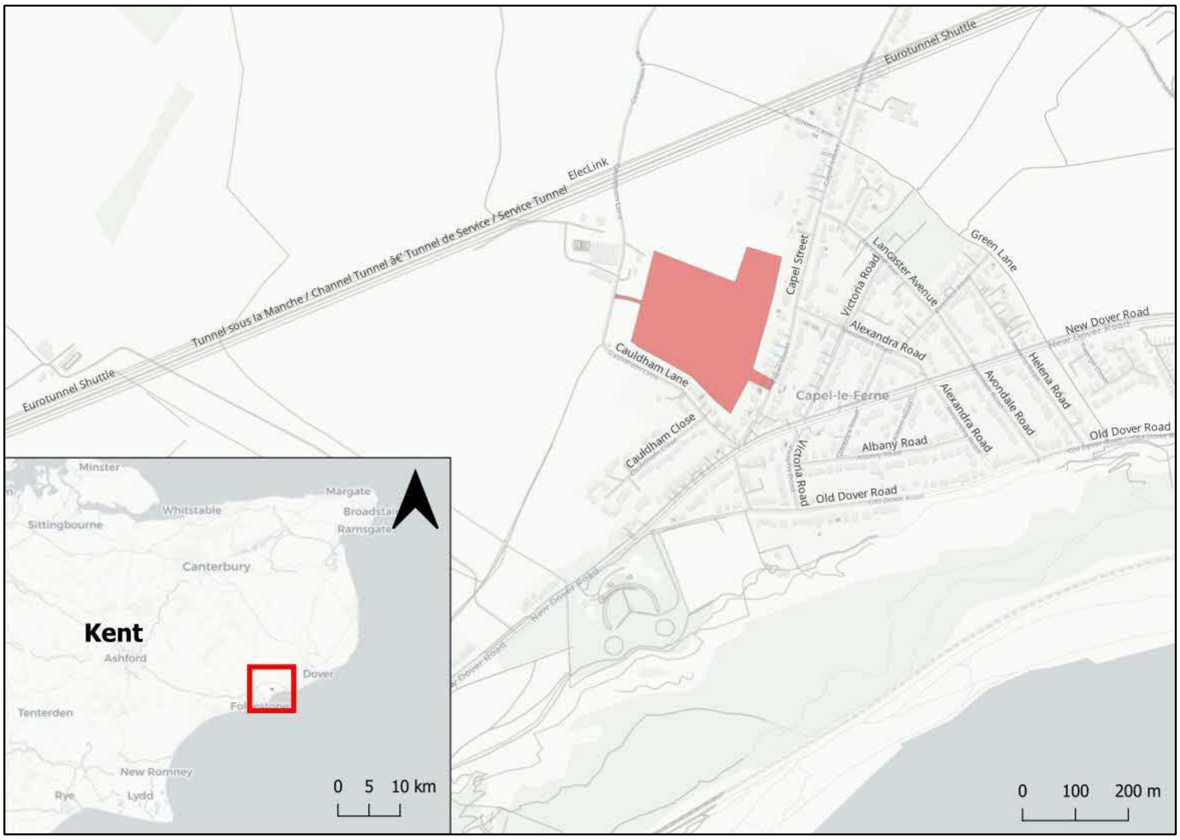
1.3.1 The findings, recommendations and conclusions of this report are based on information obtained from a variety of external sources which are understood to be reputable. However, C&A Consulting Engineers Ltd cannot guarantee the authenticity or reliability of any data and/or records provided by third parties.

2 Existing Site

2.1 Site Location

2.1.1 The site is located between Cauldham Lane and Capel Street, Dover, and it has been allocated for 90 dwellings as site CAP006b in the Regulation 19 Dover Local Plan. A site location plan is shown in **Figure 2.1** below.

Figure 2.1: Site Location Plan



2.1.2 The site is bounded to the south and west by residential properties and Cauldham Lane. To the east by residential properties on Capel Street and to the north by open agricultural fields. The site is currently an agricultural field and is classed as a greenfield site.

2.2 Topography & Existing Drainage

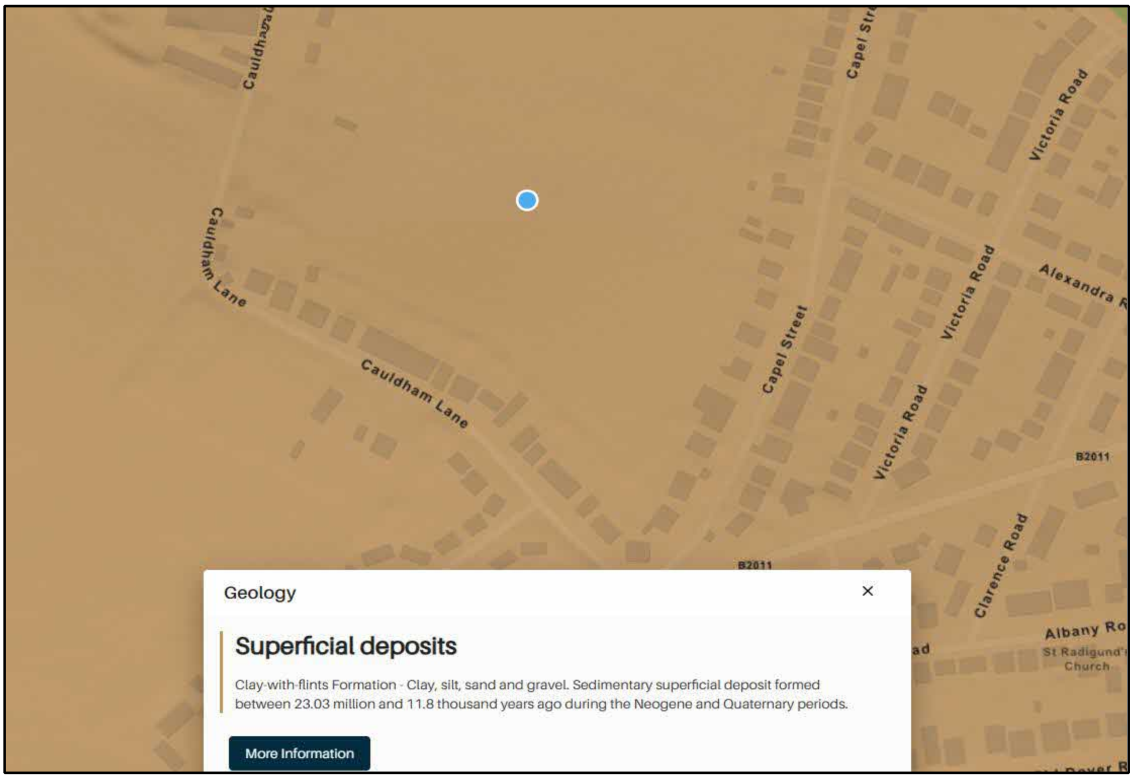
2.2.1 A topographical survey was produced by Survey Design Services (SDS) in May 2023. Review of the site levels show that most of the site falls towards the northern boundary. The highest level recorded within the site boundary based on the topographical survey is 165.94m AOD (Above Ordinance Datum) located in the southwestern corner, and the lowest recorded level is 152.52m AOD located in the northeastern corner of the site. The topographical survey has been included within **Appendix B** of this report.

2.2.2 The topographic survey identifies the site to be comprised of open agricultural greenfield with dense vegetation located south and east of the site forming a distinct boundary. The survey identifies fences along the southern and eastern portion of the site. A continuous fence line is identified along the western site boundary creating separation between the land to the west and the site.

2.3 Geology and Hydrogeology

2.3.1 According to the published geological data from the British Geological Survey (BGS) (Ref 11), the site is underlain by bedrock deposits of Lewes Nodular Chalk Formation. The superficial deposits comprise of Clay-with-flints Formation – Clay, Silt, Sand and Gravel. This is shown in **Figure 2.2** and **2.3** below.

Figure 2.2: BGS Mapping - Superficial Geology

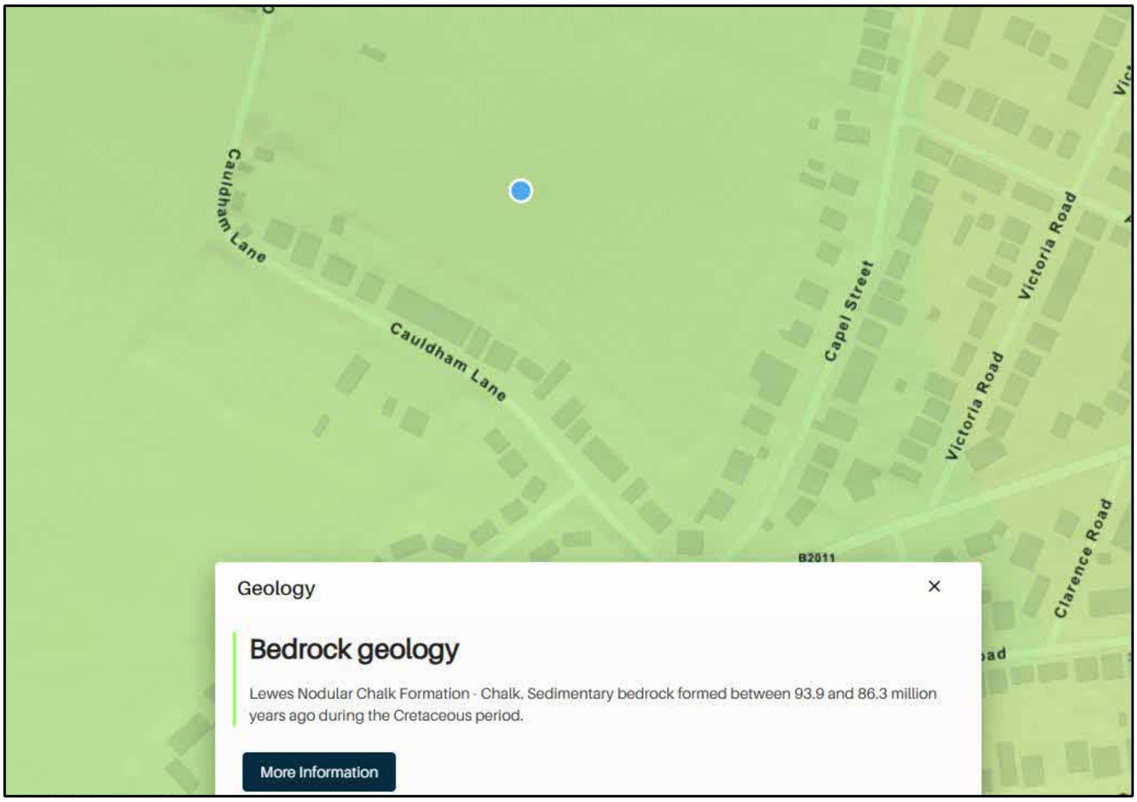


Geology

Superficial deposits

Clay-with-flints Formation - Clay, silt, sand and gravel. Sedimentary superficial deposit formed between 23.03 million and 11.8 thousand years ago during the Neogene and Quaternary periods.

Figure 2.3: BGS Mapping - Superficial Geology



Bedrock geology

Lewes Nodular Chalk Formation - Chalk. Sedimentary bedrock formed between 93.9 and 86.3 million years ago during the Cretaceous period.

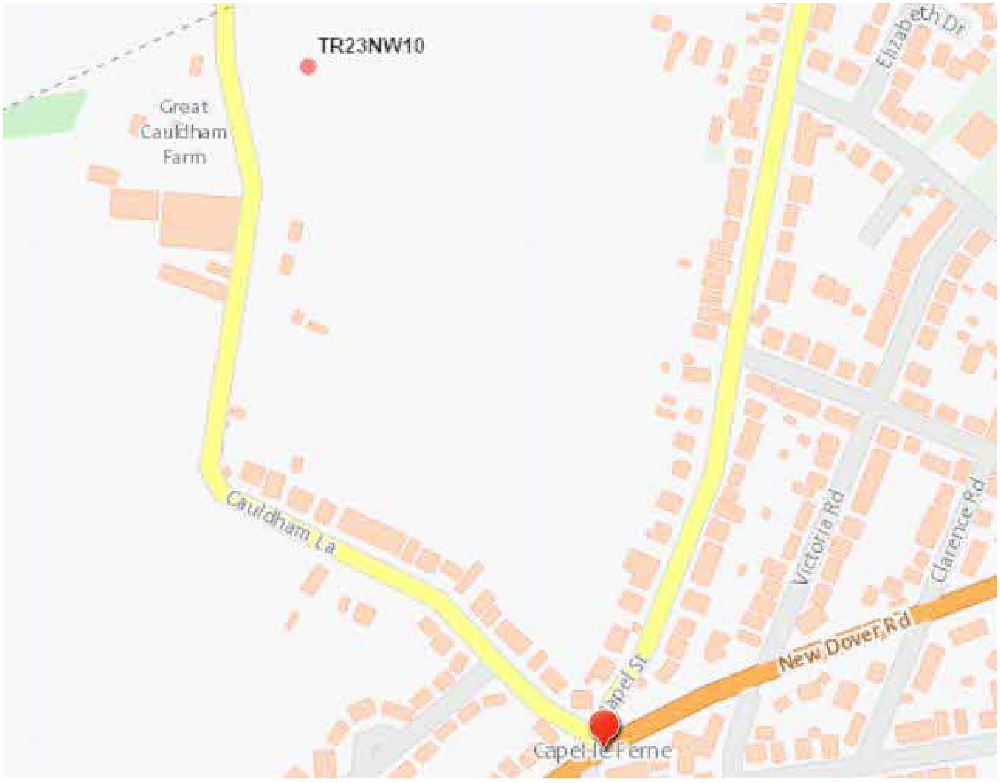
2.3.2 A Phase 1 Land Contamination Report was produced by Ecologia in August 2023 (updated in February 2024). The report references the BGS data, as described above. The geology is summarised in **Figure 2.4** below. Refer to **Appendix C** for the Phase 1 Land Contamination Report.

Figure 2.4: Summary of Geology

Group / Formation		Lithology	Approximate Thickness (m)
Superficial	Clay with Flints Formation *(Sand)*	Dominant lithology is orange-brown and red-brown sandy clay with abundant nodules and rounded pebbles of flint.	Up to 10m
	Clay with Flints Formation *(Clay, Silt, Sand, Gravel)*		
Bedrock	Lewes Nodular Chalk	Composed of hard to very hard chalks and hardgrounds (which resist scratching by fingernail) with interbedded soft to medium chalks (some grainy) and marls.	Up to 60m

2.3.3 The BGS website provides information on local borehole records. There is a borehole within 250m of the site, reference TR23NW10, as shown in **Figure 2.5** below.

Figure 2.5: BGS Borehole Location



2.3.4 A summary of the borehole log is shown in **Figure 2.6** below and the downloaded scan has been included in **Appendix D.**

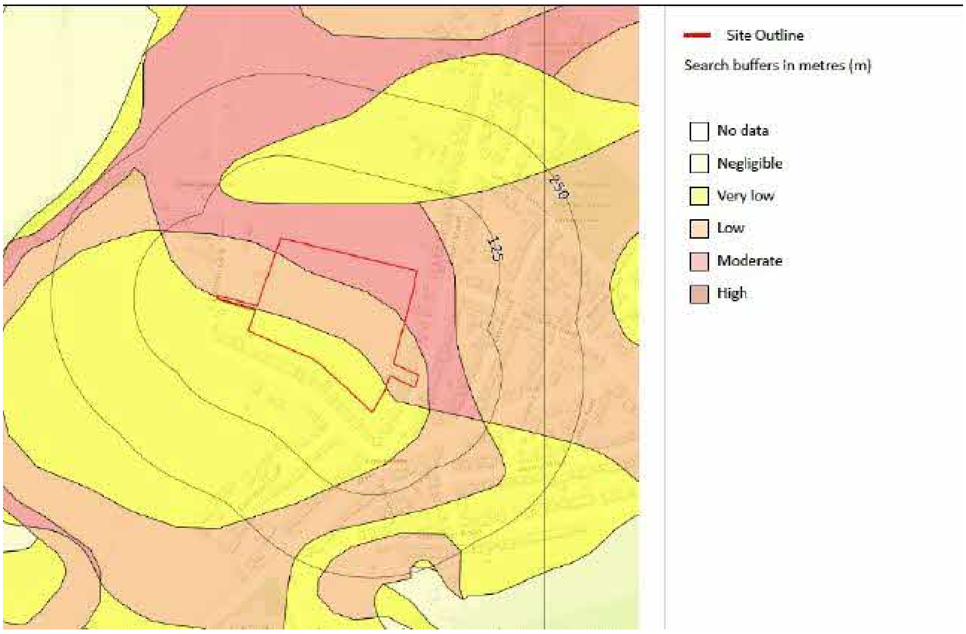
Figure 2.6: BGS Borehole Summary

ID	Grid Reference	Name	Location	Depth (m)	Description
1	624560 138910	CHANNEL TUNNEL E6 CAPEL LE FERNE	131m NW	0.00 – 0.15	Topsoil
				0.15 – 4.27	Firm brown sandy Clay
				4.27 – 7.01	Stiff brown sandy Clay with flints
				7.01 – 8.84	Brown and grey Clay with bands of weathered Chalk
				8.84 – 47.24	White Chalk without flints
				47.24 – 56.90	Hard, creamy-white “nodular” Chalk with streaks of greyish marly chalk
				56.90 – 59.74	Pale grey-white marly Chalk
				59.74 – 70.03	Massive, uniform, soft pale grey-white Chalk
				70.03 – 71.32	Pale, grey-white Chalk, harder
				71.32 – 91.74	Unrecovered Chalk Groundwater level at 75.70m
				91.74 – 129.39	Grey streaky Chalk, relatively hard

2.3.5 As can be seen the borehole log reflects the BGS records with the chalk bedrock encountered at 8.84m.

2.3.6 Ecologia's Land Contamination Report (**Appendix C**) confirms there is a very low to moderate risk of ground dissolution features within the soluble rocks. This has been reproduced in **Figure 2.7** below.

Figure 2.7: Risk of Ground Dissolution Features within Soluble Rocks



2.3.7 A ground investigation report will be undertaken within the site to confirm ground conditions and infiltration rates within the chalk strata should the site gain outline planning permission.

2.3.8 An aquifer is a body of rock and/or sediment that holds groundwater and is typically composed of a water-bearing permeable rock, rock fractures, or unconsolidated materials. Secondary aquifers typically have high water storage capacities and are important sources of base flow to rivers. Aquifers are classified as follows:

Principal: layers of rock or drift deposits with high permeability and, therefore, provide a high level of water storage

Secondary A: rock layers or drift deposits capable of supporting water supplies at a local level and, in some cases, forming an important source of base flow to rivers.

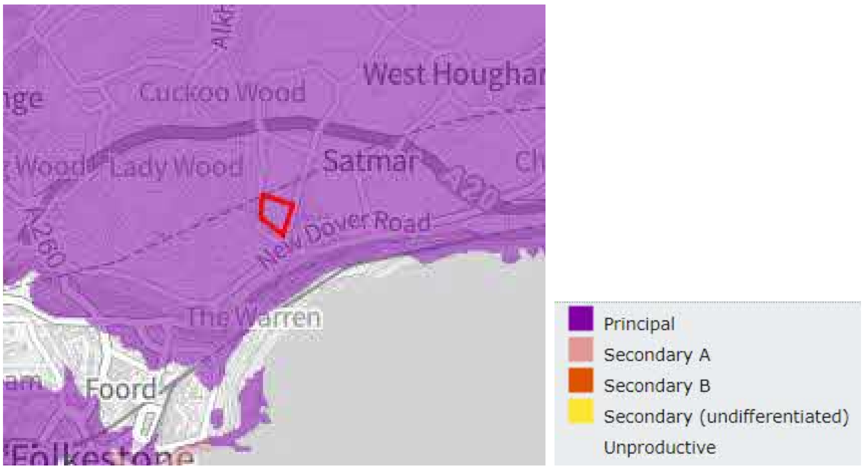
Secondary B: lower permeability layers of rock or drift deposits which may store and yield limited amounts of groundwater.

Secondary undifferentiated: rock types which do not fit into either category A or B.

Unproductive Strata: rock layers and drift deposits with low permeability and, therefore, have a negligible impact on water supply or river base flow.

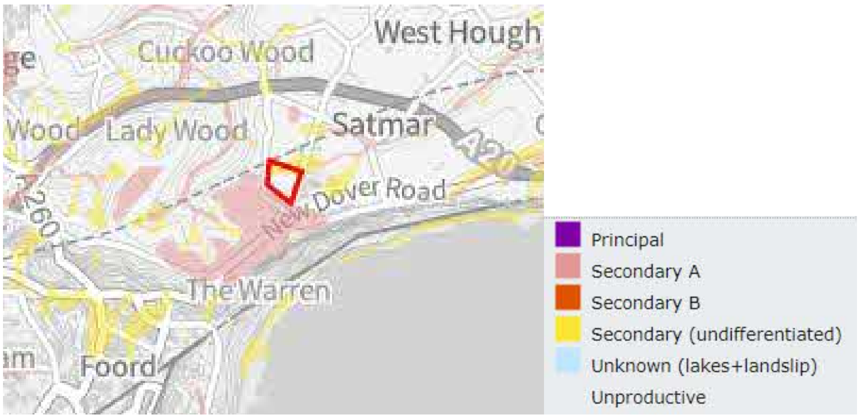
2.3.9 The Department for Environment, Food & Rural Affairs (DEFRA) “Magic Map” (Ref 12) show the site is underlain by a Principal Aquifer within the bedrock. There are no superficial aquifers present on the site. Refer to **Figure 2.8** below.

Figure 2.8: Bedrock Aquifer Map



2.3.10 The site is underlain by a Secondary Aquifer within the superficial deposits along the southern boundary and an unproductive aquifer within the superficial deposits along the northern border. Refer to **Figure 2.9** below.

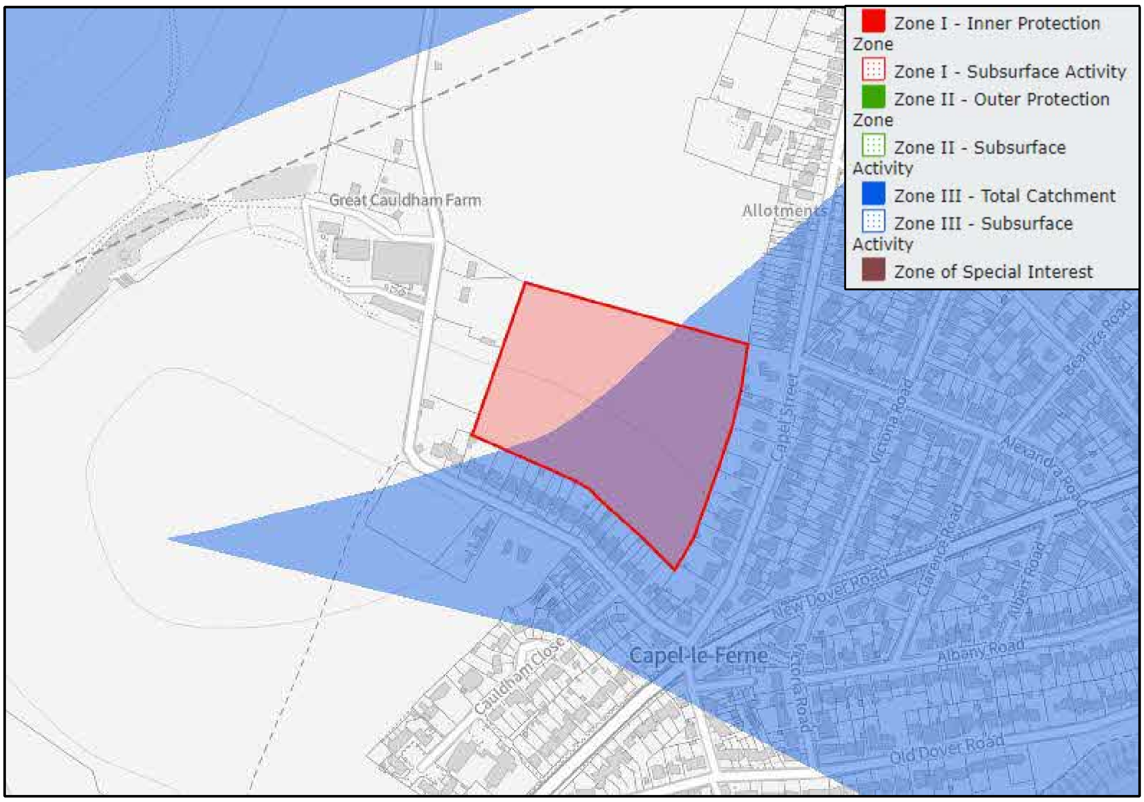
Figure 2.9: Superficial Aquifer Map



2.4 Groundwater

2.4.1 A review of the Department for Environment, Food & Rural Affairs (DEFRA) “Magic Map” (Ref 12), confirms the eastern portion of the site is in a Groundwater Source Protection Zone identified as Total Catchment Zone – Zone 3 as shown in **Figure 2.9** below with the site boundary in red.

Figure 2.9: Groundwater Source Protection Zone



2.4.2 Land within Total Catchment (SPZ3) is land around a supply source within which all the groundwater ends up at the abstraction point.

3 Policy Context

3.1 National Planning Policy

National Planning Policy Framework

3.1.2 The National Planning Policy Framework (NPPF), updated December 2023, provides national guidance to planning authorities, developers, the public, and the Environment Agency (EA), to ensure that flood risk is considered at all stages of the planning process.

3.1.3 The NPPF states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

3.1.4 The NPPF states that Local Plans should be supported by Strategic Flood Risk Assessments (SFRA) and policies developed to manage flood risk from all sources, considering advice from the EA and other relevant flood risk management bodies, such as lead local flood authorities and internal drainage boards. It advises that Local Plans should apply a sequential, risk-based approach to the location of development to avoid, where possible, flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:

- Applying the Sequential Test and if necessary, the Exception Test.
- Safeguarding land from development that is required, or likely to be required, for current or future flood management.
- Using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes of impacts of flooding, (making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management); and
- Where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to facilitate the relocation of development, including housing, to more sustainable locations.

3.1.5 The aim of the Sequential Test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the Proposed Development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.

3.1.6 If it is not possible for development to be in zones with a lower risk of flooding (considering wider sustainable development objectives), it may be necessary to undertake the Exception Test. The need for the exception test will depend on the potential vulnerability of the Site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3 of the NPPF.

3.1.7 The application of the exception test should be informed by the strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. To pass the exception test it should be demonstrated that:

The development would provide wider sustainability benefits to the community that outweigh the flood risk; and
The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

3.1.8 **Section 4** of this report confirms that the Application Site is located within Flood Zone 1 and is at low risk of flooding from all other sources of flooding. Therefore, it is considered that the Sequential Test is passed, and the Exception Test is not required.

3.1.9 Major developments should incorporate SuDS unless there is clear evidence that this would be inappropriate. The systems used should:

Take account of advice from the lead local flood authority.
Have appropriate proposed minimum operational standards.
Have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and
Where possible, provide multifunctional benefits.

Planning Practice Guidance

3.1.10 The Planning Practice Guidance (PPG) provides additional guidance to LPAs to ensure effective implementation of the planning policies set out within the NPPF regarding development in areas at risk of flooding.

3.1.11 The PPG states that developers and LPAs should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of SuDs.

3.1.12 Flood risk vulnerability is split into five classifications in Table 2 of the PPG, as follows, and the compatibility of these within each Flood Zone is set out in Table 3 of the PPG:

Essential Infrastructure, e.g. essential transport and utility infrastructure, wind turbines.

Highly Vulnerable, e.g. emergency services (those required to be operational during flooding), basement dwellings.

More Vulnerable, e.g. residential dwellings, hospitals, schools, hotels, drinking establishments.

Less Vulnerable, e.g. retail, offices, storage and distribution, leisure, restaurants; and

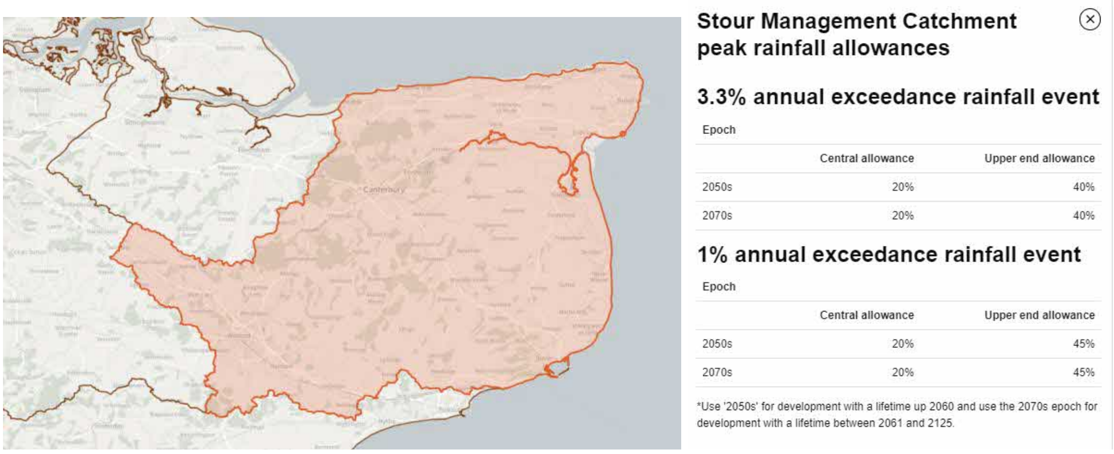
Water-Compatible Development, e.g. docks, marinas, wharves.

Climate Change

3.1.13 Based on the most recent advice on climate change reported in NPPG, peak rainfall intensity, sea level, peak river flow, offshore wind speed and extreme wave heights are all expected to increase in the future. It is recommended that considerations for future climate change are included in surface water drainage designs for proposed developments.

3.1.14 Having reviewed the Climate Change Allowance map the site lies within the Stour Management Catchment. **Figure 3.1** below summarises climate change allowances within this catchment.

Figure 3.1: DEFRA Climate Change Allowance Map



Stour Management Catchment peak rainfall allowances

3.3% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	20%	40%
2070s	20%	40%

1% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	20%	45%
2070s	20%	45%

*Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

3.1.15 The proposed surface water drainage strategy will be designed to cater for the upper allowance for the 2050s epoch, as this provides a more robust design and allows for the additional 45% climate change event.

3.1.16 All events up to and including the 100 year + 45% climate change events will be catered for within the proposed system. Further analysis will be undertaken to establish the effect on the system for the 1 in 30 year + 40% climate change event.

3.2 Regional and Local Planning Guidance

Kent County Council Drainage & Planning Policy Statement, December 2019

3.2.2 As the Lead Local Flood Authority, KCC produced a Drainage and Planning Policy – a Local Flood Risk Management Strategy Document December 2019. The primary objective of the policy statement is to contribute to the achievement of sustainable development and deliver the requirements of the NPPF and specific policies set out by the relevant Local Planning Authority (LPA). Key policies included within KCC policy statement are summarised below.

SuDS Policy 1 ‘Follow the drainage hierarchy’ states that:

> *‘’Surface runoff not collected for use must be discharged according to the surface water drainage hierarchy:*
>
> *a) To ground*
> *b) To a surface water body,*
> *c) A surface water sewer, highway drain, or another drainage system, or*
> *d) To a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewage undertaker.*
>
> *The selection of a discharge point should be clearly demonstrated and evidenced.”*

SuDS Policy 2 ‘Deliver effective drainage design’ states that,

> *“Any proposed new drainage scheme must manage all sources of surface water and should be designed to match greenfield discharge rates, and volumes as far as possible. Development in previously developed land should also seek to reduce discharge rates and volumes off-site and utilise existing connections where feasible.*
>
> *Drainage schemes should provide for exceedance flows and surface flows from offsite, ensure emergency ingress and egress and protect any existing drainage connectivity, so that flood risk is not increased on-site or off site.’’*

SuDS Policy 3 ‘Maintain Existing Drainage Flow Paths & Watercourses’ states that,

> *“Drainage schemes should be designed to follow existing drainage flow paths and catchments and retain where possible existing watercourses and features.”*

SuDS Policy 4 ‘Seek to Reduce and Avoid Existing Flood Risk’ states that,

> *“New development should be designed to take full account of any existing flood risk, irrespective of the sources of flooding.*
>
> *Where a site or its immediate surroundings have been identified to be at flood risk, all opportunities to reduce the identified risk should be investigated at the master planning stage of design and subsequently incorporated at the detailed design stage.*

> *Remedial works and surface water infrastructure improvements may be identified in the immediate vicinity of the development to facilitate surface water discharge from the proposed development site."*

SuDS Policy 5 'Drainage Sustainability and Resilience' states that,

> *"The design of the drainage system must account for the likely impacts of climate change and changes in impermeable area over the design life of the development. Appropriate allowances should be applied in each case.*
>
> *A sustainable approach which considers control of surface water runoff at the surface and at source is preferred and should be considered prior to other design solutions."*

SuDS Policy 6 'Sustainable Maintenance' states that,

> *"When designing a surface water management scheme, full consideration must be given to the system's capacity to remove pollutants and to the cleanliness of the water being discharged from the site, irrespective of the receiving system,*
>
> *Interception of small rainfall events should be incorporated into the design of the drainage system."*

SuDS Policy 7 'Safeguard Water Quality' states that,

> *"When designing a surface water management scheme, full consideration must be given to the system's capacity to remove pollutants and to the cleanliness of the water being discharged from the site, irrespective of the receiving system,*
>
> *Interception of small rainfall events should be incorporated into the design of the drainage system."*

SuDS Policy 8 'Design for Amenity and Multi-Functionality' states that,

> *"Drainage design must consider opportunities for inclusion of amenity and multi-functionality objectives and thus provide multi-functional use of open space with appropriate design for drainage measures within the public realm.*
>
> *Local environmental objectives may identify other benefits which can be agreed to be delivered through appropriate design of the drainage system."*

SuDS Policy 9 'Enhance Biodiversity' states that,

> *"Drainage design must consider opportunities for biodiversity enhancement, through provision of appropriately designed surface systems, consideration of connectivity to adjacent water bodies or natural habitats, and appropriate planting specification."*

3.2.3 Sustainable Urban Drainage techniques for the attenuation of surface water runoff will be utilised within this development, ensuring that policy and guidance, such as that required under the Local Plan, National Planning Policies, the Flood & Surface Water Management Act 2010 and the current national SuDS Guidance, are all met and satisfied.

3.2.4 The SuDS scheme, which will be submitted, as part of the planning application complies with the above guidance. The details of the SuDS scheme are presented in **Section 5** of this report.

The Kent design guide - making it happen - sustainability (drainage systems)

3.2.5 The aim of the Kent Design Guide is to provide guidance on the design of buildings and their surroundings. It covers a range of topics including sustainability, accessibility, and design quality.

3.2.6 This document is used to assist in the preparation of drainage design for any new development in Kent. It sets out the procedures relating to the design and subsequent adoption of both SuDS and more traditional positive drainage systems and outlines the specific requirements of Kent County Council in their role as Highways Authority and LLFA.

3.2.7 The Kent Design Guide is offered to all local authorities for formal adoption and is expected to be used as a supplementary planning document attached to Local Development Framework or the Local Plan.

Dover District Council Core Strategy, Adopted February 2010

3.2.8 The Core Strategy is the key Plan in the District's Local Development Framework (LDF). It sets out the overall ambitions and priorities for the district, a set of proposals, and a means for making sure that they are delivered - in effect a business plan. It covers the period to 2026, which is consistent with the Regional Spatial Strategy, but also sets a longer-term framework.

3.2.9 The Core Strategy establishes the overarching principles of the LDF through which the Borough's essential development needs will be met. The Core Strategy makes key decisions about how much development will take place in the district, as well as where and when it will take place. The polices relating to flood risk and drainage are listed below:

Policy DM 17: Groundwater Source Protection, states,

"Within Groundwater Source Protection Zones, shown on the Proposals Map, the following will not be permitted in Zones 1 and 2 unless adequate safeguards against possible contamination are provided:

1. *Septic tanks, storage tanks containing hydrocarbons or any chemicals, or underground storage tanks;*
2. *Proposals for development which may include activities which would pose a high risk of contamination unless surface water, foul or treated sewage effluent, or trade effluent can be directed out of the source protection zone;*
3. *Proposals for the manufacture and use of organic chemicals, particularly chlorinated solvents;*
4. *Oil pipelines;*
5. *Storm water overflows;*
6. *Activities which involve the disposal of liquid waste to land; and*
7. *Sustainable urban drainage systems.*

New graveyards will not be permitted in Zone1. Farm waste, storage areas, new foul or combined sewerage systems will also not be permitted in Zone 1 unless adequate safeguards are provided."

3.2.10 The proposed drainage strategy does not pose a risk to groundwater. Therefore, compliant with Policy DM 17 of the Core Strategy.

Dover District Council Local Plan, Regulation 19, October 2022

3.2.11 The emerging Local Plan outlines the vision, strategic objectives, and development strategy for the district's growth to 2040. It provides a planning framework for housing, economy, community facilities, infrastructure, natural and historic environment conservation, climate change adaptation, and well-designed places. The plan, once adopted, will replace the Core Strategy 2010, Land Allocations Plan 2015, and 2002 Local Plan policies.

3.2.12 Although the emerging Local Plan is yet to be adopted it has been referred to and the relevant allocations and policies have been identified below.

3.2.13 The emerging Local Plan contains polices related to flood risk and surface water management. These are mentioned below.

CC5 – Flood Risk

"Development on sites at risk of flooding must comply with the National Planning Policy Framework and associated guidance and will only be permitted as an exception and where it is demonstrated by a site-specific Flood Risk Assessment (FRA), carried out in accordance with the requirements set out in the Council's Strategic Flood Risk Assessment, that it would not result in an unacceptable risk of flooding on the site itself or elsewhere.

The FRA should be prepared in accordance with the guidance set out in the Council's 'Site-specific Guidance for Managing Flood Risk.' For development identified by the FRA to be at risk of flooding from any source, flood mitigation should be implemented in accordance with the Flood Risk Management hierarchy outlined in the document 'Site-specific Guidance for Managing Flood Risk.'

Where development does go ahead, all floor levels for living and sleeping accommodation should be set at a minimum of 300mm and 600mm above the flood level for Flood Zones 2 and 3 respectively, including an allowance for climate change."

3.2.14 As the site is in Flood Zone 1 and not at risk of flooding it complies with Policy CC5 of the emerging Local Plan.

CC6 – Surface Water Management

"All new development should replicate natural ground and surface water flows and decrease surface water run-off through the use of Sustainable Drainage Systems, in accordance with the following criteria and the NPPG:

a. Proposals must follow the hierarchy of methods for discharge set out in the Council's Site-specific Guidance for Managing Flood Risk (2019):

  i. Into the ground, infiltration: the preferred method for discharging surface water run-off.

  ii. To a surface water body, subject to appropriate pollution control measures

  iii. To a surface water sewer, highway drain or another drainage system

  iv. To a combined sewer

b. SuDS design and robust long-term maintenance plan must be considered as an integral part of the master-planning and design process and should where possible provide multi-functional benefits.

c. No surface water connection to a foul only sewer will be permitted.

d. The discharge of surface water runoff into a public surface or combined sewer will only be acceptable if infiltration or discharge into a surface water body are shown not to be possible, an assessment of the capacity of the sewer has been undertaken, and the evidence demonstrates that there is no increased flood risk.

e. In Groundwater Source Protection Zones 1and 2 SuDS will only be permitted if adequate safeguards against possible contamination are provided or where it can be demonstrated than there will be no environmental risks to water quality and adequate mitigation measures can be implemented.

For major development, the following criteria also apply:

f. Drainage must be integrated into on-site multifunctional open space and landscape provision.

g. Proposals should be informed by guidance produced by the Lead Local Flood Authority.

h. Approval for the design and long-term maintenance of SuDS will be required prior to the development being permitted.

Where SuDs are required, a Sustainable Drainage Strategy containing proportionate information on the proposed sustainable drainage systems must be submitted as part of any planning application.”

3.2.15 The development proposes to discharge through infiltration to ground. The site is within SPZ 3. The proposed SuDS design provides suitable mitigation measures for the size and type of development, and it can be demonstrated that improvement to the quality of water discharging to the ground is being provided. Therefore, the proposal complies with Policy CC6 of the emerging Local Plan.

Dover District Council Strategic Flood Risk Assessment, March 2019

3.2.16 Strategic Flood Risk Assessments are required to inform the development of Local Plans, as stated within the NPPF. The primary objective of the SFRA is to identify the areas within a development plan area that are at risk from all forms of flooding. This enables the Local Planning Authority (LPA) to select and allocate sustainable development away from flood risk areas.

3.3 Other Technical Guidance

British Standards

3.3.2 The British Standard BS 8582:2013 Code of practice for surface water management for development sites gives recommendation on the planning, design, construction, and maintenance of surface water management systems for new development and redevelopment sites in minimizing and/or mitigating flooding and maximizing the social and environmental benefits.

3.3.3 The surface water sewer system for the Proposed Development would be designed to convey surface water only, with foul water being discharged separately. The design would be in accordance with BS EN 16933-2 – Drain and Sewer Systems Outside Buildings.

Building Regulations

3.3.4 Part H of the Building Regulations (Ref 13) was amended in 2015 to encourage and provide guidance on the incorporation of SUDS in drainage systems. This provides a hierarchical approach for the disposal of rainwater, with the preferred option being to drain it to an adequate soakaway or other infiltration system. If this is not possible, the next favoured option is to discharge to a watercourse. Only if neither of these options is possible should the site discharge rainwater to a sewer.

CIRIA SuDS Manual (C753), 2015

3.3.5 An appropriate maintenance programme for the SuDS features will need to be established in accordance with standard industry guidance and best practice. Details of recommended activities and frequencies are set out in The SuDS Manual (CIRIA, C753), which has guided development of the Surface Water Strategy for this site.

4 Evaluation of Potential Sources of Flooding

4.1.1 Flood Zones are defined in Table 1 of NPPF – Technical Guidance Document. The Flood Zones refer to the probability of flooding from rivers, the sea and tidal sources and ignore the presence of existing defences, because these can be breached, overtopped and may not be in existence for the lifetime of the development.

4.2 Sources of Flooding

4.2.1 NPPF identifies six potential sources of flooding that require investigation:

Flooding from rivers or fluvial flooding.
Flooding from the sea or tidal flooding.
Flooding from surface water.
Flooding from groundwater.
Flooding from sewers; and
Flooding from reservoirs, canals, and other artificial sources.

4.3 Flooding from Rivers or Fluvial flooding

4.3.1 A fluvial, or river flood, occurs when the water flowing in the channel overflows its banks and spreads out onto the surrounding land. Heavy rainfalls, long periods of rain, impermeable rock, steep slopes are some of the issues generally associated with an increase of river levels causing river flooding. The closest main river is River Dour located approximately 7.20 km northeast of the site.

4.3.2 Flood maps published by the EA and further information provided by the agency indicate that the site lies within ‘Flood Zone 1’, low probability of flooding and comprises land assessed as having a 0.1% annual probability of river flooding and 0.1% annual probability of sea flooding. As defined by Table 1 of NPPF.

4.3.3 The site is located within the ‘very low’ risk extent of flooding. There are no historic records of fluvial flooding on or adjacent to the site. A copy of the mapping is included within **Figure 4.1** below**.**

Figure 4.1: GOV Flood Map – Rivers and Sea

4.4 Flooding from the Sea or Tidal flooding

4.4.1 Tidal flooding in general happens when there are exceptionally high tides due to storm surges. Storm surges are associated with increases in water levels due to the changes in atmospheric pressure and wind generated by storms.

4.4.2 The site is located approximately 0.8km from the sea; however, with the site's topography showing levels of between 166mAOD and 152mAOD it is considered the site is not at risk of sea or tidal flooding and no further assessment is required.

4.5 Flooding from Land (Local Surface Water Flooding)

4.5.1 Intense rainfall, often of short duration, which is unable to soak into the ground or enter drainage systems can run quickly off land and result in local surface water flooding. Increased run-off from developed areas consisting of impermeable surfaces can increase overland flows. If the flow paths of these overland flows are not carefully considered during the detail design and planning stages, flooding from overland flows could occur.

4.5.2 The latest Environment Agency's surface water flood map for the site and surrounding area (**Figure 4.2**) shows there is no risk of surface water flooding within the site. There is an area of low risk flooding to the north of the site but not within the site boundary.

4.5.3 The site currently falls towards this area of low risk surface water flooding and surface water run off from our site likely contributes to this area of flooding. Due to the proposed surface water drainage strategy surface water run off from our site will be collected and discharged to ground, thus alleviating some of this off-site surface water flooding and reducing flood risk.

Figure 4.2: GOV Flood Map – Surface Water

4.6 Flooding from Sewers

4.6.1 Local urban drainage should be considered, as every drainage system has a design capacity, which at some point can be exceeded. Sewer and surface water flooding results in localised short-term flooding caused by intense rainfall events which overload the capacity of sewers or runs off adjacent land as sheet flow. Flooding can also occur because of blockage, poor maintenance, or structural failure.

4.6.2 Southern Water are responsible for managing the sewer network in and around the proposed development area. There are no existing public sewers within the site. The closest foul water sewers are in Capel Street and Cauldham Lane. Southern Water sewer records are included in **Appendix E.**

4.6.3 All new sewers proposed within the development will be constructed in accordance with the latest technical guidance. The risk of sewer flooding to the site has been considered as very low.

4.7 Flooding from Groundwater

4.7.1 Groundwater flooding occurs when water levels in the ground rise above surface elevations. Severe storm events could cause groundwater levels to rise above ground level. Underlying geology is the principal factor that effects groundwater flooding. Groundwater flooding most commonly occurs in low lying areas which are underlain by permeable rocks or aquifers.

4.7.2 The site does fall within a groundwater source protection zone area and a detailed contamination assessment will be required within detailed planning to prove the site is not going to contaminate onsite groundwater.

4.7.3 No records of groundwater flooding within vicinity of the site have been identified within the SFRA. Therefore, the site is at a low risk of groundwater flooding.

4.8 Flooding from Reservoirs, Canals, and other Artificial Sources

4.8.1 The main cause for flooding from a reservoir would be a structural failure in the walls of the reservoir or some form of accident-causing significant damage to the structure of the reservoir.

4.8.2 There are no artificial sources of water (i.e., reservoirs, dams *etc.)* in the vicinity of the site or flood defences and therefore failure of local infrastructure of perched water sources or flood defences is unlikely to pose a risk of flooding to the site. Therefore, no further detail assessment is required.

5 Surface Water Management Proposal

5.1 Development Proposal

5.1.1 The proposed development is for 90 houses with associated parking and infrastructure as shown on the indicative Masterplan **(Appendix A).**

5.2 Proposed Drainage

5.2.1 A comprehensive sustainable drainage system will be implemented to prevent runoff from this development increasing flood risk to other areas. This will be fully detailed at the detail drainage design stage of the proposed development, although an indicative strategy to demonstrate that SuDS can be delivered is described below.

5.2.2 There are a number of options available to impose surface water restrictions on proposed development plots such as attenuation ponds, oversized sewers, below ground storage tanks, pervious paving, infiltration systems etc. Approved document Part H[10] sets out a hierarchy for surface water disposal, which encourages a sustainable approach.

An adequate soakaway or some other adequate infiltration system, or where that is not reasonably practicable.
A Watercourse, or where that is not reasonably practicable.
to a surface water sewer, highway drain, or other drainage system.
to a combined sewer.

5.2.3 As detailed in **Section 2.3** above the site is underlain by Lewes Nodular Chalk. This suggests that infiltration will be within this strata. Although infiltration testing is yet to be undertaken to an infiltrating surface water strategy has been proposed.

5.2.4 It is accepted that infiltration testing will be required to confirm the assumed rates used in the proposed strategy as the site progresses through the planning process.

5.3 Proposed and Existing Run off Rates

5.3.1 Under current conditions, there is no formal drainage system in place for the site. Precipitation falling on the existing ground currently disperses through a combination of evaporation, transpiration, run-off from largely impermeable soil and geology. Excess rainfall drains diffusely across the surface of the site in a northerly direction towards the site boundary likely contributing to the area of low surface water flooding beyond the northern boundary.

5.3.2 Current government guidance advises that the post-development rate of runoff should be no greater than the pre-developed rate with the same rainfall event.

5.3.3 The ‘post development’ discharge rates will be improved from the current rates, for all storm events up to and including the critical 1% AEP (1 in 100-year return period) storm event incorporating the impacts of climate change allowances (applied as a 45% uplift in peak rainfall intensity) for the lifetime of the development (assessed as being 100 years) due to the introduction of a new surface water drainage network and SuDS features. Surface water runoff will now be collected via. permeable paving, traditional gullies, and pipes. Flows will be routed to attenuation basins and tanks prior to discharging to ground via. deep bore soakaways.

5.3.4 Due to the proposals surface water runoff from the site will be significantly reduced as it will be discharged to the permeable substrata rather than flowing over the surface and off site as surface water flooding, thus reducing flood risk.

5.4 Proposed SuDS

5.4.1 A Drainage Strategy has been developed and included within **Appendix F.**

5.4.2 Run off from the proposed development will be drained via infiltration techniques in accordance with drainage hierarchy set out in NPPF, KCC Policy and Building Regulations. This provides considerable betterment than the existing scenario where surface water flows over land and off site.

5.4.3 The attenuation required to restrict the runoff will be provided by a series of attenuation features including permeable paving, swales, filter drains, attenuation basins and tanks.

5.4.4 The proposed surface water strategy is split into 2 separate networks. Network 1 directs flows to an attenuation basin above an attenuation tank. The basin bottom will be planted with dense vegetation and underlain by a 300mm deep layer of soil with good contaminant attenuation potential (as stipulated by CIRIA SuDS guidance) above the attenuation tank. Flows will be attenuated in this structure prior to discharging to the permeable strata via. a deep bore soakaway.

5.4.5 Network 2 directs flows from the western part of the site to a swale above a filter trench where flows are attenuated and treated. Surface water runoff is then released from this structure into an attenuation basin above an attenuation tank, in the northeastern corner of the site. The basin bottom will be planted with dense vegetation and underlain by a 300mm deep layer of soil with good contaminant attenuation potential (as stipulated by CIRIA SuDS guidance) above the attenuation tank. Flows are attenuated here before discharging to the permeable strata via. 3 deep bore soakaways.

5.4.6 Surface water runoff from the eastern part of the site, which is not collected by Network 1, is directed to the attenuation basin and attenuation tank in the northeastern corner of the site (as described above). Flows are attenuated here before discharging to the permeable strata via 3 deep bore soakaways.

5.4.7 SuDS guidance (CIRIA C753) recommends an inclusion of additional 10% impermeable area to account for potential future development (Urban creep). The current masterplan was used to measure the proposed impermeable areas of the development. The proposed was strategy has been modelling using these impermeable areas with an additional 10% added for urban creep.

5.4.8 As stated in NPPF climate change must be considered for all proposed surface water drainage systems. Therefore, all events up to and including the 100 year + 45% climate change events will be catered for within the proposed system. Further analysis will be undertaken to establish the effect on the system for the 1 in 30 year + 40% climate change event.

5.4.9 The preliminary SuDS system for the development has been designed in accordance with best practice SuDS guidance as set out in the SuDs Manual and in accordance with KCC's guidance, as LLFA, and the NPPF.

5.5 Pollution Control Measures

5.5.1 The surface water run-off from the site will be treated in accordance with the Simple Index Approach outlined in CIRIA SuDS Manual 2015. Table 26.2 of the CIRIA SuDS Manual provides Pollution hazard indices for different land use classifications. The development is for 90 residential units, due to the amount of traffic movements generated by that number of units the site is classified as having a Low and medium Pollution Hazard Level.

5.5.2 Table 26.2 of the CIRIA SuDS Manual confirms that, where the pollution hazard level is classified as "low," this correlates to the following pollution indices:

Total Suspended Solids (TSS) – 0.5
Metals – 0.4
Hydrocarbons – 0.4

5.5.3 Table 26.2 of the CIRIA SuDS Manual confirms that, where the pollution hazard level is classified as "medium," this correlates to the following pollution indices:

Total Suspended Solids (TSS) – 0.7
Metals – 0.6
Hydrocarbons – 0.7

5.5.4 Table 26.4 of the CIRIA SuDS Manual – Indicative SuDS mitigation indices for discharge to groundwater provides mitigation indices relating to SuDS features.

5.5.5 The proposed surface water strategy shows that all surface run-offs will flow through an attention basin and into an attenuation tank beneath before infiltrating into the ground via deep bore soakaways. The eastern part of the site will also flow through a swale and filter drain providing further treatment.

5.5.6 According to Table 26.3 of the CIRIA SuDS Manual an attenuation basin has the following mitigation indices:

Total Suspended Solids (TSS) – 0.5
Metals – 0.5
Hydrocarbons – 0.6

5.5.7 Table 26.3 of the CIRIA SuDS Manual also states that a swale has the following mitigation indices:

Total Suspended Solids (TSS) – 0.5
Metals – 0.6
Hydrocarbons – 0.6

5.5.8 Table 26.3 of the CIRIA SuDS Manual also states that a filter drain has the following mitigation indices:

Total Suspended Solids (TSS) – 0.4
Metals – 0.4
Hydrocarbons – 0.4

5.5.9 Table 26.4 of the CIRIA SuDS Manual provides mitigation indices for characteristics of the material overlying the proposed infiltration surface. As described above the attenuation basins are proposed to have a base with dense vegetation underlain by a 300mm deep layer of soil with good contaminant attenuation potential. This layer provides the following mitigation indices.

Total Suspended Solids (TSS) – 0.6
Metals – 0.5
Hydrocarbons – 0.6

5.5.10 In accordance with the CIRIA SuDS Manual the total SuDS Mitigation Index for the Site is calculated using the following formula:

$$\textit{Total SuDS mitigation index} = \textit{mitigation index}_1 + 0.5(\textit{mitigation index}_2)$$

5.5.11 As stated previously the site is split into 2 separate networks, the mitigation indices vs the pollution indices for each network have been calculated below.

5.5.12 Refer to Table 5.3 below for the Total SuDS mitigation indices for Network 1. Surface water flows within this network are classified as Low Hazard Level.

Table 5.3: Total SuDS Mitigation Index – Network 1

Pollutant	Pollution Hazard Indices (low pollution hazard level)	Detention Basin Mitigation Indices	Permeation through base of basin	Total SuDS Mitigation Indices
Total Suspended Solids (TSS)	0.5	0.5	0.6	0.8
Metals	0.4	0.5	0.5	0.75
Hydrocarbons	0.4	0.6	0.6	0.9

5.5.13 Refer to Table 5.4 below for the Total SuDS mitigation indices for the eastern parcel of Network 2. Surface water flows within this network are classified as Medium Hazard Level.

Table 5.4: Total SuDS Mitigation Index – Network 2 (Eastern Parcel)

Pollutant	Pollution Hazard Indices (medium pollution hazard level)	Detention Basin Mitigation Indices	Permeation through base of basin	Total SuDS Mitigation Indices
Total Suspended Solids (TSS)	0.7	0.5	0.6	0.8
Metals	0.6	0.5	0.5	0.75
Hydrocarbons	0.7	0.6	0.6	0.9

5.5.14 Refer to Table 5.5 below for the Total SuDS mitigation indices for the western parcel of Network 2. Surface water flows within this network are classified as Medium Hazard Level.

Table 5.5: Total SuDS Mitigation Index – Network 2 (Western Parcel)

Pollutant	Pollution Hazard Indices (medium pollution hazard level)	Swale Mitigation Indices	Filter Drain Mitigation Indices	Detention Basin Mitigation Indices	Permeation through base of basin	Total SuDS Mitigation Indices
Total Suspended Solids (TSS)	0.7	0.5	0.4	0.5	0.6	1.25
Metals	0.6	0.6	0.4	0.5	0.5	1.3
Hydrocarbons	0.7	0.6	0.4	0.6	0.6	1.4

5.5.15 As can be seen from Tables 5.3 to 5.5 above the Total SuDS mitigation indices for the Site match or exceed the requirements of CIRIA SuDS Manual for the required pollutants (Total Suspended Solids (TSS), metals and hydrocarbons) and will provide sufficient protection to the groundwater as described within **Section 2.4** of this report.

5.6 Surface Water Storage Calculations

5.6.1 SuDS guidance (CIRIA C753) recommends an inclusion of additional 10% impermeable area to account for potential future development (Urban creep), which has been added to the calculation. The preliminary masterplan in **Appendix A** was used to assess the impermeable areas on the developed site. As this masterplan is further developed through the detailed design process run off calculations will be further refined.

5.6.2 An analysis has been undertaken using a 45% increase in rainfall intensity. This SuDS strategy will ensure that the surface water runoff from the future development will be attenuated within the development area and discharged via infiltration.

5.6.3 Calculations for the strategic SuDS that are located within **Appendix G** demonstrate that for the respective critical storm events of up to 1 in 100year return period plus a 45% allowance for climate change, the drainage system and storage of run off is contained within the storage features. There is also the potential to implement source control SuDS measures such as permeable paving, rainwater harvesting etc. locally to reduce the runoff entering the drainage system and to provide pollution treatment at source. These will be considered during the detailed design stage.

5.6.4 Excess flood flows will be effectively managed within the drainage system through the incorporation of controlled storage and release mechanisms, ensuring the system's capacity to handle extreme precipitation events.

5.6.5 The preliminary SuDS system for the development has been designed to accord with current KCC/DDC guidance. This guidance will be followed should the site gain planning permission, when full final design details will be developed to release planning conditions and enable construction, including any potential updates resulting from changes to the masterplan and results from soakage testing.

5.7 Flood Risk Management Measures

5.7.1 NPPG requires that the safety of people and the proposed development be considered against each source of flooding identified in **Section 4.**

5.7.2 A preliminary surface water drainage strategy incorporating SuDS has been proposed to manage the increase in run-off from the site over the lifetime of the development, such that it will not place existing or proposed properties at risk of surface water flooding.

5.7.3 The flood risk to the proposed development and surrounding area, because of the development is therefore considered to be low and no specific flood risk management measures will be required.

6 Conclusions & Recommendations

6.1.1 Charles & Associates Consulting Engineers Ltd (C&A) has been commissioned by Quinn Estates to prepare a Flood Risk Assessment (FRA) and Surface Water Drainage Strategy to support an application for outline planning permission for the erection of 90 dwellings with associated parking and infrastructure following demolition of an existing dwelling; with all matters reserved except access. This site is located between Cauldham Lane and Capel Street, Dover, Kent.

6.1.2 The entire development area lies in Flood Zone1 ‘Low Probability’ flood area defined by Table 1 of the NPPG. The proposed development is considered as ‘More Vulnerable’ when utilising Table 2 of the NPPG. The development proposed is consistent with the appropriate uses for Flood Zone 1, as outlined in Table 3 of the Planning Practice Guidance.

6.1.3 All potential sources of flood risk to and from the site, as listed in NPPF, have been assessed and the risks of flooding on Site occurring have all been assessed as **Low** and has little to no impact on the proposed development. In assessing the flood risk, the impacts of climate change have been considered for the lifetime of the proposed development and are also considered acceptable.

6.1.4 The safety of individuals is considered appropriate for all foreseeable flooding events. No specific flood management measures, other than routine maintenance, are deemed necessary for this site.

6.1.5 The drainage strategy outlined in this assessment proposes managing surface water run-off from the development by employing sustainable drainage techniques that will provide and improve the surface water drainage regime and flood risk profile.

6.1.6 Consequently, this will reduce surface water run-off flows from the site, for storm return periods up to the 1 in 100-year event plus 45% allowance for the detrimental effects of climate change. The proposed development will not increase the risk of flooding elsewhere. The implementation of the SuDS scheme proposed, is likely to reduce any existing risk of downstream flooding.

6.2 Recommendations

Due to the positive outcome of the assessment conducted, there is no reason why the site should not continue through the planning process and be approved for residential development in respect of flood risk and surface water drainage.

7 References

Ref 1 National Planning Policy Framework, Department for Communities and Local Government, 2023

Ref 2 The Flood & Water Management Act 2010 (TFWMA), DEFRA, April 2010

Ref 3 Department for Communities and Local Government, August 2022 National Planning Practice Guidance

Ref 4 Kent County Council (KCC) Drainage and Planning Policy Statement, December 2019

Ref 5 Dover Surface Water Management Plan, August 2011

Ref 6 Dover District Adopted Core Strategy, Adopted February 2010

Ref 7 Dover District Local Plan to 2040 Regulation 19 Submission, October 2022

Ref 8 Dover District Council's Strategic Flood Risk Assessment (SFRA), March 2019

Ref 9 The Sustainable Drainage (SuDS) Manual -C753, CIRIA, 2015

Ref 10 Sewerage Sector Guidance, June 2022

Ref 11 British Geological Survey, Geology of Britain viewer, https://geologyviewer.bgs.ac.uk/?_ga=2.170449888.1779472162.1685460599-540387963.1685460599

Ref 12 Department for Environment, Food & Rural Affairs, Magic Maps, Magic Map Application (defra.gov.uk)

Ref 13 Part H of the Building Regulations 2000. 2002 DTLR. The Stationary Office

Appendix A Indicative Layout

Quinn Estates

Proposed Strategic Development, Site A, Capel-Le-Ferne

NOTES:

Do Not Scale.

Report all discrepancies, errors and omissions.

Verify all dimensions on site before commencing any work on site or preparing shop drawings.

All materials, components and workmanship are to comply with the relevant British Standards, Codes of Practice, and appropriate manufacturers recommendations that from time to time shall apply.

For all specialist work, see relevant drawings.

Rev	Date	Description
A	18/12/2023	First Issue
B	03/01/2024	Unit Mix Update
C	04/01/2024	Unit numbers increased
D	04/01/2024	Schedule added
E	05/01/2024	Layout amended
F	08/01/2024	Layout amended
G	13/02/2024	Boundary Line Update
H	14/02/2024	Graphical Amendments
I	15/02/2024	Site Boundary Amendment
J	20/02/2024	Graphical Amendments
K	21/02/2024	Access Road Amendment
L	22/02/2024	Site Boundary Amendment

Schedule of Accommodation

UNIT MIX	
PRIVATE (70%)	63 units
1s = 0 %	0
2s = 29%	18
3s = 47%	30
4s = 24%	15
AFFORDABLE (30%)	27units
1s = 7.5%	2
2s = 44%	12
3s = 30%	8
4s = 18.5%	5
TOTAL	90units

Key

🟥	Site Boundary
*	Corner Plots at an angle or double aspect

Project Title

Land off Capel Street,
Capel-Le-Ferne
Kent
CT18 7HF
For Quinn Estates

Drawing Description

Proposed Site Layout Plan

Scale	Drawn by
1:500 @ A1	DJ
Date	**Checked by**
February 2024	CSS

CLAGUE ARCHITECTS

62 Burgate, Canterbury
Kent CT1 2BH
01227 762060

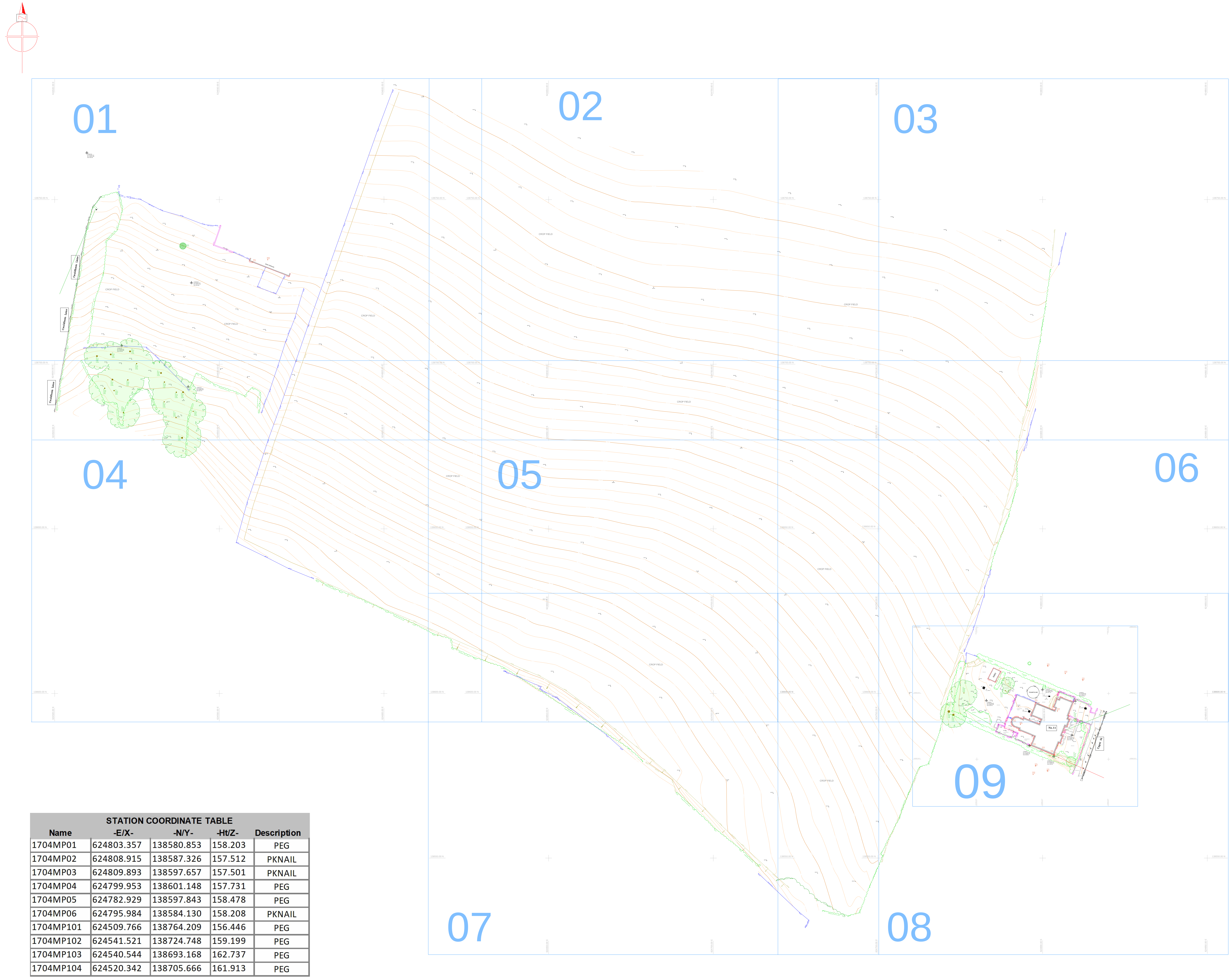
1 Kinsbourne Court, Luton Road,
Harpenden, Hertfordshire Al5 3BL
01582 765102

8, Disney Street
London SE1 1JF
0203 597 6112

CANTERBURY LONDON HARPENDEN

Drawing Number	Revision
23395A_SK107	L

Appendix B Topographical Survey



STATION COORDINATE TABLE

Name	-E/X-	-N/Y-	-Ht/Z-	Description
1704MP01	624803.357	138580.853	158.203	PEG
1704MP02	624808.915	138587.326	157.512	PKNAIL
1704MP03	624809.893	138597.657	157.501	PKNAIL
1704MP04	624799.953	138601.148	157.731	PEG
1704MP05	624782.929	138597.843	158.478	PEG
1704MP06	624795.984	138584.130	158.208	PKNAIL
1704MP101	624509.766	138764.209	156.446	PEG
1704MP102	624541.521	138724.748	159.199	PEG
1704MP103	624540.544	138693.168	162.737	PEG
1704MP104	624520.342	138705.666	161.913	PEG

TOPOGRAPHICAL SURVEY LEGEND

GENERAL

AV	AIR VALVE
BB	BOLISHA BEACON
Bdy	BOUNDARY
BH	BOREHOLE
BL	BED LEVEL
BO	BOLLARD
BS	BUS STOP
BKW	BRICK WALL
CATV	CABLE TELEVISION
CG	CATTLE GRID
CH	CHANNEL LEVEL
Conc	CONCRETE
Corr	CORRUGATED
CO	COPING LEVEL
CPS	CONC. PAVING SLABS
CR	CROWN LEVEL
CUL	CULVERT
DK	DROP KERB
DP	DOWN PIPE
EB	ELECTRICITY BOX
EC	ELECTRICITY CABLE
ElecMH	ELECTRICITY MANHOLE
EP	ELECTRICITY POLE
EPy	ELECTRICITY PYLON
ER	EARTHING ROD
FH	FIRE HYDRANT
FLR	FLOOR LEVEL
FM	FLOW METER
FB	FLOWER BED
FW	FOUL WATER
GL	GROUND LEVEL
GP	GATE POST
GV	GAS VALVE
H	HIGH
HO	HOLE
HW	HEADWALL
IC	INSPECTION COVER
JB	JUNCTION BOX
KL	KEEP LEFT ROAD SIGN
LB	LETTER BOX
LH	LAMP HOLE
LP	LAMP POST
MK	MARKER POST
MS	MILE STONE
NB	NOTICE BOARD
NP	NAME-PLATE
OSBM	ORDNANCE SURVEY BENCH MARK
OH	OVERHEAD
PE	PENSTOCK
PM	PARKING METER
PO	POST
RB	RUBBISH BIN
RS	ROAD SIGN
RTW	RETAINING WALL
RWP	RAIN WATER PIPE
SAP	SAPLING
SC	STOP COCK
SL	SOFFIT LEVEL
SVP	SOIL VENT PIPE
SP	SIGN POST
STN	SURVEY STATION
SV	STOP VALVE
SW	SURFACE WATER
TB	TREE BOLE
TBM	TEMPORARY BENCH MARK
TCB	TELEPHONE CALL BOX
TH	THRESHOLD
TL	TRAFFIC LIGHT
TMH	TELEPHONE MANHOLE
TOW	TOP OF WALL
TP	TELEGRAPH POLE
TS	TREE STUMP
U/G	UNDERGROUND
VA	VALVE
VP	VENT PIPE
W	WIDE
WL	WATER LEVEL
WM	WATER METER
WO	WASH OUT
WP	WOODEN POST
WV	WATER VALVE

FENCE TYPES

BWF	BARBED WIRE FENCE
CBF	CLOSE BOARDED FENCE
CLF	CHAINLINK FENCE
CPF	CHESTNUT PALING
CWF	FENCE CHICKEN WIRE
IRF	FENCE IRON RAILING
IWF	FENCE INTERWOVEN
LLF	FENCE LARCH LAP
PAL	FENCE PALISADE FENCE
PRF	POST & RAIL FENCE
PWF	POST & WIRE FENCE
TR	TRELLIS

TREE TYPES

AA	ACACIA
AH	ASH
AL	ALDER
AN	ASPEN
AP	APPLE
BH	BEECH
BL	BLACKTHORN
BR	BIRCH
CE	CHERRY
CO	CONIFER
CR	CEDAR
CY	CYPRESS
DD	DEAD
ED	ELDER
EM	ELM
FR	FIR
HB	HORNBEAM
HC	HORSE CHESTNUT
HN	HAWTHORN
HY	HOLLY
HZ	HAZEL
LA	LARCH
LE	LIME
LN	LONDON PLANE
ME	MAPLE
OK	OAK
OR	ORNAMENTAL
PE	PINE
PD	POLLARDED
PR	POPLAR
SB	SILVER BIRCH
SC	SWEET CHESTNUT
SU	SPRUCE
SY	SYCAMORE
WB	WHITEBEAM
WT	WALNUT
WW	WILLOW
YW	YEW
XX	UNKNOWN

TREE ANNOTATION

CO	TYPE
45.96	LEVEL
16.00	SPREAD
0.300	DIAM.
18.00	HEIGHT

SERVICE ABBREVIATIONS

AC	ASSUMED CONNECTION
AR	ASSUMED ROUTE
BD	BACK DROP
CC	CONFIRMED CONNECTION
CD	CHAMBER DEPTH
COW	CABLE ON WALL
CL	COVER LEVEL
CP	CATCH PIT
CB	CABLE RISER
DTB	DEPTH TO BASE
D	DEPTH
(dis)	DISUSED
EOT	END OF TRACE
GU	GULLY
IL	INVERT LEVEL
KIG	KERB INLET GULLY
MH	MANHOLE
OHL	OVER HEAD LINE
PI	PETROL INTERCEPTOR
RD	FROM RECORD DRAWINGS
RE	RODDING EYE
SK	SOAKAWAY
TPT	TRACED POINT
UNK	UNKNOWN SERVICE
UTL	UNABLE TO LOCATE
UTR	UNABLE TO RAISE
UTT	UNABLE TO TRACE
UTS	UNABLE TO SURVEY

UTILITY LEGEND AND NOTES

FOUL WATER DRAINAGE	►
COMBINED WATER DRAINAGE	►
SURFACE WATER DRAINAGE	►
WATER	WATER
GAS	GAS
ELECTRICITY	ELEC
ELECTRICITY OVERHEAD	ELEC/OH
TELEPHONE	TEL
TELEPHONE	TEL/OH
UNKNOWN SERVICE DETECTED BY EML	UNK (EML)
UNKNOWN SERVICE DETECTED BY GPR	UNK (GPR)
OIL	OIL
CATV	CATV
UNKNOWN LINEAR FEATURE DETECTED BY GPR	GPR
FIBRE OPTIC	F_OPT
UNDERGROUND CHAMBER	▭

GPR (0.00) GROUND PENETRATING RADAR (DEPTH)

UTILITY DEPTHS

SERVICES ARE DRAWN IN 3D WITH THE LEVEL CORRESPONDING TO THE CENTRE OF THE UTILITY.
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(SEE EXAMPLE BELOW)

XXXXXXX B1P

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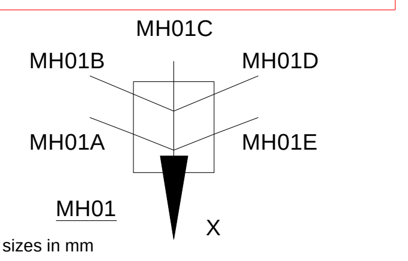

Note: Pipe sizes in mm

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A SCALE FACTOR OF
1.000000
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Rev.	Date	Description	By

Drawn by	Surveyed by	Checked by
MP	MP	SDS

Project title
CAULDHAM LANE
CAPEL LE FERNE, CT18 7HG

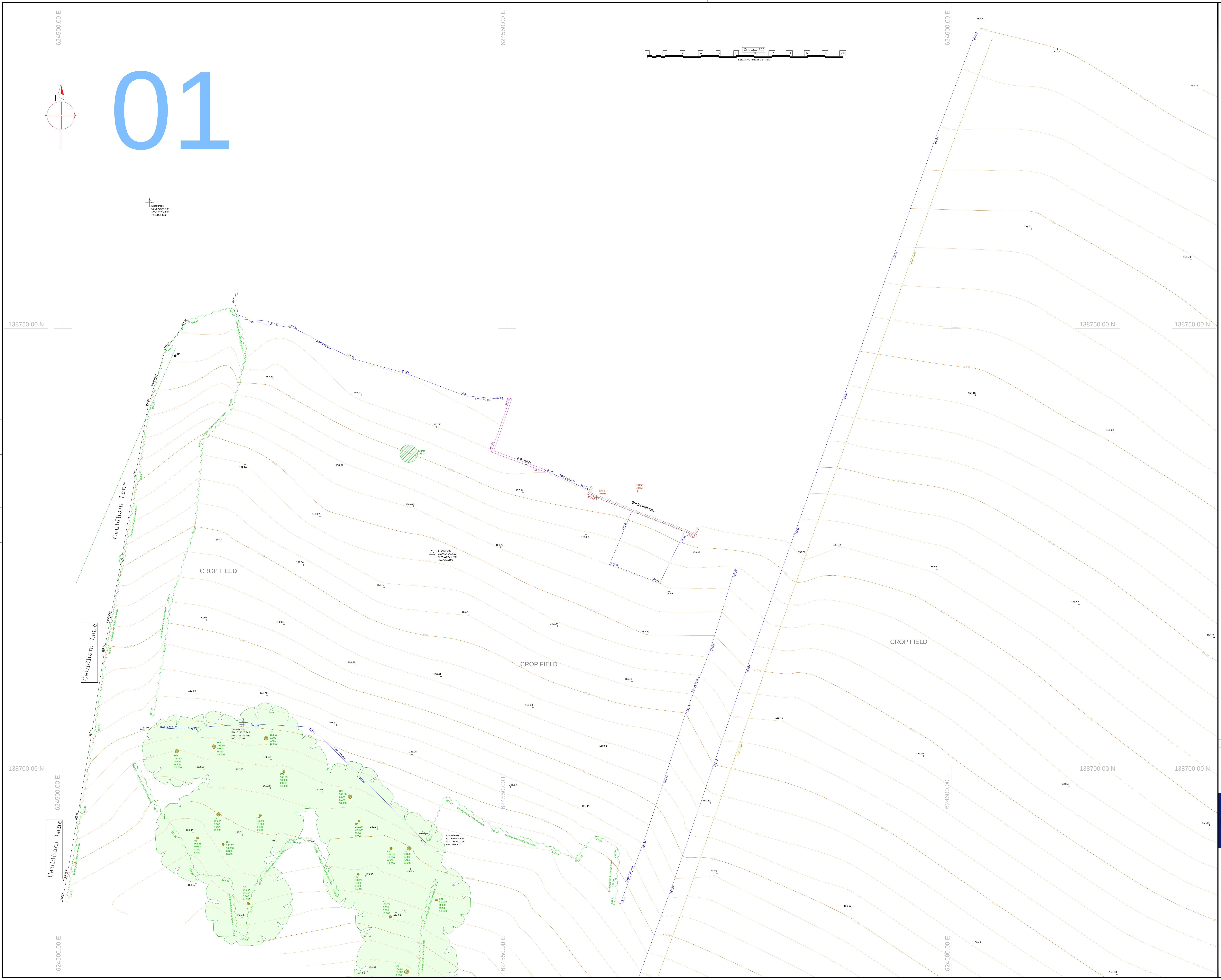
Drawing title
SHEET
LAYOUT

Client
QUINN ESTATES

Drawing No.	Revision
SDS 208912.00	_

Scale	Date	Sheet size
NTS	MAY 2023	A1

SURVEY DESIGN SERVICES and ASSOC. LTD. UNITS 13 & 14,FOUNDRY BUSINESS PARK, SEAGER ROAD, FAVERSHAM, KENT. ME13 7FD TEL. 01795 594110 www.surveydesignservices.co.uk



TOPOGRAPHICAL SURVEY LEGEND

GENERAL

AV	AIR VALVE	LH	LAMP HOLE
BB	BOLISHA BEACON	LP	LAMP POST
Bdy	BOUNDARY	MK	MARKER POST
BH	BOREHOLE	MS	MILE STONE
BL	BED LEVEL	NB	NOTICE BOARD
BO	BOLLARD	NP	NAME-PLATE
BS	BUS STOP	OSBM	ORDNANCE SURVEY BENCH MARK
BKW	BRICK WALL	OH	OVERHEAD
CATV	CABLE TELEVISION	PE	PENSTOCK
CG	CATTLE GRID	PM	PARKING METER
CH	CHANNEL LEVEL	PO	POST
Conc	CONCRETE	RB	RUBBISH BIN
Corr	CORRUGATED	RS	ROAD SIGN
CO	COPING LEVEL	RTW	RETAINING WALL
CPS	CONC. PAVING SLABS	RWP	RAIN WATER PIPE
CR	CROWN LEVEL	SAP	SAPLING
CUL	CULVERT	SC	STOP COCK
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GL	GROUND LEVEL	TP	TELEGRAPH POLE
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GV	GAS VALVE	U/G	UNDERGROUND
H	HIGH	VA	VALVE
HO	HOLE	VP	VENT PIPE
HW	HEADWALL	W	WIDE
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JB	JUNCTION BOX	WM	WATER METER
KL	KEEP LEFT ROAD SIGN	WO	WASH OUT
LB	LETTER BOX	WP	WOODEN POST
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FENCE TYPES

BWF	BARBED WIRE FENCE	IWF	FENCE INTERWOVEN
CBF	CLOSE BOARDED FENCE	LLF	FENCE LARCH LAP
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CWF	FENCE CHICKEN WIRE	PWF	POST & WIRE FENCE
IRF	FENCE IRON RAILING	TR	TRELLIS

TREE TYPES

AA	ACACIA	ED	ELDER	OR	ORNAMENTAL
AH	ASH	EM	ELM	PE	PINE
AL	ALDER	FR	FIR	PD	POLLARDED
AN	ASPEN	HB	HORNBEAM	PR	POPLAR
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CO	CONIFER	LE	LIME	WT	WALNUT
CR	CEDAR	LN	LONDON PLANE	WW	WILLOW
CY	CYPRESS	ME	MAPLE	YW	YEW
DD	DEAD	OK	OAK	XX	UNKNOWN

TREE ANNOTATION

CO	TYPE
45.96	LEVEL
16.00	SPREAD
0.300	DIAM.
18.00	HEIGHT

SERVICE ABBREVIATIONS

AC	ASSUMED CONNECTION	IL	INVERT LEVEL
AR	ASSUMED ROUTE	KIG	KERB INLET GULLY
BD	BACK DROP	MH	MANHOLE
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UTILITY LEGEND AND NOTES

FOUL WATER DRAINAGE	——▶——
COMBINED WATER DRAINAGE	——▶——
SURFACE WATER DRAINAGE	——▶——
WATER	—— WATER ——
GAS	—— GAS ——
ELECTRICITY	—— ELEC ——
ELECTRICITY OVERHEAD	—— ELEC/OH ——
TELEPHONE	—— TEL ——
TELEPHONE	—— TEL/OH ——
UNKNOWN SERVICE DETECTED BY EML	—— UNK (EML) ——
UNKNOWN SERVICE DETECTED BY GPR	—— UNK (GPR) ——
OIL	—— OIL ——
CATV	—— CATV ——
UNKNOWN LINEAR FEATURE DETECTED BY GPR	—— GPR ——
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UNDERGROUND CHAMBER	▭ ▭ ▭

GPR (0.00) GROUND PENETRATING RADAR (DEPTH)

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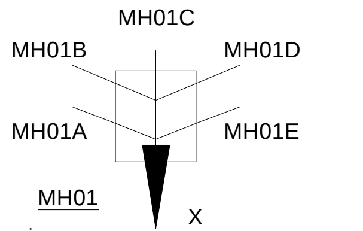

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Rev.	Date	Description	By

Drawn by MP	Surveyed by MP	Checked by SDS

Project title

CAULDHAM LANE
CAPEL LE FERNE, CT18 7HG

Drawing title

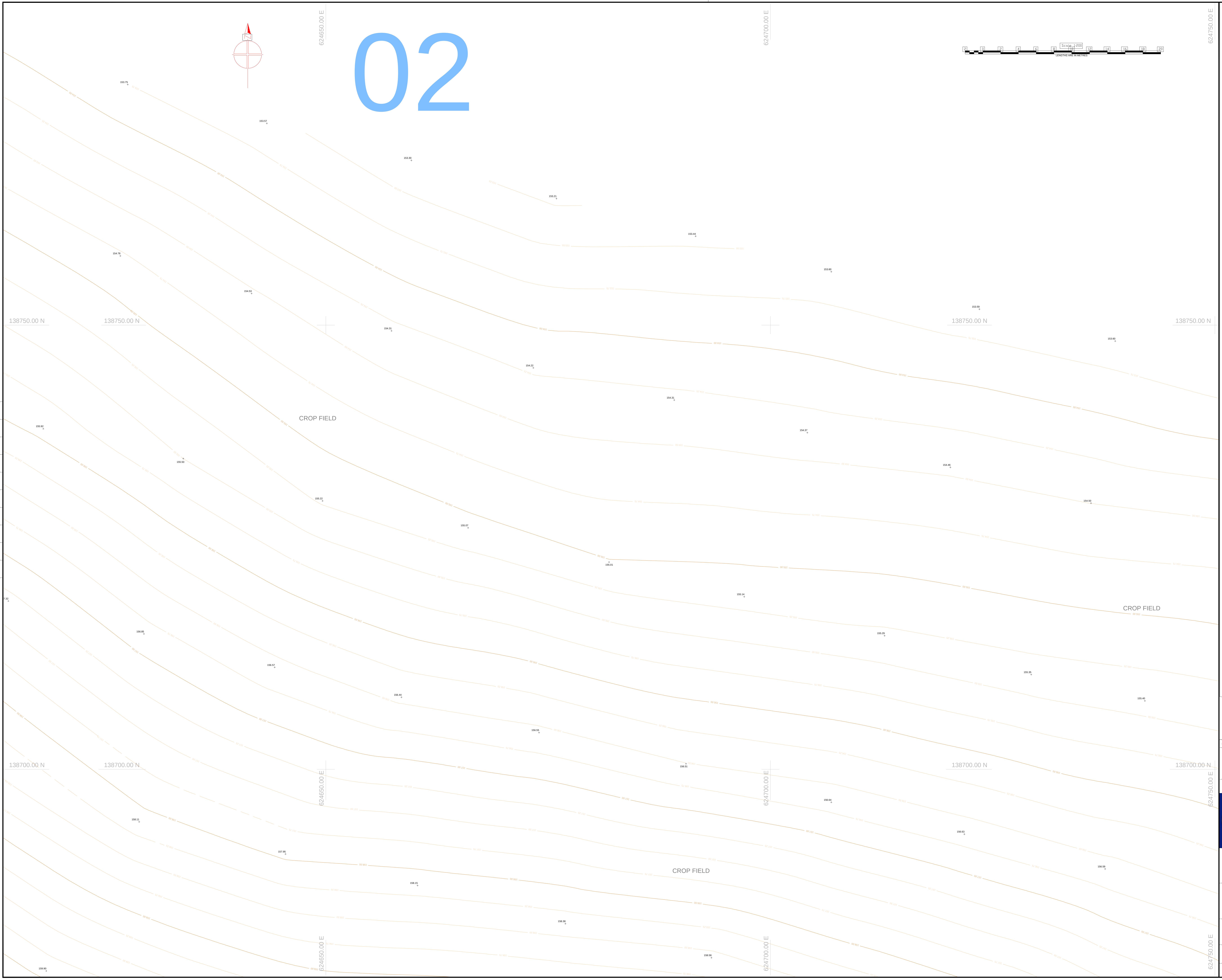
TOPOGRAPHICAL
SURVEY

Client

QUINN ESTATES

Drawing No. SDS 208912.01	Revision —

Scale 1:200 @ A1	Date MAY 2023	Sheet size A1



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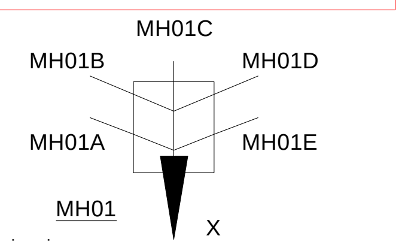

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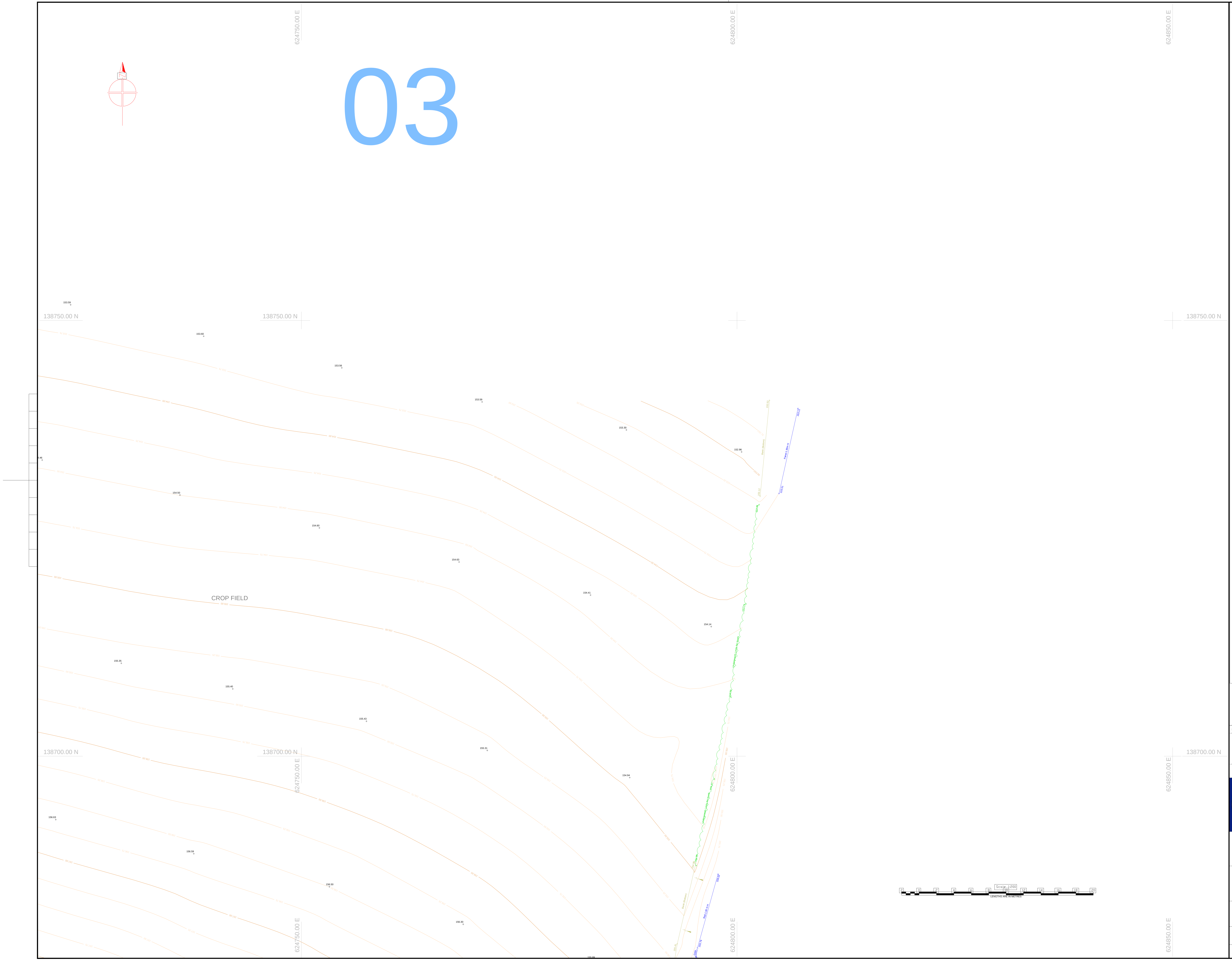
Project title
CAULDHAM LANE
CAPEL LE FERNE, CT18 7HG

Drawing title
TOPOGRAPHICAL
SURVEY

Client
QUINN ESTATES

Drawing No.	Revision
SDS 208912.02	–

Scale 1:200 @ A1	Date MAY 2023	Sheet size A1



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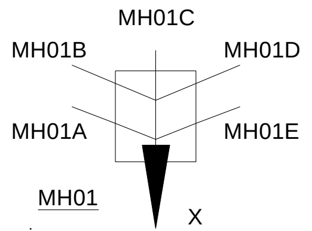

Note: Pipe sizes in mm

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A SCALE FACTOR OF
1.000000
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Rev.	Date	Description	By

Drawn by	Surveyed by	Checked by
MP	MP	SDS

SURVEY DESIGN SERVICES
SDS

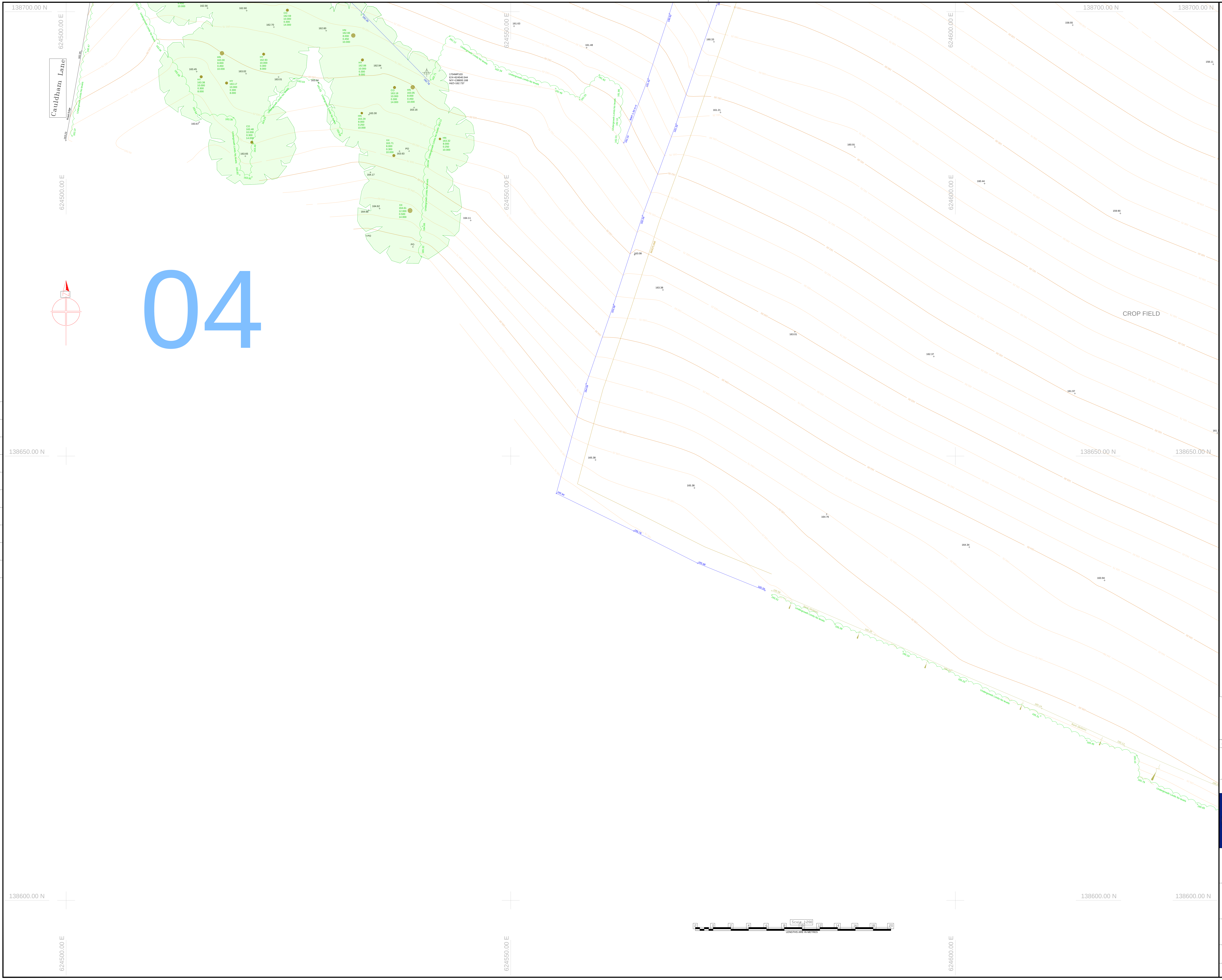
Project title
CAULDHAM LANE
CAPEL LE FERNE, CT18 7HG

Drawing title
TOPOGRAPHICAL SURVEY

Client
QUINN ESTATES

Drawing No.	Revision
SDS 208912.03	–

Scale	Date	Sheet size
Scale 1:200 @ A1	MAY 2023	A1



TOPOGRAPHICAL SURVEY LEGEND

GENERAL

AV	AIR VALVE	LH	LAMP HOLE
BB	BOLISHA BEACON	LP	LAMP POST
Bdy	BOUNDARY	MK	MARKER POST
BH	BOREHOLE	MS	MILE STONE
BL	BED LEVEL	NB	NOTICE BOARD
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BS	BUS STOP	OSBM	ORDNANCE SURVEY BENCH MARK
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Corr	CORRUGATED	RS	ROAD SIGN
CO	COPING LEVEL	RTW	RETAINING WALL
CPS	CONC. PAVING SLABS	RWP	RAIN WATER PIPE
CR	CROWN LEVEL	SAP	SAPLING
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GV	GAS VALVE	U/G	UNDERGROUND
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LB	LETTER BOX	WP	WOODEN POST
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TREE ANNOTATION

CO	TYPE
45.96	LEVEL
16.00	SPREAD
0.300	DIAM.
18.00	HEIGHT

SERVICE ABBREVIATIONS

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UTILITY LEGEND AND NOTES

FOUL WATER DRAINAGE	►
COMBINED WATER DRAINAGE	►
SURFACE WATER DRAINAGE	►
WATER	WATER
GAS	GAS
ELECTRICITY	ELEC
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TELEPHONE	TEL
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OIL	OIL
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FIBRE OPTIC	F_OPT
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GPR (0.00) GROUND PENETRATING RADAR (DEPTH)

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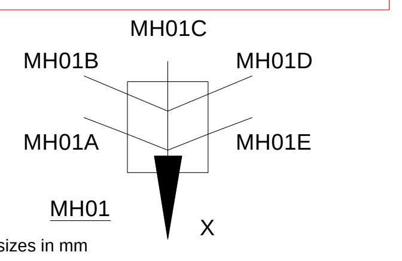

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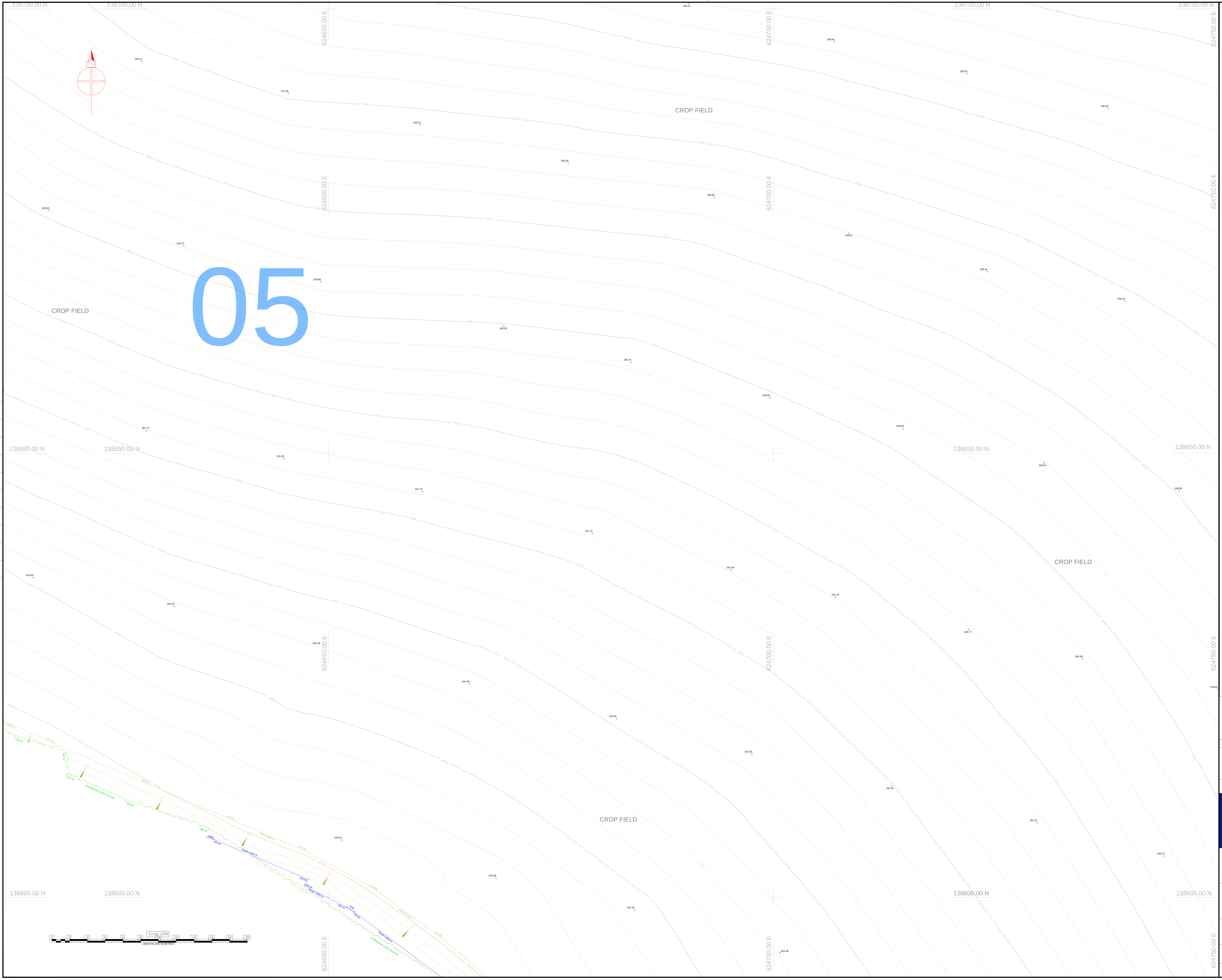

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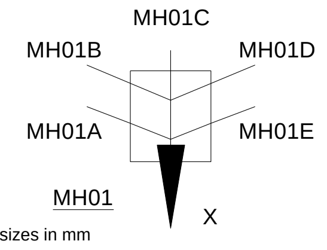

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CAULDHAM LANE
CAPEL LE FERNE, CT18 7HG

Drawing title

TOPOGRAPHICAL
SURVEY

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QUINN ESTATES

Drawing No.	Revision
SDS 208912.05	_

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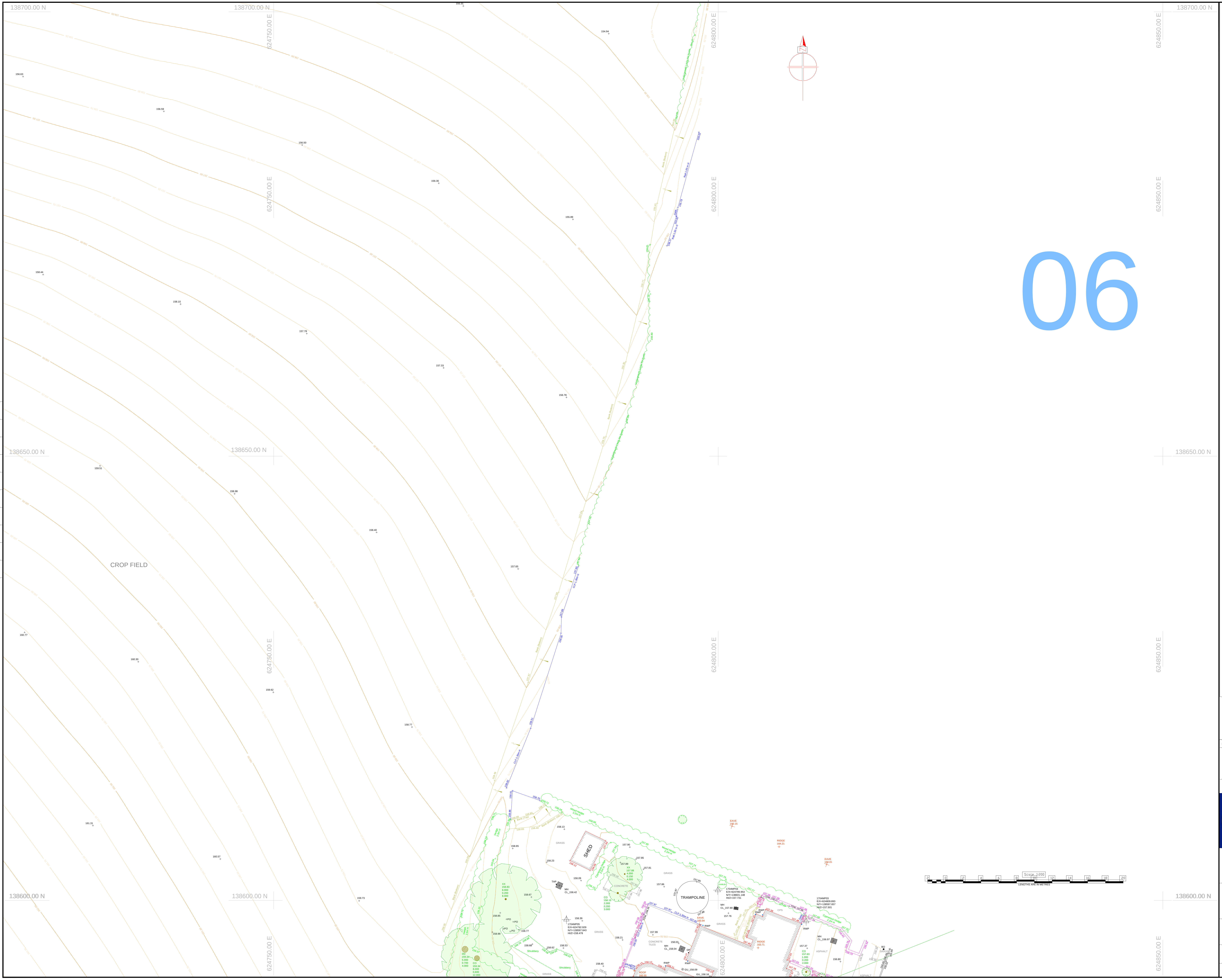
Scale 1:200 @ A1	MAY 2023	A1

SURVEY DESIGN SERVICES and ASSOC. LTD. UNITS 13 & 14,FOUNDRY BUSINESS PARK, SEAGER ROAD, FAVERSHAM, KENT. ME13 7FD TEL. 01795 594110 www.surveydesignservices.co.uk



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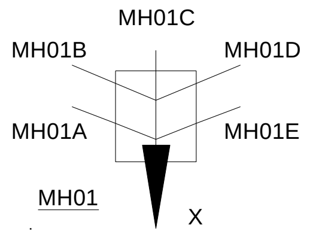

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GRID IS BASED ON OS DATUM, OBTAINED FROM ACTIVE GPS NETWORK "OSGB36(15)"

ALL KERB LEVELS ARE TAKEN IN CHANNEL.

A SCALE FACTOR OF
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Rev.	Date	Description	By

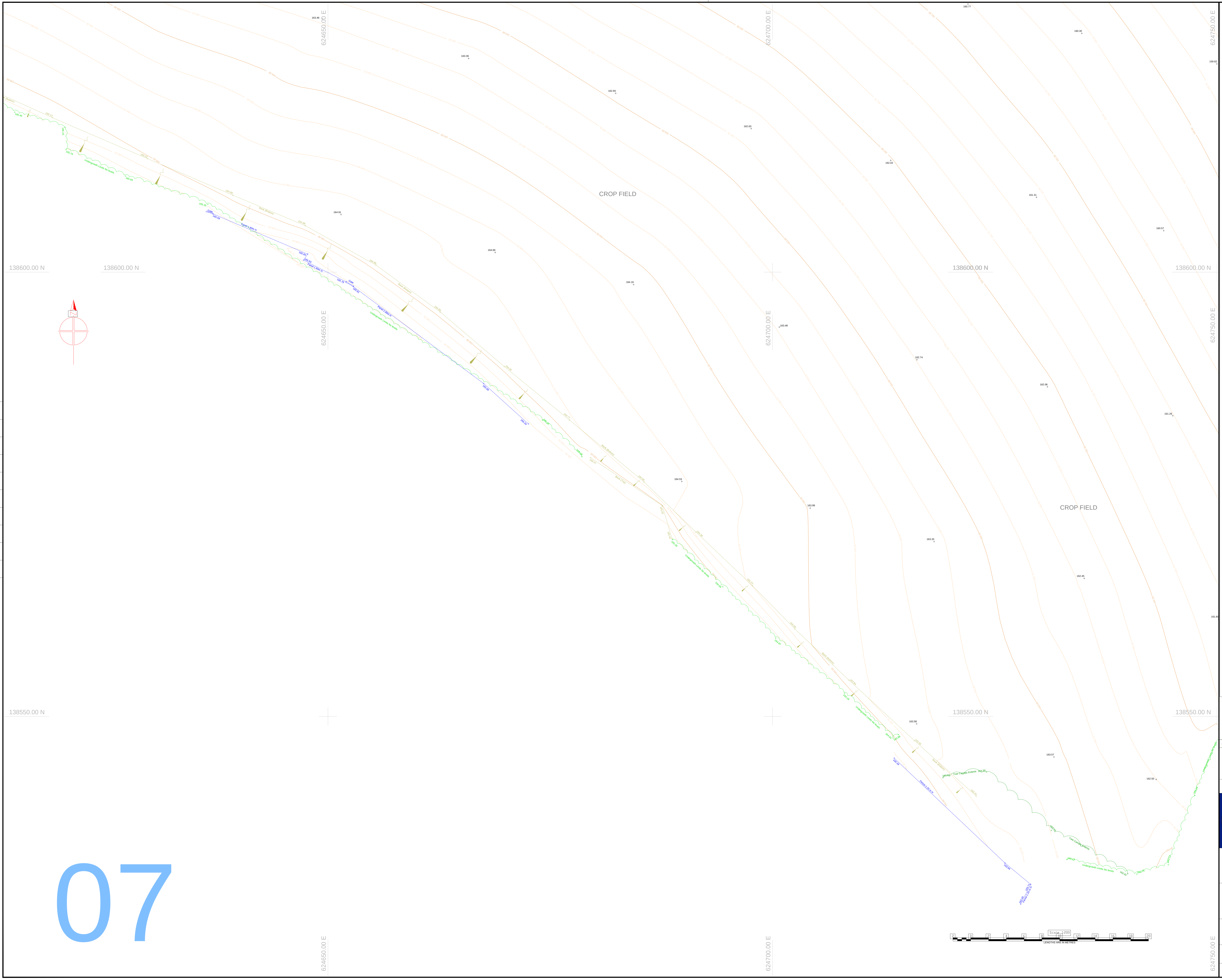
Drawn by MP	Surveyed by MP	Checked by SDS

Project title
CAULDHAM LANE
CAPEL LE FERNE, CT18 7HG

Drawing title
TOPOGRAPHICAL
SURVEY

Client
QUINN ESTATES

Drawing No. SDS 208912.06	Revision –
Scale 1:200 @ A1	Date MAY 2023
	Sheet size A1



07

TOPOGRAPHICAL SURVEY LEGEND

GENERAL

AV	AIR VALVE	LH	LAMP HOLE
BB	BOLISHA BEACON	LP	LAMP POST
Bdy	BOUNDARY	MK	MARKER POST
BH	BOREHOLE	MS	MILE STONE
BL	BED LEVEL	NB	NOTICE BOARD
BO	BOLLARD	NP	NAME-PLATE
BS	BUS STOP	OSBM	ORDNANCE SURVEY BENCH MARK
BKW	BRICK WALL	OH	OVERHEAD
CATV	CABLE TELEVISION	PE	PENSTOCK
CG	CATTLE GRID	PM	PARKING METER
CH	CHANNEL LEVEL	PO	POST
Conc	CONCRETE	RB	RUBBISH BIN
Corr	CORRUGATED	RS	ROAD SIGN
CO	COPING LEVEL	RTW	RETAINING WALL
CPS	CONC. PAVING SLABS	RWP	RAIN WATER PIPE
CR	CROWN LEVEL	SAP	SAPLING
CUL	CULVERT	SC	STOP COCK
DK	DROP KERB	SL	SOFFIT LEVEL
DP	DOWN PIPE	SVP	SOIL VENT PIPE
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EC	ELECTRICITY CABLE	STN	SURVEY STATION
ElecMH	ELECTRICITY MANHOLE	SV	STOP VALVE
EP	ELECTRICITY POLE	SW	SURFACE WATER
EPy	ELECTRICITY PYLON	TB	TREE BOLE
ER	EARTHING ROD	TBM	TEMPORARY BENCH MARK
FH	FIRE HYDRANT	TCB	TELEPHONE CALL BOX
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FB	FLOWER BED	TMH	TELEPHONE MANHOLE
FW	FOUL WATER	TOW	TOP OF WALL
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GP	GATE POST	TS	TREE STUMP
GV	GAS VALVE	U/G	UNDERGROUND
H	HIGH	VA	VALVE
HO	HOLE	VP	VENT PIPE
HW	HEADWALL	W	WIDE
IC	INSPECTION COVER	WL	WATER LEVEL
JB	JUNCTION BOX	WM	WATER METER
KL	KEEP LEFT ROAD SIGN	WO	WASH OUT
LB	LETTER BOX	WP	WOODEN POST
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IRF	FENCE IRON RAILING	TR	TRELLIS

TREE TYPES

AA	ACACIA	ED	ELDER	OR	ORNAMENTAL		
AH	ASH	EM	ELM	PE	PINE		
AL	ALDER	FR	FIR	PD	POLLARDED		
AN	ASPEN	HB	HORNBEAM	PR	POPLAR		
AP	APPLE	HC	HORSE CHESTNUT	SB	SILVER BIRCH		
BH	BEECH	HN	HAWTHORN	SC	SWEET CHESTNUT	TREE ANNOTATION	
BL	BLACKTHORN	HY	HOLLY	SU	SPRUCE		
BR	BIRCH	HZ	HAZEL	SY	SYCAMORE		
CE	CHERRY	LA	LARCH	WB	WHITEBEAM	CO	TYPE
CO	CONIFER	LE	LIME	WT	WALNUT	45.96	LEVEL
CR	CEDAR	LN	LONDON PLANE	WW	WILLOW	16.00	SPREAD
CY	CYPRESS	ME	MAPLE	YW	YEW	0.300	DIAM.
DD	DEAD	OK	OAK	XX	UNKNOWN	18.00	HEIGHT

SERVICE ABBREVIATIONS

AC	ASSUMED CONNECTION	IL	INVERT LEVEL
AR	ASSUMED ROUTE	KIG	KERB INLET GULLY
BD	BACK DROP	MH	MANHOLE
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D	DEPTH	UTL	UNABLE TO LOCATE
(dis)	DISUSED	UTR	UNABLE TO RAISE
EOT	END OF TRACE	UTT	UNABLE TO TRACE
GU	GULLY	UTS	UNABLE TO SURVEY

UTILITY LEGEND AND NOTES

FOUL WATER DRAINAGE	▶
COMBINED WATER DRAINAGE	▶
SURFACE WATER DRAINAGE	▶
WATER	WATER
GAS	GAS
ELECTRICITY	ELEC
ELECTRICITY OVERHEAD	ELEC/OH
TELEPHONE	TEL
TELEPHONE	TEL/OH
UNKNOWN SERVICE DETECTED BY EML	UNK (EML)
UNKNOWN SERVICE DETECTED BY GPR	UNK (GPR)
OIL	OIL
CATV	CATV
UNKNOWN LINEAR FEATURE DETECTED BY GPR	GPR
FIBRE OPTIC	F_OPT
UNDERGROUND CHAMBER	▭
GPR (0.00)	GROUND PENETRATING RADAR (DEPTH)

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(SEE EXAMPLE BELOW)

XXXXXXX B1P

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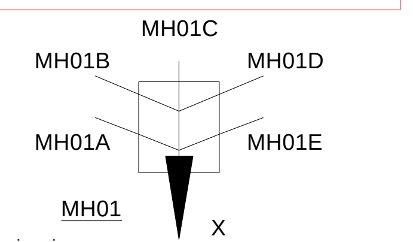

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SURVEY

Client
QUINN ESTATES

Drawing No. SDS 208912.07
Revision –
Scale 1:200 @ A1
Date MAY 2023
Sheet size A1

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CO	TYPE
45.96	LEVEL
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0.300	DIAM.
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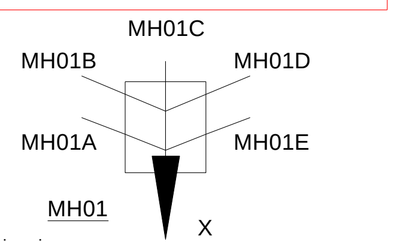

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CAPEL LE FERNE, CT18 7HG

Drawing title
TOPOGRAPHICAL
SURVEY

Client
QUINN ESTATES

Drawing No. SDS 208912.08	Revision _

Scale 1:200 @ A1	Date MAY 2023	Sheet size A1

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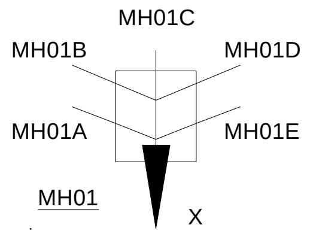

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TOPOGRAPHICAL SURVEY

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QUINN ESTATES

Drawing No. SDS 208912.09	Revision _
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SURVEY DESIGN SERVICES and ASSOC. LTD. UNITS 13 & 14,FOUNDRY BUSINESS PARK, SEAGER ROAD, FAVERSHAM, KENT. ME13 7FD TEL. 01795 594110 www.surveydesignservices.co.uk

Appendix C Land Contamination Report

[redacted]

Report

Ecologia

experts on the ground

Phase 1
Land Contamination Assessment

Capel Street, Capel-le-Ferne,
Folkestone, Kent CT18 7HG

Prepared for: **Quinn Estates Ltd.**

Reference: EES 23.144.1

Date: 16th February 2024

Building 711 & 712
Kent Science Park
Sittingbourne,
Kent, ME9 8BZ, UK

Tel: +44 (0)1795 471611
Fax: +44 (0)1795 430314
e-mail: info@ecologia-environmental.com
Website: www.ecologia-environmental.com

Ecologia
experts on the ground

Title: **Phase 1**

Land Contamination Assessment

Capel Street, Capel-le-Ferne, Folkestone, Kent CT18 7HG

Ecologia Reference: EES 23.144.1

Client:	Quinn Estates Ltd.	**Client Reference:**	Capel

Management Systems Control

Ecologia operates under an integrated management system certified to ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018.

Version No.	Status	Prepared by:	Checked by:	Authorised by:	Date
1	DRAFT	J. Stephens *MSc (Hons)*	L.Allen *BSc (Hons)*	F. Townley *BSc (Hons) MSc CGeol FGS QP285*	24/08/2023
2	FINAL	J. Stephens *MSc (Hons)*	L.Allen *BSc (Hons)*	F. Townley *BSc (Hons) MSc CGeol FGS QP285*	25/08/2023
3	FINAL	J. Stephens *MSc (Hons)*	L.Allen *BSc (Hons)*	F. Townley *BSc (Hons) MSc CGeol FGS QP285*	26/01/2024
4	FINAL	J. Stephens *MSc (Hons)* [redacted]	L.Allen *BSc (Hons)* [redacted]	F. Townley *BSc (Hons) MSc CGeol FGS QP285* [redacted]	16/02/2024

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Ecologia has undertaken this report in accordance with the agreement dated 28th July 2023 (Ref: 23.144.1) under which these services have been performed. The report may be relied upon by Quinn Estates Ltd. as “the Client” within the meaning given to that phrase within the agreement and subject to the terms and conditions contained therein.

EXECUTIVE SUMMARY

Site Location	Capel Street, Capel-le-Ferne, Folkestone, Kent CT18 7HG.
Site Description	The Site covers an area of approximately 4.03 hectares (ha) and is situated in the semi-rural village of Capel-le-Ferne. Folkestone town centre is approximately 3.5km to the southwest with the Southern Railway running approximately 600m south of the Site. There are residential properties which directly border the eastern and southern edges of the Site, and partially border the western edge. The northern edge borders agricultural land, which is consistent with the current onsite land use. There is a small industrial / farm estate with several businesses just off Cauldham Lane, which is approximately 15m to the west. The proposed Site access points are currently occupied by a residential property to the east and pastureland to the west.
Objective	This Phase 1 Contaminated Land Assessment is submitted in support of an Outline Planning application for the redevelopment of the Site in accordance with the National Planning Policy Framework. From information provided by the Client, it is understood that the current proposed Site redevelopment comprises the erection of up to 90 dwellings with associated parking and infrastructure following demolition of the existing dwelling; with all matters reserved except access. If this changes, then the conclusions drawn in this report will need to be reconsidered.
Environmental Setting	The geology underlying the Site comprises Clay with Flints Superficial deposits (Secondary A Aquifer, medium vulnerability), with bedrock geology comprising the Lewes Nodular Chalk Formation (Principal Aquifer, medium vulnerability). The Site is located within a groundwater Source Protection Zone (SPZ) 3 – Total Catchment. The Site is not situated in a Drinking Water Protected Area (DrWPA) for groundwater of surface water, with groundwater resting level reported to be at depths of ~75m bgl. No surface water features are present within 250m of the Site boundary. The nearest significant surface water is the Strait of Dover from East Wear Bay, 0.8km to the south. The Site is partially reported to be in a Radon affected area (over 30% of the properties); therefore, full protective measures are necessary for new developments.
Historical Setting	The majority of the Site has remained an undeveloped agricultural field since the late 1800s to current day. The properties which border the Site boundary to the east and south are identified in maps dated from 1931 onwards, with the small industrial estate to the west being mapped from 1972. Over the years, residential properties have primarily been constructed to the southeast of the Site to expand the village of Capel-le-Ferne. The remaining surrounding area consists mainly of agricultural land uses.
Initial Conceptual Site Model	An initial Conceptual Site Model (CSM) has been developed based on the relevant findings in this Phase 1 Assessment. **Onsite Sources:** Future End Users: Moderate Risk associated with dermal contact, inhalation of indoor and outdoor dust and vapours from the agricultural land and existing residential property. Groundwater: Moderate Risk of vertical soil leaching to Secondary A and Principal Aquifer. Surface Water: Very Low Risk of surface water run-off (nearest receptor is the Strait of Dover at East Wear Bay, 0.8km south). Buildings and Structures: High Risk associated with ground gas accumulation within buildings. Moderate / Low Risk associated with hydrocarbons / VOCs permeation of plastic utilities pipes. Moderate Low Risk associated with aggressive ground conditions on concrete. **Off-Site Sources:** Moderate / Low Risk associated with lateral migration of contaminants from surrounding historical and current land uses, historic tanks, electrical substation, road network and residential developments.
Recommendations	Based on the risks assessed by Ecologia, further site investigation works are considered necessary to characterise shallow soil conditions and assess the risks from ground gas generation. Additionally, as a minimum it is recommended that the following is considered during the development construction works: A detailed UXO risk assessment to be conducted prior to any ground penetrative works, given the Site's location in an area at Moderate risk from UXO. A Consultants Coal Mining Report should be obtained to further assess coal mining issues, given the Site's location in a Coal Mining Area as defined by the Coal Authority.

	An assessment of the Site to establish the presence or absence of invasive species would be advisable, to be undertaken by a competent person i.e. trained ecologist, before proceeding with development. A discovery strategy (procedures to be followed should unexpected contamination be identified) during redevelopment works in the event that unforeseen and suspected contamination is encountered, the client should stop works and further assessment undertaken by experienced Environmental Consultant. The discovery strategy may be a requirement / condition of the LPA as the planning application progresses. Appropriate PPE for ground workers, to mitigate potential risks from dermal contact, ingestion and inhalation of contamination materials / soils. Good housekeeping rules should also be observed onsite i.e. washing of hands before eating etc. in accordance with health and safety regulations. **The above recommendations should be presented to the Local Authority for comment and agreement. Typically, we would expect the recommendations to be conditioned as part of a planning application (i.e. Construction Management Plan).**
The initial Conceptual Site Model (CSM), Qualitative Risk Assessment (QRA) and recommendations are made based on the Site being redeveloped for a residential end use with private gardens and soft landscaping. If the proposed end use of the Site is changed, potential risks would need to be reassessed and the GQRA and CSM herein refined accordingly.	

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Appendix I	Figures
Appendix II	Groundsure Report
Appendix III	Photographic Report
Appendix IV	Qualitative Risk Assessment Methodology

1. INTRODUCTION

1.1 Background

Ecologia has been instructed by Quinn Estates Ltd. (the ‘Client’), to complete a Phase 1 Land Contamination Assessment (Desk Study and Site Walkover) for the proposed residential development (the ‘Site’) located at Capel Street, Capel-le-Ferne, Folkestone, CT18 7HG.

1.2 Objectives

This Phase 1 Contaminated Land Assessment is submitted in support of an Outline Planning application for the redevelopment of the Site in accordance with the National Planning Policy Framework (MHCLG, July 2021).

1.3 Proposed Development

From information provided by the Client, it is understood that the proposed redevelopment will comprise the erection of up to 90 dwellings with associated parking and infrastructure following demolition of the existing dwelling; with all matters reserved except access.

The redevelopment plan is included in Appendix I for reference.

1.4 Report Structure

This Phase 1 Land Contamination Assessment has been undertaken in accordance with the Land Contamination Risk Management guidance (EA, 2023) which has been developed to provide the technical framework for applying a risk management process when dealing with land affected by contamination.

This report includes:

- A description of the Site setting and findings of a Site walkover survey.
- A review of readily available information and an environmental data search addressing:
  - the environmental setting of the Site (geology, hydrogeology, hydrology and sensitive environmental land designations); and,
  - historical mapping and existing and former industrial sites to determine former potentially contaminative land uses.
- An initial Conceptual Site Model (CSM) establishing potential contaminant linkages and a qualitative assessment of whether these are likely to form an unacceptable risk.
- Recommendations for further works (if required).

1.5 Information Sources

A Groundsure environmental data search has been obtained in the preparation of this report which has been included in Appendix II.

A full set of references is detailed in Section 7.

2. SITE DESCRIPTION

2.1 Site Location

The Site address is:

Capel Street
Capel-le-Ferne
Folkestone
Kent
CT18 7HG

The Site covers an area of approximately 4.03 hectares (ha) and is situated in the semi-rural village of Capel-le-Ferne. Folkestone town centre is approximately 3.5km to the southwest with the Southeastern Railway running approximately 600m south of the Site. There are residential properties which directly border the eastern and southern edges of the Site, and partially border the western edge. The northern edge borders agricultural land, which is consistent with the current land use onsite. Little Cauldham Farmhouse and garden border the Site to the west, with a small industrial estate with several businesses just off Cauldham Lane (approximately 75m west). Two Site access points are proposed to the east and west; one to replace a residential property (east; main access) and the other to cross through the neighbouring pastureland (west; emergency access).

The location of the Site and the approximate outline of the Site development area (outlined in red) are shown in Plans 1 and 2 below.

Plan 1. Approximate Site Location (*Source: Google Maps, 2023*).

Plan 2. Approximate Proposed Redevelopment Area (*Source: Google Maps, 2024*).

2.2 Site Walkover Survey

The general Site setting is summarised in Table 2.1 below.

Table 2.1. General Site Setting

National Grid Reference	624686 138669	
Site Area	4.03 hectares	
Approximate Elevation	166.3m AOD (south) to 153.8m AOD (north)	
Site Geometry	Irregular polygon	
Site Boundary	North	Large open agricultural field.
	East	Residential dwellings and Capel Street.
	South	Residential dwellings and Cauldham Lane.
	West	Residential dwelling 'Little Cauldham Farmhouse', Cauldham Lane and small industrial estate / farm estate.

A Site walkover survey was completed by Ecologia on Wednesday, 02 August 2023. The photographic report, included in Appendix III, should be referred to in conjunction with the Site description below.

The Site is situated within a semi-rural, predominantly agricultural area (plates 1,3 & 4). The proposed development area itself encompasses a large grain based arable field, with a topography which slopes down gradient from south to north (plate 2). On both the eastern and southern Site boundaries, there are residential properties with gardens that back onto the agricultural field. The northern Site boundary continues as an arable field, which is consistent with the monoculture crop field found onsite.

The western boundary borders a farmhouse and a field where horses are kept. Cauldham Lane runs parallel to the western and southern Site boundaries, whilst Capel Street runs parallel to the eastern Site boundary. Access to the Site was very limited, which Ecologia gained by walking through the agricultural field via Cauldham Lane, northwest of the Site (plates 5 and 6).

The main development area currently consists of an open agricultural field. Some evidence of dumping was found on the Site boundary, where properties backed onto the field (south and east), including piles of garden waste and wooden pallets (plates 7 and 8). Some general litter was also observed during the Site walkover.

The proposed access points were viewed from the agricultural field (residential back garden and pastureland); no obvious signs of contamination were noted.

No services were identified during the Site walkover, with the exception of one black cable which ran parallel to the southern boundary, its use is currently unknown (plate 9). No soakaways, drainage ditches or septic tanks were identified during the Site walkover.

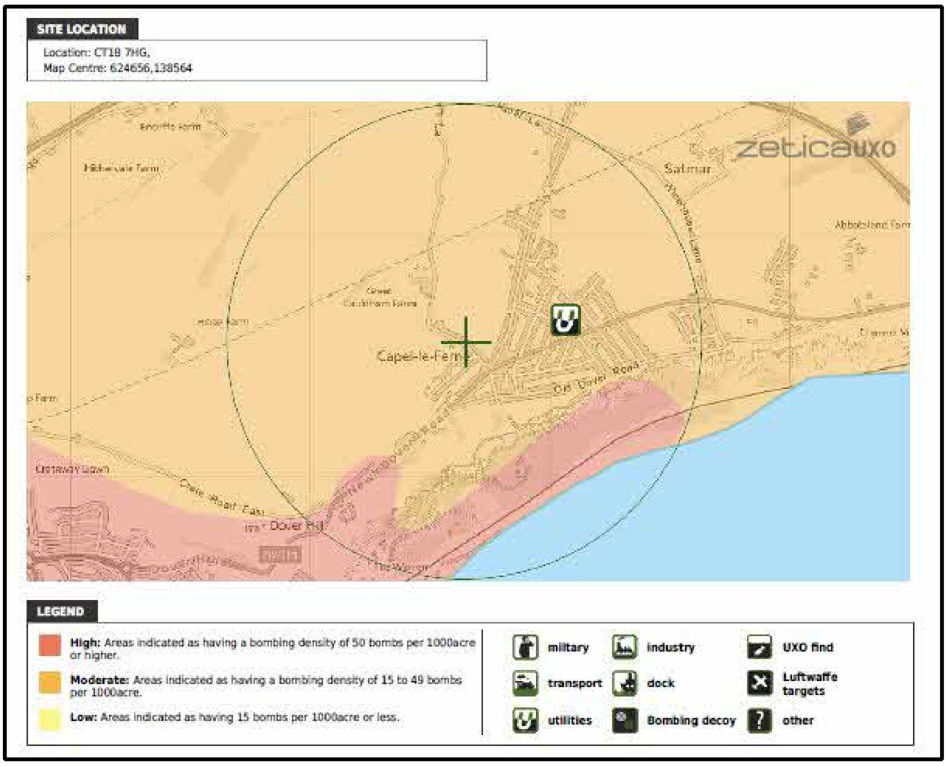
No tanks or storage containers were recorded during the Site walkover. Some brick rubble was identified in soils surrounding the perimeter of the Site (plate 10).

No evidence for invasive species e.g., Japanese Knotweed or Himalayan Balsam etc was observed; however, it must be noted that such identifications are subject to seasonality and can only be reliably made by competent persons (e.g. Ecologists) so the presence of invasive species at the Site cannot be ruled out at this stage.

Overall, no major potential sources of contamination were identified during the Site walkover.

2.3 Unexploded Ordnance

Information obtained from Zetica UXO Risk Map website indicates a ‘Moderate Bomb Risk’ at the Site. The UXO risk map search results are presented in Plan 3 below.



SITE LOCATION

Location: CT18 7HG,
Map Centre: 624656,138564

LEGEND

🟥 **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.

🟧 **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.

🟨 **Low:** Areas indicated as having 15 bombs per 1000acre or less.

Plan 3. Zetica UXO Risk Map (*Source: Zetica UXO, 2023*).

3. ENVIRONMENTAL SETTING

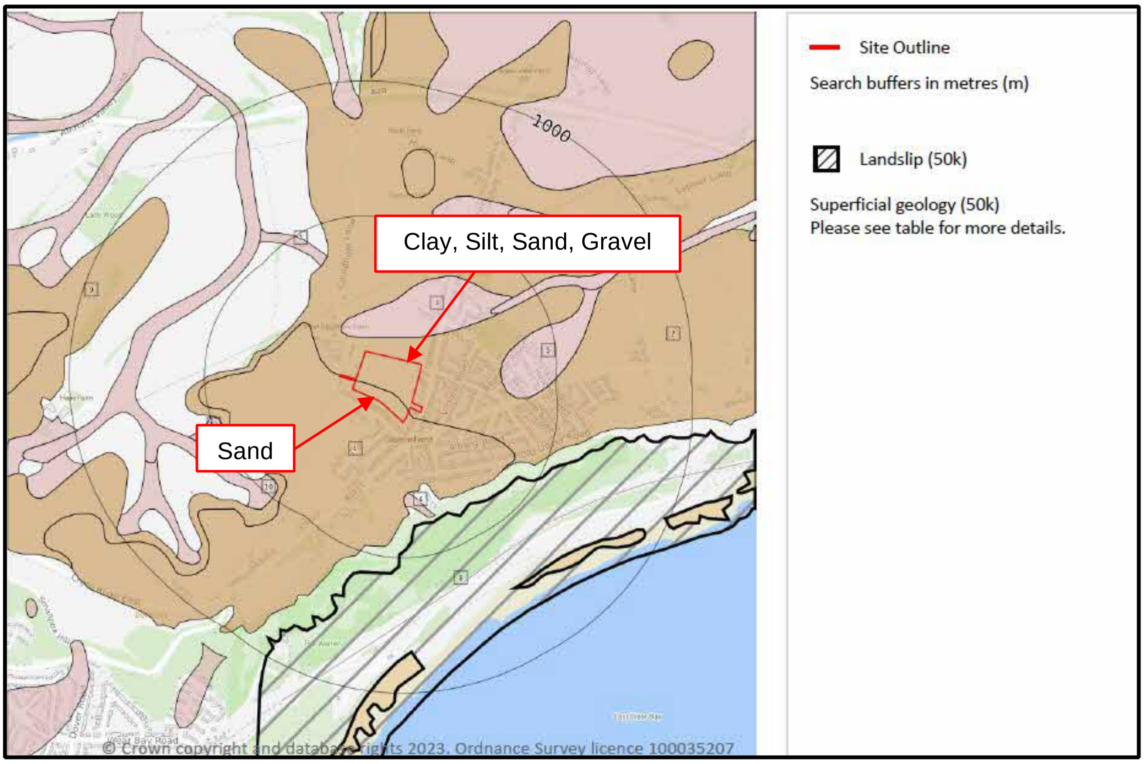
Information with regards to the environmental setting of the Site has been obtained from readily available public sources including the British Geological Survey (BGS); MAGIC (Natural England *et al*); and, GOV.UK websites alongside a report commissioned by Groundsure (Appendix II).

3.1 Geology

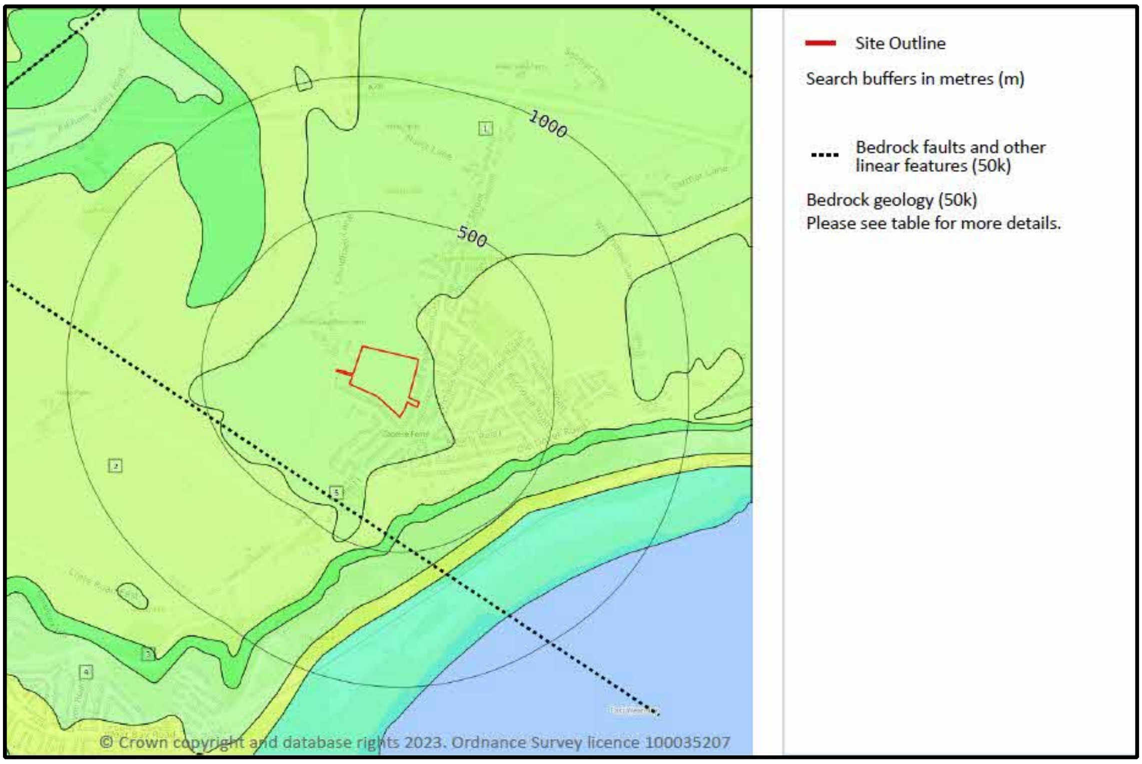
Published geological information (British Geological Survey 1:50 000) and the BGS website (Geology of Britain Viewer) indicates that the Site is directly underlain by the geological sequences as summarised in Table 3.1 below, and shown in Plans 4 and 5.

Table 3.1. Geological Information

Group / Formation		**Lithology**	**Approximate Thickness (m)**
Superficial	Clay with Flints Formation *(Sand)*	Dominant lithology is orange-brown and red-brown sandy clay with abundant nodules and rounded pebbles of flint.	Up to 10m
	Clay with Flints Formation *(Clay, Silt, Sand, Gravel)*		
Bedrock	Lewes Nodular Chalk	Composed of hard to very hard chalks and hardgrounds (which resist scratching by fingernail) with interbedded soft to medium chalks (some grainy) and marls.	Up to 60m



Plan 4. Superficial Geology (50k), 1:50,000 scale (*Source: Groundsure, 2023*).



Plan 5. Bedrock Geology (50k), 1:50,000 scale (*Source: Groundsure, 2023*).

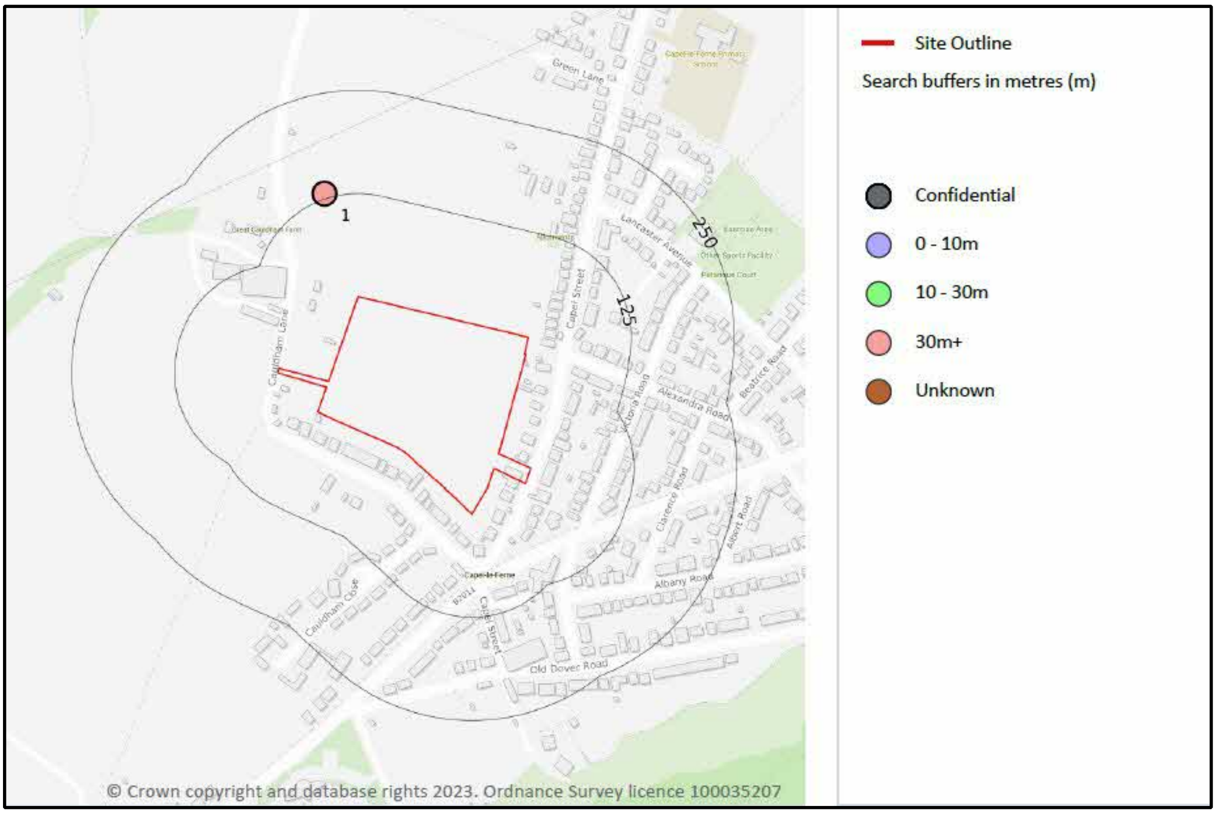
3.1.1. Borehole Records

Information with regards to local borehole records was obtained from the BGS website and the Groundsure report. There is one (1No.) borehole within 250m of the Site, with the geological information summarised in Table 3.2 below.

Table 3.2. Local Borehole Records

ID	Grid Reference	Name	Location	Depth (m)	Description
1	624560 138910	CHANNEL TUNNEL E6 CAPEL LE FERNE	131m NW	0.00 – 0.15	Topsoil
				0.15 – 4.27	Firm brown sandy Clay
				4.27 – 7.01	Stiff brown sandy Clay with flints
				7.01 – 8.84	Brown and grey Clay with bands of weathered Chalk
				8.84 – 47.24	White Chalk without flints
				47.24 – 56.90	Hard, creamy-white “nodular” Chalk with streaks of greyish marly chalk
				56.90 – 59.74	Pale grey-white marly Chalk
				59.74 – 70.03	Massive, uniform, soft pale grey-white Chalk
				70.03 – 71.32	Pale, grey-white Chalk, harder
				71.32 – 91.74	Unrecovered Chalk Groundwater level at 75.70m
				91.74 – 129.39	Grey streaky Chalk, relatively hard

The borehole location is depicted on Plan 6 overleaf.



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Plan 6. Borehole Location (*Source: Groundsure, 2023*).

3.1.2. Mineral Safeguarding Areas

The Kent Minerals and Waste Local Plan for the Folkestone and Hythe District has been consulted, which confirms that the Site does not fall within a Mineral Safeguarding Area.

3.1.3. Mining, Extraction and Cavities

There are no records of British Pits (BritPits) within 500m of the Site boundary.

There are fifteen (15No.) records of surface ground workings within 250m of the Site boundary, which are defined as ground excavations at the surface level including:

Pond, 138m NW, mapped in 1897

Pond, 142m NW, mapped in 1938 and 1931

Pond, 144m NW, mapped in 1973

Pond, 146m NW, mapped in 1961

Pond, 149m NW, mapped in 1931 (2No. records)

Pond, 207m S, mapped in 1938 and 1931

Unspecified Pit, 233m S, mapped in 1931 (2No. records)

Unspecified Pit, 235m S, mapped in 1938

Unspecified Pit, 237m S, mapped in 1938 and 1931

Unspecified Pit, 240m S, mapped in 1961

There are two (2No.) records of underground workings within 1,000m of the Site boundary:

Tunnel, 173m NW, mapped in 1993

Tunnel, 466m NE, mapped in 1993

There are no records of underground mining extents within 500m of the Site boundary.

There are no records of historical mineral planning areas within 500m of the Site boundary.

There are two (2No.) records of Non-coal mining within 1000m of the Site boundary, which are listed as the following:

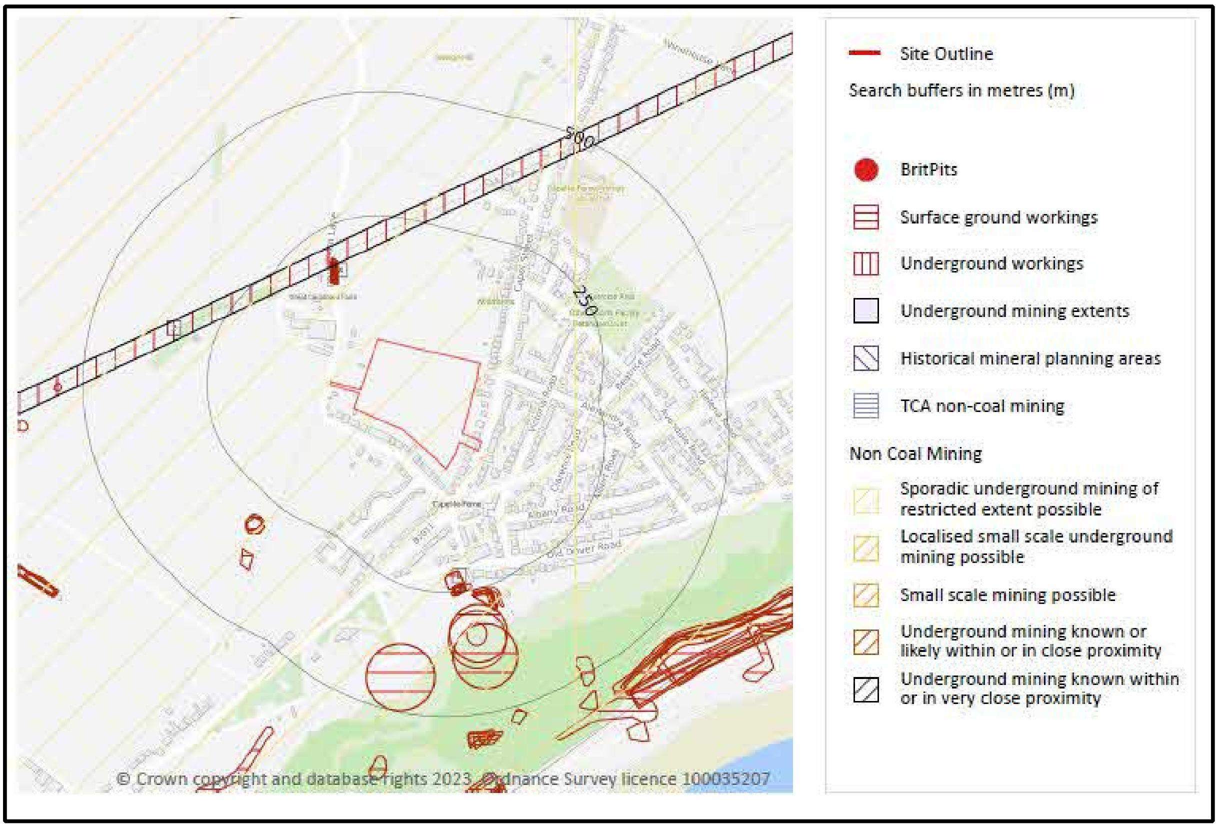
> Onsite, Chalk, Class: A, Likelihood: Underground mining workings are uncommon, although the geology is similar to that worked elsewhere. Potential for difficult conditions are unlikely and are at a level where they need not to be considered.
>
> 190m E, Chalk, Class: A, Likelihood: Underground mining workings are uncommon, although the geology is similar to that worked elsewhere. Potential for difficult conditions are unlikely and are at a level where they need not to be considered.

There is one (1No.) record of Researched mining within 500m of the Site boundary, which is described as the following:

> 199m NE, mineral type: Stone

There is one (1No.) record of Coal mining, which states that the Site is in a coal mining area as defined by the Coal Authority. A Consultants Coal Mining Report is recommended to further assess coal mining issues at the Site.

Mining and Ground Workings are depicted in Plan 7, below.



Plan 7. Mining and Ground Workings (*Source: Groundsure, 2023*).

There are two (2No.) records of natural cavities within 500m of the Site:

> 241m W, Type: Solution Pipe x 1
>
> 373m S, Type: Solution Pipe x 3

There are no records of mining cavities within 1000m of the Site boundary.

There are fourteen (14No.) records of historical incidents related to ground cavities and sinkholes within 500m of the Site boundary, which are defined as types of holes:

280m S, unspecified hole, mapped in 1938 and 1931

292m S, unspecified hole, mapped in 1872

317m S, unspecified hole, mapped in 1961

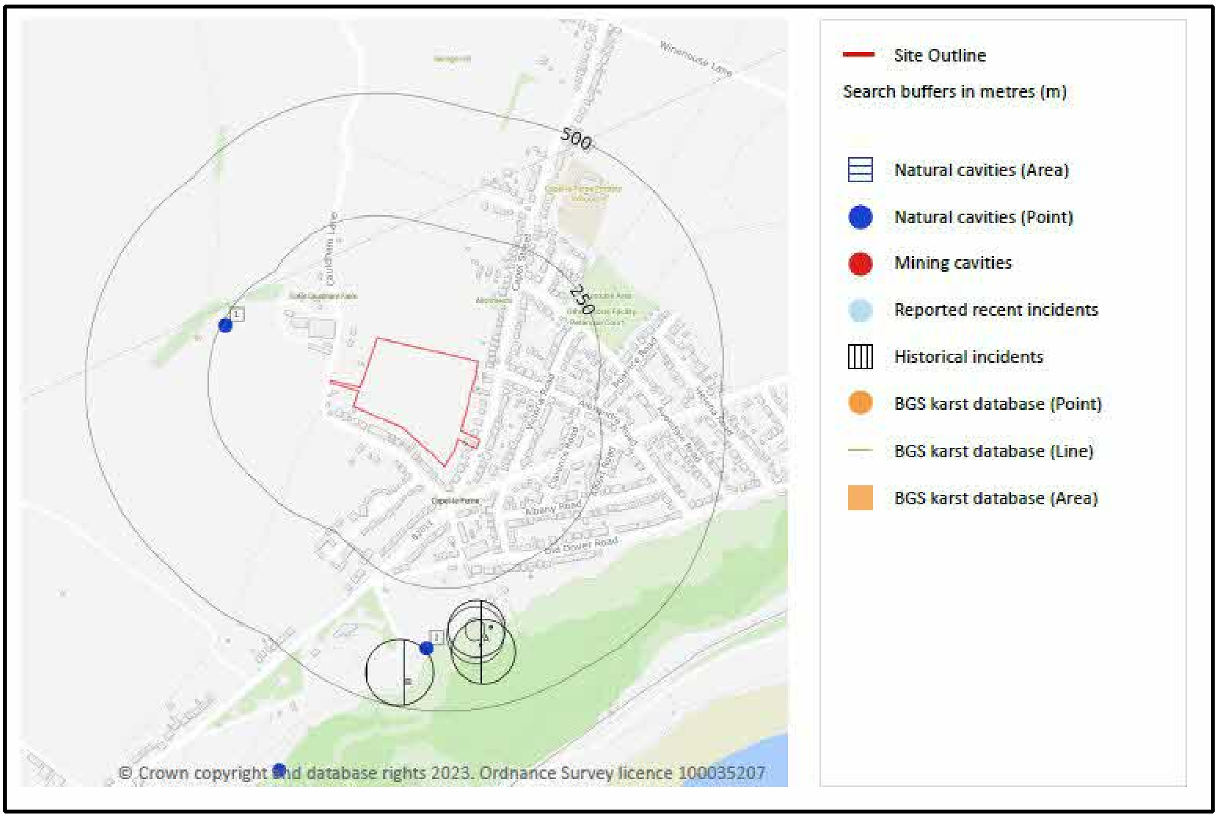
321m S, unspecified hole, mapped in 1906 and 1897

339m S, hole, mapped in 1993, 1992, 1993 and 1982

363m S, unspecified hole, mapped in 1993 and 1973

369m S, hole, mapped in 1898 and 1873

The ground cavities locations are depicted in Plan 8, below.



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Plan 8. Ground Cavities (*Source: Groundsure, 2023*).

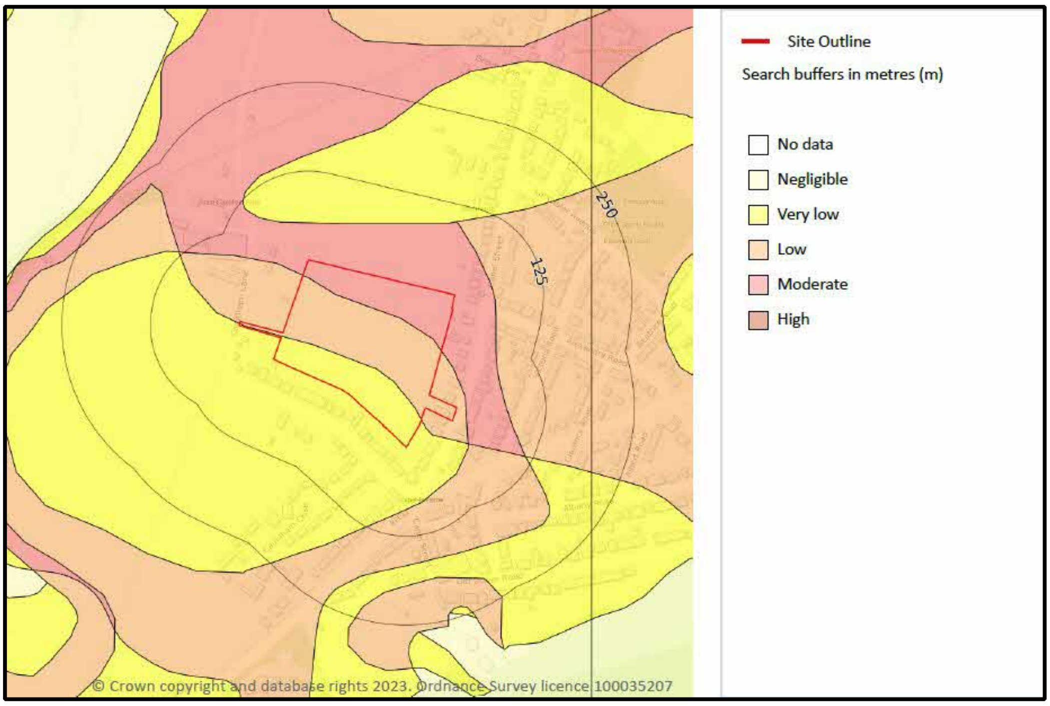
3.1.4. Ground Hazards

The Groundsure report indicates the following ground hazards in Table 3.3 below, within a 50m buffer of the Site.

Table 3.3. Ground Hazards

Hazard	Risk
Shrink Swell Clays	**Negligible (southern edge)** (Ground conditions predominantly non-plastic). **Low (majority of Site)** (Ground conditions predominantly medium plasticity).

Hazard	Risk
Landslides	**Very Low** (Slope instability problems are not likely to occur but consideration to potential of adjacent areas impacting on the Site should always be considered).
Ground Dissolution of Soluble Rocks (see Plan 9)	**Very Low (southern edge)** (Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground conditions or localised subsidence are at a level where they need not be considered). **Low (central band)** (Soluble rocks are present within the ground. Some dissolution may be present. Potential for difficult ground conditions are at a level where they may be considered, localised subsidence need not be considered except in exceptional circumstances). **Moderate (northern edge)** (Soluble rocks are present within the ground. Many dissolution features may be present. Potential for difficult ground conditions are at a level where they should be considered. Potential for subsidence is at a level where it may be considered).
Compressible Deposits	**Negligible** (Compressible strata are not thought to occur).
Collapsible Deposits	**Very Low** (Deposits with potential to collapse when loaded and saturated are unlikely to be present).
Running Sands	**Negligible (majority of Site)** (Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions). **Very low (southern edge)** (Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly).



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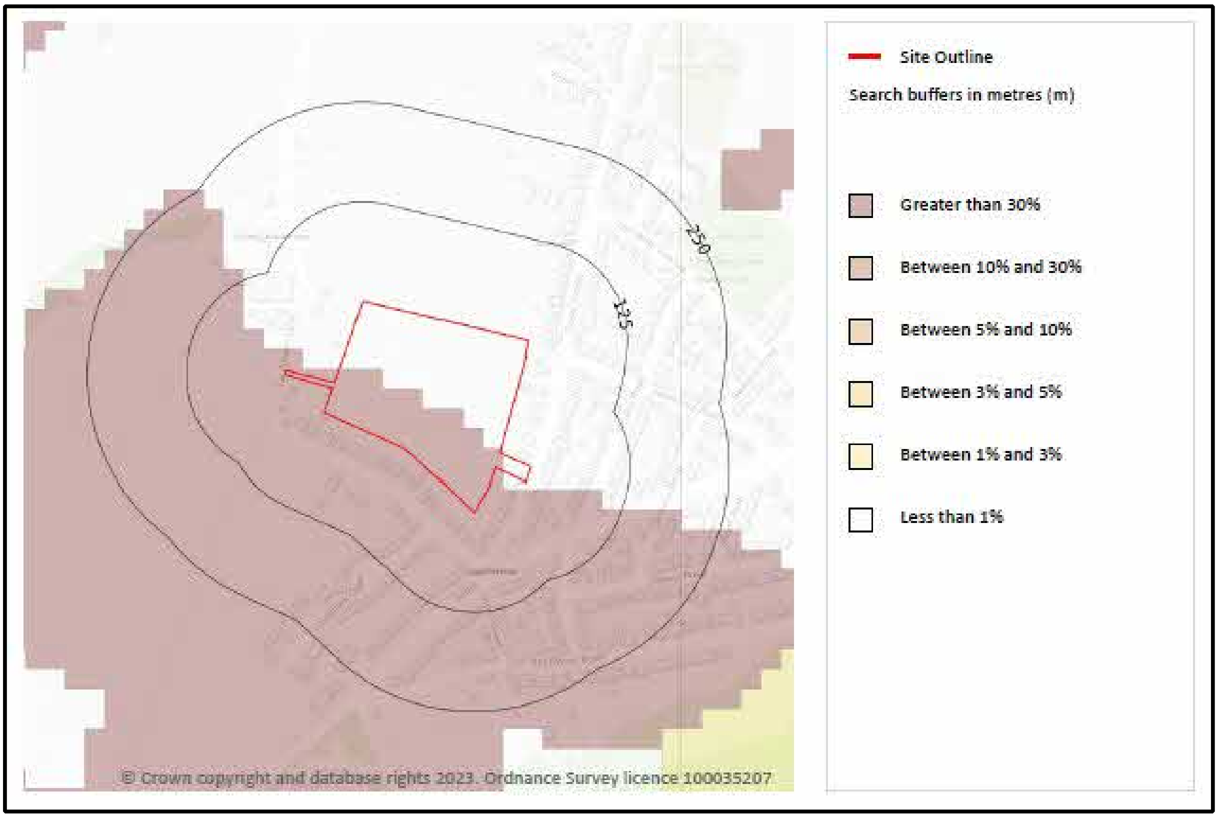
Plan 9. Ground Dissolution of Soluble Rocks (*Source: Groundsure, 2023*).

3.1.5. Radon Affected Areas and Protection Measures

The Groundsure report and reference to the UK radon website (Public Health England, n.d.) indicates that the Site is partially located in an area where greater than 30% of properties are potentially affected, and that consequently **full** radon protection measures are required for buildings developed in these areas. The Site is partially also in an area where less than 1% of the properties are potentially affected by radon, and that consequently no protection measures are required for buildings constructed in these areas.

The radon potential locations are depicted in Plan 10, below.



Plan 10. Ground Dissolution of Soluble Rocks (*Source: Groundsure, 2023*).

3.1.6. Soil Chemistry

The Groundsure report has identified two (2No.) records onsite, which indicate the following estimated background concentrations of potentially harmful elements in the topsoil, however, concentrations below are below current general assessment criteria for Human Health residential end use.

Onsite:

- Arsenic – 15 mg/kg.
- Bio-accessible Arsenic – No Data.
- Lead – 100mg/kg.
- Bio-accessible Lead – 60mg/kg.
- Cadmium – 1.8 mg/kg.
- Chromium – 60-90mg/kg.
- Nickel – 15-30mg/kg.

3.2 Hydrogeology

The Groundsure report and MAGIC website indicate the Site is located over the following:

Principal Aquifer associated with the bedrock geology (Lewes Nodular Chalk).

Secondary A Aquifer associated with the superficial geology (Clay with Flints – Sand).

Unproductive Aquifer associated with superficial geology (Clay with Flints – Clay, Silt, Sand, Gravel).

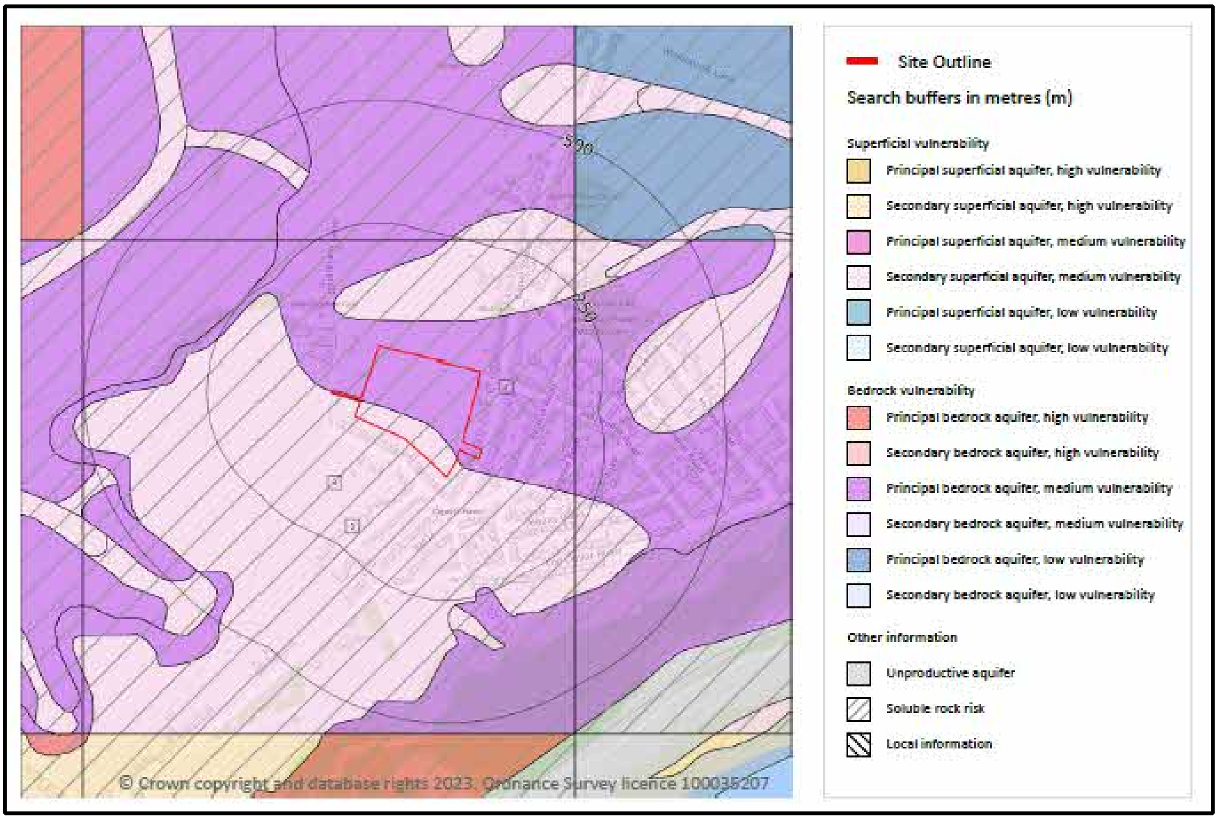
Principal Aquifers are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.

Secondary A Aquifers are layers of permeable rock, which are capable of supporting water supplies at a local rather than strategic scale, and in some cases form an important source of base flow to rivers.

Unproductive Aquifers are rock layers of drift deposits with low permeability that have negligible significance for water supply or river base flow.

The Site is shown in an area where both the bedrock and superficial (Clay with Flints – Sand) Aquifers are classified as having medium groundwater vulnerability.

The groundwater vulnerability designations are depicted in Plan 11, below.



Plan 11. Groundwater Vulnerability Location Plan *(Source: Groundsure, 2023).*

3.2.1. Groundwater Abstraction

The Groundsure report has identified six (6No.) records of potable groundwater abstractions within 2km of the Site; four (4No.) historical and two (2No.) active, as shown in Table 3.4, overleaf.

Table 3.4. Groundwater Abstractions

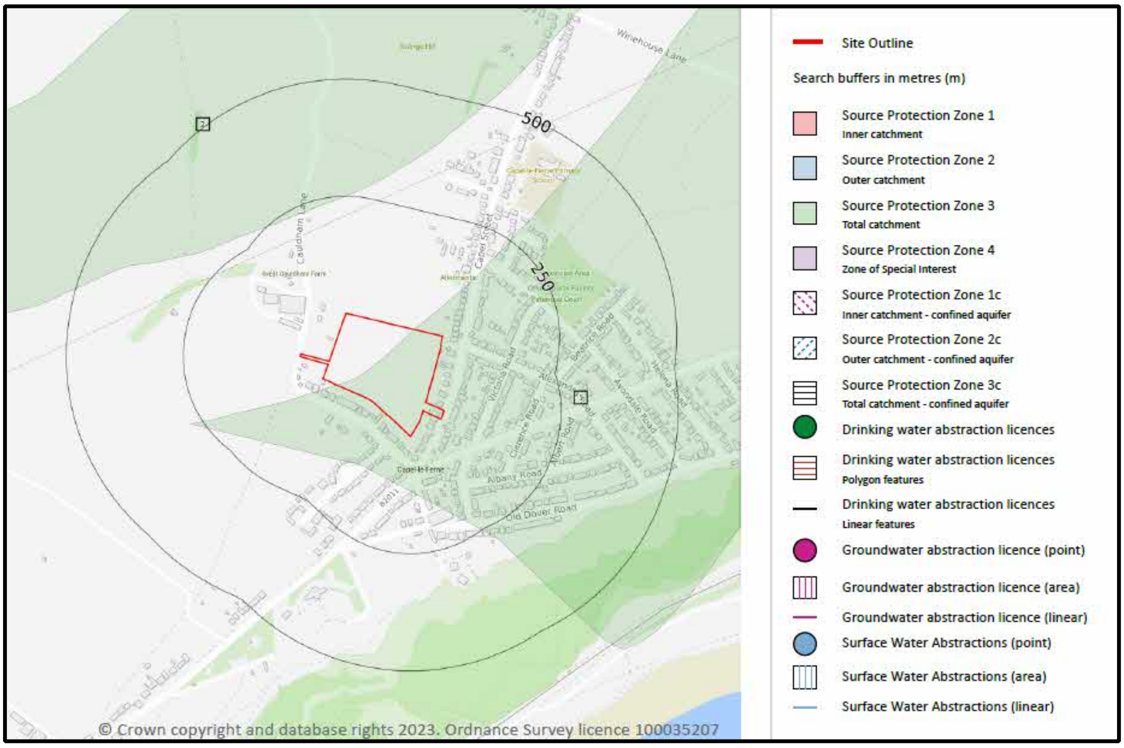
Location	Name	Details
1086m NW	Folkestone & Dover Water Services Ltd	Status: Historical Licence No: 9/40/04/0065/GR Details: Potable Water Supply - Direct
1086m NW	Folkestone & Dover Water Services Ltd	Status: Historical License No: 9/40/04/0065/GR Details: Potable Water Supply - Direct
1086m NW	Affinity Water Limited	Status: Historical Licence No: 9/40/04/0065/GR Details: Potable Water Supply - Direct
1086m NW	Affinity Water Limited	Status: Historical License No: 9/40/04/0065/GR Details: Potable Water Supply – Direct
1728m N	Affinity Water Limited	Status: Active License No: 9/40/04/0065/GR Details: Potable Water Supply – Direct
1730m N	Affinity Water Limited	Status: Active License No: 9/40/04/0065/GR Details: Potable Water Supply – Direct

The Site is not situated in a Drinking Water Safeguard Zone for Groundwater.

The Site is located within one (1No.) groundwater water body:

East Kent Chalk Stour. Overall rating: Poor. (ID: GB40701G501500).

Information obtained from the MAGIC website and Groundsure report indicates that the Site is partially located in a groundwater Source Protection Zone (SPZ) - Zone 3 (Total Catchment).



Plan 12. Groundwater Source Protection Zones *(Source: Groundsure, 2023).*

3.3 Hydrology

There are no notable surface water features within 250m of the Site. A pond is located approximately 20m from the northwest boundary on the industrial estate. The nearest water feature to the Site is the Strait of Dover from East Wear Bay, approximately 0.8km to the south.

Information on the GOV.UK website and Groundsure reports indicates the flood risk onsite as:

- Rivers and Sea – Very Low;
- Surface Water – Negligible; and,
- Groundwater – Low

The Site is not located within a Flood Zone and there are no records of historic flood events within 250m of the Site.

3.3.1. Surface Water Abstraction

The Groundsure report has identified no surface water abstractions within 2km of the Site.

The Site is located within one (1No.) surface water body catchment:

- River catchment. Dour from Kearsney to Dover (ID: GB107040073310).

The Site is not situated in a Drinking Water Protected Area for Surface Water.

3.4 Environmentally Sensitive Areas

The Groundsure report and MAGIC website record the following statutory environmental designation areas within 1km of the Site boundary:

- Sites of Special Scientific Interest (SSSI):
  - 309m S, Folkestone Warren
- Local Nature Reserves (LNR)
  - 309m S, Folkestone Warren
  - 864m S, Folkestone Warren
- Designated Ancient Woodland
  - 874m W, Unknown – Ancient & Semi-Natural Woodland
  - 990m NW, Unknown – Ancient & Semi-Natural Woodland
- Marine Conservation Zone
  - 698m SE, Dover to Folkestone

3.4.1. Nitrate Vulnerable Zone

The Site is not located within a Nitrate Vulnerable Zone (NVZ).

In accordance with the Natural England guidance on nutrient neutrality published in November 2020, an assessment and evidence may be required as part of the planning process to demonstrate that the proposed development is nutrient neutral (Natural England, 2020).

3.4.2. Habitat Designation

The Groundsure report has identified no open mosaic habitat designations within 250m of the Site.

The Groundsure report has identified no priority habitats within 250m of the Site boundary.

The Groundsure report has identified three (3No.) habitat networks within 250m of the Site boundary:

8m SE, Network Enhancement Zone 2

197m S, Network Enhancement Zone 1

249m S, Restorable Habitat

3.4.3. Tree Felling Licences

The Groundsure report has identified one (1No.) Tree Felling Licence within 250m of the Site boundary:

197m NW, Selective Fell/Thin (Conditional) – Ref: 019/570/11-12

3.4.4. Site of Special Scientific Interest (SSSI) Impact Risk Zone

SSSI Impact Risk Zones (IRZs) allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. Local planning authorities (LPAs) have a duty to consult Natural England before granting planning permission on any development that is in or likely to affect a SSSI. Defined zones around each SSSI indicate the types of development proposals which could potentially have adverse effects. The following types of development would require consultation if proposed onsite.

Infrastructure - Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). airports, helipads and other aviation proposals.

Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, review of minerals permissions (romp), extensions, variations to conditions etc. oil & gas exploration/extraction.

Rural non-residential - Large non-residential developments outside existing settlements/urban areas where net additional gross internal floorspace is > 1,000m² or footprint exceeds 0.2ha.

Residential - Residential development of 100 units or more.

Rural residential - Any residential development of 50 or more houses outside existing settlements/urban areas.

Air pollution - Any industrial/agricultural development that could cause air pollution (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 200m², manure stores > 250t).

Combustion - General combustion processes >20mw energy input. incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.

Waste - Mechanical and biological waste treatment, inert landfill, non-hazardous landfill, hazardous landfill, household civic amenity recycling facilities construction, demolition and excavation waste, other waste management.

Composting - Any composting proposal with more than 500 tonnes maximum annual operational throughput. incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management.

Discharges - Any discharge of water or liquid waste that is discharged to ground (ie to seep away) or to surface water, such as a beck or stream.

Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is > 1,000m² or any development needing its own water supply.

Notes: For new residential development in this area financial contributions are required to mitigate increased recreational disturbance on coastal SPAs and Ramsar Sites. Check with Local Planning Authority.

Although the Site is not reported to be in a SSSI, it is within an SSSI IRZ, and elements of the proposed development do fall into the above categories, namely rural residential and discharges.

3.5 Agricultural Designations

The Groundsure report and MAGIC website designates the Site as the following:

Agricultural Grade 3 – Good to moderate quality agricultural land.

Agricultural Grade 3 is defined as good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

3.5.1. Open Access Land

The Groundsure report describes Open Access Land as areas the Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to without having to use paths. There are no areas of Open Access Land within 250m of the Site boundary.

3.6 Visual and Cultural Designations

The Groundsure report indicates that there is an Area of Outstanding Natural Beauty within 250m of the Site boundary:

4m W, Kent Downs

There are no records of listed buildings with 250m of the Site boundary.

2. HISTORICAL AND INDUSTRIAL SITE SETTING

4.1 Site and Surrounding Area Historical Development

Historical Maps (1:1,250, 1:2,500, 1:10,000 & 1:10,560) have been provided by Groundsure dating from 1872 to 2023.

The Site has remained an undeveloped agricultural field throughout the dated maps. The properties, which border the Site boundary to the east and south are identified in maps dated from 1931 onwards, with the small industrial estate to the west being mapped from 1972. Over the years, residential properties have primarily been constructed to the southeast of the Site to expand the village of Capel-le-Ferne. The remaining surrounding area consists mainly of agricultural land uses.

Table 4.1 details the historical activities onsite, significant land use changes within 250m of the Site boundary and historical regional setting (between 250m and 1km from the Site boundary).

Table 4.1. Historical Summary

Dates	Onsite	Locally (<250m)	Regionally (250m – 1km)
1872-1898	The Site is undeveloped agricultural land.	Great Cauldham Farm borders the Site to the west, where some properties and buildings are identified, including Little Cauldham Farmhouse. A farm track which is now Cauldham Lane, runs parallel to the southern and western edges of the Site, likewise another farm track runs parallel to the east, which is now Capel Street. The wider setting comprises of agricultural fields. Some woodland areas lie within the 250m boundary including approximately 50m to the south and within 50m to the west.	A property known as Little Hope lies to the south of the Site. The wider setting comprises of agricultural fields. The Southern Railway is mapped approximately 600m to the south, running east to west through ‘The Warren’. Air shafts, chalk pits and earthworks features are annotated throughout ‘The Warren’.
1907-1908	No significant changes.	No significant changes.	Properties have been constructed in the wider setting, specifically to the south of the Site.
1933-1934	A residential property has been constructed off Capel Street (location of proposed eastern entrance).	Multiple properties off Capel Street, backing onto the eastern Site boundary have been constructed, including properties to the east and south of the Site.	Properties in all directions have been constructed.
1937-1938	No significant changes.	Further properties off Capel Street have been constructed. A major road system (A20) has been constructed, approximately 100m south of the Site, which runs in a southwest to northeast direction.	Further properties off Capel Street have been constructed in all directions of the Site (predominantly to the east).
1972-1993	No significant changes.	Further properties predominantly to the south and east of the Site have been constructed. The nearby industrial estate, ‘Great Cauldham Farm’, has been	A tunnel was developed, approximately 350m northwest of the Site. A school is mapped in 1975, northeast of the Site.

Dates	Onsite	Locally (<250m)	Regionally (250m – 1km)
		developed approximately 75m to the west comprising several small business units. Cauldham Close has been developed to the south of the Site, off Cauldham Lane. Three electricity substations have been constructed approximately 105m southeast, 170m northeast and 205m south of the Site.	The majority of properties in this area have been built by 1993.
2023	No significant changes.	No significant changes.	Slight expansion to the school to the northeast.

4.2 Industrial Setting

4.2.1. Trade Directory Entries

The Groundsure report presents the following records of potentially contaminative industrial sites within 250m of the Site boundary, as per Table 4.2 and Table 4.3, below.

Table 4.2. Trade Directory Entries – Current

Location	Company	Details
47m S	House and Garden Clearance	Clearance and Salvage Dealers – Recycling Services
59m NW	Invicta Mould Ltd	Moulds, Dies and Castings – Industrial Products
79-85m NW	Silo	Hoppers and Silos – Farming
105m SE	Electricity Sub Station	Electrical Features – Infrastructure and Facilities
157m NW	Silo	Hoppers and Silos – Farming
158m SE	Gas Governor	Gas Features – Infrastructure and Facilities
170m NE	Electricity Sub Station	Electrical Features – Infrastructure and Facilities
211m S	Capel Garage	Vehicle Repair, Testing and Servicing – Repair and Servicing
212m S	Electricity Sub Station	Electrical Features – Infrastructure and Facilities

Table 4.3. Trade Directory Entries – Historic

Location	Details	Dates
75-102m NW	Tanks	1937 – 1979
173m NW	Tunnel	1993
233-240m S	Unspecified Pit	1931 – 1961
104-107m SE	Electricity Substation	1972 – 1993
163-164m NE	Electricity Substation	1972 – 1979
205-224m S	Electricity Substation	1975 – 1993
199-203m S	Garage	1975 – 1993

4.3 Landfill and Waste Facilities

The Groundsure report details no records of landfill or waste facilities (active or recently closed) within 500m (EA, July 2003) of the Site.

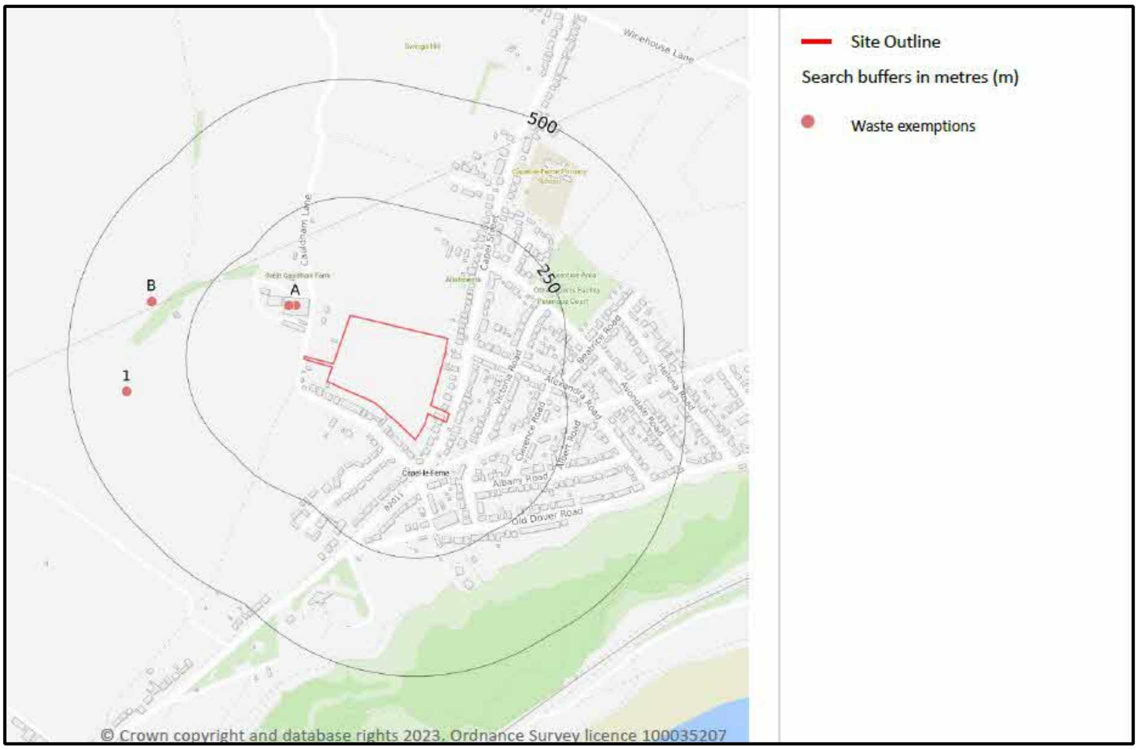
4.4 Waste Exemptions

The Groundsure report presents the following thirty-four (34No.) waste exemptions recorded within 500m of the Site boundary, as detailed in Table 4.4, below and shown in Plan 13 overleaf.

Table 4.4. Waste Exemptions

Location	Site	Reference	Category	Description
109m NW	Great Cauldham Farm, Cauldham Lane, Capel-Le-Ferne, Folkestone, CT18 7HQ	WEX150837	Using waste exemption	Use of waste for a specified purpose
				Use of waste in construction
				Spreading waste on agricultural land to confer benefit
				Burning of waste as a fuel in a small appliance
				Spreading waste on non-agricultural land to confer benefit
				Use of waste in the construction of entertainment or educational installations etc
			Disposing of waste exemption	Deposit of agricultural waste consisting of plant tissue under a Plant Health notice
				Burning waste in the open
			Storing waste exemption	Storage of waste in a secure place
			Treating waste exemption	Treatment of waste wood and waste plant matter by chipping, shredding, cutting, or pulverising
				Screening and blending of waste
				Aerobic composting and associated prior treatment
				Burning waste in the open
109m NW	Great Cauldham Farm, Cauldham Lane, Capel-Le-Ferne, Folkestone, CT18 7HQ	WEX288128	Disposing of waste exemption	Deposit of agricultural waste consisting of plant tissue under a Plant Health notice
			Treating waste exemption	Aerobic composting and associated prior treatment
				Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
				Screening and blending of waste
			Using waste exemption	Spreading waste on non-agricultural land to confer benefit
				Spreading waste on agricultural land to confer benefit
				Use of waste for a specified purpose
				Burning of waste as a fuel in a small appliance
				Use of waste in construction
112m NW	Great Cauldham Farm, Cauldham Lane, Capel-Le-Ferne, Folkestone, CT18 7HQ	EPR/DF0533AM/A001	Disposing of waste exemption	Disposal by incineration
				Burning waste in the open
			Treating waste exemption	Screening and blending of waste
				Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
				Use of waste in construction

Location	Site	Reference	Category	Description
			Using waste exemption	Spreading waste on agricultural land to confer benefit
				Use of mulch
				Use of baled end-of-life tyres in construction
				Use of waste for a specified purpose
112m NW	Great Cauldham Farm, Cauldham Lane, Capel-Le-Ferne, Folkestone, CT18 7HQ	WEX175327	Storing waste exemption	Storage of sludge
344m W	-	WEX257487	Storing waste exemption	Storage of sludge
383m W	-	WEX331712	Storing waste exemption	Storage of sludge



Plan 13. Waste Exemptions *(Source: Groundsure, 2023).*

4.5 Licensed Pollutant Release

The Groundsure report details no records of licensed pollutant releases within 500m of the Site.

4.6 Licensed Discharges to Controlled Waters

The Groundsure report details no records of licensed discharge to controlled waters within 500m of the Site.

4.7 Pollution Incidents

The Groundsure report has record of the following pollution incident within 500m of the Site:

Table 4.5. Pollution Incidents

Location	Details	Impact
78m W	Incident Date: 23/06/2002 Incident Identification: 86697 Pollutant: Oils and Fuel Pollutant Description: Insulating and Cable Oils	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
237m SE	Incident Date: 13/11/2003 Incident Identification: 201452 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Vegetable Cuttings and Deposits	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (minor) Air Impact: Category 4 (No Impact)

4.8 Pollution Inventory Substances

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters, and land. The Groundsure report has no records of pollution inventory substances within 500m of the Site.

4.9 Sites Determined as Contaminated Land

The Groundsure report has no records of sites determined as Contaminated Land under Part 2a of the Environmental Protection Act 1990 within 500m of the Site.

4.10 Control of Major Accident Hazard (COMAH) Sites

The Groundsure report has no records of COMAH or Notification of Installations Handling Hazardous Substances (NIHHS) sites within 500m of the Site.

4.11 Hazardous Substance Storage/Usage Sites

The Groundsure report has no records of sites granted consent to hold certain quantities of hazardous substances within 500m of the Site.

5. INITIAL CONCEPTUAL SITE MODEL

5.1 Introduction

The current best practice risk assessment methodology is outlined in the guidance for LCRM, EA, 2020, updated 2023. The risk assessment process is underpinned by the concept of establishing whether a contaminant linkage exists between a source and a sensitive receptor. For a potential risk to be realised all three components must be identified and a contaminant linkage established.

The risk assessment process aims to establish whether unacceptable risks exist and, if so, what further action needs to be taken in relation to the Site. It is an iterative tiered approach which consists of three progressively detailed stages of risk assessment; preliminary risk assessment (PRA), generic quantitative risk assessment (GQRA) and detailed quantitative risk assessment (DQRA). Depending on the nature of the Site and contamination present, not all stages of risk assessment may be required.

5.2 Sources of Contamination

A source is defined as a substance which is located in, on or under the land and has the potential to cause harm to human health, water resources or the wider environment.

5.2.1 Potential Onsite Sources

Reference has been made at this stage to any potential sources identified during the Site walkover, potentially contaminative land uses identified from the historical review and from any previous works undertaken (Table 5.1 below).

Table 5.1. Potential Onsite Sources and Typical Contaminants

Potential Onsite Sources	Typical Contaminants
Farming vehicle use on Site.	Potential for a range of contaminants including asbestos, total petroleum hydrocarbons (TPH), BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), general inorganics including heavy metals, herbicides and pesticides.
Farming fertiliser and pesticide use. Waste exemptions permitted to Great Cauldham Farm (such as using waste on agricultural land / burning waste etc.).	
Made Ground and demolition waste from proposed access points.	
Natural ground gases and Radon.	Potential for ground gas (methane and carbon dioxide, carbon monoxide, radon, hydrogen sulphide).

5.2.2 Potential Offsite Sources

Potential sources of contamination identified within 250m of the Site are summarised on Table 5.2, overleaf.

Table 5.2. Potential Offsite Sources and Typical Contaminants

Potential Offsite Sources	Typical Contaminants
Surrounding agricultural land use including potential machinery and use of agricultural chemicals.	Potential for a range of contaminants including asbestos, TPH, BTEX compounds, PAHs, VOCs, general inorganics including heavy metals, herbicides and pesticides.
Surrounding land uses including farming / industrial estate ~50m northwest (inc. historical tanks, silos, waste exemptions), electrical substations (~100m southeast), historical garage (~200m south).	
Run-off from surrounding roads (Cauldham Lane and Capel Street).	
Residential developments on the east and south boundaries.	

The remaining surrounding industry in the wider area is not considered further due to the distance from the Site.

5.3 Receptors

A receptor is something which could come to harm, including human health, water resources, surface water courses or the wider environment. The following potential receptors to any site-based impaction have been identified:

- Human Health.
- Controlled Waters.
- Ecosystems.
- Property (buildings).

5.3.1 Human Health

The following potential human health receptors have been identified:

- Future Site Users comprising:
  - Residential Occupants.
- Maintenance / Construction Groundworkers.

5.3.2 Controlled Waters

The following Controlled Waters have been identified as potential receptors:

- Groundwater.
  - Principal Aquifer underlying the Site, associated with the Lewes Nodular Chalk Formation bedrock deposits, in a groundwater medium vulnerability area and SPZ 3.
  - Secondary A Aquifer associated with the superficial geology (Clay with Flints - Sand), southern half of the Site.

5.3.3 Ecosystems

The following Ecosystems have been identified as potential receptors:

Area of Outstanding Natural Beauty – West Downs, 4m west.

Priority Habitat 'Network Enhancement Zone 2', 8m southeast.

SSSI IRZ – proposed development falls within the 'Rural Residential' category, which would trigger the need for further assessment in the context of impact to the SSSI.

5.3.4 Property

The following property has been identified as a potential receptor:

Buildings.

Future proposed residential buildings to be constructed on the Site.

Water supply pipes.

5.4 Pathways

A pathway is the means or route by which a source of contamination can migrate, an identified receptor can be exposed to, or be affected by an identified source.

5.4.1 Human Health Exposure Pathways

Future Site Users

The identification of potential pathways has been undertaken cognisant of the Contaminated Land Exposure Assessment (CLEA) model (EA, January 2009) and CIRIA guidance on ground gas risks (CIRIA, 2007).

Table 5.3. Human Health Exposure Pathways (Future Site Users)

Exposure Pathway			Residential
			With Homegrown Produce
Ingestion	Soil		✓
	Homegrown produce		✓
	Soil attached to homegrown produce		✓
	Consumption of potable water via utilities pipes		✓
Inhalation	Indoor dust	Tracking back from garden	✓
	Outdoor dust	Wind-blown	✓
	Indoor vapour	Soil and groundwater migration via permeable strata and ingress into confined spaces	✓
	Outdoor vapour	Soils and groundwater	✓
Dermal Contact	Outdoor soil		✓
	Indoor dust tracked from garden / wind-blown		✓

Maintenance / Construction Groundworkers

Short term human health risks during ground works as part of any development have been excluded from further consideration on the basis that risks of acute exposure can be addressed through the use of appropriate control measures, including Personal Protective Equipment (PPE) and good standards of health and safety practice.

5.4.2 Controlled Waters

The Environment Agency Groundwater Protection Guides (EA, 2017) and Remedial Targets Methodology ‘Hydrogeological Risk Assessment for Land Contamination’ (EA, 2006) discusses potential pathways as:

The geological and hydrogeological characteristic of the ground.

The depth and distribution of groundwater and its direction and rates of flow.

The attenuating properties of the soil and aquifer materials:

potential leaching through soils into underlying strata and aquifers from induced infiltration; and,

potential vertical/lateral migration of contaminants through groundwater bodies.

Influences of preferential flow via fissures, drainage systems, soakaways, man-made structures foundations, old mines, boreholes etc

Surface water run-off in areas of low permeability surfacing and / or susceptible to flooding.

5.4.3 Plant Uptake

Phytotoxic contaminants e.g. some heavy metals such as copper and zinc can be taken up by vegetation / planting an cause poor growth or vegetation dieback. Soils used in gardens or landscaping must provide a healthy growth medium.

5.4.4 Ecosystems

Environment Agency guidance (EA, October 2008) defines potential ecological pathways. These are primarily considered to comprise those listed in Section 5.3.3.

5.4.5 Property

Buildings and Structures

The migration via granular and/or fissured strata of ground and/or groundwater gas / vapours and their accumulation of in confined spaces to explosive limits.

Aggressive ground conditions that may influence sub surface concrete foundations.

Utility Infrastructure

Hydrocarbon and VOCs permeation of water supply pipework by direct permeation or ingress through connection points.

Migration via pipes, bedding materials and drainage runs, ducts etc of groundwater and / or gas / vapours and accumulation of in confined spaces to toxic, asphyxiant or explosive limits could occur.

5.5 Conceptual Model Summary

The initial conceptual Model for the Site has been summarised in Table 5.4, overleaf. The qualitative risk assessment methodology has been included within Appendix IV.

Table 5.4. Initial Conceptual Site Model & Preliminary Risk Assessment

Potential Onsite Sources	Potential Receptor	Possible Pathway	Probability		Consequence		Risk
Current use of land: primarily agricultural with a residential property and pastureland on proposed access points *(potential contaminants include asbestos, TPH, BTEX compounds, PAHs, VOCs, general inorganics inc. heavy metals, herbicides and pesticides)*	Future Site Users	Ingestion soil	Likely	Future development to include soft landscaping and private gardens. The Site is currently (and historically) primarily utilised for agricultural purposes and so has the potential for shallow impacted soils. Additionally, creation of the Site access points will involve the demolition of the existing residential property and so potentially impacted shallow soils are anticipated. Construction workers are not considered further due to mitigation through PPE. Should the development proposals change, the CSM will require review.	Medium	Potential for chronic damage to Human Health until proven otherwise.	Moderate
		Ingestion home-grown produce					
		Ingestion soil attached to home-grown produce					
		Inhalation indoor dust					
		Inhalation outdoor dust					
		Dermal soil contact					
		Dermal indoor dust contact					
		Inhalation indoor vapour					
		Inhalation outdoor vapour					
	Groundwater (Secondary A Aquifer and Principal Aquifer)	Vertical soil leaching	Low Likelihood	Site is underlain by a Secondary A Aquifer (Superficial Deposits – Clay with Flints) and a Principal Aquifer (Bedrock – Lewes Nodular Chalk Formation) of medium groundwater vulnerabilities and within a Groundwater SPZ – Zone 3. A nearby borehole log has found groundwater resting level to be ~75m bgl. The Site is at low risk of groundwater flooding.	Severe	Pollution of sensitive water resources (controlled waters).	Moderate

Potential Onsite Sources	Potential Receptor	Possible Pathway	Probability		Consequence		Risk
	Surface Water	Surface water run-off, soil leaching and lateral migration	Unlikely	Site lies in a negligible risk for surface water flooding. No surface water features within 250m of the Site. It is assumed that drainage will be properly managed for the final development.	Mild	Pollution of non-sensitive water resources.	Very Low
	Buildings and structures	Gas accumulation in confined spaces	Likely	Impacted shallow soils from previous and current uses is expected to be limited. The Site lies within a Radon affected area (southern portion) and therefore full protective measures are required.	Severe	Potential for catastrophic damage to proposed buildings. Potential for chronic damage to Human Health	High
		Hydrocarbons / VOCs permeation of plastic utilities pipes	Low Likelihood	Limited hydrocarbon / VOCs contamination anticipated.	Medium	Potential for chronic damage to Human Health	Moderate / Low
		Aggressive ground conditions in relation to subsurface concrete foundations	Low Likelihood	pH and sulphate could be present at levels / concentrations that can impact concrete.	Medium	Potential for significant damage to proposed buildings.	Moderate / Low

Potential Offsite Sources	Potential Receptor	Possible Pathway	Probability		Consequence		Risk
Surrounding land uses including farming, industrial estate ~50m northwest (inc. historical tanks, silos, waste exemptions), electrical substations (~100m southeast), historical garage (~200m south). Run-off from surrounding roads. Residential developments on the east and south boundaries.	Future Site Users Buildings and structures	Lateral migration of contaminants	Low Likelihood	Future development to include areas of soft landscaping. Underlying permeable superficial deposits (Clay with Flints – sand) and bedrock deposits (Lewes Nodular Chalk Formation) lie between the Site and the sources; however, significantly impacted soils are considered unlikely. Should the development proposals change, the CSM will require review.	Medium	Exposure to human health unlikely to lead to “significant harm”. Pollution of sensitive water resources (classified aquifers). Minor damage to crops, buildings or property.	Moderate / Low

3. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Ecologia has been instructed by Quinn Estates Ltd (the ‘Client’), to complete a Phase 1 Land Contamination Assessment (Desk Study and Site Walkover) for Capel Street, Capel-le-Ferne, Folkestone, Kent, CT18 7HG.

This Phase 1 Contaminated Land Assessment is required in support of a Planning application for the redevelopment of the Site in accordance with the National Planning Policy Framework.

From information provided by the Client, it is understood that the current Site redevelopment plan will comprise the erection of up to 90 dwellings with associated parking and infrastructure following demolition of the existing dwelling; with all matters reserved except access. If this changes, then the conclusions drawn in this report will need to be reconsidered.

The Site covers an area of approximately 4.03 hectares (ha) and is situated in the semi-rural, residential village of Capel-le-Ferne. Residential properties directly border the Site to the south and east, with an industrial / farm estate to west. Folkestone town centre is approximately 3.5km to the southwest with the Southern Railway running approximately 600m south of the Site.

The majority of the Site has remained an undeveloped agricultural field since the late 1800s to current day. The properties, which border the Site boundary to the east and south are identified in maps dated from 1931 onwards, with the small industrial estate to the west being mapped from 1972. Over the years, residential properties have primarily been constructed to the southeast of the Site to expand the village of Capel-le-Ferne. The remaining surrounding area consists mainly of agricultural land uses.

The Site is underlain by Superficial Clay with Flints Deposits (Secondary B Aquifer of medium vulnerability) with bedrock geology comprising the Lewes Nodular Chalk Formation (Principal Aquifer of medium vulnerability). The Site is located within a groundwater SPZ 3 – Total Catchment. The Site is not located in a Drinking Water Protected Area (DrWPA) for groundwater or surface water and groundwater resting levels are anticipated to be at depths of ~75m bgl. No surface water features are present within 250m of the Site.

An initial CSM has been developed based on the relevant findings in this Phase 1 Assessment. Potential sources of contamination have been identified in connection to the Site’s historical use and the following preliminary risk assessment of the relevant contaminant linkages has been produced:

Onsite Sources:

Future End Users:

- **Moderate Risk** associated with ingestion, dermal contact, inhalation of indoor and outdoor dust and vapours from agricultural land and the existing residential property.

Groundwater:

- **Moderate Risk** of vertical soil leaching to the Secondary A and Principal Aquifers.

Surface Water:

- **Very Low Risk** of surface run-off to nearby receptors (Strait of Dover at East Wear Bay, 0.8km S).

Buildings and Structures:

- **High Risk** associated with ground gas accumulation within buildings (Radon affected area).
- **Moderate / Low Risk** associated with hydrocarbons / VOCs permeation of plastic utilities pipes.
- **Moderate / Low Risk** associated with aggressive ground conditions (pH and sulphate) on concrete.

Off-Site Sources:

Moderate / Low Risk associated with lateral migration of contaminants from surrounding historical and current land uses, historic tanks, electrical substation, road network and residential developments.

6.2 Recommendations

From a review of the relevant findings, historical land use and anticipated ground conditions, Ecologia does not anticipate significant risks from potential contamination. However, the proposed access point will involve the demolition of an existing residential dwelling which has the potential for shallow impacted ground.

Therefore, an intrusive investigation is recommended as part of development works, which should comprise shallow soils testing and deeper boreholes for ground gas monitoring purposes.

Additionally, as a minimum it is recommended that the following is considered during the development construction works:

A detailed UXO risk assessment to be conducted prior to any ground penetrative works, given the Site's location in a Moderate UXO risk area.

A Consultants Coal Mining Report should be obtained to further assess coal mining issues, given the Site's location in a Coal Mining Area as defined by the Coal Authority.

An assessment of the Site to establish the existence or absence of invasive species would be advisable, to be undertaken by a competent person i.e. trained ecologist before proceeding with development.

A discovery strategy (procedures to be followed should unexpected contamination be identified) during redevelopment works in the event that unforeseen and suspected contamination is encountered, the client should stop works and further assessment undertaken by experienced Environmental Consultant. The discovery strategy may be a requirement / condition of the LPA as the planning application progresses.

Appropriate PPE for ground workers, to mitigate potential risks from dermal contact, ingestion and inhalation of contamination materials / soils.

Good housekeeping rules should also be observed onsite i.e. washing of hands before eating etc. in accordance with health and safety regulations.

The above recommendations should be presented to the Local Authority for comment and agreement. Typically, we would expect the recommendations to be conditioned as part of a planning application (i.e. Construction Management Plan).

If redevelopment plans change, potential risks would need to be reassessed and the GQRA, CSM and recommendations refined accordingly.

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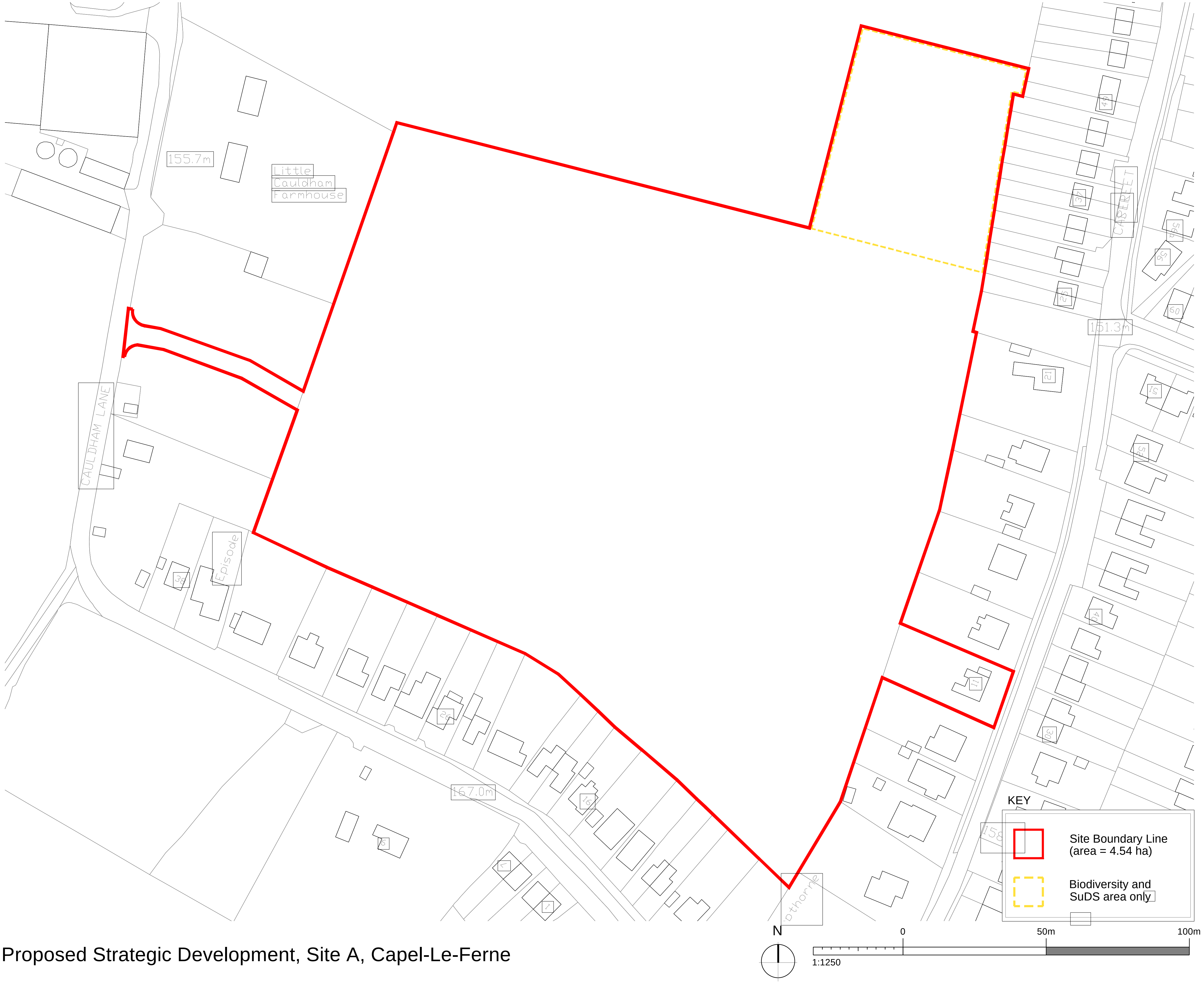
APPENDIX I

FIGURES

Quinn Estates



KEY

🟥 Site Boundary Line
(area = 4.54 ha)

▢ Biodiversity and
SuDS area only

Proposed Strategic Development, Site A, Capel-Le-Ferne

NOTES:

Do Not Scale.

Report all discrepancies, errors and omissions.

Verify all dimensions on site before commencing any work on site or preparing shop drawings.

All materials, components and workmanship are to comply with the relevant British Standards, Codes of Practice, and appropriate manufacturers recommendations that from time to time shall apply.

For all specialist work, see relevant drawings.

Rev	Date	Description
A	01.02.2021	First Issue
B	01.02.2021	Area amendment
C	02.02.2021	Area amendment
D	09.11.2021	Red Line Amended
E	02.02.2024	Red Line Amended
F	12.02.2024	Hatch colour added
G	14.02.2024	Red Line Amended

Project Title

Land off Capel Street,
Capel-Le-Ferne
Kent
CT18 7HF
For Quinn Estates

Drawing Description

Site Location Plan

Scale	Drawn by
1:1250 @ A3	AS
Date	**Checked by**
February 2024	CSS

CLAGUE ARCHITECTS

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CANTERBURY LONDON HARPENDEN

Drawing Number	Revision
23395A_20	G