



Report prepared at

Land adj. to 5 Muntham Drive
Barns Green
Horsham
RH13 0PT

On behalf of

Shanly Homes

Report reference

25-129.01
Version 2

Report date

May 2026

Prepared by

Aviron Associates Limited

Report Quality Management			
Project Name	Land adj. to 5 Muntham Drive, Barns Green, Horsham, RH13 0PT		
Project Title	Preliminary Risk Assessment		
Client	Shanly Homes		
Project Number	25-129.01		
Version	2 – updated site plan		Date
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1.0 PROJECT AND SITE INFORMATION

1.1 APPOINTMENT

Aviron Associates Limited (Aviron) was retained by Shanly Homes (the “Client”) to prepare a tier 1 Preliminary Risk Assessment (PRA) of the following premises:

Land adj. to 5 Muntham Drive, Barns Green, Horsham, RH13 0PT (hereafter referred to as the “site”).

The PRA associated with the residential development of the site, forms a tier 1 assessment by completing a desk-based study with site walkover to identify potential areas of contaminative concern associated with the redevelopment. The PRA will then form a preliminary Conceptual Site Model (CSM) with recommendations for any further investigation or risk assessment if required.

In addition, geotechnical issues shall be assessed to provide recommendations for new foundations, drainage and pavement design, if required.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

1.2 THE SITE

Table 1.2 provides a summary of site details and surrounding area.

Table 1.2: Site Details	
Site Location	The site is located in Barns Green, off Muntham Drive, between Chapel Road and Smugglers Lane which form the northern, south-eastern and south-western boundaries respectively. The site is situated equidistant between Horsham and Billingshurst, which are located approximately 5.5 kilometres (km) to the north-east and 4.0km to the south-west respectively. Figure 1 is presented as the Site Location Plan.
National Grid Ref.	Centred at approximately 512530, 127130.
Current Land Use	The site currently comprises pasture with small, dilapidated stable buildings and animal pens located within the north-western corner. Discarded farming equipment and a horse box are located inside the site entrance and in the south-east of the site respectively. Figure 2 is presented as the Existing Site Layout Plan. Figure 3 is presented as the Site Photographs.
Surrounding Land Use	The site is surrounded by Muntham Drive to the north, Chapel Road to the south-east, Smugglers Lane (public bridleway) to the south-west and a footpath to the north-west. The site is almost entirely surrounded by agricultural land or pasture with residential premises of Muntham Drive to the east and Chapel Road to the south-east. A cricket pitch, clubhouse and a sports and social club are located to the north-east of the site off Muntham Drive.

Table 1.2: Site Details

Proposed Land Use	The proposed development comprises the construction of twenty-one new homes. The buildings include detached, semi-detached and apartments units, with private and communal gardens, parking, garaging locally, a new access road off Chapel Road and associated infrastructure. An attenuation pond is proposed in the south-east of the site. Figure 4 is presented as the Proposed Development Plan.
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1.3 SITE WALKOVER SURVEY

A site walkover survey was undertaken on 22 January 2025 and included an inspection of the site and surrounding area, where safe and accessible. The purpose of the survey is to identify any potential on-site or nearby contaminative activities or potential sources of land contamination.

Additionally, as part of the survey any features which may affect site re-development in terms of physical site and ground conditions were noted.

Table 1.3 provides a description of site features observed during the walkover survey and also current Ordnance Survey maps made available at the time of report writing.

Table 1.3: Summary of Site Walkover Survey

Physical Site Characteristics	
Existing Structures	Small, dilapidated buildings (stables) of corrugated sheet metal construction in the north-western corner of the site. Various animal pens and discarded vegetable plots also at this location.
Basements	None observed.
Visual Topography and Site Surfacing	A topographical survey drawing by Midland Survey Limited (reference H 1055 – 1, dated May 2017) indicates that the site slopes gently downwards in a south-easterly direction from approximately 44.0 metres (m) above Ordnance Datum (AOD) in the north-west to 32.5m AOD in the south-east.
Retaining Structures and Slopes	The site slopes gently downwards in a south-easterly direction.
Drainage Issues	Shallow drainage ditch observed along the western and south-western site boundary.
Surface Waters	Softened ground surface following prolonged rain.
Trees and Hedges	Numerous young, semi-mature and mature trees, shrubs and hedges line the site boundaries.
Made and Infilled Ground	No significant made ground or infilled ground is anticipated. Made ground may however be encountered locally as unmade surfacing at the site entrances and around the buildings and animal pens in the north-western corner of the site.

Table 1.3: Summary of Site Walkover Survey

Contaminative Characteristics	
Above (AST) or Underground (UST) Storage Tanks and Drums	None observed.
Fuel Interceptors	None observed.
Waste Storage and Disposal	None observed.
Hazardous Material Storage and Use	None observed.
Asbestos Containing Materials (ACMs)	Possibility of ACMs as part of the existing or former building materials to the buildings in the north-western corner. An asbestos survey is recommended prior to the redevelopment works.
Boiler Houses	None observed.
Sub-stations	None observed.
Surface Staining	None observed.
Potentially Contaminative Activities	No significant evidence of potentially contaminative activities observed at the site.

1.3.1 Summary of Physical Site Characteristics

Consideration should be made towards the make-up and competency of the underlying strata and the influence of trees on any proposed building.

1.3.2 Summary of Contaminative Site Characteristics

No significant evidence of potentially contaminative activities observed at the site.

2.0 DESK STUDY REVIEW

Historical Ordnance Survey (OS) maps were obtained as part of the Envirocheck database search within report package reference 351441950 dated 28 June 2024, provided by the Client and included within **Appendix I**. Database information within the Envirocheck report also includes reference to the hydrogeology, hydrology and ground gas hazards in the site area and is summarised in the following sections.

A summary of the ground hazards for construction purposes is also included.

2.1 HISTORICAL REVIEW

Historical Ordnance Survey (OS) maps were reviewed within the Envirocheck report, and the historical development of the site and the surrounding land is summarised in the following table.

Table 2.1: History of the Site and Surrounding Land		
Date	Site History	Surrounding Land History
1877 (1:2,500) 1879 (1:10,560) 1897 (1:2,500) 1898 (1:10,560) 1911 (1:2,500) 1913 (1:10,560) 1947 (aerial photograph)	The site is shown to have comprised undeveloped agricultural land or pasture, set almost entirely within its current boundaries. The south-eastern section of the site is located within the grounds of the adjacent Bennetts.	The site is surrounded by Muntham Drive to the north, Chapel Lane to the south-east, Smugglers Lane to the south-west and a footpath to the north-west. The site boundaries are shown to be locally tree-lined with deciduous species. A railway line is marked 300m to the south-east of the site. Ponds noted in the area, the closest of which is marked 180m to the south-west of the site. Surface watercourses shown in the surrounding area, the closest of which is marked 150m to the south, flowing in an easterly direction and marked as Parson's Brook further downstream of the site. Numerous water wells shown in the wider site area.
1961 (1:10,560)	No notable changes identified at the site.	Residential development noted within Barns Green further to the south-east of the site.
1977 (1:2,500) 1982 (1:10,000) 1993 (1:2,500)	The site boundaries are shown to have been slightly redefined to include the existing site extents. The grounds of Bennetts are noted to have been separated from the site at this time.	Residential development noted immediately east of the site in Muntham Drive and to the south-east in Chapel Road, as well as further to the south. Recreation ground, hall and pavilion marked to the north-east of the site off Muntham Drive.
1999 (aerial photograph) 2000-2024 (1:10,000 incl.)	Cluster of buildings noted in the north-western corner of the site. Site boundaries are shown to have been almost entirely lined with trees and hedges.	No notable changes identified in the surrounding area.

Table 2.1: History of the Site and Surrounding Land

Date	Site History	Surrounding Land History
2025 walkover	The buildings in the north-western corner of the site (stables) are noted to have become dilapidated at this time.	Recreational ponds and lakes shown to have been created in the wider site area to the south and west.
Note: All distances are approximate.		

2.1.1 Anecdotal Evidence

No anecdotal evidence available at the time of reporting.

2.1.2 Summary of Historical Landuses

The site has remained mostly undeveloped throughout the available mapping history, with the exception of the buildings located in the north-western corner of the site by 1999.

No significant industrial or commercial landuses shown in the surrounding area.

2.2 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

2.2.1 Anticipated Geology

Relevant geological information has been sourced using the British Geological Survey (BGS) extract sheet 302 of Horsham and is summarised in table 2.1.1 below.

Table 2.2.1: Anticipated Geology

Stratum	Age	Possible Thickness (m)	Typical Description	Aquifer Status
Artificial/Made Ground None indicated on site	N/A	N/A	N/A	N/A
Superficial None indicated on site	N/A	N/A	N/A	N/A
Superficial Weald Clay Formation	Hauterivian to Barremian	Up to 460m	Thinly bedded mudstones (shales) and mudstones with subordinate siltstones, sandstones, including calcareous sandstone, shelly limestones and clay ironstones	Unproductive strata

The BGS website indicates that there are no references to artificial ground, mass movement, linear features or faults recorded on site or within 500m of the site.

2.2.2 Ground Conditions – BGS Borehole and Trial Pit Records

The nearest BGS borehole log(s) for drilling or excavation works undertaken within circa 500m of the site, and a summary of the ground conditions encountered to approximate depths in metres (m) below ground level (bgl), are presented in table 2.2.2.

Table 2.2.2: Summary of Local BGS Borehole Logs			
Unit	Description	From (bgl)	To (bgl)
TQ12NW15 – SUMNERS POND CHAPEL ROAD BARNES GREEN HORSHAM – 410m south-west			
Topsoil	Topsoil	GL	0.5m
Solid	Clay + Stone	0.5m	4.5m
	Clay with hard bands of Mudstone	4.5m	35.0m
	Horsham Stone – very hard	35.0m	40.0m
	Stiff Clay	40.0m	44.0m
	Stiff Clay and stone throughout	44.0m	52.0m
	Clay	52.0m	54.0m
Groundwater	N/A – drilled with mud (Oct 2023)		
GL = Ground Level			

2.2.4 Hydrogeology

The hydrogeology of the site has been determined by the solid geology of the Weald Clay Formation, which is classified by the Environment Agency as unproductive strata. Unproductive strata comprise rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

The combined classification groundwater vulnerability beneath the site is noted as ‘unproductive aquifer’.

Both the Envirocheck report and the Environment Agency website (January 2025) indicate that the site is not located within an Environment Agency source protection zone (SPZ).

The Envirocheck report indicates that there are references to groundwater abstraction licences for premises within 1000m of the site, including public water supply.

2.2.5 Hydrology

The Ordnance Survey Water Network Lines indicates that the nearest inland river (and surface water feature) is located 144m to the south, within the Adur and Teville catchment. Parson's Brook is referenced at a location 290m to the north-east of the site.

The Envirocheck report indicates that there are no references to surface water abstraction licences and no licences for public water supply for premises within 1000m of the site.

The Envirocheck report indicates that there are five references to 'Discharge Consents' for premises within 250m of the site, the nearest being 148m to the south for 'discharge of other matter-surface water, into a freshwater stream/river.

The Envirocheck report indicates that there is one record of a 'Pollution Incident to Controlled Waters' at a location 236m to the south, where 'oils – petrol' is noted to have entered the stream, however the incident is shown to have been 'minor'.

There are no 'Local Authority Pollution Prevention and Controls' for premises within 250m of the site.

The Envirocheck report indicates that the site is not located within an area that is at risk of 'extreme flooding' or 'flooding' from rivers or sea without defences. The site is located in a Flood Zone I, where there is a low risk of flooding. The site is not located in an area that benefits from flood defences. The site is not located in a flood water storage area.

The Envirocheck report indicates that discreet areas within the site are located in a 1 in 1000 year surface water flood extent.

2.3 LANDFILLS AND BIO-GROUND GAS

2.3.1 Landfills, Waste Management Facilities and Infilled Ground

The Envirocheck report indicates that there no historical landfill sites, Local Authority recorded landfill sites, registered landfill sites, or waste facilities within 250m of the site.

There are also no references to potentially infilled land (non-water or water) within 250m of the site.

2.3.2 Preliminary Risk Assessment (PRA) – Bio-Ground Gas

Table 2.3.2 summarises the gas risk for the site, based on the above information gained through the desk-based research.

In accordance with current guidance (CIRIA C665), the gas generation potential for each source has been individually assessed, with references to potential gassing risk made according to the following definitions: Negligible, Very Low, Low, Moderate, High and Very High. The definitions are explained in Section 10.0 of the guidance. The objective of this exercise is to determine if potentially unacceptable bio-ground gas risks exist, and whether further investigation and assessment is necessary.

Table 2.3.2: Preliminary Risk Assessment (PRA) – Bio-Ground Gas			
Potential Source	Risk	Risk Rating	Rationale
Made Ground (CO ₂ + CH ₄)	Human health Explosion	Very Low	The site has remained mostly undeveloped with the exception of the buildings and pens in the north-west, therefore significant Made Ground is not anticipated. Although Made Ground may be encountered locally at site entrance points and around the buildings and vegetable plots in the north-west of the site, significant organic biodegradable material is not expected.
Alluvial Strata (CO ₂ + CH ₄)	Human health Explosion	Negligible	No alluvial deposits noted within 250m of the site.
Landfills (CO ₂ + CH ₄)	Human health Explosion	Negligible	No landfill sites noted within 250m of the site.
Infilled Ground + Burial Sites (CO ₂ + CH ₄)	Human health Explosion	Negligible	No potentially infilled ground locally within 250m of the site.
Coal and Mining (CO ₂ + CH ₄)	Human health Explosion	Negligible	The risk in connection with 'non-coal mining area(s) of Great Britain' is noted to be 'highly unlikely'.
Soil Vapours	Human health Explosion	Very Low	No evidence of fuel storage.
COMBINED RISK RATING = VERY LOW			

A combined Very Low risk from ground gas ingress and explosion is considered and ground gas monitoring is not typically required. However, precautionary gas monitoring would be prudent as a matter of course during future site investigation.

2.4 RADON GAS

Information from the Envirocheck report (using data supplied by the BGS) indicates that 'The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level)' and that no radon protection measures are required.

Notwithstanding the above, a Radon report is recommended immediately prior to the re-development as radon guidance periodically changes and the above advice may be outdated by the time of any re-development.

The HSA website (ukradon.org) can be used to purchase radon reports, where an address-specific radon report may be obtained. It should however be noted that for redevelopment sites, a GeoReport provided by the British Geological Survey may be more appropriate.

2.5 GROUND STABILITY, NATURAL CAVITIES AND MINING HAZARDS

Table 2.5 indicates potential ground stability, natural cavities and mining hazards identified within the Envirocheck report for the site.

These will be considered in terms of the proposed development and detailed in the following section 2.5, Preliminary Ground Hazards Summary.

Table 2.5: Ground Stability, Natural Cavities and Mining	
Hazard	Ground Stability and Natural Cavities Hazard Potential
Potential for Collapsible Ground Stability	Very Low
Potential for Compressible Ground Stability	No Hazard
Potential for Ground Dissolution	No Hazard
Landslides	Very Low
Running Sands	No Hazard
Shrink-Swell Clay	Low
Hazard	Mining Hazard Potential
Non coal mining areas of Great Britain	Risk noted as 'highly unlikely'
Coal Mining Affected Areas	In an area that might not be affected by coal mining
Infilled Land	No potentially infilled land (non-water or water) within the site extents

Table 2.5: Ground Stability, Natural Cavities and Mining

Other mining/quarrying	None noted on the historical mapping within the site or immediate vicinity
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The site is not located in a coal mining affected area. The risk associated with 'non-coal mining area(s) of Great Britain' is noted to be highly unlikely.

The risk of shrink/swell clays is noted to be 'low' for the site and the surrounding area.

The risk of ground dissolution of soluble rocks is noted to be 'negligible' for the site and the surrounding area.

2.6 PRELIMINARY GROUND HAZARDS SUMMARY

The following Table 2.6 provides a summary of the preliminary ground hazards identified with the ground and groundwater conditions and historical site use as determined from the desk-based information accumulated within the PRA. The following key plan should be considered in regard of plausible risk:

○ - Further action required. Potentially plausible hazard.

○ - Unlikely to represent a hazard, no further consideration required.

Table 2.6: Preliminary Ground Hazards Summary

Ground Hazard	Plausible	Description
Topographic		
Site constraints	○	Restricted site access and buildings locally. The site is almost entirely soft surfaced; however, small buildings are located in the north-western corner of the site.
Slopes, embankments, cuttings	○	The site is slightly sloping to the south-east. Foundation type and construction difficulties. Remedial measures to stabilise slopes, embankments and cuttings, and mitigate risks of landslides.
Man-made		
Filled ground/ made ground/ infilled basements	○	Foundation type and construction difficulties associated with existing and former buildings on site, locally in the north-western corner.
Existing foundations and below ground structures	○	Foundation type and construction difficulties. Obstructions to new construction. Influence of existing and adjacent foundations to new construction. Vibration associated with the construction technique.

Table 2.6: Preliminary Ground Hazards Summary

Ground Hazard	Plausible	Description
Mining instability	○	Foundation type and construction difficulties. Appropriate mining investigation.
Ground chemistry	○	Made Ground is heterogenous and subject to composition may present a risk of sulphate and sulphide attack on buried concrete.
Unexploded Ordnance	○	Detailed unexploded ordnance (UXO) risk assessment did not form part of our project instruction.
Geological		
Frost action	○	Susceptibility of soils affected at pavement and foundation formation. Provision of non-frost susceptible materials.
Lateral soil instability	○	Foundation type and construction difficulties. Provision of temporary works – shoring.
Soft clays, silts and compressible soils	○	Foundation type and construction difficulties. Sufficient bearing resistance to support the proposed construction.
Shrinkable soils	○	Foundation type and construction difficulties. Influence of trees on foundation depths. Potential for desiccation to have occurred and heave protection. NHBC Standards Chapter 4.2, Building Near Trees.
Ground dissolution of soluble rocks	○	The risk of ground dissolution of soluble rocks is noted to be 'negligible'. Foundation type and construction difficulties. Dynamic probing, torque readings.
Ground chemistry	○	Natural soils may present a risk of sulphate and sulphide attack on concrete.
Hydrogeological/Hydrological		
Elevated or rising groundwater	○	Foundation type and construction difficulties. Provision of temporary works – dewatering (possibly well-points) in shallow excavations due to surface water flooding. Provision of temporary works – shoring. Reduced bearing resistance. Effectiveness of soakaway drainage. Sufficient freeboard required to enable effective infiltration. Unproductive strata anticipated.
Fluvial or coastal scour/erosion	○	Foundation type and construction difficulties. Remedial or preventative measures.

Table 2.6: Preliminary Ground Hazards Summary

Ground Hazard	Plausible	Description
○ - Further action required. Potentially plausible hazard. ○ - Unlikely to represent a hazard, no further consideration required.		

The available mapping history indicates that the site has remained mostly undeveloped with the exception of the buildings, pens and vegetable plots in the north-western corner, and therefore the site is not expected to be overlain by significant thicknesses of made ground.

Any proposed new construction will need to consider the required bearing resistance of the proposed buildings and the influence of trees.

A conventional shallow foundation solution may be feasible; however, a suitable ground investigation would confirm an appropriate foundation solution.

Shallow soakaway drainage is unlikely to be successful given the anticipated low permeable clay soils at shallow depth. Soil infiltration testing and groundwater monitoring are recommended.

Although groundwater is not expected at shallow depth, perched water or water held in fissures may be encountered following periods of heavy rainfall.

3.0 REGULATORY INFORMATION, CONSULTATIONS AND OTHER

Unless otherwise stated regulatory database information has been obtained from the Envirocheck report included as **Appendix I**.

3.1 STATUTORY REGISTERS AND AUTHORISATIONS

Table 3.1 includes the statutory registers and authorisations that relate to the site and surrounding area. Pertinent registers and authorisations will be used in conjunction with the desk-based review to determine the preliminary environmental risk.

Table 3.1: Statutory Registers and Authorisations		
Item	0 – 250m	251 – 500m
Contaminated Land Register Entries and Notices	0	0
Records of Licensed Discharge Consents	5	4
Prosecutions Relating to Controlled Waters	0	0
Enforcements and Prohibition Notices	0	0
Integrated Pollution Controls	0	0
Integrated Pollution Prevention and Control	0	0
Local Authority Integrated Pollution Prevention and Control	0	0
Local Authority Pollution Prevention and Controls	0	0
Local Authority Pollution Prevention and Control Enforcements	0	0
Pollution Incidents to Controlled Waters	1	2
Substantiated Pollution Incident	0	1
Prosecutions Relating to Authorised Processes	0	0
Registered Radioactive Substances	0	0
Records of Water Industry Act Referrals	0	0

Table 3.1: Statutory Registers and Authorisations		
Item	0 – 250m	251 – 500m
Explosive Sites	0	0
Planning Hazardous Substance Consents/Planning Hazardous Substance Enforcements	0	0
Notification of Installations Handling Hazardous Substances (NIHHS) Facilities and Control of Major Accident Hazards Facilities (COMAH)	0	0
Fuel Stations	0	0
Contemporary Trade Directory Entries	Contemporary Trade Directory Entries within 250m of the site: 78m E: Blacksmiths & Forgemasters – Active 228m S: Precision Engineers – Inactive 228m S: Lawnmowers & Garden Machinery - Sales & Service – Active 228m S: Fishing & Angling Equipment - Manufacturers & Distributors - Inactive	
Commercial Services Entries	Relevant Commercial Services Entries within 250m of the site: 77m E: Metalworkers Including Blacksmiths 78m E: Metalworkers Including Blacksmiths 180m S: Recycling, Reclamation and Disposal 210m SE: Distribution and Haulage	
Manufacturing and Production	Relevant Manufacturing and Production Entries within 250m of the site: 66m E: Works - Unspecified Works or Factories	
National Grid High Voltage Underground Electricity Transmission Cables	0	0
National Grid High Pressure Gas Transmission Pipelines	0	0
Item	Immediate Vicinity	
Sensitive Land Uses	Ancient and Semi-Natural Woodland is recorded 13m to the west of the site.	

3.2 CONSULTEES

3.2.1 Local Authority - Contaminated Land Officer

The Local Environmental Health Department has not been contacted as part of our project instruction.

3.2.2 Local Authority - Building Control Officer

The Local Authority Building Control Officer has not been contacted as part of our project instruction.

3.2.3 Local Authority - Petroleum Officer

The Local Authority Petroleum Officer has not been contacted as part of our project instruction.

3.2.4 Local Authority - Archaeological Officer

The Local Authority Archaeological Officer has not been contacted as part of our project instruction.

3.2.5 Environment Agency - Contaminated Land and Groundwater

The Contaminated Land and Groundwater Team of Environment Agency has not been contacted as part of our project instruction.

3.2.6 Coal Authority and Mining Searches UK

The Coal Authority and Mining Searches UK have not been contacted as part of our project instruction.

4.0 PRELIMINARY RISK ASSESSMENT

4.1 METHODOLOGY

A tier 1 PRA and CSM have been prepared in accordance with the technical approach on Land Contamination Risk Management (LCRM), which replaced 'CLR11'. Possible hazards identified by a potential source of contamination and sensitive receptors have been assessed via a source-pathway-receptor (SPR) model in accordance with current UK protocols. A risk may only exist where a plausible SPR linkage is viable and where the quantity or concentration of a contaminant (source) is sufficient to cause harm. Under the statutory definition "Contamination" may only exist where contaminants pose a risk of harm to a receptor. Risk may be defined as a function of the likelihood and severity of any adverse effects resulting from a contamination event in accordance with CIRIA C552. A summary of how risk is derived and the associated definition is presented in tables 4.1.1 and 4.1.2.

Table 4.1.1: Risk Ratings Matrix				
	Consequence			
Probability	Severe	Medium	Mild	Minor
High Likelihood	Very high risk	High risk	Moderate Risk	Moderate/low risk
Likely	High risk	Moderate Risk	Moderate/low risk	Low risk
Low Likelihood	Moderate Risk	Moderate/low risk	Low risk	Very low risk
Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Table 4.1.2: Risk Ratings Definition	
Risk Rationale	Definition
Very high risk	A high probability that severe harm could occur to determined receptor from identified contaminant - OR - evidence exists that severe harm to receptor is currently occurring. Urgent investigation and remediation should be considered. If demonstrated this risk is likely to result in substantial liability.
High risk	Harm is likely to occur to determined receptor from identified contaminant. Urgent investigation and short-term risk minimisation remediation followed by longer term fit for purpose remediation should be considered. If demonstrated this risk is likely to result in substantial liability.
Moderate Risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is relatively unlikely that any harm would be severe or should harm occur it is likely to be relatively mild.
Moderate/low risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is unlikely that any harm would be severe or should harm occur it is probable to be relatively mild.
Low risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is unlikely that such harm, if indeed present, would at worst be mild.
Very low risk	There is a low possibility that harm could occur to a receptor. In such event the harm would not be severe.

4.2 POTENTIAL SOURCES OF CONTAMINATION

Based on the desk-study and walkover survey completed, table 4.2 presents a summary of the potential sources identified.

Table 4.2: Potential Sources			
Source	Key Contaminants of Concern	Description	Plausible?
1. Site-wide soil contamination	Metals, hydrocarbons (TPH/PAH), asbestos.	Limited risk of soil contamination within the site associated with existing buildings and use of the site and the possibility of the presence of Made Ground.	Yes
2. Local soil contamination	Metals, hydrocarbons (TPH/PAH), asbestos.	Limited risk of soil contamination from existing buildings in the north-west of the site and at site entrances.	Yes
3. Asbestos	Asbestos	Limited risk of Asbestos Containing Soils (ACS) and Asbestos Containing Materials (ACMs) from previous and existing buildings.	Yes
4. Groundwater	Groundwater is not anticipated at shallow depth beneath the site.	Site is underlain by unproductive strata and not located in an SPZ.	No
5. Ground gases/vapours	Hazardous bio-ground gas. Complete routine bio-ground gas monitoring.	Significant hazardous ground gas sources are not anticipated on-site.	Yes

4.3 PATHWAYS

A pathway is one or more routes or means that a receptor can be exposed to, or affected by, a contaminant.

Table 4.3: Plausible Pathways
On-Site and Locally
Direct contact; to humans and infrastructure
Underlying geology/hydrogeology; <i>Weald Clay Formation comprising unproductive strata</i>
Inhalation and ingestion
Surface run-off/drainage

4.4 RECEPTORS

A receptor is either a living organism, a group of organisms, an ecological system, controlled waters or property that could be harmed or polluted by a contaminant. Table 4.4 examines the potential receptors.

Table 4.4: Potential Receptors			
Receptor	Description	Comments	Plausible
Construction workers	Groundworkers and general construction works.	Construction works proposed within the site.	Yes
End users	Occupants of the proposed development.	Landscaped areas proposed around the site.	Yes
Adjacent land users	Occupants of surrounding residencies.	Adjacent residential dwellings which could be affected by run-off or migration.	Yes
Soft landscaping	Areas of new planting including lawns.	Landscaped areas proposed around the site.	Yes
Water supply pipes	Plastic pipework for potable water supply may be affected if laid in contaminated soils.	New supply required for redevelopment.	Yes
Buildings & infrastructure	Buried concrete for new foundations may be in contact with aggressive ground (sulphur attack).	New building works proposed.	Yes
Groundwater	Controlled waters (aquifers) beneath the site.	Site underlain by unproductive strata. No potable water supply within 1000m of the site. The site is not located in an SPZ.	No
Surface waters	Controlled water such as lakes, streams, rivers or coastal waters.	Main river 144m south of the site.	Yes
Ecological receptors	Sensitive areas of ecological significance defined under Part 2A of EPA 1990.	Ancient and Semi-Natural Woodland 13m to the west.	Yes

4.5 SUMMARY OF POLLUTANT LINKAGES FOR PROPOSED LAND USE - INITIAL CSM

The initial CSM is based upon the proposed site end use and the information currently consulted relating to various risk sources and plausible pollutant linkages and is presented within table 4.5.

Table 4.5: Initial Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification	Linkage No.
Source 1 Site-wide soil contamination	Construction workers	Direct contact	Unlikely	Mild	Very Low <i>Note 1.</i> Site occupied with existing buildings locally, and in use as agricultural land or pasture. Potential for made ground and contaminants associated with the buildings locally. Potential asbestos arising from building materials.	1
	End users	Direct contact	Low Likelihood	Mild	Low <i>See Note 1.</i>	2
	Adjacent land users	Direct contact via run-off	Unlikely	Mild	Very Low <i>Note 2.</i> Site is underlain by unproductive strata. Site occupied with existing buildings locally, and in use as agricultural land or pasture. Site predominantly soft surfaced.	3
	Soft landscaping	Root uptake	Low Likelihood	Mild	Low <i>Note 3.</i> Potential for made ground has been identified locally which may impact soft landscaping and root development. However, no evidence of existing vegetation die-back.	4
	Water supply pipes	Direct contact	Low Likelihood	Mild	Low <i>Note 1.</i>	5
	Buildings & infrastructure	Direct contact	Low Likelihood	Mild	Low <i>Note 1.</i>	6
	Groundwater	Vertical migration through hydrogeology	Unlikely	Mild	Very Low <i>Note 4.</i> Site is underlain by unproductive strata. The site is not located in an SPZ. Site predominantly soft surfaced, but pathway restricted by geology to controlled water receptors.	7

Table 4.5: Initial Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification	Linkage No.
	Surface water	Run-off	Unlikely	Mild	Very Low <i>Note 5.</i> No inland rivers within the immediate vicinity and pathway restricted by geology to controlled water receptors.	8
	Ecology	Direct contact via run-off	Unlikely	Mild	Low <i>See Note 2.</i>	9
Source 2 Local soil contamination	Construction workers	Direct contact	Unlikely	Mild	Very Low <i>Note 6.</i> On site contaminative features of interest including existing buildings and the possibility of made ground locally in the north-west and at site entrances.	10
	End users	Direct contact	Low likelihood	Mild	Low <i>See Note 6.</i>	11
	Adjacent land users	Direct contact via run-off	Unlikely	Mild	Low <i>See Note 6.</i>	12
	Soft landscaping	Root uptake	Low likelihood	Mild	Low <i>See Note 6.</i>	13
	Water supply pipes	Direct contact	Low likelihood	Mild	Low <i>See Note 6.</i>	14
	Buildings & infrastructure	Direct contact	Low likelihood	Mild	Low <i>See Note 6.</i>	15
	Groundwater	Vertical migration through hydrogeology	Unlikely	Mild	Very Low <i>See Note 4.</i>	16
	Surface water	Run-off	Unlikely	Mild	Very Low <i>See Note 5.</i> No inland rivers within the immediate vicinity and pathway restricted by geology to controlled water receptors.	17

Table 4.5: Initial Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification	Linkage No.
	Ecology	Direct contact via run-off	Unlikely	Mild	Very Low <i>See Note 2.</i>	18
Source 3 Asbestos	Construction workers	Inhalation	Low likelihood	Minor	Very Low <i>Note 7. Potential for ACMs from existing buildings locally.</i>	19
	End users	Inhalation	Low likelihood	Minor	Low <i>See Note 7.</i>	20
	Adjacent land users	Inhalation	Unlikely	Mild	Very Low <i>Note 8. Potential for ACMs from buildings locally.</i> Distance and dispersion in outdoor air limits risk.	21
Source 4 Groundwater	Construction workers End users Adjacent land users Water supply pipes	Direct contact	Unlikely	Mild	Very Low <i>Note 9. Unproductive strata beneath the site.</i> Groundwater contamination from site unlikely as risk of soil contamination is low.	22
	Soft landscaping	Root uptake	Unlikely	Mild	Very Low <i>See Note 9.</i>	23
	Groundwater Surface water Ecology	Lateral migration through hydrogeology	Unlikely	Mild	Very Low <i>See Note 9.</i>	24
Source 5 Ground gases and Soil vapours (on/off site source)	Construction workers	Inhalation of vapours/gas	Low likelihood	Minor	Very Low <i>Note 10. No significant notable sources of ground gas identified within the site or within the vicinity of the site, however, possible risks locally in the north-west from made ground and soil vapours and at site entrance points.</i>	25
	End users	Inhalation of vapours/gas	Low likelihood	Mild	Low <i>See Note 10.</i>	26

Table 4.5: Initial Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification	Linkage No.
					<i>Perceived risk increased due to long-term occupancy.</i>	

The overall environmental risk classification for the site is considered to be generally **LOW**.

Due to the sensitivity of the proposed land use and site investigation and suitable risk assessment should be completed, to include:

-  Complete precautionary site-wide soil contamination testing of overlying soils to determine the presence or absence of contaminants. Additionally, pH, sulphate and sulphur testing should be completed to enable design of buried concrete.
- 1. Complete targeted soil contamination testing locally in the area of the existing buildings in the north-western corner of the site.
- 2. Complete precautionary ground gas monitoring to provide quantification to the qualitative risk assessment.

To assess the risk, the following analysis should be completed:

-  Aviron's "ES-1" of laboratory analysis shall be applied to future site investigations which includes; arsenic, barium, cadmium, total chromium, copper, nickel, zinc, lead, mercury, selenium, water soluble boron, total cyanide, total sulphate, water soluble sulphide, speciated Polycyclic Aromatic Hydrocarbons (PAH), speciated Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) and Methyl Tert-Butyl Ether (MTBE), organic matter, total phenols, pH and asbestos. **Provides broad analysis of common soil contaminants.**

The listed suite of analysis is considered suitable and will provide a screening for the majority of commonly found soil contaminants.

5.0 CONCLUSIONS AND RECOMMENDATIONS

This PRA comprising a Desk Study review was undertaken for environmental and geotechnical purposes. Through evaluating all the relevant information Aviron have been able to assess the relevant linkages in terms of risk and identified any area where further information may be required to increase the certainty in the recommendations.

5.1 ENVIRONMENTAL

Through evaluating the relevant and commercially available desk-based information Aviron have been able to assess the relevant pollutant linkages in terms of risk the 'source – pathway – receptor' method. Accordingly, an initial Conceptual Site Model was prepared for relevant pollutant linkages with through qualitative means has determined a LOW risk. The contaminative risk principally emanates from the use of the site as farm related buildings in the north-western corner of the site.

An increase in certainty in the risk assessment can be achieved by the collection of quantitative data, typically by means of site investigation, which should target pollutant linkages considered to be of greater risk than low. Accordingly, site investigation is recommended to refine the risk assessment. Table 5.1 summarises the pertinent environmental risks providing advice on further works and assessment.

Table 5.1: Environment Risk Summary			
Medium	Item	Risk Description	Comments/Recommendations
Soils	1	Very Low soil contamination risk to construction workers, end users, new planting, new water mains, buried concrete, groundwater, surface water and ecology.	Complete precautionary site-wide investigation and collect suitable soil samples for chemical analysis to complete risk assessment.
Local Soils	2	Low soil contamination risk associated with soils around existing buildings in the north-western section of the site and migration about the northern boundary.	Collect suitable soil samples for chemical analysis to complete risk assessment.
Ground Gas	3	Very Low risk of ingress of hazardous ground gases (CH ₄ + CO ₂) and soil vapours into new buildings and depleted oxygen.	Install monitoring wells during site investigation to complete precautionary/routine gas/vapour monitoring to quantify the risk assessment.

Once the above risks have been investigated the corresponding linkages within the CSM can be revaluated and the environmental risk assessment refined.

5.2 NEW FOUNDATIONS AND DRAINAGE SUMMARY

5.2.1 New Foundations

Ordinarily the overlying Weald Clay Formation would be expected to provide the required bearing resistance to support lightly loaded buildings on conventional shallow foundations.

Typically, medium to high volume change potential Clay strata should be expected which is typical of the Weald Clay Formation. Therefore, the suitability of conventional footings would be subject to, though not limited to:

-  the required bearing resistance to support the proposed buildings
-  the volume change potential of the overlying soils and the proximity of trees to new buildings in accordance with NHBC Chapter 4.2.

A suitable site investigation would confirm an appropriate foundation solution and should include in-situ and laboratory soil strength and material property testing.

5.2.2 Soakaway Drainage

Shallow soakaway drainage is unlikely to be successful given the anticipated clay soils beneath the site.

It is recommended an alternative method of surface water disposal to soakaway drainage is sought.

Soil infiltration testing and groundwater monitoring may be necessary to prove what is expected to be a negative result.

5.2.3 Pavement Design

A low California Bearing Ratio (CBR) value should be anticipated, likely in the order of 2-3% for any overlying soils at shallow depth.

6.0 PROJECT INSTRUCTION AND LIMITATIONS

6.1 SCOPE OF WORKS

The following scope of work was undertaken to an agreed brief set out in Aviron's proposal and involved the following:

-  Site reconnaissance survey, to include inspection of the infrastructure and potential discussions with the owner or occupant regarding site activities.
-  Procurement of available historical mapping editions, geo-environmental sensitivity data and British Geological Survey (BGS) borehole records.
-  Identification of potential areas of environmental concern relating to current and/or historic site use and surroundings to prepare a refined CSM.
-  Preparation of suitable conclusions and recommendations with regard to the site's suitability for use or the requirement for further assessment and site investigation on the basis of the CSM.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

6.2 PUBLISHED GUIDANCE

This report follows the technical approach presented on Land Contamination Risk Management (LCRM), accessed on gov.uk website. The guidance replaced the Contaminated Land Report 11 (CLR11) "Model Procedures for the Management of Land Contamination" prepared by the Environment Agency in 2004. CLR11, which was withdrawn in 2020, provided guidance on the application of management processes when assessing potentially contaminated land.

This project and report have been designed to fulfil the information requirements set out in LCRM.

This report is additionally prepared in accordance with current guidance notes, standards and practices as set out by the Environment Agency and statutory organisations in order to establish potential and significant contaminant linkages as defined in Part IIA of the Environmental Protection Act 1990.

6.3 LIMITATIONS

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the information review and current landuse. The results of the work should be viewed in the context of the range of data sources consulted, the number of locations where the ground was sampled previously and the number of soil gas or groundwater samples tested. No liability can be accepted for the information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate.

Changes in legislation, statutory requirements or industry practices may mean that this the conclusions of this reports should be reviewed.

7.0 REFERENCES AND OTHER SOURCES OF INFORMATION

Landmark Envirocheck database search report package reference 351441950 dated 28 June 2024

Land Contamination Risk Management (LCRM) - LCRM: Stage 1 risk assessment - GOV.UK (www.gov.uk)

British Geological Survey. Solid and drift edition sheet BGS map 302 – Horsham

British Geological Survey Website. www.bgs.ac.uk and <https://mapapps2.bgs.ac.uk/geoindex/home.html>

Environment Agency Website: www.environment-agency.gov.uk

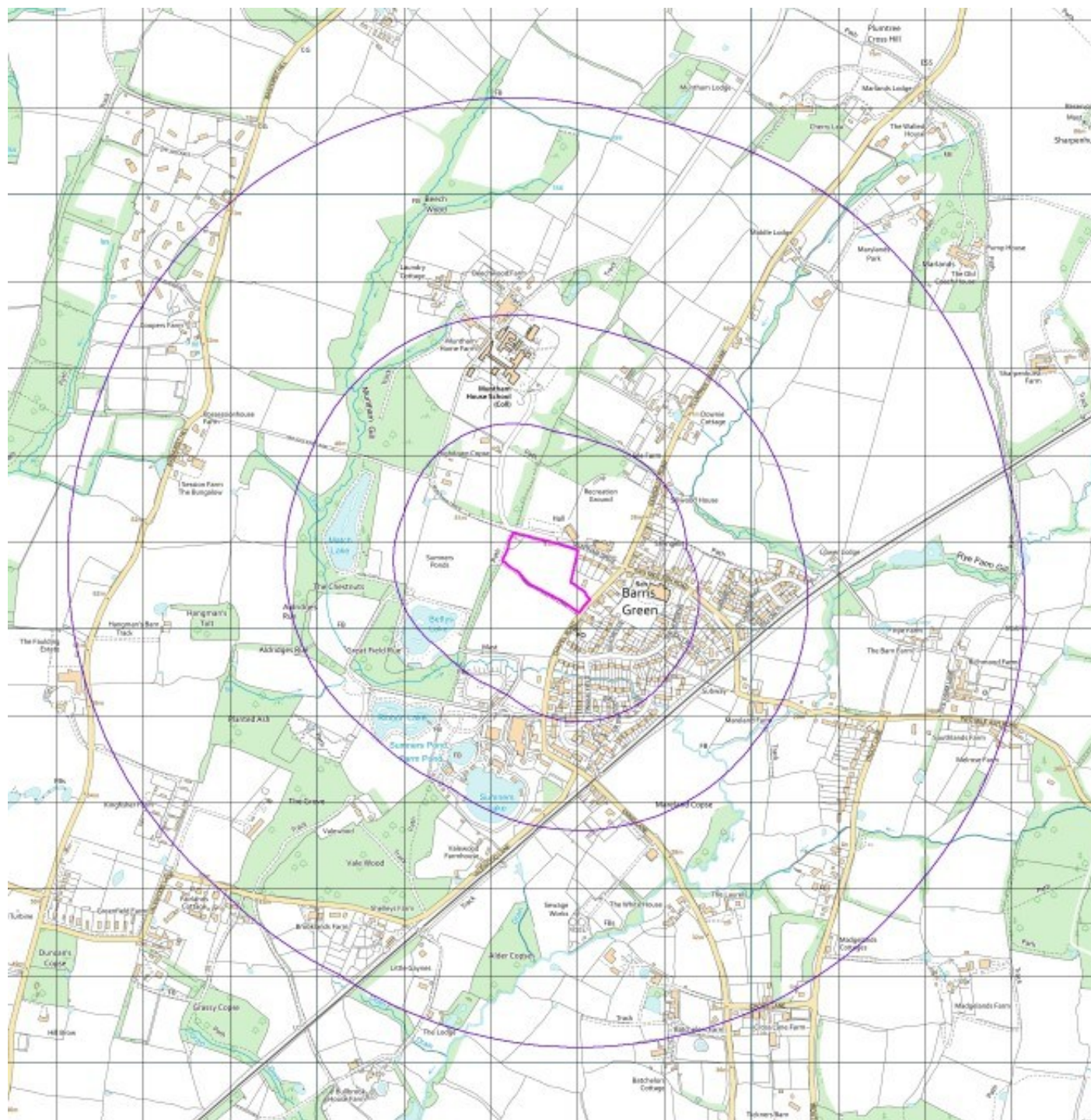
BS 10175:2011+A2:2017. British Standards Institute, Investigation of Potentially Contaminated Land - Code of Practice.

Environment Agency. July 2005. Guidance on Requirements for Land Contamination Reports.

CIRIA. C552. Contaminated Land Risk Assessment. A Guide to Good Practice. January 2001.

Figures

- 1 Site Location Plan
- 2 Existing Site Layout Plan
- 3 Site Photographs
- 4 Proposed Development Plan



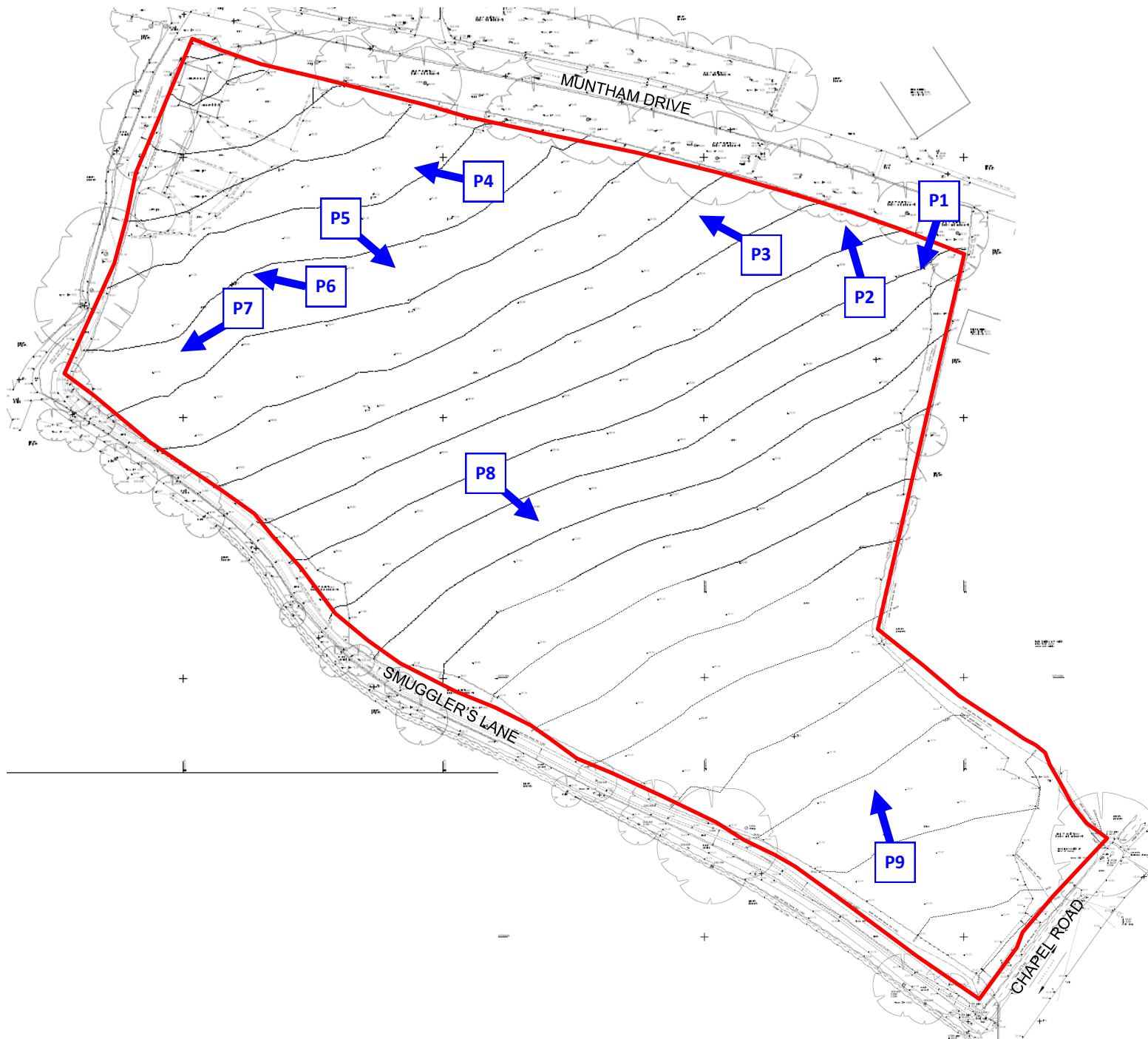
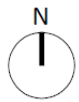
 Approximate Site Boundary

Drawing Title
Site Location Plan

Project Title
Land adj. to 5 Muntham Drive,
Barns Green, Horsham, RH13 0PT

Checked by	JB
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Legend

-  Approximate Site Boundary
-  Photo Direction

Notes

Figure 2

Drawing Title

Existing Site Layout Plan

Project Number 25-129.01

Project Title

Land adj. to 5 Muntham Drive,
Barns Green, Horsham, RH13 OPT

Drawn by OB

Checked by JB

Scale NTS





Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9

Legend

Notes

Figure 3

Drawing Title

Site Photographs

Project Number 25-129.01

Project Title

Land adj. to 5 Muntham Drive,
Barns Green, Horsham, RH13 OPT

Drawn by OB

Checked by JB

Scale NTS





Legend

 Approximate Site Boundary

Notes

Figure 4

Drawing Title
Proposed Development Plan

Project Number 25-129.01

Project Title
Land adj. to 5 Muntham Drive,
Barns Green, Horsham, RH13 OPT

Drawn by OB

Checked by JB

Scale NTS



Appendices

I	Envirocheck Maps and Database Reports
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