Phase 1
Land Contamination Assessment

New Street, Ash, Canterbury
CT3 2AH

Report

Ecologia
experts on the ground

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Report

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Land Contamination Assessment

New Street, Ash, Canterbury, CT3 2AH

Prepared for: **Classicus Estates Ltd.**
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Reference: EES 22.108.2

Date: 03/11/2022

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Title: **Phase 1**
Land Contamination Assessment
New Street, Ash, Canterbury CT3 2AH

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Client:	Classicus Estates	**Client Reference:**	New Street

Management Systems Control

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EXECUTIVE SUMMARY

Site Location	New Street (the 'Site') located on New Street, Ash, Kent CT3 2AH.
Site Description	The Site covers an area of approximately 1.45 hectares and is situated in a mixed residential and agricultural area of Ash, near Sandwich. Sandwich town centre is located approximately 3.37km to the east of the Site. The River Stour is located approximately 2.79 km to the east. The Site is bordered by Sandwich Road and agricultural land to the north, industrial units, an agricultural merchants, residential properties and agricultural land to the east. To the west and south residential properties and agricultural land border the Site
Objective	This Phase 1 Land Contamination 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 comprises fifty-four (54No.) residential properties including sixteen (16No.) affordable housing units with private gardens, associated infrastructure, landscaping and an attenuation pond. If this changes then the conclusions drawn in this report will need to be reconsidered.
Environmental Setting	The Site is underlain by superficial Head deposits, associated with an Unproductive Aquifer, and bedrock deposits of Thanet Formation, designated as a Secondary A Aquifer. The nearest surface water feature to the Site comprises an inland river located on Site. The nearest Primary Surface Water Feature is the River Stour, approximately 2.79km east. The Site is not situated in a Drinking Water protected Area (DrWPA) for groundwater or surface water. The Groundsure report has identified no groundwater abstractions within 2km of the Site, and seven (7No.) surface water abstractions within 1km of the Site. The Site is located with a SSSI Impact Risk Zone, however the current proposed development does not fall into any notifiable category.
Historical Setting	Historically, the Site was occupied by orchards with some buildings present in the south of the Site from 1872 until the 1950s when the orchards were scaled down and buildings were added in the centre and west of the Site to form a nursery. The nursery buildings were removed from Site in approximately the 1990's, and an area of hardstanding was constructed in the south of the Site between the remaining buildings. The local area (<250m) has remained predominantly agricultural and residential since the 1870's, with development of some industrial and commercial buildings and residential areas mostly to the north and south of the Site. Regionally (250-1,000m) the land has remained agricultural and residential with some industrial/commercial areas and farms in all directions.
Outline Conceptual Site Model	An outline Conceptual Site Model (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 pollutant linkages has been produced: **Onsite Sources:** • **Future End Users:** – **Moderate Risk** associated with dermal contact, inhalation of indoor and outdoor dust and vapours from Made Ground. • **Groundwater:** – **Moderate/Low Risk** of vertical soil leaching to Secondary A Aquifer. • **Surface Water:** – **Moderate/Low Risk** of surface run-off to inland drainage channel – Onsite. – **Moderate/Low Risk** of surface run-off to Surface Water Abstractions within 1km of the Site • **Buildings and Structures:** – **High Risk** associated with ground gas accumulation within buildings due to potential Made Ground. – **Moderate Risk** associated with VOC permeation of plastic utilities pipes. **Off-Site Sources:** • **Moderate/Low Risk** associated with lateral migration of contaminants from surrounding historical and current industry, electrical substations 112m W, 168m W and 248m E, historic tank 87m W.
Recommendations	From the review of the relevant findings limited further works are recommended, comprising: • An intrusive Phase 2 Site Investigation to assess underlying shallow ground conditions, presence of Made Ground and potential contamination levels across the Site. • At this stage, as a minimum, it would be expected that any construction works would be undertaken allowing for: • 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. • 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 on site 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.
If redevelopment plans change, potential risks would need to be reassessed and the GQRA, CSM and recommendations refined accordingly.	

CONTENTS

TABLES

PLANS

APPENDICES

1. INTRODUCTION

1.1. Background

Ecologia has been instructed by Classicus Estates Ltd. (the 'Client') to complete a Phase 1 Land Contamination Assessment (Desk Study and Site Walkover) for New Street (the 'Site') located in Ash, Canterbury, CT3 2AH.

1.2. Objectives

This Phase 1 Contaminated Land Assessment is required in support outline planning consent for the redevelopment of the Site in accordance with the National Planning Policy Framework (MHCLG, July 2021).

1.3. Proposed Redevelopment

From information provided by the Client, it is understood that the current Site redevelopment comprises fifty-four (54No.) residential properties (including sixteen (16No.) affordable housing units) with private gardens, associated infrastructure, landscaping and an attenuation pond.

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, 2020) 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 comprising a review of:
  - the Site's environmental setting (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 outline Conceptual Site Model (CSM) establishing potential pollutant 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 are detailed in Section 7.

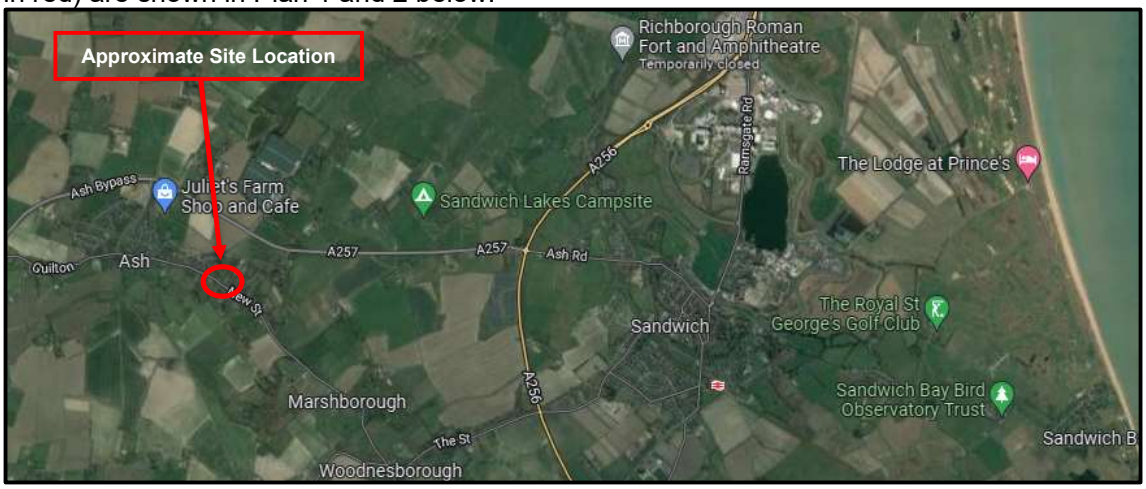
2. SITE DESCRIPTION

2.1. Site Location

The Site address is: New Street,
Ash,
Canterbury,
Kent CT3 2AH

The Site covers an area of approximately 1.45 hectares and is situated in a mixed residential and agricultural area of Ash, near Sandwich. Sandwich town centre is located approximately 3.37km to the east of the Site. The River Stour is located approximately 2.79 km to the east. The Site is bordered by Sandwich Road and agricultural land to the north, industrial units, an agricultural merchants, residential properties and agricultural land to the east. To the west and south residential properties and agricultural land border the Site.

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



Plan 1. Approximate Site Location (*Source: Google Maps, 2021*).

Plan 2. Approximate Proposed Redevelopment Area (*Source: Google Maps, 2021*).

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	Approx. 629443 158320	
Site Area	1.45 hectares	
Approximate Elevation	21.0-29.0m AOD	
Site Geometry	Irregular	
Site Boundary	North	Sandwich Road and agricultural land beyond
	East	Commercial/Industrial buildings, residential properties and agricultural land beyond
	South	Residential properties and agricultural land beyond
	West	Residential properties and agricultural land beyond

A Site walkover survey was completed by Ecologia on Wednesday, 15 June 2022. The photographic report included in Appendix III should be referred to in conjunction with the Site description below.

The Site is located in Ash, near Canterbury and is accessed from New Street to the south of the Site via a hardstanding driveway with a large single metal gate (Plate 1). The Site comprises hardstanding and vacant buildings from previous businesses in the south of the Site (Plate 2), and the remainder of the Site comprises an area of open grassland with mature trees sporadically throughout (Plate 3). The Site is bordered on the western boundary by a waist height wire and wood fence (Plate 4), in the south by mature trees and hedgerows (Plate 5) and in the east by wood panel fencing and mature trees (Plate 6).

The area to the south of the Site was previously inhabited by businesses working out of approximately five (5No.) buildings which have now been left vacant, these buildings consist of a reception or office building, storage buildings, and an open warehouse style building. These buildings contain white goods (Plate 7), a gas cylinder (Plate 8), petrol containers (Plate 9), stockpiled materials and waste such as ladders, pallets, bricks, steel wire, plastic crates, rubber tires, tarpaulins, cardboard, and scaffold boards (Plate 10) and paint containers (Plate 11).

A greenhouse (Plate 12) is present in the southeast corner of the Site, containing tools and materials such as steel wire, cables, hammers and wrenches, bricks, wood, and paint cans (Plate 13). Adjacent to this greenhouse is a large, empty above ground storage tank (AST) raised on cinderblocks (Plate 14). No odour was noted, the tank was not bunded and some evidence of staining was present. Square sheets of greenhouse glass (Plate 15) and plastic tubing were stacked adjacent to the greenhouse.

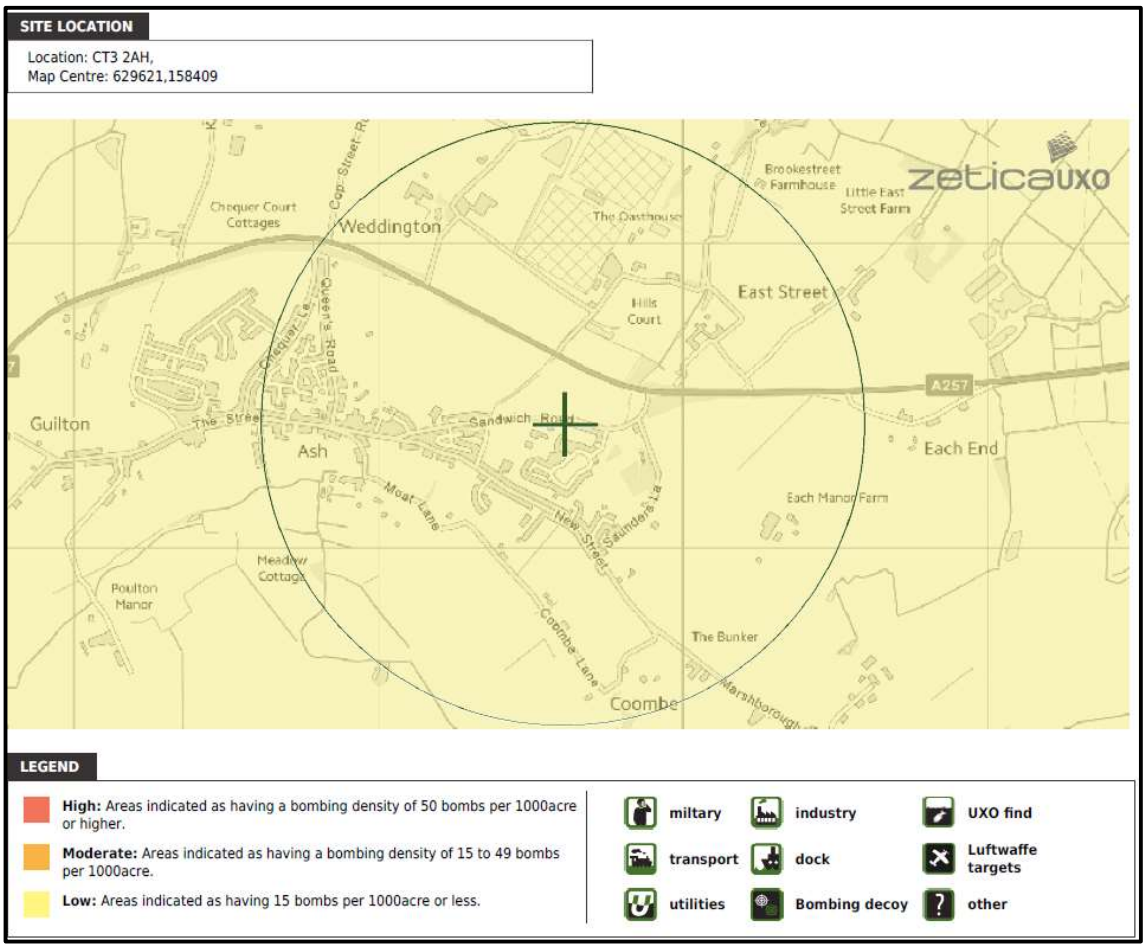
Two (2No.) unbunded ASTs were present immediately north of the buildings in the south of the Site on soft ground, evidence of staining was noted (Plate 16). Stockpiles of wood, pallets (Plate 17) and metal (Plate 18) were also present in this area at the time of the walkover.

Some evidence of burning was noted in the east of the Site, in the open area away from buildings (Plate 19).

The rooves on all of the buildings in the south of the Site were noted to contain potential asbestos containing materials (ACM) (Plates 20-22) and several stockpiles of corrugated cement sheeting were noted around the Site (Plates 23-26) which may have potentially been ACM.

2.3. Unexploded Ordnance

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



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

3. ENVIRONMENTAL SETTING

Information with regards to the Site's environmental setting has been obtained from readily available sources including the 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 (Sheet 290 Dover, 1:50 000 1977) and the BGS website (Geology of Britain Viewer) indicates that the Site is directly underlain by the geological sequences summarised in Table 3.1 below.

Table 3.1. Geological Information

Group / Formation		Lithology	Approximate Thickness (m)
Superficial	Head (Clay and Silt)	Gravel, sand and clay, with lenses of silt, clay or peat and organic material.	N/A
Bedrock	Thanet Formation	Glauconitic, fine grained sand with sandy silt, silt or silty clay.	10-24m

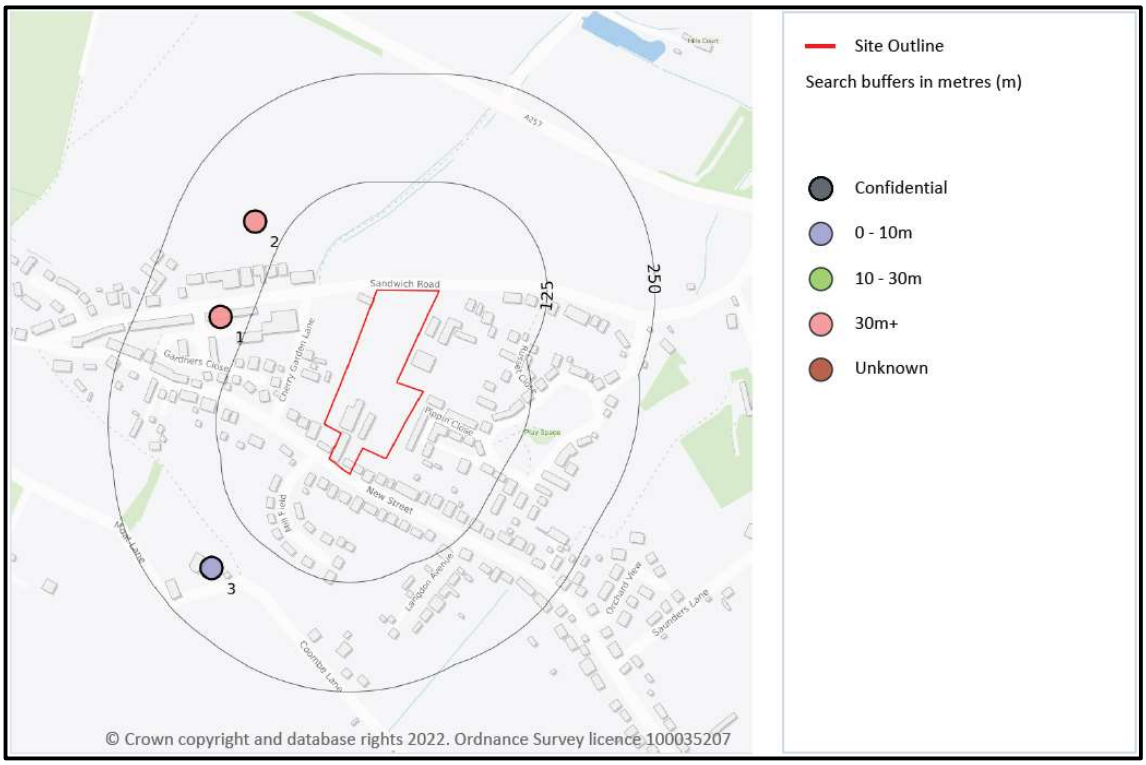
3.1.1. Borehole Records

Information with regards to local borehole records was obtained from the BGS website and Groundsure report. There are three (3No.) boreholes within 250m of the Site, one of these records does not hold usable information, and two of these records hold identical information which is summarised in Table 3.2 below.

Table 3.2. Local Borehole Records

ID	Grid Reference	Name	Location	Depth (m)	Description
1	629260 158390	Puma Works - Ash	158m W	121.92	Topsoil recorded from Ground Level (GL) to 1.20m below ground level (bgl). Clay, sand and gravel were recorded from 1.20m to 4.20m bgl. Thanet sand and clay from 4.20m bgl to 32.00m bgl, and chalk was encountered below this, to the base of the borehole. Resting groundwater was present at approximately 19.00m bgl.

The borehole locations are depicted on Plan 4 overleaf.



Plan 4. BGS Boreholes *(Source: GroundSure, 2022).*

3.1.2. Mineral Safeguarding Areas

The Minerals and Waste Local Plan for Dover 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, which are defined as surface mineral workings.

There are no records of natural cavities within 500m of the site.

There are no records of surface ground workings within 250m of the Site boundary, which are defined as ground excavations at the surface level.

There are two (2No.) records of non-coal mining area onsite and fourteen (14No.) records of non-coal mining areas within 1,000m of the Site, these include:

- Onsite, Unnamed Chalk mining, Class: A, Likelihood: Sporadic underground mining of restricted extent may have occurred. Potential for localised difficult ground conditions are unlikely and localised, and are at a level where they need not be considered;
- Onsite, Unnamed Chalk mining, Class: B, Likelihood: Small scale underground mining may have occurred. Potential for localised difficult ground conditions are unlikely or localised, and are at a level where they need not be considered;
- 15m E, 229m N, 259m NW, 487m E, 492m W, 519m E, 672m NW & 803m E Unnamed Chalk mining, Class: B, Likelihood: Small scale underground mining may have occurred. Potential for localised difficult ground conditions are unlikely or localised and are at a level where they need not be considered.

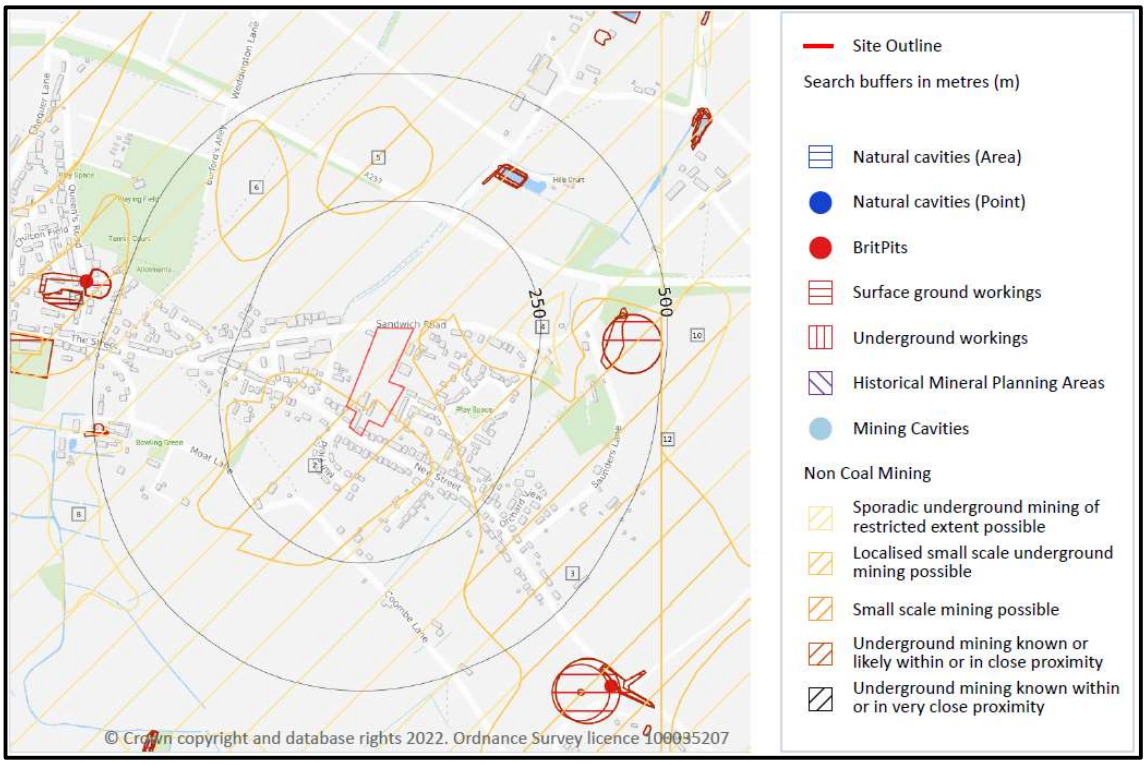
- 205m E, 449m W, 635m S & 763m NE. Unnamed Sand mining, Class: A, Likelihood: Sporadic underground mining of restricted extent may have occurred. Potential for localised difficult ground conditions are unlikely and localised, and are at a level where they need not be considered
- 488m E & 515m E, Unnamed Chalk mining, Class A, Sporadic underground mining of restricted extent may have occurred. Potential for localised difficult ground conditions are unlikely and localised, and are at a level where they need not be considered

There is one (1No.) record of coal mining on Site. The Site is located within 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.

There are no records of underground workings within 1,000m of the Site boundary.

There are no records of historic mineral planning areas or mining cavities within 500m of the Site.

The mining locations are depicted on Plan 5 below.



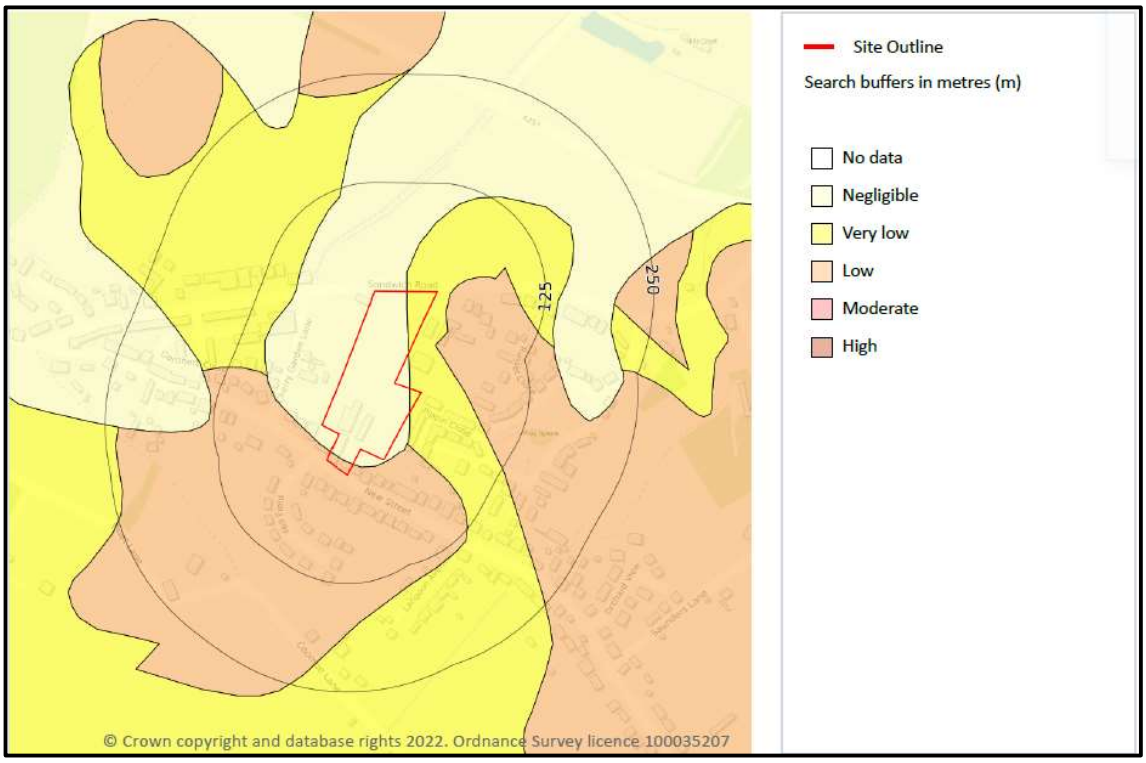
Plan 5. Mining Location Plan *(Source: Groundsure).*

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 and these are shown within Plan 6 overleaf.

Table 3.3. Ground Hazards

Hazard	Risk
Shrink Swell Clays	**Low** (Ground conditions predominantly high plasticity). **Negligible (Southern extent of Site)** (Ground conditions predominantly non-plastic).
Landslides	**Very Low** (Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered).
Ground Dissolution of Soluble Rocks	**Negligible** (Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present). .
Compressible Deposits	**Negligible** (Compressible strata are not thought to occur).
Collapsible Deposits	**Moderate** (Deposits with potential to collapse when loaded and saturated are probably present in places). **Very Low (Eastern and southern extents of Site)** (Deposits with potential to collapse when loaded and saturated are unlikely to be present).
Running Sands	**Low (Southern extent of Site)** (Running sand conditions may be present. No identified constraints may apply to land uses involving excavation or the addition or removal of water). **Very Low (Eastern extent of Site)** (Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly) **Negligible** (Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on land use due to running conditions).



Plan 6. Running Sands map *(Source: Groundsure).*

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 located in an area where less than 1% of properties are affected. However, no radon protective measures are considered necessary.

3.1.6. Soil Chemistry

The Groundsure report has identified nine (9No.) records onsite which indicate the following estimated concentrations of potentially harmful elements in the topsoil.

- Onsite:
  - Arsenic – 15-25mg/kg.
  - Lead – 100-200mg/kg.
  - Bio-accessible Lead – 60-120mg/kg.
  - Cadmium – 1.80mg/kg.
  - Chromium – 60-90mg/kg.
  - Nickel – 15-30mg/kg.

3.2. Hydrogeology

The MAGIC website indicates the Site is located over:

- Secondary A Aquifer associated with the bedrock deposits, relating to the Thanet Formation; and,
- Unproductive Strata associated with the Superficial Head deposits.

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

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

The Site is classified a Secondary A bedrock aquifer of high vulnerability.

3.2.1. Groundwater Abstraction

Information obtained from the MAGIC website and Groundsure report indicates that the Site is not located within in a groundwater Source Protection Zone (SPZ).

The Site is not situated in a Drinking Water protected Area (DrWPA) for groundwater.

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

- East Kent Tertiaries. Overall rating: Poor. (ID: GB40702G501600).

The Groundsure report has identified the following groundwater abstractions within 2km of the Site in Table 3.4 below:

Table 3.4. Groundwater Abstractions

Location	Name	Details
481m W	Case	Status: Historical Licence No: 9/40/04/0367/G Details: General Farming and Domestic
1,533m S	Southern Water Services Ltd.	Status: Active Licence No: 9/40/04/0056/GR Details: Potable Water Supply - Direct
1,543m S		Status: Historical Licence No: 9/40/04/0056/GR Details: Potable Water Supply - Direct
1,561m NW	C R Quested	Status: Historical Licence No: SO/040/0009/013 & SO/040/0009/013R01 Details: Spray Irrigation - Storage
1,670m S & 1,849m S	Southern Water Services Ltd.	Status: Active Licence No: 9/40/04/0057/GR & 9/40/04/0056/GR Details: Potable Water Supply – Direct.

3.3. Hydrology

The nearest surface water feature to the Site comprises an inland river located onsite. The nearest Primary Surface Water Feature is the River Stour, approximately 2.79km east.

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

- Rivers and Sea – Negligible;
- Surface Water – 1 in 30 years, 0.1m -0.3m; and,
- Groundwater – Low to Negligible.

The Groundsure report records no historic flood events within 250m of the Site.

The Site is within Flood Zone 1 (Fluvial Models), it has a low risk of being flooded by rivers or the sea.

3.3.1. Surface Water Abstraction

The Groundsure report has identified thirty-six (36No.) surface water abstractions within 2km of the Site. Surface Water Abstractions present within 1km of the Site are detailed in Table 3.5 below & overleaf:

Table 3.5. Surface Water Abstractions

Location	Name	Details
826m N	Laslett & Sons	Status: Historical Licence No: 12/085 Details: Spray Irrigation – Storage
833m NE	Laslett	Status: Active Licence No: 12/085 Details: Spray Irrigation – Storage
833m N	Laslett & Sons	Status: Historical Licence No: 12/085 Details: Spray Irrigation – Storage
		Status: Active Licence No: 12/085/R01 Details: Spray Irrigation – Storage
922m W	D G Clarke (Kent)	Status: Historical Licence No: 9/40/04/0233/SR Details: Spray Irrigation – Direct
955m N	Laslett & Sons	Status: Historical Licence No: 12/085 Details: Spray Irrigation – Storage
960m N	Laslett & Sons	Status: Historical Licence No: 12/085 Details: Spray Irrigation – Storage
		Status: Active Licence No: 12/085/R01 Details: Spray Irrigation – Storage

Location	Name	Details
976m W	Mansfields	Status: Historical Licence No: 9/40/04/0233/SR Details: Spray Irrigation – Direct

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

- Ash Level Catchment. Stour Marshes operational Catchment. Stour Management Catchment (ID:GB107040019600).

The Site is not situated in a Drinking Water protected Area (DrWPA) for surface water.

3.4. Environmentally Sensitive Areas

The Groundsure report and MAGIC website records no statutory environmental designation areas within 1,000m of the Site boundary.

3.4.1. Nitrate Vulnerable Zone

The Site is located within in the following Nitrate Vulnerable Zones (NVZs).

- 80m SW, Name: Wingham River NVZ, Type: Surface Water (ID:512);

3.4.2. 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 - Airports, helipads and other aviation proposals.
- Residential - Residential development of 500 units or more.
- Rural residential - Any residential development of 500 or more houses outside existing settlements/urban areas.
- Air pollution - Any industrial/agricultural development that could cause air pollution (including industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 750m² & manure stores > 3500t).
- Combustion - General combustion processes >50MW energy input. Including energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.
- Discharges - Any discharge of water or liquid waste of more than 20m³/day to ground (i.e. to seep away) or to surface water, such as a beck or stream

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, however, the proposed development does not fall into the above categories.

3.5. Listed Buildings

Buildings are listed for special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate relative importance, however building controls apply to all buildings equally, irrespective of the grade, and apply to the interior and exterior of the building in its entirety.

The Groundsure report has identified no record for listed buildings onsite.

3.6. Agricultural Designations

The Groundsure report and MAGIC website designates the entire Site as Grade 1 – Excellent quality agricultural land.

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

3.7. Visual and cultural designations

3.7.1. Listed Buildings

The Groundsure Report indicates the following listed buildings within 250m of the Site boundary:

- 11m west, 50, New Street, Ash, Dover, Kent, CT3, Grade II, Listed: 26/11/1987.
- 102m southeast, The Shrubbery, Ash, Dover, Kent, CT3, Grade II, Listed: 26/11/1987.
- 165m west, 43, New Street, Ash, Dover, Kent, CT3, Grade II, Listed: 26/11/1987.
- 203m west, 43, Flint House Cottage, Ash, Dover, Kent, CT3, Grade II, Listed: 26/11/1987.
- 240m southwest, Lovekey Cottage, New Street, Ash, Dover, Kent, CT3, Grade II, Listed: 26/11/1987.

4. HISTORICAL AND INDUSTRIAL SITE SETTING

4.1. Site and Surrounding Area Historical Development

Historical Maps (1:2,500 & 1:10,000) have been provided by Groundsure dating from 1872 to 2022.

The Site was used as orchards with some buildings present in the south of the Site from 1872 until the 1950s when the orchards were scaled down and buildings were added in the centre and west of the Site to form a nursery. The nursery buildings were removed from Site in approximately the 1990's, and an area of hardstanding was constructed in the south of the Site between the remaining buildings.

The local area (<250m) has remained predominantly agricultural since the 1870's, with development of some industrial and commercial buildings and residential areas mostly to the north and south of the Site. Regionally (250-1,000m) the land has remained agricultural and residential with some industrial/commercial areas and farms in all directions.

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

Table 4.1. Historical Summary

Dates	Onsite	Locally (<250m)	Regionally (250m – 1km)
1872-1873	The majority of the Site is occupied by orchards. The S of the site contains two unnamed buildings, and the E of the Site is vacant land.	Orchards and unnamed buildings are present immediately to the W of the Site. A brewery is present 100m W. A Vicarage is present 90m W New Street and some residential properties are present immediately S of the Site, New Street runs from W-SE. Orchards are present 150m NE, 200m ESE,100m SE, 100m W, 160m NW. Unnamed buildings (assumed residential) are present 250m W. Mount Ephraim residential area is located 200m SW. Roman Road runs E-W immediately N of the Site.	Orchards and vacant land are present in all directions, between 500m-1km from Site. Moat Farm is present 500m W. A Gas Works is present 500m WNW Goshall Farm is present 1km NE. A Sheep Pen is located 700m NE. Residential/agricultural area of Weddington is located 600m N. Residential area of Ash is located 500-1km W, comprising residential properties, schools and churches. Ringleton Farm is present 1km S. Each Farm is located 850m ESE Coombe residential area is present 750m SE.
1896-1898	No significant changes.	Orchards 100m to the SE extended to the SE. Orchards 150m NE now 180m NE. Other orchards remain the same. Mount Ephraim to the SW now contains a Mill. Residential development 'The Gables' added just N of the Brewery – 70m NW.	Old Sand Pit added 510m W. Sewage Works added 800m W. Old Sand Pit added 1km WSW.

Dates	Onsite	Locally (<250m)	Regionally (250m – 1km)
1905-1907	No significant changes.	Tanks added 250m WNW. Orchards 100m W no longer present, replaced with vacant land. Orchards 180m SE extended to 150m E. Orchards added immediately E of the Site, to 110m E. Allotment Gardens added 160m SE. Residential properties added to Roman Road, 70-110m E. Unnamed building added immediately E of Site. Further properties added to New Street to the S of the Site.	Orchards added 750m N, 600m W. Old Sand Pit 1km WSW no longer present. No other significant changes.
1938-1948	Orchards no longer present on Site, 2No. buildings added in the S of the Site.	Tanks 250m WNW no longer present. Further residential properties added to Roman Road and New Street. Vicarage 90m W now named 'Old Vicarage' Allotment gardens 160m SE now replaced with residential properties.	Gas Works 500m WNW no longer present. Westward and northward residential expansion of Ash to the W. East Kent Light Railway added 550m SW of the Site, running from W to S.
1955-1960	Several buildings added in the S to the centre of the Site, labelled as a nursery. E of the Site is now occupied by orchards	Roman Road to the N now named Sandwich Road, and residential properties added along this road. Further residential properties added to New Street to the S of the Site. Orchards added 20m S, 80m SE, 250m SE, 200m SW. Buildings 250m WNW named White Post Farm. Mount Ephraim Mill no longer present. Pond added 90m W. Old Vicarage to the W now named Pomaret. Pylons added 50m SW. Drain added 160m NNE.	Old Sand Pit 510m W replaced with Recreation Ground and Allotment Gardens. Continued northward expansion of Ash. Sewage Works 800m WSW no longer present, replaced with vacant land. Allotment Gardens added 750m WSW. Twitham Hill Farm added 700m NE. Great Weddington Farm and Little Weddington Farm added 700m N. Drains added 500m WSW.
1970-1977	More buildings added to the Nursery. E of the Site no longer occupied by orchards.	Unnamed residential buildings immediately to the W of Site now named Cherry Garden. 2No. unnamed buildings added immediately E of the Site and named Agricultural Merchants. Pomaret to the W now named Research Centre (Biological). Electrical substation added 215m W.	Continued westward and northward residential expansion of Ash. Addition of Westland Nurseries 480-1km+ N of the Site, consisting of 10No. large buildings, 3No. reservoirs and 2No.Tanks. Radar Station added 800m SE. Filter Beds added 760m SE. Pump House added 300m E East Kent Light Railway 550m SW of the Site, running from W to S no longer present.

Dates	Onsite	Locally (<250m)	Regionally (250m – 1km)
		Engineering Works replaces the Brewery 100m W, Garage added 130m WNW. Mount Ephraim to the SW now occupied by Lovekey Cottage. Pylons 50m SW no longer present, replaced by unnamed buildings. Nurseries added 100m S Residential properties added on New Street 250m SE.	
1982-1993	4No. Nursery buildings no longer present on Site. Area of hardstanding now present from Site entrance on New Street to the South partially into the Site. Orchards present in the N of the Site.	Some residential properties added S of Cherry Garden, immediately W of the Site. Residential properties added along Sandwich Road to the N of the Site and New Street to the S of the Site. Nursery added alongside the Agricultural Merchants immediately to the E of the Site.	Electrical substation added 700m SE. Residential expansion to the N of Ash. 2No. small buildings added to Westland Nurseries.
2003-2022	More buildings removed from Site. No other significant changes. Site now resembles current layout.	Nursery immediately to the E no longer present. Addition of small roads related to surrounding residential developments. No other significant changes, area resembles current layout from approximately 2010.	General expansion and layout changes to Ash to the W and Coombe to the SE. Area resembles current layout from approximately 2010.

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 and overleaf.

Table 4.2. Trade Directory Entries – Current

Location	Company	Details
67m W	Gas Governor	Gas Features
84m E	Obsolete Petrol Station	Obsolete
168m W	Electrical Substation	Electrical Features
248m E	Electrical Substation	Electrical Features

Table 4.3. Trade Directory Entries – Historic

Location	Details	Date
Onsite	Nursery	1960-1991
58-60m NW	Unspecified Works/Brewery	1871-1991
68m SE	Nursery	1975-1991
72-85m W	Brewery	1938-1975
87m W	Unspecified Tank	1938
112m W	Electricity Substation	1970-1993
116m W	Garage	1790-1982
128m W	Garage	1993
197m SW	Unspecified Tank	1873
188-198m SW	Windmill	1871-1938
218m E	Nursery	1960

4.3. Landfill and Waste Facilities

The Groundsure report details two (2No.) records of historical landfill or waste facilities within 500m (EA, July 2003) of Site;

- 378m E, Site Reference: Gosshall Farm, Waste Type: Non-Biodegradable Wastes.
- 406m E, Site Reference: DO20, P/07/45, Waste Type: Inert, Commercial.
- 439m E, Site Reference: P/07/45, DO20, Waste Type: Inert.

4.4. Waste Exemptions

Waste exemptions are activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. There are no waste exemptions recorded within 250m of the Site.

4.5. Licensed Discharges to Controlled Waters

The Groundsure report details the following records of the licensed discharges to controlled waters within 500m of the Site (Table 4.4 below & overleaf):

Table 4.4. Licensed Discharges to Controlled Waters

Location	Address	Details
400m S	Ash Coombe Vineyard, Coombe Lane, Ash, Kent	Effluent Type: Sewage Discharges – Final/Treated Effluent – Not water company Permit Number: P01420 Permit Version: 1 Receiving Water: INTO LAND Issue date: 29/01/1988 Effective Date: 29/01/1988

Location	Address	Details
		Revocation Date: 31/03/1997
408m NE	Europa Nursery, Hills Court Road, Ash, Canterbury, Kent, CT3 2AP	Effluent Type: Sewage Discharges – Final/Treated Effluent – Not water company Permit Number: P07817 Permit Version: 1 Receiving Water: THE RIVER STOUR Issue date: 10/12/1999 Effective Date: 10/12/1999 Revocation Date: -

4.6. Pollution Incidents

The Groundsure report has no record of pollution incidents within 500m of the Site.

4.7. 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 details no records of pollution inventory substances within 500m of the Site.

4.8. 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.

4.9. 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.

4.10. Hazardous Substance Storage/Usage Sites

The Groundsure report has records of the following sites granted consent to hold certain quantities of hazardous substances within 500m of the Site:

- 476m SE, Site Address: Kemica Ltd, Old Radar Site, Saunders Lane, Ash, Canterbury, Kent, England CT3. Details: No Details.

5. OUTLINE CONCEPTUAL SITE MODEL

5.1. Introduction

This outline Conceptual Site Model (CSM) has been developed cognisant of the Land Contamination Risk Management (EA, 2020) and follows the principle of the identification of the:

Source ⇨ Pathway ⇨ Receptor.

For a potential risk to be realised all three components must be identified and a pollutant linkage established. Once a potential pollutant linkage is identified, the severity of any potential harm is assessed by a staged iterative process of initially qualitative assessment (Preliminary Risk Assessment) then numerically through Quantitative Risk Assessment (QRA).

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).

Specific potential contaminants of concern are additionally identified with reference to:

- Contaminated Land Report 8 (DEFRA / EA, 2002) *(*although withdrawn still a useful reference guide).

Table 5.1. Potential Onsite Sources and Typical Contaminants

Potential Onsite Sources	Typical Contaminants
Historical activities – Made Ground from historic development onsite, historical use of Site as orchards. Historical buildings still present in south of Site, potential ACM cement sheeting on rooves of buildings noted during the Site walkover, white goods/appliances and stockpiled materials present in the south of the Site during the Site walkover (including potential ACMs).	Potential for a range of contaminants including metals, asbestos, total petroleum hydrocarbons (TPHs), BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and general inorganics. Agricultural chemicals including potential for herbicide and pesticide use, fuels, asbestos containing materials (ACMs)
Accumulation of ground gas – Made Ground associated with historical nursery buildings on Site	Potential for ground gas (methane and carbon dioxide, carbon monoxide, 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 historical agricultural activities – surrounding orchards, surrounding residential and commercial developments within 250m of the Site including historical brewery, gas works, sand pit, allotment gardens, farms, pond, pylons, drains, research center, engineering works, garages, nurseries and obsolete petrol station. Current industry – Agricultural merchants immediately to the east of Site. Electrical Substations 112m W, 168m W and 248m E. Historic Tank 87m W.	Potential for a range of contaminants including total petroleum hydrocarbons (TPHs), BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs). Agricultural chemicals including potential for herbicide and pesticide use, fuels, asbestos containing materials (ACMs)

Any other potential contaminative sources are not considered further due to their 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 - residents
- Maintenance / construction groundworkers.

5.3.2. Controlled Waters

The following Controlled Waters have been identified as potential receptors:

- Surface Water.
  - Inland river – On Site
  - Surface Water Abstractions within 1km.
- Groundwater.
  - Secondary ‘A’ Aquifer – Thanet Formation bedrock deposits.

5.3.3. Ecosystems

Although the Site is not reported to be in a SSSI, it is within an SSSI IRZ. The proposed development does not fall into any notifiable category.

There is an NVZ for surface water ‘Wingham River NVZ’ located 80m southwest of the Site.

5.3.4. Property

The following property has been identified as potential receptors:

- Buildings.
  - VOC permeation of plastic utilities pipes
  - 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.

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

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
			Plant Uptake
Ingestion	Soil		✓
	Homegrown produce		✓
	Soil attached to homegrown produce		✓
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. Ecosystems

Environment Agency guidance (EA, October 2008) defines potential ecological pathways. These are primarily considered to comprise those listed in Section 5.2.3.

5.4.4. 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

Notably, aggressive ground conditions and possibility for VOC permeation of water supply pipework.

5.5. Conceptual Model Summary

The Outline 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. Outline Conceptual Site Model & Preliminary Risk Assessment

Potential Onsite Sources	Potential Receptor	Possible Pathway	Probability		Consequence		Risk
Historical activities – Made Ground from historical development on site, historical use of Site as orchards. Historical buildings still present in south of Site, potential ACM cement sheeting on rooves of buildings and stockpiled throughout the south of the Site noted during the Site walkover, white goods/appliances and stockpiled materials present in the south of the Site during the Site walkover, 3No. unbunded tanks were noted on soft ground on the Site, with some staining noted.	Future Site Users/	Ingestion soil	Likely	Potential Made Ground to be present on Site from historical use as a nursery with associated buildings. Agricultural chemicals potentially present from historical use as orchards. Potential ACM noted on Site during walkover – present on rooves of buildings in the south of the Site and stockpiled throughout the Site, unbunded tanks with staining evident resting on soft ground in 3No locations, potential for material to have leaked into the ground surface. White goods and stockpiled materials present in the south of the Site noted during the Site walkover.	Medium	Potential for chronic damage to Human Health.	Moderate
		Inhalation indoor dust					
		Inhalation outdoor dust					
		Dermal soil contact					
		Dermal indoor dust contact					
		Inhalation indoor vapour					
		Inhalation outdoor vapour					

(Potential for a range of contaminants including metals, asbestos, total petroleum hydrocarbons (TPHs), BTEX compounds (benzene, toluene, ethylbenzene, and xylenes), polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs) and general inorganics. Agricultural chemicals including potential for herbicide and pesticide use, fuels, and asbestos containing materials (ACMs)).	Groundwater (Secondary 'A' Aquifer)	Vertical soil leaching	Low Likelihood	Potential Made Ground to be present on Site from historical use as a nursery with associated buildings. Agricultural chemicals potentially present from historical use as orchards. Site is underlain by superficial head deposits underlain by a permeable Secondary 'A' Aquifer. The unproductive superficial head deposits will limit the potential for vertical soil leaching. Groundwater was encountered at depth at approximately 19.00m bgl within a local borehole record, however, this was 150m from the Site and therefore may not be representative of onsite conditions.	Medium	Pollution of sensitive water resources (classified aquifers).	Moderate / Low
	Surface Water (land drain–on Site)	Surface water run-off	Likely	Site lies in a low risk for surface water flooding and is in Flood Zone 1 – it has a low risk of being flooded by rivers or the sea. It is assumed drainage will be properly managed for the final development.	Mild	Pollution of non-sensitive water resources.	Moderate / Low
	Surface Water Abstractions within 1km of the Site. River Stour 2.79km east.	Surface water run-off	Low Likelihood	Site lies in a low risk for surface water flooding and is in Flood Zone 1 – it has a low risk of being flooded by rivers or the sea. The nearest active surface water abstraction point is 833m away from the Site. The River Stour is greater than 2km from the Site.	Medium	Pollution of sensitive water resources (classified aquifers).	Moderate / Low

	Buildings and structures	Gas accumulation in confined spaces	Likely	Potential Made Ground to be present on Site from historical use as a nursery with associated buildings, 3No unbunded tanks with localised staining noted on Site, potential for material to have leaked into the ground surface. Agricultural chemicals potentially present from historical use as orchards.	Severe	Potential for catastrophic damage to proposed buildings.	High
		VOC permeation of plastic utilities pipes	Likely		Medium	Potential for chronic damage to Human Health	Moderate
Potential Offsite Sources	**Potential Receptor**	**Possible Pathway**	**Probability**		**Consequence**		**Risk**
Surrounding historical agricultural activities – surrounding orchards, surrounding residential and commercial developments within 250m of the Site including historical brewery, gas works, sand pit, allotment gardens, farms, pond, pylons, drains, research centre, engineering works, garages, nurseries and obsolete petrol station. Current industry – Agricultural merchants immediately to the east of Site Electrical Substations 112m W, 168m W and 248m E. Historic Tank 87m W.	Future Site Users/ Construction Workers Buildings and structures	Lateral migration of contaminants.	Low Likelihood	Superficial Head Deposits lie between the sources and the Site. Clay deposits reduce the risk of migration of contaminants. 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

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Ecologia has been instructed by Classicus Estates Ltd. (the 'Client') to complete a Phase 1 Land Contamination Assessment (Desk Study and Site Walkover) for New Street (the 'Site') located in Ash, Canterbury, Kent, CT3 2AH.

This Phase 1 Land Contamination 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 comprises fifty-four (54No.) residential properties including sixteen (16No.) affordable housing units with private gardens, associated infrastructure, landscaping and an attenuation pond. If this changes then the conclusions drawn in this report will need to be reconsidered.

The Site covers an area of approximately 1.45 hectares and is situated in a mixed residential and agricultural area of Ash, near Sandwich. Sandwich town centre is located approximately 3.37km to the east of the Site. The River Stour is located approximately 2.79 km to the east. The Site is bordered by Sandwich Road and agricultural land to the north, industrial units, an agricultural merchants, residential properties and agricultural land to the east. To the west and south residential properties and agricultural land border the Site.

Historically, the Site was occupied by orchards with some buildings present in the south of the Site from 1872 until the 1950s when the orchards were scaled down and buildings were added in the centre and west of the Site to form a nursery. The nursery buildings were removed from Site in approximately the 1990's, and an area of hardstanding was constructed in the south of the Site between the remaining buildings. The local area (<250m) has remained predominantly agricultural and residential since the 1870's, with development of some industrial and commercial buildings and residential areas mostly to the north and south of the Site. Regionally (250-1,000m) the land has remained agricultural and residential with some industrial/commercial areas and farms in all directions.

The Site is underlain by superficial Head deposits, associated with an Unproductive Aquifer, and bedrock deposits of Thanet Formation, designated as a Secondary A Aquifer. The nearest surface water feature to the Site comprises an inland river located on Site. The nearest Primary Surface Water Feature is the River Stour, approximately 2.79km east. The Site is not situated in a Drinking Water protected Area (DrWPA) for groundwater or surface water. The Groundsure report has identified no groundwater abstractions within 2km of the Site, and seven (7No.) surface water abstractions within 1km of the Site.

The Site is located with a SSSI Impact Risk Zone; and the current proposed redevelopment does not fall into the notifiable categories.

An outline Conceptual Site Model (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 pollutant linkages has been produced:

Onsite Sources:

- **Future End Users:**
  - **Moderate Risk** associated with dermal contact, inhalation of indoor and outdoor dust and vapours from Made Ground.
- **Groundwater:**

- **Moderate/Low Risk** of vertical soil leaching to Secondary A Aquifer.

- **Surface Water:**
  - **Moderate/Low Risk** of surface run-off to inland drainage channel – Onsite.
  - **Moderate/Low Risk** of surface run-off to Surface Water Abstractions within 1km of the Site

- **Buildings and Structures:**
  - **High Risk** associated with ground gas accumulation within buildings due to potential Made Ground.
  - **Moderate Risk** associated with VOC permeation of plastic utilities pipes.

Off-Site Sources:

- **Moderate/Low Risk** associated with lateral migration of contaminants from surrounding historical and current industry, electrical substations 112m W, 168m W and 248m E, historic tank 87m W.

6.2 Recommendations

From the review of the relevant findings limited further works are recommended, comprising:

- An intrusive Phase 2 Site Investigation to assess underlying shallow ground conditions, presence of Made Ground and potential contamination levels across the Site.

At this stage, as a minimum, it would be expected that any construction works would be undertaken allowing for:

- 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.
- 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 on site 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.

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