



Thakeham Tiles, Rock Road

Phase 1 Desk Study Report

For Thakeham Concrete Products Ltd

Date *9 June 2026*

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1. Introduction

1.1 Terms of reference

In February 2025, Stantec UK was commissioned by Thakeham Concrete Products Ltd (the Client) to update the Phase 1 Desk Study for the site located along Rock Road, Storrington, RH20 3AD, known as Thakeham Tiles. This report has been updated following revision of the red line boundary to include two new parcels of land in the north of the site, which has added to the number of residential units, and included areas to be enhanced for biodiversity.

The initial desk study for the site was undertaken and prepared in February 2018 by Hydrock (reference: TRS-HYD-XX-GI-RP-GE-1001), and the site since has subsequently undergone numerous ground investigations and reporting listed and summarised in Section 3. The updated desk study is being prepared within a new report to show the additional areas that have been added and to allow for a summary of the site's investigation history. An updated walkover was also completed on 19th May 2026, photos from which are included within this version of the report.

The works have been undertaken in accordance with Stantec's proposal 08347-HYD-XX-XX-FP-GE-0007 and the Client's instructions to proceed via email dated 28th February 2025, plus Stantec's proposal 333800445-STN-XX-XX-FP-GE-0002 (for updates to address comments received from the Local Authority) and the Client's instructions to proceed via email dated 19th May 2026.

1.2 Project background and Objectives

The site is currently a concrete product manufacturing plant, covering 6.12 hectares (ha).

Stantec understands that outline planning application is for the demolition of all existing buildings, the erection of 108 dwellings with associated landscaping and open space; and the formation of a new access onto Rock Road. All matters to be reserved, except for means of access. A proposed development layout (Thrive Architects drawing: THAK230417 IMP-04D) is presented in Appendix A.

The works have been commissioned to support the outline planning application and to assist with the design of the development.

This report will identify potential contaminant linkages and establish where there are potentially unacceptable risks in the context of the report objectives. It will also provide preliminary assessment of geotechnical risks within the new areas of the site.

1.3 Available information

The following documents have been provided to Stantec by the Client for use in the preparation of this report:

- » Thrive Architects. 10 September 2025. Constraints Plan. Thakeham Tiles. Job No: THAK230417. Drawing No: CP-01 A; and
- » Thrive Architects. 12 May 2026. Illustrative Masterplan. Thakeham Tiles. Job No: THAK230417. Drawing No: IMP-04 D.

1.4 Regulatory context and guidance

This report has been prepared in accordance with relevant parts of BS 5930:2015+A1:2020 'Code of practice for ground investigations'.

The geo-environmental aspects of this report are written with reference to:

- » Environment Agency (EA) guidance 'Land Contamination Risk Management' (LCRM), 2025;
- » BS 10175:2011+A2:2017 'Investigation of potentially contaminated sites – Code of practice';
- » BS EN ISO 21365:2020 'Soil quality – Conceptual site models for potentially contaminated sites';
- » AGS (2006) 'AGS Guidelines for Good Practice in Site Investigations'; and
- » R&D Publication 66: 2008 'Guidance for the Safe Development of Housing on Land Affected by Contamination' published by NHBC, the Environment Agency and CIEH.

The methods used follow a risk-based approach, with this report constituting the first stage, a Phase 1 Desk Study and Field Reconnaissance (also referred to as 'preliminary investigation'). The potential geo-environmental risks have been assessed qualitatively using the 'source-pathway-receptor (SPR) contaminant linkage' concept as introduced in the Environmental Protection Act 1990 (EPA, 1990).

The geotechnical aspects of this report are prepared in general accordance with:

- » relevant parts of BS EN 1997-1:2004+A1:2013 'Eurocode 7: Geotechnical design. General rules' (EC7); and
- » associated document NA+A2:2022 'UK National annex to Eurocode 7: Geotechnical design. General rules' and BS 8004:2015+A1:2020 Code of Practice for foundations.

1.5 Uncertainties and limitations

1.5.1 Site-specific comments

The presence, nature and extent of former adits is unknown. These features may have been removed by progression of the open pit, infilled with waste or remain open.

The newly acquired deciduous woodland areas have not been included in previous ground investigations due to it not being part of the development boundary at the time, it is likely some preliminary investigation will be required to confirm ground conditions.

1.5.2 General comments

Stantec has prepared this report in accordance with the instructions of the Client, under the terms of appointment for Stantec. It is for the sole and specific use of the Client and parties to whom reliance has been agreed with Stantec.

Stantec shall not be responsible for use of the report or its contents for purposes other than that for which it was prepared or for use of the report by parties not defined in Stantec's appointment. Third parties who use the information contained herein do so at their own risk.

The report has been prepared by Stantec on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, not all potential environmental constraints or liabilities associated with the site may have been revealed.

Stantec has used reasonable skill, care and diligence in its interpretation of the information obtained. The inherent variation of ground conditions however, means that significant extrapolation and inference may be made between data points. This could result in actual ground conditions not correlating with the assessment or conclusions of this report.

Information provided by third parties has been used in good faith and is taken at face value; however, Stantec do not guarantee its accuracy or completeness.

The work has been carried out in general accordance with recognised best practice. Unless otherwise stated, no assessment has been made for the presence of radioactive substances or unexploded ordnance. Where the phrase 'suitable for use' is used in this report, it is in keeping with the terminology used in planning control and does not imply specific warranty or guarantee offered by Stantec.

Please note that notwithstanding site observations concerning the presence or otherwise of archaeological sites, asbestos-containing materials or invasive weeds, this report does not constitute a formal survey of these potential constraints. Specialist advice should be sought.

Site boundary lines depicted on plans do not imply legal ownership of land.

2. Desk study and field reconnaissance

An updated environmental database report has been obtained for the site to account for the new site boundary and this is presented in Appendix D.

2.1 Site referencing

Table 2-1: Site referencing information

Item	Description
Site name	Thakeham Tiles, Rock Road
Site address	Land at Thakeham Tiles, Rock Road, Storrington, RH20 3AD
Site location	Centred on National Grid Reference: 510385E, 114913N
Site dimensions	Approximately 230m wide (south-east) by 380m in length (north-south) and 6.12ha.

Figure 2-1: Site location



OS licence AC0000817865



Figure 2-2: Aerial imagery with updated site boundary



Figure 2-3: Aerial imagery with previous site boundary

2.2 Site Description and field reconnaissance survey

The following information is based on online aerial imagery and maps and observations from the field reconnaissance survey undertaken on 20th February 2018 and 19th May 2026. Photographs from the visit in May 2026 are presented in Appendix B.

A site location plan (Stantec drawing 37212-HYD-XX-XX-DR-GE-1000) and a site constraints plan (Thrive Architects drawing THAK203417 CP-01 A) are presented in Appendix A.

Table 2-2: Site description

Item	Description
Site access	Along Rock Road where the northern site boundary is situated.
Elevation and topography	The site slopes from the north (48m above ordnance datum (AOD)) towards the south of the site (64m AOD). The two deciduous woodland areas adjacently south of Rock Road are split by the site entrance/access road and lies approximately at 56m AOD in the east sloping down to 46m AOD in the west towards the houses associated with Hillside Walk. Within the former sandpit area in the south end of site there is undulating and steep ground which is covered with dense vegetation and mature trees.
Site boundaries and surrounding land use	Rock Road bounds the site to the north with open fields beyond. To the east and west are residential properties. To the south of site lies woodland and residential properties, and beyond there is a quarry, currently operated by CEMEX.
Present land use	The site is currently an active concrete manufacturing plant operated by Thakeham Concrete Products Ltd (the client). The site can be split into two key areas, the northern half of site and the southern half of site. The northern half of site closest to Rock Road, comprises the main factory production facilities with warehouses and industrial units. The southern half is used for aggregate storage. This area to the south has formerly been a quarry, extracting sand and subsequently later used as a landfill. The woodland areas are not in use but were accessed as part of the May 2026 walkover, and were found to contain dense vegetation and mature trees within them, with evidence of some previously installed monitoring wells
Surface cover and vegetation	Dense vegetation and mature trees border the whole site boundary with an area of woodland to the south of the site adjacent to the aggregate storage area. Two additional areas of deciduous woodland are situated off Rock Road, to the east and west of the site's existing access. These were accessed as part of the May 2026 walkover, and were found to contain dense vegetation, with a drainage channel along the northwestern boundary, and a small dry pond within the northeastern area of woodland.
Evidence of contamination	A number of site features and operations were noted during the 2026 site walkover survey. These included silo features, fuel storage tanks, workshops, kerosene, paraffin and iron oxide and pigment stores, oil spray treatment areas, potential asbestos containing materials (ACMs) within the building fabric and an infilled former sandpit. These areas of potential

Item	Description
	concern are presented on drawing ref: 37212-HYD-XX-XX-DR-GE-1002 (Appendix A).
General site sensitivity	The site lies in a suburban area on the eastern outskirts of Storrington. There are no Designated Environmentally Sensitive Sites in the vicinity of the site.

Selected photographs from the field reconnaissance are presented in Appendix B.

2.3 Data sources

The following sources of information have been reviewed as part of the Desk Study:

- » Historical Ordnance Survey mapping (Appendix C).
- » Third-party environmental report (Groundsure report, reference HYD-QKX-TF5-HSL-2U2) (Appendix D).
- » British Geological Survey (BGS) GeoIndex Onshore (mapapps2.bgs.ac.uk/geoindex/home.html).
- » BGS 1:50,000 geological map of Brighton and Worthing (Sheet 318).
- » BGS Memoir for Sheet 318.
- » BGS Lexicon (webapps.bgs.ac.uk/lexicon/).
- » DEFRA's MAGiC Map (magic.defra.gov.uk/MagicMap.aspx).
- » BGS/Environment Agency's aquifer designation dataset (bgs.ac.uk/datasets/aquifer-designation-data/).
- » Allen et al (1997) and Jones et al (2000).
- » Environment Agency Catchment Data Explorer (environment.data.gov.uk/catchment-planning/).
- » Environment Agency's Hydrology Data Explorer (environment.data.gov.uk/hydrology/explore).
- » UK Health Security Agency's Interactive Radon Map (ukradon.org/information/ukmaps).
- » BGS Radon Report (Reference: BGS_336701_51534) (Appendix D).
- » Unexploded bomb (UXB) Risk Maps (zeticauxo.com/downloads-and-resources/risk-maps/).

2.4 Site history

A study of historical maps (Appendix C) and aerial imagery has been undertaken to identify former land uses at the site and in the surrounding areas, which may have affected, or be affected by, the site.

2.4.1 On-site

Table 2-3: Site history

Reference	Key Features on-site
1875 – 1897 (1:2,500) & 1876 – 1897 (1:10,560)	Site is covered by coniferous woodland labelled Heath Common or The Plantation and is crossed by a footpath running east to west through the centre of site. The northern extent is shown as an open field with the 'main' road or track running along the northern boundary.
1911 (1:2,500) & 1914 (1:10,560)	Mixed woodland has encroached the northeastern corner of the site and the southern half remains as coniferous woodland.
1937 (1:2,500)	A tile works occupies the northern central slither of site, cutting through the woodland. The access has also been created along the 'main' road to the north. Three large buildings are located in the central area and northern area, and numerous small buildings in the north of the site. The greenhouses located along the western central boundary of site noted to be on site are associated with Elizabeth cottage and are not part of the tile works. In the south there is a large sandpit with half of the woodland remaining in the east. An additional area of woodland is now marked on which covers the northwest corner of site. A narrow-gauge railway runs along the west side of the sandpit area to the buildings in the north of the site.
1966, 1971 – 1990 (1:2,500)	Minor development of the tile works is evident, with five large buildings and numerous smaller ones. A weighbridge is present in the north and a hopper is noted in the centre. The narrow-gauge railway now runs between buildings in the south and the central areas of the site. The sandpit is noted as disused and covered in mixed woodland.
2002-2010 (1:10,000)	The site is shown in its present-day configuration and is labelled as a works.

2.4.2 Off-site

The key off-site feature within 250m of the site are summarised in Table 2.4. All distances quoted are approximate to the nearest site boundary.

Table 2-4: Key off-site historical features

Feature	Location	Dates	Comment
Heath Common or The Plantation	On and off-site	1875-1971	Site is surrounded to the east, south and west by woodland and a marshland area is also shown to the southeast.
Thakeham Union Workhouse School	122m west	1875-1937 1971	One of the few buildings situated from the vicinity of site at the time, then re-built into Thakeham intermediate school. Is noted to still be used as a school at present (now named Steyning Grammar School).
Snape's Farm Orchardway Farm	5m-500m north	1875-1966 1966-2025	Area of farmland renamed to Orchardway Farm around 1966 with a new access track built from

Feature	Location	Dates	Comment
			Rock Road leading to an area of cottages. Water wells noted to be present.

2.4.3 Site history summary

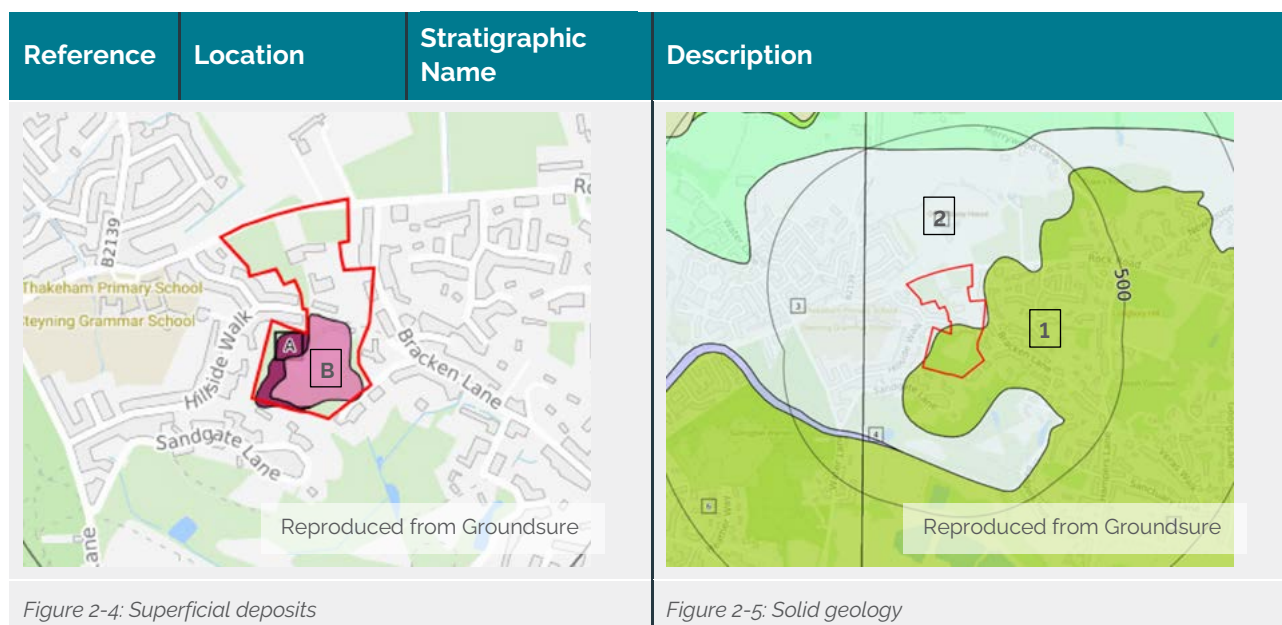
The site remained as coniferous and mixed woodland until the late 1920s, when the tile works opened and comprised of eight small to large buildings, a narrow-gauge railway with associated hoppers to the north and a sandpit to the south. Throughout the 1970s to 2000s there have been minor changes to the site layout and ancillary buildings, but predominantly the site use has not changed since its opening in 1929. The pit was noted to receive inert waste from the tile works, including surplus aggregate and concrete products. A copy of Town and Country News article titled 'A roofing tile of outstanding merit', dated 14th November 1930 was provided by the client (Appendix D). The article includes photographs of the site which appear to show a potential adit leading to underground workings, however it is unclear whether this feature was simply a part of the opencast sand excavation.

2.5 Published Geology

The general geology of the site is shown on the BGS GeoIndex and 1:50,000 geological map of Brighton and Worthing (Sheet 318), with further information provided in the BGS Memoir for Sheet 318. The 1:50,000 and 1:10,000 BGS map extracts are reproduced as part of the Groundsure Report in Appendix D. A summary of the published geology is presented in Table 2.5.

Table 2-5: Published Geological Sequence

Reference	Location	Stratigraphic Name	Description
Artificial Ground (Figure 2.4)			
A	On Site	Made Ground	Man-made superficial deposits of variable composition including waste bricks/tiles.
B	On Site	Worked Ground	Void – coincident to the location of the former sandpit in the southern half of site.
Solid Geology (Figure 2.5)			
1	On Site (outcrop to the south)	Folkestone Formation	Medium and coarse grained, well sorted cross-bedded sands and weakly cemented sandstones.
2	On Site	Fittleworth Member	Glauconitic sandy clays and clayey sands. Orange brown where weathered; bright green where unweathered.
	On site (at depth)	Hythe Formation	Underlying the Fittleworth Member. Fine to medium grained, sparsely glauconitic sands, sandstones and silts, locally pebbly with calcareous or siliceous cement.
Figures			



Some Made Ground is anticipated across the site area from previous development, with potentially deep Made Ground infilling the former sandpit. Superficial deposits are shown to be absent from the site. There are no faults beneath, or within influencing distance of the site.

2.5.1 Regional Geology

Storrington is situated within the South Downs of West Sussex and is part of the Wealden District that covers parts of Kent, Surrey and Hampshire. The Wealden District is characterised by various anticlines and synclines which form ridges and valleys across the landscape. The most prominent and central feature is known as the Weald Anticline, where the axis of this anticline is situated north of the site striking east to west with site being on the southern limb and the geological units dipping to the south at approximately 5°.

The Wealden District is also divided into two main belts, the Northern and Southern belts, distinguished by their geological compositions. The Northern belt comprise the Chalk Group, Gault Clay and Upper Greensand with the Southern belt comprising the Chalk Group and Lower Greensand Group. The chalk has largely been eroded away within the Storrington area and exposes the older rock formations of the Lower Greensand Group which are split into the Atherfield Clay, the Hythe Formation, the Sandgate Beds (which includes the Fittleworth Member) and the Folkestone Formation.

2.6 BGS Borehole records

A number of borehole logs from the BGS archive (through GeoIndex) have been reviewed. Selected relevant records are summarised in Table 2.6. Boreholes that have been drilled on site have been reviewed and summarised in Section 3.2.

Table 2-6: BGS archive borehole logs

Reference	Location	Strata and Groundwater Observations
TQ11SW108	280m southeast	» Folkestone beds (soft sand with occasional bands of sandstone) – 0m to 31m bgl); and » Sandgate beds (stiff blue clay) - 31 to 32m bgl.

Reference	Location	Strata and Groundwater Observations
		» Water level at 8m below datum (mbd).
TQ11NW2	420m northeast	» Old well (strata not logged) – 0 to 9.1m bgl; » Hythe beds (hard blue rock) – 9.1m bgl to 27.4m bgl; and » Hythe beds (green sand to rock) – 27.4m to 27.6m bgl. » Water level at 16.7m

2.7 Hydrogeology

Information relating to the hydrogeological setting of the site is summarised in Table 2.7 through to Table 2.9.

Table 2-7: Aquifer system

Stratum	Aquifer Designation	Comments
Artificial Ground		
Made Ground	N/A	Moderate to high porosity because of unconsolidated nature, but permeability likely to be constrained to low or low to moderate where poor sorting and high clay content are present.
Solid Geology		
Folkestone Member	Principal aquifer	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale.
Fittleworth Formation	Secondary A aquifer	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.
Hythe Formation	Principal aquifer	Dual porosity aquifer, groundwater flows via intergranular flow (primary porosity) and along fractures (secondary porosity). The secondary porosity can contribute significantly to the permeability and flow.

The site is situated within the Hardham basin and is formed of the Folkestone Formation and Hythe Formation Principal aquifers, which are separated by the Sandgate Formation (also known as the Fittleworth Member) Secondary A aquifer. Due to its clay content, the Fittleworth Member in this region acts as an aquitard separating the two principal aquifers. The Hythe Formation aquifer is confined by the overlying Fittleworth Member and is hydraulically separated from the overlying Folkestone Formation. The Lower Greensand Group aquifers are known to be highly productive with yields up to 51l/s. Sandgate beds (which includes the Fittleworth Member) yield little groundwater.¹

¹ BGS. (1978). Hydrogeological map of the South Downs and the adjacent part of the Weald including parts of hydrometric areas 39, 40, 41 and 42. Scale 1:100,000.

According to the Groundsure report, there are no active licensed groundwater abstraction or discharges within 250m of the site. However, in September 2024 a deep rotary borehole (58m depth) was drilled and tested in the north of the site with future intention to use as a groundwater abstraction point for the new development. Further details of the investigation and drilling of this borehole can be found in Hydrock report (reference: 08347-HYD-XX-XX-RP-GE-1005).

Table 2-8: Groundwater Vulnerability and Source Protection Zones

Item	Details
Groundwater Vulnerability	Principal Bedrock aquifer – High vulnerability Secondary bedrock aquifer – High vulnerability
Source Protection Zone	Not located within a source protection zone

Table 2-9: Other groundwater information

Item	Details
Operational Catchment	South East GW Management Catchment
Groundwater body	Lower Greensand Arun and Western Streams
Groundwater levels	The BGS borehole (TQ11SW108) recorded groundwater level within the Folkestone at 8mbd and (TQ11NW2) at 16m bgl within the Hythe Formation.
Groundwater quality	Poor classification rating (2019); » Chemical rating body – poor; » Quantitative – good. Objectives; Overall water body – good by 2027 (low confidence due to being disproportionately expensive)
Groundwater flooding	Negligible

2.8 Hydrology

Information relating to the hydrological setting of the site is summarised in Table 2.10 and Table 2.11.

Table 2-10: Surface water features

Feature	Location	Flow direction and comments
Inland river (ditch/stream)	46m to 67m northwest	Inland river not influenced by normal tidal action. On ground surface. Watercourse contains water all year round.
Inland river (ditch/stream)	72m to 108m southeast	Inland river not influenced by normal tidal action. On ground surface (running underground 196m southeast). Watercourse contains water all year round.
Lake, loch or reservoir (pond)	119m to 207m southeast	On ground surface and contains water all year round.
Inland river (ditch/stream)	188m to 209 north east and 240m north	Inland river not influenced by normal tidal action. On ground surface. Watercourse contains water all year round.

There are no active licensed surface water abstractions or discharges within 250m of the site.

Table 2-11: Other surface water information

Item	Details
Operational Catchment	Arun and Western Streams
Water body	River Stor
Surface water quality	Moderate classification rating (2019-2022): » Ecological rating – moderate;

Item	Details
	» Chemical rating – fail.
Surface water drainage	Site level drainage is apparent at a number of points on the site. It was noted that a drainage feature is located alongside the fuel storage tank area in the form of a drainage channel which discharges off-site to the northwest.
Surface water flooding	Highest risk on site: 1 in 30 year, 0.1m – 0.3m. No further consideration of flood risk is undertaken in this report. Specialist flood risk advice should be sought with regard to drainage and flooding.

2.9 Mining and mineral extraction

Table 2-12: Mining and mineral extraction

Item	Details
Sand extraction	The site is recorded to have been subject to sand extraction. This relates to the disused sandpit within the southern half of the site. In addition, it appears some adits may have been progressed beneath the site.

2.10 Waste management

The southern area of the site, formerly a sand pit, has since been partially infilled by inert materials related to the waste product from the tile works. This is summarised in Table 2.13 and shown in Figure 2.6.

Table 2-13: Waste management sites

Site Name	Location	Details
Thakeham Tiles	On site - Storrington, Sussex	Status: Closed Operational dates: 1970-1994 Waste accepted: inert, (waste products from tile manufacturing)



Figure 2-6: Waste management sites within 250m

2.11 Regulatory information

Information in the Groundsure Report, relating to various regulatory controls has been reviewed, with a summary of key aspects not included in the above sections presented in Table 2.14. Refer to Appendix D for further information. All distances quoted are approximate.

Table 2-14: Regulatory information within 250m of the site

Regulatory Data	Location	Details	Potential Risk	Comment
Licensed pollutant release	On site	Use of bulk cement	Yes	Potential contaminative processes from tile works.
Recent industrial land uses	On site	Factory	Yes	Potential contaminative processes from tile works.
	34m northwest & 67m northeast & 191m southwest	Electricity substation	No	Contaminants associated with substations (Polychlorinated Biphenyls - PCBs) are not considered mobile in soil or water.
	167m west	Petrol station (now obsolete)	No	Due to distance from site and being down gradient.
	168m west	Vehicle hire and rental	No	No contaminative processes identified and due to distance from site.
	174m west & 221m northwest	Vehicle repair, testing and servicing	No	Due to distance from site and being down gradient.
	239m west	Gas Meter House	No	Due to distance from site and being down gradient.

There are no records relating to the storage of radioactive materials within 500m of the site.

There is no Local Authority Pollution Prevention and Controls, COMAH sites, NIHHS sites, or Planning Hazardous Substance consents or enforcements within 500m of the site.

There are no contaminative industrial processes operating in the surrounding area at present, with historic records relating primarily to the site itself including the presence of the sandpit, railway and cement products works. However, as long as these have been operated in accordance with any applicable licence, no impact on the site is envisaged.

2.12 Radon

The radon risk is reported in a Radon Report obtained from the British Geological Survey. The site is in a radon affected area where 0-1% (southern half) and 1-3% (northern half) of homes are estimated to be at or above the action level.

At these levels no radon protective measures are necessary for incorporation into new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment.

A copy of the BGS radon report is presented in Appendix D.

2.13 Unexploded ordnance

There is no indication of former military use from the desk study, and screening against the Zetica regional bomb risk map (West Sussex) indicates the site to be in an area where the bomb risk is low. A copy of the map is presented in Appendix D.

The non-specialist UXO screening exercise has indicated no further assessment is required regarding UXO in relation to ground investigation. Further assessment may be considered prudent for construction activities.

3. Summary of previous reports

The previous reports that have been reviewed as part of this Desk Study are listed in Section 3.1.

3.1 List of previous reports

- » Hydrock Consultants Ltd (Hydrock). July 2018. Rock Road, Storrington. Desk Study and Ground Investigation. Reference: TRS-HYD-XX-GI-RP-GE-1001;
- » Hydrock Consultants Ltd. (Hydrock). May 2021. Supplementary Ground Investigation Report. Reference: 08347-HYD-XX-XX-RP-GE-1002;
- » Hydrock Consultants Ltd. (Hydrock). January 2022. Supplementary Ground Investigation Factual Report. Reference: 08347-HYD-XX-XX-RP-GE-1003;
- » Hydrock Consultants Ltd. (Hydrock). April 2022. Supplementary Ground Investigation. Reference: 08347-HYD-XX-XX-RP-GE-1004;
- » Hydrock Consultants Ltd. (Hydrock). April 2022. Remediation Strategy and Verification Plan. Reference: 08347-HYD-XX-XX-RP-GE-3001;
- » Hydrock Consultants Ltd. (Hydrock). February 2024. Water Features Survey. Reference: 08347-HYD-XX-XX-TN-GE-1001;
- » Hydrock Consultants Ltd. (Hydrock). March 2024. Contaminated Land Risk Assessment Summary. Reference: 08347-HYD-XX-XX-TN-GE-1000;
- » Hydrock Consultants Ltd. (Hydrock). June 2024. Ground Investigation Specification. Reference: 08347-HYD-XX-XX-SP-GE-1000;
- » Hydrock Consultants Ltd. (Hydrock). September 2024. Abstraction well soil sampling assessment. Reference: 08347-HYD-XX-XX-TN-GE-1001; and,
- » Hydrock Consultants Ltd. (Hydrock). December 2024. Water Supply Borehole Investigation. Reference: 08347-HYD-XX-XX-RP-GE-1005.

3.2 Ground conditions identified from previous investigations

The site before the development boundary was changed in 2025, has undergone numerous previous ground investigations and assessments between 2018 and 2024. The majority of the findings and works to date (with the exception of the abstraction borehole investigation) have been summarised in the Contaminated Land Risk Assessment review (reference: 08347-HYD-XX-XX-TN-GE-1000) which was produced for the client and the Environment Agency (EA), during the investigation of the groundwater abstraction well.

The ground conditions identified to date within the original boundary of site has been summarised below, in Table 3.1 and in Figure 3.1.

Table 3-1: Summary of ground conditions encountered (2018-2024)

Zone A (Northern main production facilities)		Zone B (Southern former sandpit/quarry area)	
Geology	Depths (m bgl)	Geology	Depths (m bgl)
Topsoil	0 – 0.6	Made Ground	0 – 5.45
Made Ground	0 – 5.55	Folkestone Formation	1 – 5.45
Fittleworth Member	0.25 – 27	Fittleworth Member	3.3 – 20
Hythe Formation	27 – 58		

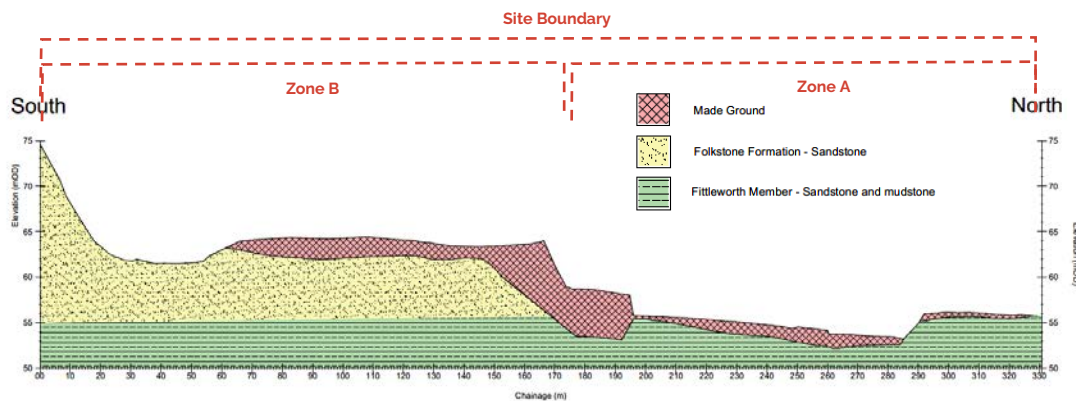


Figure 3-1: Indicative geological cross section of site

The conditions varied across site (Zone A – the northern area and Zone B - the southern area) and three types of Made Ground were identified:

- » **"Surface covering"** which included concrete hardstanding/paving slabs within the northern area of site and reinforced concrete within the southern area which was found at a maximum depth of 0.30m bgl;
- » **'General' Made Ground** which was found in the northern area to a maximum depth of 5.55m bgl (proven at BH202); and,
- » **'Quarry backfill/Landfilled' Made Ground** which was found in the southern area to a maximum depth of 5.45m bgl. This Made Ground within the southern area contained occasional visible asbestos and rare asbestos fibres. An investigation into the extent of the asbestos contamination has been undertaken and these findings can be found in report 08347-HYD-XX-XX-RP-GE-1004.

Topsoil was encountered in the northwest of site between 0.10m and 0.60m thick and comprised of dark brown clayey sandy silt with roots and rootlets.

The Folkestone Formation was encountered underlying and surrounding the quarry backfill/landfilled Made Ground only within the southern area of site between the depths of 1.00m to 5.45m bgl. This generally consisted of brownish red/pink of medium to very dense pink sands with rare interbedded sandstones. The Folkestone Formation was not encountered within the northern area of site. The BGS mapping shows the apparent contact between the Folkestone Formation and Fittleworth Member bisecting the site and the ground investigation data largely supports this.

The Fittleworth Member was encountered across the whole site underlying the Made Ground between depths of 0.25m bgl and 27m bgl within the northern area and between depths of 3.30m and 20m bgl within the southern area (bases of which was not proven). The strata comprised of greenish grey sands and clays and becoming weakly cemented sandy siltstone and sandstone at depths around 7.50m and 8.50m bgl.

The Hythe Formation was encountered during the drilling of the groundwater abstraction borehole undertaken in September 2024 within the northern half of the site. The transition from the Fittleworth Member to the Hythe Formation has been inferred as an approximate depth of 27m bgl due, but this is likely not the exact depth due to the difficulties in defining the two units due to the drilling method used, as well as their similarities geologically. This stratum was described and recovered as dark grey sandy fine and medium gravels of glauconitic sandstone and chert. This is not shown above in Figure 3.1, however it is expected to underlie the Fittleworth Member across the site.

A review of the existing monitoring data and installations has highlighted that although some monitoring wells do not screen the entire Made Ground – the range of monitoring well installation depths range from 0.5 to 3.5m bgl within the Made Ground – and overall, this coverage is considered sufficient at outline planning stage. Table 3-2 below summarises the well installations within the Made Ground.

Table 3-2 Monitoring well installations targeting the Made Ground

Location	Ground level (mAOD)	Screen top and base depth (m bgl)	Screen top and base elevation (mAOD)	Strata targeted
WS101	51.03	0.50 to 3.00	50.53 to 48.03	Made Ground / Fittleworth
WS102	52.01	0.50 to 3.00	51.51 to 49.01	Made Ground / Fittleworth
WS103	50.47	0.50 to 3.00	49.97 to 47.47	Made Ground / Fittleworth
WS106	51.67	0.50 to 1.00	51.17 to 50.67	Made Ground
WS108	50.52	0.50 to 1.00	50.02 to 49.52	Made Ground
WS109	52.65	0.50 to 3.00	52.15 to 49.65	Made Ground
WS110	53.00	1.00 to 3.00	52.00 to 50.00	Made Ground / Fittleworth
WS111	56.03	0.50 to 3.00	55.53 to 53.03	Made Ground / Fittleworth
WS112	58.38	1.00 to 3.50	57.38 to 54.88	Made Ground
WS113	64.20	1.00 to 3.00	63.20 to 61.20	Made Ground / Folkestone
WS115B	64.39	1.00 to 3.00	63.39 to 61.39	Made Ground / Folkestone
WS119	63.63	1.00 to 3.00	62.63 to 60.63	Made Ground
BH202	58.47	1.00 to 7.00	57.47 to 51.47	MG - General
WS201	50.56	0.50 to 4.50	50.06 to 46.06	MG - General / Fittleworth
WS207	51.87	1.00 to 3.00	50.87 to 48.87	MG - General / Fittleworth
BH203	64.22	1.00 to 5.00	63.22 to 59.22	MG – Quarry backfill / Folkestone Formation

Installation of additional ground gas monitoring wells is recommended ground gas monitoring following demolition of existing buildings, in areas where the proposed development will contain buildings.

3.3 Groundwater conditions

In general, shallow groundwater <1.0m bgl, was encountered during site works in the north of the site within the Made Ground (most likely perched groundwater). Within the Fittleworth Member (also within the north), groundwater was encountered at 49.62m and 50.99m above ordnance datum (OD), no groundwater was encountered within the Folkestone Formation during the site works.

Water levels recorded post-fieldwork in the north ranged from 48.86m and 55.77m OD (1.11m to 2.83m bgl) in the Made Ground and 47.77m to 54.14m OD (0.30m to 2.50m bgl) in the Fittleworth Member and in the south area between 59.72m to 60.30m OD (3.92 to 4.50m bgl) in the Folkestone Member.

Groundwater levels during the drilling of the groundwater abstraction borehole encountered an initial seepage within the hand pit at 1.25m bgl. During drilling, a deeper water strike was encountered at 19.80m bgl rising to 12.25m bgl after 40 minutes. Resting groundwater after the drilling was recorded between 13.65m and 14.43m bgl.

The groundwater generally flows south to north and appears to be topographically controlled.

3.4 Geo-environmental findings

Stantec drawing 37212-HYD-XX-XX-DR-GE-1005, presented in Appendix A, highlights the main areas of contamination that have been identified throughout the investigations. This drawing also includes all the positions of all exploratory hole locations undertaken from to date.

A summary of identified contamination is outlined in the Remediation Strategy and Verification Plan (08347-HYD-XX-XX-RP-GE-3001) and is presented below:

Human Health

- » Elevated Lead in Made Ground – General, in the north of the site (WS204, WS108 and WS110).
- » Elevated Total Petroleum Hydrocarbons (TPH) (WS203B, WS102, WS108, WS110, TP107 and SA104).
- » Elevated Benzo(a)anthracene, Benzo(b)fluoranthene, Indeno(1,2,3,cd)pyrene, chrysene and dibenz(a,h)anthracene in Made Ground – General in the north of the site and in Made Ground – Quarry backfill.
- » Asbestos in Made Ground - General and Quarry backfill/landfilled Made Ground. Rare to frequent incidences of visible asbestos and asbestos loose fibres were encountered in a number of locations in the southern site area (former quarry). Sporadic visible asbestos and loose asbestos fibres were identified within the northern site area.

Plant Growth

- » Elevated Zinc in Made Ground – General (WS212, WS103, WS108 and WS110).
- » Elevated Boron in Made Ground – General (SA106 and SA103).

Waters

- » Petroleum hydrocarbons were detected at WS203B in the vicinity of the fuel storage and old filling pump.

Ground Gas

- » Characteristic Situation 1 conditions determined – no additional gas mitigation required.
- » No significant risk concluded with respect to potential for VOC vapours.

Construction materials:

- » Plastic or bitumastic products may be at risk from high concentrations of petroleum hydrocarbons locally – consideration should be given to the appropriate selection of construction materials.

Water supply pipes:

- » The site is brownfield and organic contamination (Polycyclic Aromatic Hydrocarbons (PAH), Volatile Organic Compounds (VOCs), and petroleum hydrocarbons) has been identified in exceedance of the threshold values in some locations across the site. Barrier pipe should be used for potable water supply. However, confirmation should be sought from the water supply company at the earliest opportunity.

As part of the Environment Agency (EA) requirements during investigation for the abstraction well on site in September 2024, contamination analysis was required to be undertaken within the hand pit of BH1, prior to the commencement of drilling works. The report (reference: 08347-HYD-XX-XX-TN-GE-1001) concluded that all Chemicals of Potential Concern (CoPC) within the soils of the hand pit were below the relevant GAC and therefore all relevant contaminant linkages are incomplete.

3.5 Remedial Recommendations

Investigation and risk assessment have concluded that the site will require remediation to mitigate the risks to the identified receptors from lead, PAH, TPH hotspots and sporadic asbestos in the north area of the site; and to mitigate the risk of PAH and TPH hotspots and frequent asbestos across the south area of the site.

The objectives of the remediation are to sever one or more of the linkages within the source-pathway-receptor model. The Remediation Strategy and Verification Plan (RSVP) (report ref: 08347-HYD-XX-XX-RP-GE-3001) details the recommended remedial measures for the site. A summary of actions is provided below.

- » Existing industrial processes will cease and buildings be subject to demolition (with prior removal of asbestos containing materials).
- » Fuel storage infrastructure will be removed.
- » Hotspots and point sources will be remediated and subject to validation works.
- » The selected most appropriate remediation options include a combination of:
 - » appropriate materials handling and stockpiling in accordance with a Materials Management Plan (MMP);
 - » In-situ remediation of soils (hand picking visible ACM);
 - » watching brief during groundworks;

- » installation of Protectaline or similar protective pipework for supply of potable water to the properties;
- » import of subsoil and topsoil in accordance with a Materials Management Plan (MMP);
- » the installation of an engineered cover system in private gardens and POS areas; comprising:
 - A geotextile marker layer; and
 - Imported subsoil / topsoil (600mm in private gardens and 450mm in public open space), comprising a minimum of 150mm topsoil.

A verification report will be produced outlining the extent of remediation undertaken.

4. Consultations and local knowledge

Discussions have been held with Horsham District Council Environmental Health & Licensing Department. Information provided through consultation, relating to the site confirms the findings of the information presented in this study.

The southern part of the site was confirmed as a recorded licensed inert landfill with site references given as WD27/212 and WD13/38. First input is reported as received in 1970 and last input in 1982. Records are held by the Environment Agency.

The site is confirmed to overly a Principal Aquifer with High Groundwater vulnerability.

Historic Petroleum Licensing records provided by West Sussex Country Council show up to 500 gallons of petrol were stored at the site. Storage of diesel fuel was not licensed.

The site is currently permitted for the blending, packing, loading, unloading and use of bulk cement. The Permit reference is EPR19.

No incidents of pollution at the site have been reported to Horsham District Council.

5. Preliminary Ground Model

Much of the ground model on site has been investigated and assessed (Zone A and Zone B). The preliminary ground model is based on the information on the ground conditions presented in Sections 2 and 3 and integrates site-specific data (where available) with regional geological desk-based information.

Table 5-1: Preliminary Ground Model

Strata	Expected Thickness (m)	Description	Comments
Artificial Ground/Topsoil			
Made Ground	0.10 – 5.55	Man-made superficial deposits of variable composition including waste bricks/tiles.	Encountered within Zone A and Zone B.
Topsoil/Made Ground	0 – 0.50	Topsoil expected within Zone C (the woodland areas adjacent to Rock Road). Some localised Made Ground expected (potential fly tipping), but not expected to be a significant thickness due to the nature that these areas have been woodland and not developed on.	
Solid Geology			
Folkestone Formation	1 – 5.45	Medium and coarse grained, well sorted cross-bedded sands and weakly cemented sandstones.	Encountered within Zone B (southern half of site only).
Fittleworth Member	0.50 – ~27	Glauconitic sandy clays and clayey sands. Orange brown where weathered; bright green where unweathered.	Encountered across site, underlying Folkestone in Zone B and underlying topsoil/made ground in Zone A. Expected to underlie topsoil/made ground in Zone C.
Hythe Formation	~27 to 58	Underlying the Fittleworth Member. Fine to medium grained, sparsely glauconitic sands, sandstones and silts, locally pebbly with calcareous or siliceous cement.	Encountered underlying the Fittleworth Member in Zone A during drilling of the groundwater abstraction well. It is expected to underlie the Fittleworth Member across the site (Zone B and Zone C).

Much of the geology encountered on site has comprised mostly of the Lower Greensand Group. The higher ground towards the south of the site is underlain by the sands and weakly cemented sandstones of the Folkestone Formation which overlies the sandy clays and clayey sands of the Fittleworth Member. The lower ground, towards the north of the site, the Folkestone Formation is absent, and the site is underlain by the Fittleworth Member and the Hythe Formation. No natural superficial deposits are recorded across the site overlying the bedrock geology. Generally Made Ground beneath the site is thin

and shallow (with an average thickness of 1.64m in the north of the site and 2.39m in the south of the south), but locally thicker Made Ground was encountered in the northern area and worked ground associated with the southern quarry area up to a maximum thickness of 5.47m.

The absence of the Folkestone Formation within the northern half of site, is consistent with the BGS mapping where the apparent contact between the Folkestone and Fittleworth bisects the site. The deepest borehole on site has been drilled to 58m bgl, identified the Fittleworth Member to approximately 27m bgl and the Hythe Formation below this from 27m to 58m bgl. The base of the Hythe Formation has not proven.

Based on publicly available mapping records, the new woodland areas (Zone C) in the north of the site are anticipated to be very similar geologically to Zone A, with the absence of the Folkestone Formation.

6. Ground hazards

6.1 Natural ground instability

The site is considered to have a very low to low risk of running sands, although it must be considered that there may be possibility of running sand problems after major changes in ground conditions. Collapsible deposits are considered a very low risk for site. However, it appears that adits may have been progressed on the site in the 1930s, the nature and extent of these is unclear.

The risk of ground dissolution from soluble rocks or from shrinking or swelling of clays is rated as negligible on the site. Landslides are considered to be at a low risk of occurring on site, although the steep cut face at the extent of the former sand pit may be at an angle uncondusive to stability.

6.2 Preliminary geotechnical hazard identification

Potential geotechnical hazards have been assessed in accordance with the general requirements of ICE/DETR Document 'Managing Geotechnical Risk' and the HE documents CS 641 and CD 622. Table 6.1 sets out the identified geotechnical risks and hazards which are associated with the site.

Table 6-1: Preliminary geotechnical hazard identification

Hazard	Hazard Plausible	Comment
Uncontrolled Made Ground (variable strength and compressibility).	Yes	There is Made Ground due to historical construction activity as well as infilling of the former sand pit in the southern half of site.
Soft / loose compressible ground (low strength and high settlement potential).	Yes	Uncontrolled Made Ground and Worked Ground and unknown strength of soils.
Shrinkage / swelling of the clay fraction of soils under the influence of vegetation.	Yes	The shallow bedrock comprises of clayey sands. Strength unknown.
Variable lateral and vertical changes in ground conditions	Yes	The site is on a slope and the extent, composition and thickness of Made Ground also varies across the site
Attack of buried concrete by aggressive ground conditions.	Yes	The ground investigation has proven that there is the potential for expansive sulphate bearing soils to be present at depth within the Fittleworth Formation
Adverse chemical ground conditions, (e.g. expansive slag).	No	Expansive slag has not been identified on site.
Obstructions.	Yes	Obstructions have been proven by the investigation and there is a potential for additional obstructions to be present due to historical construction activity, or unknown fill in Made Ground.

Hazard	Hazard Plausible	Comment
Existing below ground structures to remain (on or off-site tunnels, foundations, basements, and adjacent sub-structures).	Yes	Existing building and structures (including adit) are likely to be present and will require removal prior to redevelopment.
Shallow groundwater.	Yes	Perched water encountered in the Made Ground. Boreholes drilled on site have recorded groundwater between <1m bgl and 19.80m bgl.
Changing groundwater conditions.	Yes	Groundwater may be seasonally affected.
Risk from erosion or flooding.	No	No erosion or flooding is anticipated.
Running sands and / or loose Made Ground, leading to difficulty with excavation and collapse of side walls.	Yes	The ground investigation has indicated that there is a potential for loose soils and Made Ground to be present at the site.
Slope stability issues – general slopes.	Yes	The site is on a significant slope.
Slope stability issues – retaining walls.	Yes	The proposed development will likely require retaining walls to be constructed and/or existing ones to remain.
Earthworks – poor bearing capacity of new fill.	No	Any imported fill should be as required in regards to its suitability of engineering properties relating to the proposed use and subgrade it will be placed upon.
Earthworks – unsuitability of site won material to be reused as fill.	Yes	There is a requirement for cut to fill to create the development platform and filling of remediation excavations. This will require reuse of soils excavated from the site.
Solution features in Chalk.	No	Chalk bedrock not present underlying the site.
Cavities in the superficial deposits, due to solution features.	No	No superficial deposits present.
Dissolution (associated with 'wet rock head').	No	N/A
Brine extraction.	No	N/A
Mining/mineral extraction	Yes	Historical sand extraction in the south of site, potential for adits.
Possible cambered ground with gulls possibly present.	No	N/A
Relict slip surfaces.	No	N/A

Hazard	Hazard Plausible	Comment
Problematic soils.	Yes	Made Ground/Worked Ground has been encountered across site.
Unforeseen ground conditions - risk associated with limited data.	Yes	Ground investigation has been undertaken. However, additional information will be obtained during construction. Ground conditions are only defined at exploratory hole locations.

6.3 Potential development elements affected

Development elements potentially affected by geotechnical hazards are:

- » Building foundations.
- » Building floor slabs.
- » Roads and pavements.
- » Services.
- » General slopes.
- » Retaining walls.
- » Gardens.
- » Construction staff, vehicles and plant operators.
- » Concrete below ground.
- » Earthworks control, inability to place and compact fill.
- » Insufficient fill to complete earthworks.

Health and safety risks to site Contractors and maintenance workers have not been assessed and will need to be considered separately during design.

7. Initial Conceptual Site Model and Preliminary Risk Assessment

7.1 Introduction

The initial Conceptual Site Model (CSM) and Preliminary Risk Assessment incorporates evidence from the site walkover, the Desk Study, and previous investigations carried out at the site. The formulation of an initial CSM is a key component of the LCRM methodology for assessing geoenvironmental risk, and incorporates the Preliminary Ground Model of the site physical conditions (Section 5) and the identification of potential contaminant linkages.

The available information has been used to identify geo-environmental hazards and to establish potential contaminant linkages based on the source-pathway-receptor (S-P-R) approach. A viable contaminant linkage requires all the components of an S-P-R to be present. If only one or two are present, there is no linkage and no further assessment is required.

Health and safety risks to site development contractors and maintenance workers have not been assessed as part of this study and will need to be considered separately.

7.2 Potential contaminants

For the purpose of this assessment the potential contaminants have been separated according to whether they are likely to have originated from an on-site or off-site source.

7.2.1 *Potential on-site sources of contamination*

- » Made Ground below the site from development of the tile works (metals, metalloids and PAH) - S1;
- » Made Ground below the site from development of the tile works (asbestos) - S2;
- » Asbestos within existing buildings - S3;
- » Landfill, inert waste products from the infilling of former sand pit and known records of historical landfill usage (cementitious products and concrete) - S4;
- » Petroleum hydrocarbon fuels, lubricants and chlorinated solvents associated with the workshops and on-site storage - S5; and,
- » Ground gases (carbon dioxide and methane) from the organic materials in the infilled sand pit area and the general Made Ground below the site - S6.

7.2.2 *Potential off-site sources of contamination*

No potential off-site sources of contamination have been identified.

7.3 Potential receptors

The following potential receptors in relation to the proposed land use have been identified.

- » Humans (neighbours, future site users) - R1;
- » Development end use (buildings, utilities and landscaping) - R2;
- » Groundwater: Principal aquifer status of the Folkestone Formation and Secondary A aquifer status of the Fittleworth Member - R3;
- » Surface water: on-site drainage ditch and streams in the vicinity of the site - R4; and

- » Ecology: the wooded areas surrounding the former sand pit area – R5.

7.4 Potential pathways

The following potential pathways have been identified.

- » Humans: ingestion, skin contact, inhalation of dust and indoor air – P1;
- » Buildings: direct contact with substances deleterious to building materials – P2;
- » Buildings: methane ingress via permeable soils and/or construction gap – P3;
- » Plant life: root uptake – P4;
- » Underlying groundwater: migration of contaminant via leachate dispersion through the unsaturated and saturated zone within the Folkestone and Fittleworth Formations – P5;
- » Surface water: overland flow – P6;
- » Surface water: drainage discharge – P7;
- » Surface water: base flow from groundwater – P8;
- » Wildlife: ingestion, skin contact, inhalation of dust and outdoor air – P9.

7.5 Potential implications of climate change

Climate change has the potential to change the risk profile for conceptual site models and associated contaminant linkages. The impact of climate change on the CSM is site-specific, and a qualitative assessment of the potential impact of climate change on the CSM for this site is summarised below. The assessment has primarily utilised the guidance in Environment Agency (2010) and SoBRA (2022) which set out the UK context to climate change and land contamination. Both guidance documents advocate a “what if” scenario approach in the context of changes in ambient temperatures, an increase in the frequency of extreme rainfall/storm events and heatwaves/droughts, and long-term changes in groundwater and sea levels.

Those “what if” scenarios that are relevant to this CSM are:

- » Increased long-term rainfall leading to increased infiltration and seasonally higher groundwater and water levels in surface waters.
- » Increased frequency and/or magnitude of extreme rainfall events leading to short-term surface flooding, surface water run-off, groundwater flooding, and/or land-based erosion.
- » Increased frequency and/or magnitude of storm events leading to short-term drops in barometric pressure and/or high winds.
- » Occurrence of extreme cold and hot weather events leading to changes in ground conditions such as soil temperature, evapo(trans)piration, and soil moisture (for example freeze-thaw effects and desiccation), decreased infiltration and fall in groundwater and surface water levels.
- » Long-term decrease in rainfall leading to lower infiltration and fall in groundwater and surface water levels.

In considering the potential impact of climate change, the following factors have been considered:

- » The design life of the proposed development is 50-100 years.

- » The location and elevation of the site in relation to the sea is 13km in distance (English Channel), 51m (northern half of site) to 65m (southern half of site) above ordnance datum.
- » The location and elevation of the site in relation to projected increased flooding extents is currently situated within a Flood Zone 1, which means it is at very low risk of flooding (>1% chance per year) and a very low chance of flooding between 2036 and 2069.
- » The underlying geology at the site are unlikely to be physically adversely affected by desiccation, subsidence or erosion.
- » The UK Climate Predictions published by the Met Office indicate that over the lifetime of the proposed development average:
 - » Precipitation is forecast to decrease annually by 9.9% by 2085;
 - » Temperature is forecast to increase by 4.9°C by 2085;
 - » Sea level is forecast to increase by 70 to 115cm by 2100; and
 - » Groundwater recharge is forecast to increase in the winter and spring months and decrease in the summer and autumn months by 2050 to 2079. Table 7.1 summarises the projected average seasonal groundwater recharge within the Lower Greensand Arun and Western Streams using the Enhanced Future Flows and Groundwater (eFLaG) dataset². The recharge changes are viewed as three slices of time throughout each season of the year: Baseline represents the years 1989-2018; Near future represents the years 2020-2049 and far future represents the years 2050-2079. Additional detailed investigation on the aquifer recharge for the site is provided in Hydrock report 08347-HYD-XX-XX-RP-GE-1005).

Table 7-1: Seasonal average projections of groundwater recharge within the Lower Greensand Arun and Western Streams

Seasons	Average Baseline (BL) mm/day	Average Near Future (NF) mm/day	Average Far Future (FF) mm/day	Comment
Spring (M, A, M)	0.44	0.44	0.45	An increase in average groundwater recharge from BL to FF by 0.01mm/day.
Summer (J, J, A)	0.08	0.04	0.02	A decrease in average groundwater recharge from BL to FF by 0.06mm/day.
Autumn (S,O,N)	0.98	0.86	0.73	A decrease in average groundwater recharge from BL to FF by 0.25mm/day.
Winter (D,J,F)	1.63	1.68	1.91	An increase in average groundwater recharge from BL to FF by 0.28mm/day.

² UK Centre for Ecology and Hydrology, 2024. Enhanced Future Flows and Groundwater Portal

- » Potential changes in soil moisture levels and soil temperature are not likely to have a significant impact on contaminant fate and transport (mobility and degradation) noting that a rise in soil temperature will likely increase the volatility and solubility of contaminants and increase the microbial degradation of contaminants. A reduction in soil moisture may decrease microbial degradation and increase vapour and gas diffusion.

For further details on the considerations made, refer to Table E.1 in Appendix E.

7.6 Summary of potential contaminant linkages

The above sources, pathways and receptors have been identified as part of a Preliminary Risk Assessment in accordance with Stage 1 of LCRM (2025). These are considered to be plausible in the context of this site and the available information and have been carried forward for investigation and assessment.

The previous desk study written in 2018, did not provide an initial risk level to the potential contaminant linkages identified at desk study stage. This has been included in Table 7.3.

Table 7.3 lists the plausible contaminant linkages which have been identified. These are considered as potentially unacceptable risks in line with guidelines published in LCRM (2025) and additional risk assessment is required.

S-P-R linkages have been assessed in general accordance with guidance in CIRIA Report C552 (Rudland et al 2001) as modified to reflect changes made in Table A4.5 of NHBC/EA R&D66 (2008), to remove the ambiguous term "low/moderate risk", and to adopt "Extremely low risk" for the lowest risk category (see Table 7.2).

Table 7-2: Consequences versus probability assessment

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Low risk	Very low risk
	Low likelihood	Moderate risk	Low risk	Low risk	Very low risk
	Unlikely	Low risk	Very low risk	Very low risk	Extremely low risk

Table 7-3: CSM

Source	Pathway	Receptor	Probability	Consequence	Risk Level	Comment
Made Ground below the site from development of the tile works (metals, metalloids and PAH) - S1	Soil ingestion, direct dermal contact, soil derived dust inhalation	Site users	Likely	Medium	Moderate	There is Made Ground and Worked Ground across the site due to the historical development and infilling of former sandpit. Elevated metals, PAHs and TPHs have been identified across site. Contact with these materials is likely in soft landscaping areas. Mitigation measures will be required to break the SPR linkage.
	Inhalation of fugitive dusts	Neighbours	Low Likelihood	Medium	Low	The risk of significant dust generation is likely only during site development process and can therefore be controlled with good site practices.
	Leaching from unsaturated soils	Groundwater (Folkestone Formation and Hythe Formation - Principal aquifers. Fittleworth Member - Secondary A aquifer)	Low Likelihood	Mild	Low	No significant risk considered to controlled waters.
	Surface water run-off	Aquatic ecosystem in	Low Likelihood	Medium	Low	Surface water run-off will drain into onsite drainage and drainage

Source	Pathway	Receptor	Probability	Consequence	Risk Level	Comment
		adjacent surface water				situated on Rock Road and will unlikely flow to any surface water features situated nearby.
	Base flow from contaminated groundwater		Likely	Medium	Moderate	Flow of groundwater may occur through soils to the aquifer at depth.
	Plant root uptake	Landscape planting	Likely	Mild	Low	Elevated levels of zinc and boron identified within the ground investigation, growing medium will have to be imported in areas of proposed soft landscaping.
Made Ground below the site from development of the tile works (asbestos) - S2	Inhalation of fugitive dust	Future site users	Likely	Severe	High	There is Made Ground and Worked Ground across the site due to the historical development and infilling of former sand pit. and asbestos fibres/ACM has been encountered.
		Neighbours	Likely	Severe		Contact with these materials is likely in soft landscaping areas. Mitigation measures may be required to break the SPR linkage. Good site practices during construction will be required to mitigate risks to off-site neighbours.
Asbestos in existing buildings – S3	Inhalation of fugitive dust	Site users	Likely	Severe	High	Asbestos may be present in existing buildings due to pre-2000 construction. Careful removal will be required from buildings during demolition

Source	Pathway	Receptor	Probability	Consequence	Risk Level	Comment
		Neighbours	Unlikely	Severe	Low	Removal under controlled conditions should limit release of fibres to the air and the ground.
Landfill, inert waste products from the infilling of former sand pit and known records of historical landfill usage (cementitious products and concrete) – S4	Soil ingestion, direct dermal contact, soil derived dust inhalation	Site users	Low Likelihood	Medium	Low	A historical landfill is present within the former sandpit area to the south. Contact with these materials is likely in soft landscaping areas. Mitigation measures will be required to break the SPR linkage.
	Inhalation of fugitive dust	Neighbours	Low Likelihood	Medium	Low	The risk of significant dust generation is likely only during site development process and can therefore be controlled with good site practices.
	Leaching from unsaturated soils	Groundwater	Low Likelihood	Medium	Low	No significant risk to controlled waters identified.
	Surface water run-off	Aquatic ecosystem in adjacent surface water	Low Likelihood	Medium	Low	Surface water run-off will drain into onsite drainage and drainage situated on Rock Road and will unlikely flow to any surface water features situated nearby.
	Plant root uptake	Landscape planting	Low Likelihood	Medium	Low	Growing medium will have to be imported in areas of proposed soft landscaping.

Source	Pathway	Receptor	Probability	Consequence	Risk Level	Comment
Petroleum hydrocarbon fuels, lubricants and chlorinated solvents associated with the workshops and on-site storage – S5	Soil ingestion, direct dermal contact, soil derived dust inhalation	Future site users	Likely	Medium	Moderate	Petroleum hydrocarbons recorded in soils during previous ground investigations. Contact with these materials is likely in soft landscaping areas. Mitigation measures will be required to break the SPR linkage.
	Leaching through unsaturated zone.	Groundwater	Low Likelihood	Mild	Low	No significant risk to controlled waters identified.
	Surface run-off.	Aquatic ecosystem in adjacent surface water	Low Likelihood	Medium	Low	Surface water run-off will drain into onsite drainage and drainage situated on Rock Road and will unlikely flow to any surface water features situated nearby.
Ground gases (carbon dioxide and methane) from organic materials in the infilled sand pit area and the general Made Ground below the site – S6	Vertical migration and ingress into buildings	Future site users	Low Likelihood	Medium	Low	There is Made Ground and Worked Ground across the site due to the historical development and infilling of former sand pit.
		On site buildings	Low Likelihood	Medium	Low	Based on the monitoring to date, CS1 conditions have been determined for the site where gas protections measures are not required. However, this should be confirmed at detailed planning stage, once the proposed development layout has been confirmed, and demolition of any

Source	Pathway	Receptor	Probability	Consequence	Risk Level	Comment
						existing buildings has taken place. This may lead to reclassification of the site (or parts of the site) to a higher CS level.

The possible contaminant linkages (for risk levels of moderate or greater) on an unremediated redeveloped site, as determined by the desk study and walk-over and previous investigations, are summarised in the table below:

Table 7-4: Possible Contaminant Linkages (for Risk Levels of Moderate or Greater)

Source(s)	Pathway(s)	Receptor(s)
Metals, metalloids, PAH, petroleum hydrocarbons and asbestos in Made Ground below the site.	Soil ingestion, direct dermal contact, soil derived dust inhalation	Site users
Made Ground below the site from development of the tile works (asbestos)	Inhalation of fugitive dust	Future site users Neighbours
Asbestos in existing buildings	Inhalation of fugitive dust	Future site users Neighbours
Petroleum hydrocarbon fuels, lubricants and chlorinated solvents associated with the workshops and on-site storage	Soil ingestion, direct dermal contact, soil derived dust inhalation	Future site users

8. Conclusions and recommendations

8.1 Geotechnical conclusions

The following plausible geotechnical risks are identified:

- » Variable Made Ground - settlement or differential settlement of foundations, floor slabs, roads and infrastructure elements.
- » Low strength, compressible ground – risk of shear failure and excessive settlement of foundations, roads and infrastructure elements.
- » Attack of buried concrete by aggressive ground conditions – the development contains Made Ground and potentially sulfate bearing soils.
- » Shrinkage/swelling of clay – settlement/heave of foundations, especially where located within the influence of trees and vegetation.
- » Running sands, loose Made Ground and shallow groundwater, leading to difficulty with excavation due to trench instability.
- » Instability of slopes and impact on foundations, floor slabs, roads and infrastructure and construction plant.
- » Potential for obstructions and the risk of instability of excavations with the impact on construction staff, vehicles and plant operators.
- » Earthworks – Low bearing capacity or settlement of new fill and impact on foundations, floor slabs, roads and infrastructure and construction plant.
- » Potential for unforeseen ground conditions and the risks associated with limited data in the woodland areas adjacent to Rock Road which have not been investigated.

These plausible risks require further investigation and assessment (see recommendations).

8.2 Geoenvironmental conclusions

Based on historical and current land uses:

- » It is considered that it is unlikely that the site would be classified as Contaminated Land under Part 2A of the EPA 1990.
- » The overall risk from land contamination at the site is considered to be low for the current development, as it is covered by hard standing or buildings limiting the possibility of contact with the soils, as well as the risk of significant rainwater infiltration leading to leaching.
- » The overall risk for a redeveloped site is assessed to be low to moderate.
- » The woodland areas not investigated to date, will need investigation, testing and assessment to confirm these areas are suitable. However, based on the historical maps and site walkover, these areas have not previously been developed, and are therefore considered to represent a low risk with respect to contaminated land. Investigation coverage at outline planning stage is therefore considered sufficient, but additional intrusive works should be done at detailed planning stage.

8.3 Recommendations

Following the update to the site boundary in 2025, the following additional works are recommended:

- » Ground investigation at detailed planning stage within the deciduous woodland area to the west along Rock Road, following vegetation clearance to include trial pitting and drilling of boreholes to confirm ground conditions, identify contamination if any within the underlying soils/geology are present along with the undertaking of insitu (SPT) to determine soil density to aid foundation design;
- » Ground investigation at detailed planning stage within the deciduous woodland to the east, along Rock Road, to include hand pitting to confirm ground conditions and identify contamination if any within the underlying soils/geology are present;
- » Ground investigation at detailed planning stage within footprints of buildings not previously investigated;
- » Additional ground gas monitoring following demolition of existing buildings, in areas where the proposed development will contain buildings;
- » Update the ground model;
- » Provide geotechnical design recommendations;
- » Update the CSM, including identification of plausible pollution linkages;
- » Undertake generic quantitative risk assessment of potential chemical contaminants to establish 'suitability for use' under the current planning regime;
- » Discuss potential environmental liabilities associated with land contamination (soil, water and gas); and
- » Provide updates if required to the mitigation and remediation recommendations to ensure the site is 'suitable for use'.

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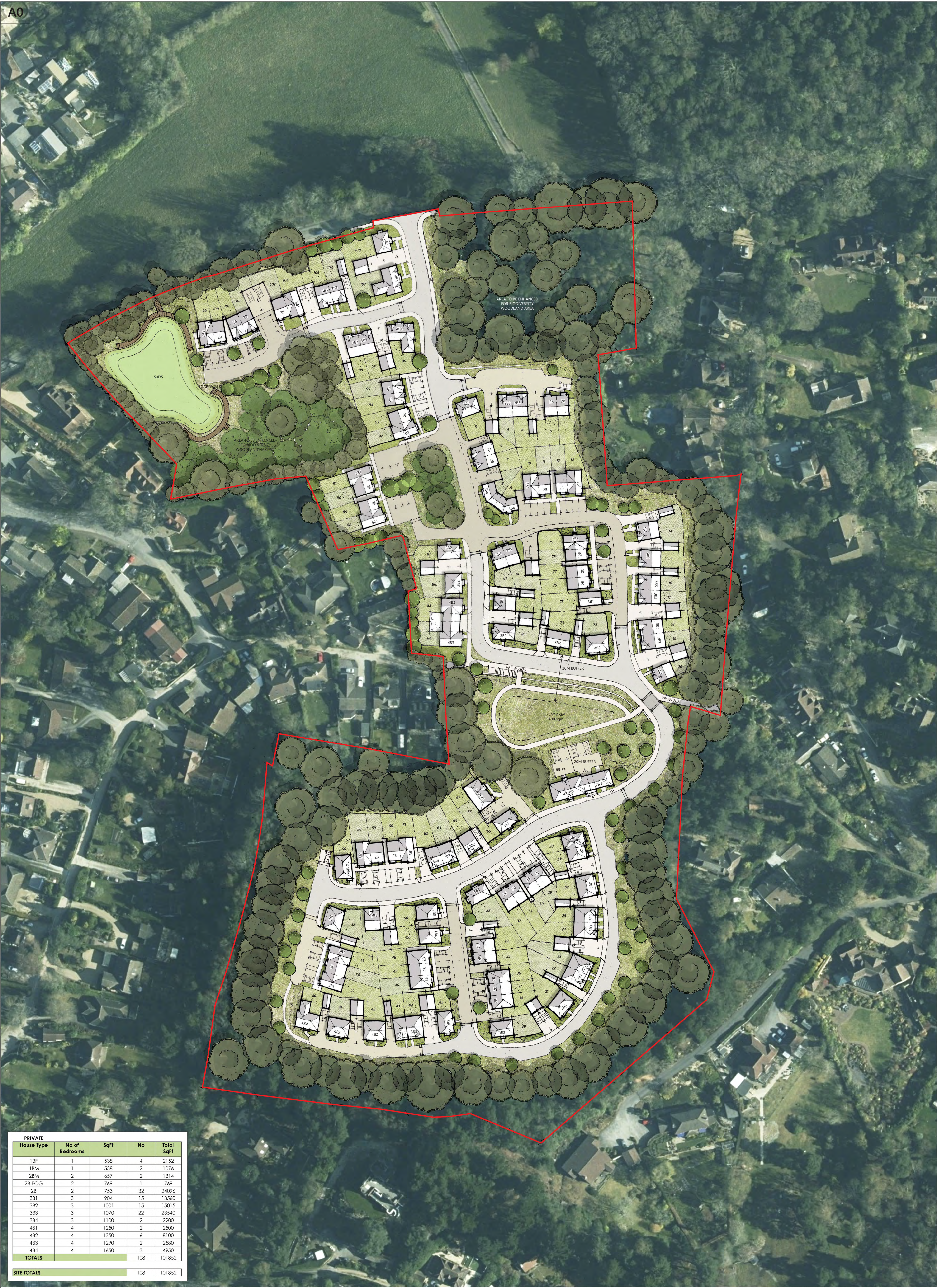
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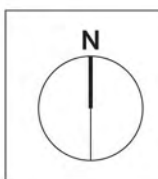
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Appendix A Drawings



PRIVATE				
House Type	No of Bedrooms	SqFt	No	Total SqFt
1BF	1	538	4	2152
1BM	1	538	2	1076
2BM	2	657	2	1314
2B FOG	2	769	1	769
2B	2	753	32	24096
3B1	3	904	15	13560
3B2	3	1001	15	15015
3B3	3	1070	22	23540
3B4	3	1100	2	2200
4B1	4	1250	2	2500
4B2	4	1350	6	8100
4B3	4	1290	2	2580
4B4	4	1650	3	4950
TOTALS			108	101852
SITE TOTALS			108	101852

— Site Boundary
26 Plot Number
3B2 House Type



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Rev	Description
A	Issued for Planning
B	Updated Layout
C	Trees Amended
D	Patches Added

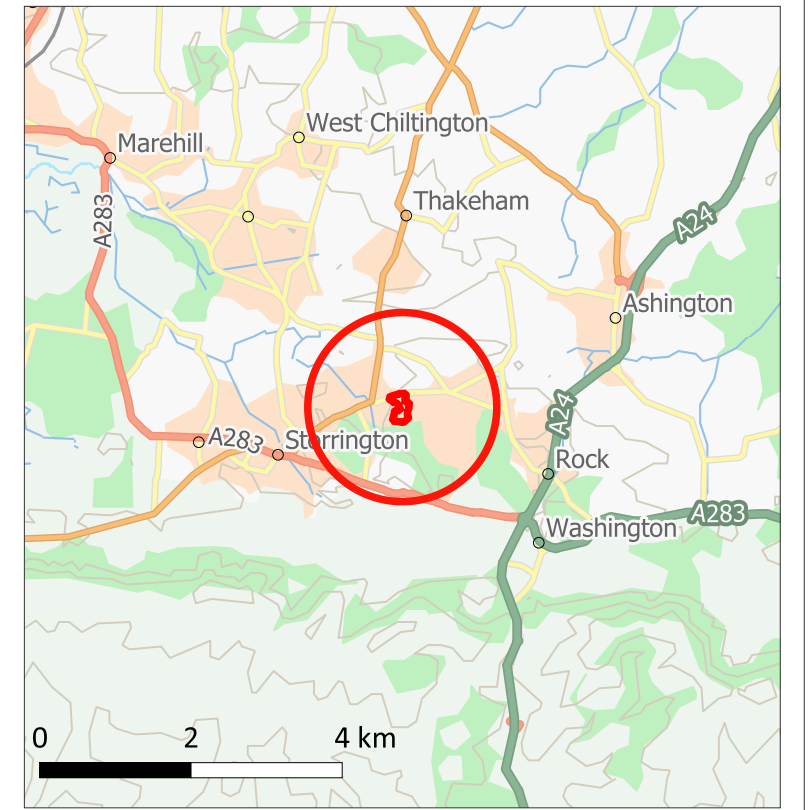
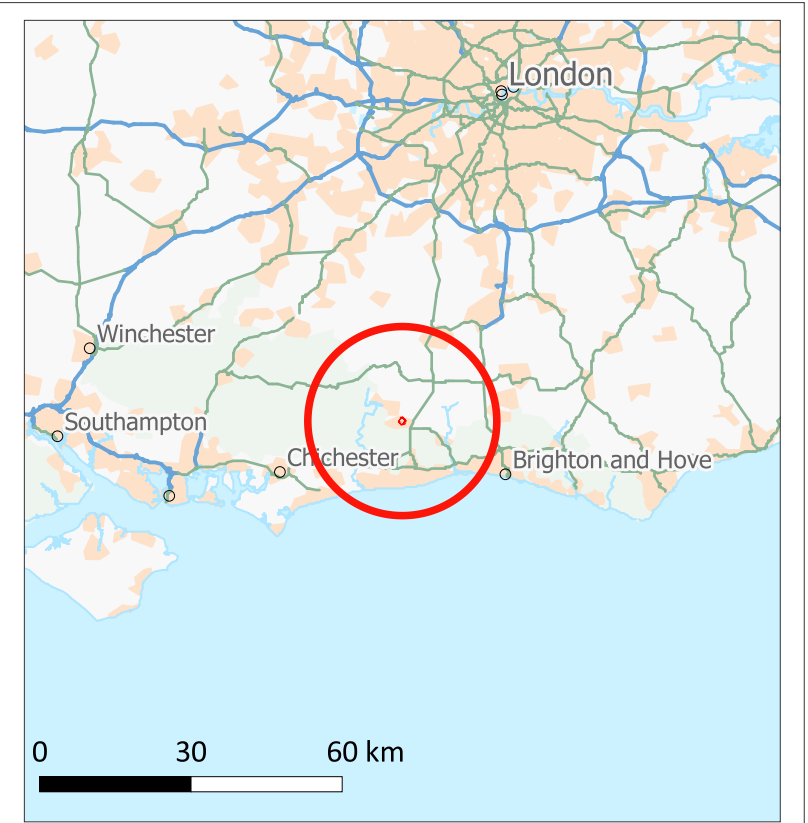
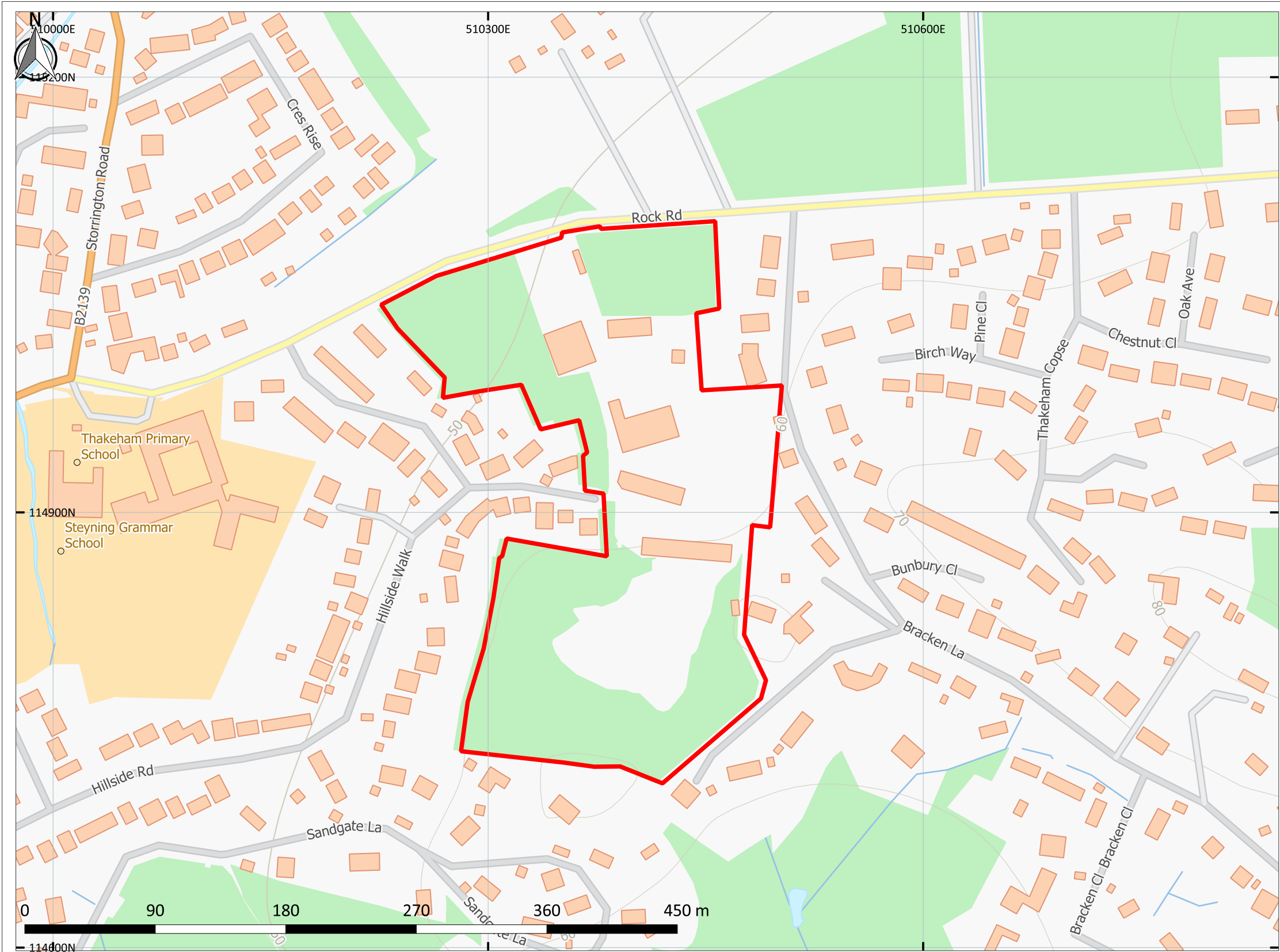
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26.03.26	CL/HP	-/-
30.04.26	CL/BC	-/-
12.05.26	CL/HR	-/-

Project Land at Thakeham Tiles, Storrington
Drawing Illustrative Masterplan - 04

Client	Thakeham Tiles Ltd	Date	10.09.25
Job no.	THAK230417	Rev.	D
Dwg no.	IMP-04	Scale	1:500@A0
Author	CL/HP	Checked	-/-
Status	PLANNING	Office	Romsey
Client ref.	-		

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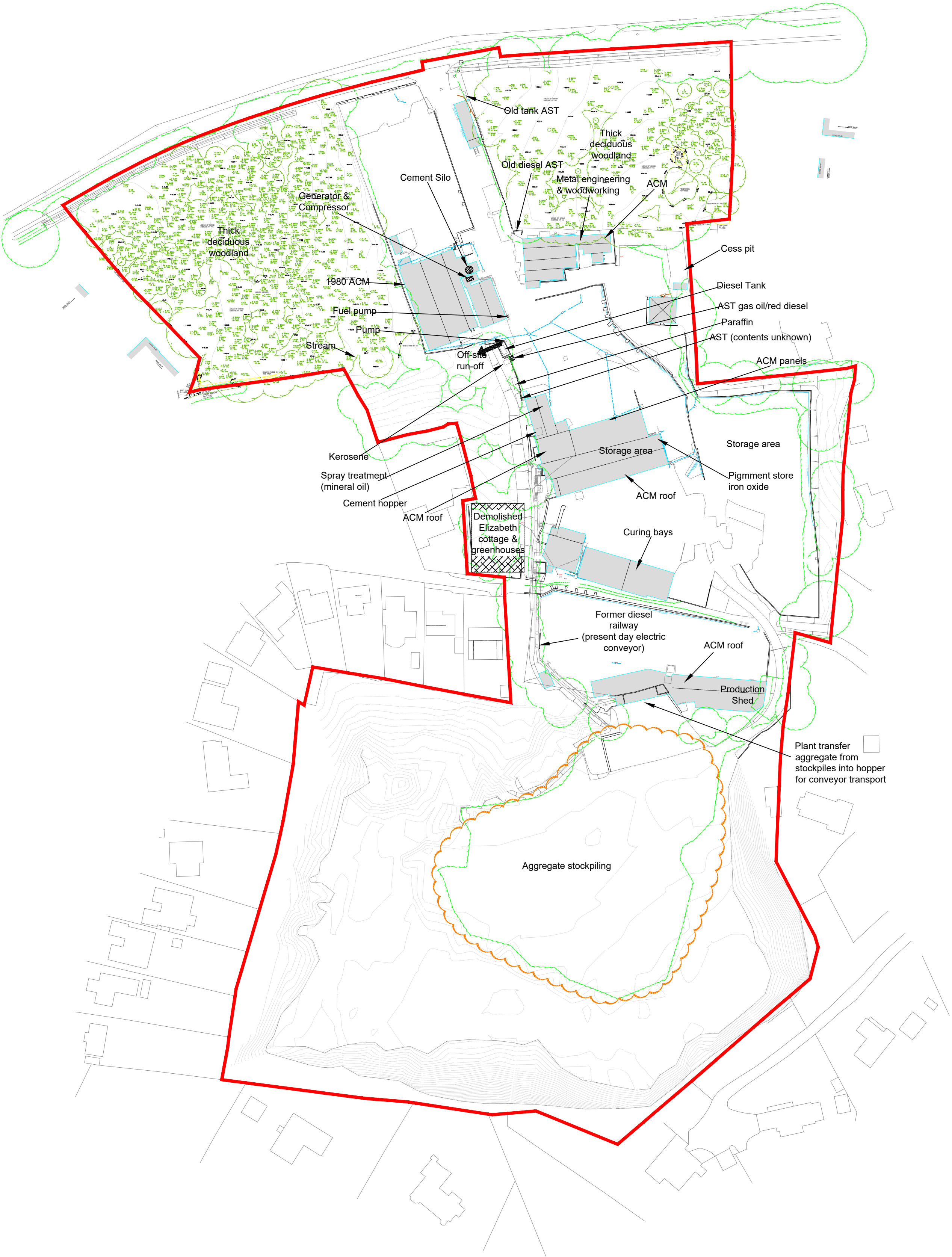


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KEY PLAN Site Boundary	NOTES 1. Contains OS data © Crown copyright and database right (2022)	REVISIONS <table><tr><th>REV.</th><th>DRAWN BY INITIALS</th><th>CHECKED BY INITIALS</th><th>DATE</th><th>REVISION NOTES/COMMENTS</th></tr><tr><td>P01</td><td>PL</td><td>LC</td><td>270325</td><td>First issue</td></tr></table>					REV.	DRAWN BY INITIALS	CHECKED BY INITIALS	DATE	REVISION NOTES/COMMENTS	P01	PL	LC	270325	First issue	Stantec		TITLE SITE LOCATION PLAN	
		REV.	DRAWN BY INITIALS	CHECKED BY INITIALS	DATE	REVISION NOTES/COMMENTS														
		P01	PL	LC	270325	First issue														
		HYDROCK PROJECT NO. 37212		SCALE @ A3 1:3,000																
CLIENT Thakeham Tiles Ltd		PURPOSE OF ISSUE SUITABLE FOR INFORMATION		STATUS S2																
PROJECT Thakeham Tiles, Rock Road		DRAWING NO. 37212-HYD-XX-XX-DR-GE-1000		REVISION P01																

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KEY	
	Site Boundary
AST : Above ground Storage Tank	
ACM : Likely Asbestos Containing Material	
	Likely area of sand pit backfill

NOTES

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2. This drawing is to be read in conjunction with all relevant Engineers' and Service Engineers' drawings and specifications.

3. This drawing has been based on the following drawings and information: Topographical Survey number: 32301 by: MK Surveys dated: February 2023.

P01	FIRST ISSUE					
	SD	02/04/25	LC	02/04/25	AE	02/04/25
REV.	REVISION NOTES/COMMENTS					
	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE



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CLIENT

Thakeham Tiles Ltd

PROJECT

Thakeham Tiles, Rock Road

TITLE
Areas of Potential Concern

HYDROCK PROJECT NO.
37212

SCALE @ A2
1:1000

PURPOSE OF ISSUE
SUITABLE FOR INFORMATION

STATUS
S2

DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)
37212-HYD-XX-XX-DR-GE-1002

REVISION
P01



	Rotary borehole
	Historical Trial Pit (Hydrock 2018 and 2021)
	Trial Pit
	Historical windowless sampler borehole (2021)
	Windowless sampler borehole
	Historical Hand Dug Trial Pit (2021)
	Hand Dug Trial Pit
	Rotary Borehole (2024 Groundwater Extraction)

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CLIENT	
Thakeham Tiles Ltd	
PROJECT	
Thakeham Tiles, Rock Road	

TITLE	
Site Remediation Plan	
HYDROCK PROJECT NO.	SCALE @ A2
37212	1:1000
PURPOSE OF ISSUE	STATUS
SUITABLE FOR INFORMATION	S2
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
37212-HYD-XX-XX-DR-GE-1005	P01