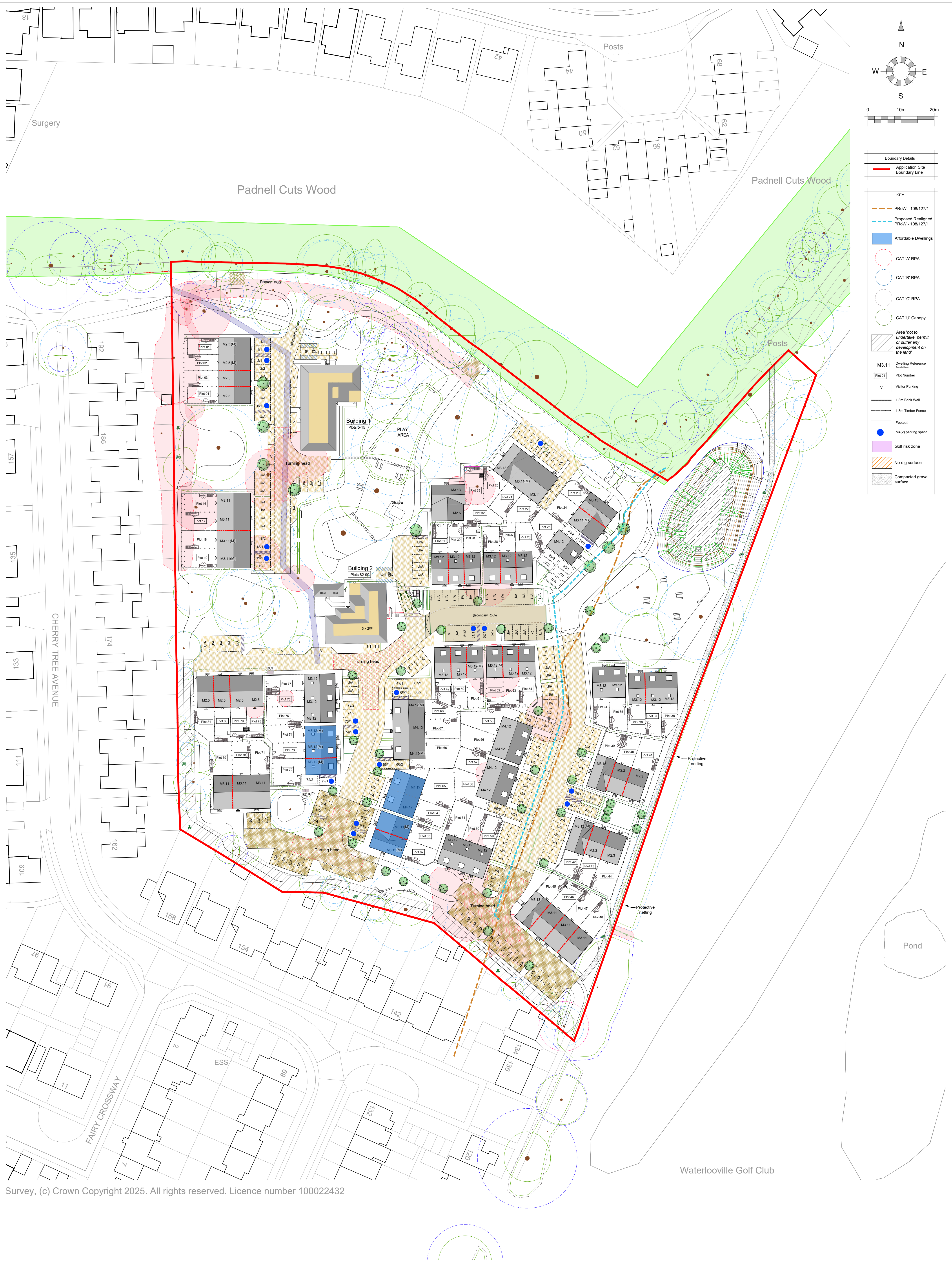




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REV.	DATE	REVISIONS:	BY	REV.	DATE	REVISIONS:	BY	STATUS:	CLIENT:	Stonebond Properties (Guildford) Ltd	PROJECT:	Padnell Grange Waterlooville		 architecture Broadmeade House, Farnham Business Park, Weydon Lane, Farnham, Surrey GU9 8QT. info@osparchitecture.com www.osparchitecture.com Tel: 01252 267878
Planning									SCALE:	1:500 (A1 ORIGINAL)	DRAWING:	Proposed Site Layout		
									DRAWN:	BH	24143	P101	-	
© COPYRIGHT EXISTS ON THE DESIGNS AND INFORMATION SHOWN ON THIS DRAWING									DATE:	Jan.'26				

This drawing may be sealed or cross referenced to the scale for planning application purposes only. Do not scale for any other purpose, use figured dimensions only. Subject to site survey and all necessary consents. All dimensions to be checked by user and any discrepancies, errors or omissions to be reported to the Architect before work commences. This drawing is to be read in conjunction with all other relevant materials. OS Licence No: 100007327

Planning

APPENDIX C TOPOGRAPHICAL SURVEY & TREE PROTECTION PLAN

1. Topographical Survey
2. Tree Protection Plan

[illegible]

DRAWING NOTES

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including: sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to starting work.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Surveyed physical features may not necessarily represent the legal boundary line.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

[illegible]

General

The contractor must check and verify all site and building dimensions, levels

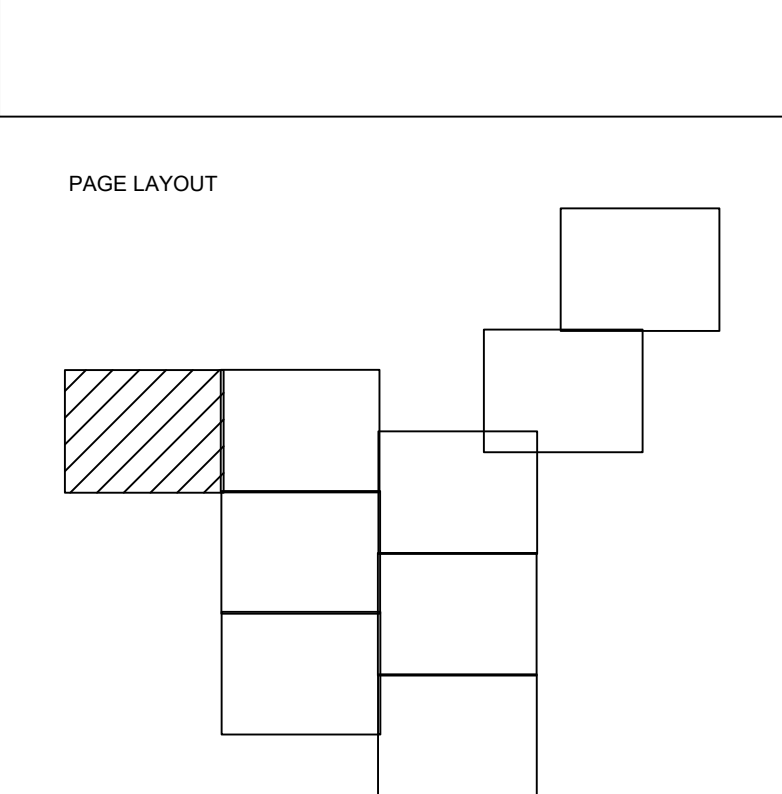
utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The survey control listed is only to be used for topographical surveys at the stated scale. All control must be checked and verified prior to use.

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This drawing should only be scaled using digital methods.



SURVEY CONTROL CO-ORDINATES				DESCRIPTION
STATION	EASTINGS	NORTHINGS	LEVEL	
ST01	499782.349	112320.580	84.123	
ST02	499787.147	112361.653	84.065	
ST03	499787.357	112376.185	84.065	
ST04	499814.823	112275.863	82.048	
ST05	499819.524	112166.422	82.048	
ST06	499861.109	112068.882	82.048	
ST07	499861.355	112082.951	82.014	
ST08	499820.756	112139.454	81.872	
ST09	499804.654	112157.141	81.654	
ST10	499873.383	112110.148	81.947	
ST11	499873.383	112110.148	81.947	
ST12	499802.981	112045.196	81.280	
ST13	499802.981	112045.196	81.280	
ST14	499824.206	112188.181	80.119	
ST15	499822.012	112062.144	80.068	
ST16	499833.992	112057.796	80.068	
ST17	499832.118	112062.012	81.702	
ST18	499832.118	112062.012	81.702	
ST19	499832.118	112062.012	81.702	
ST20	499832.118	112062.012	81.702	
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ST35	499832.118	112062.012	81.702	
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ST59	499832.118	112062.012	81.702	
ST60	499832.118	112062.012	81.702	
ST61	499832.118	112062.012	81.702	
ST62	499832.118	112062.012	81.702	

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.000, using GPS Smartnet.
The level datum established for this survey is related to Ordnance Survey (OS)

To avoid discrepancies within the survey, adding to the survey or setting out points from the survey, any coordinated data must be directly derived from the original survey control. Survey Solutions are not responsible for any third-party adding survey data to the existing information.

REV	DESCRIPTION	DRAWN	APPR	DATE
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LONDON-EAST / MANCHESTER / NEWCASTLE / NORWICH / NOTTINGHAM / THAMES VALLEY

PROJECT TITLE
PADNELL GRANGE, PADNELL RD
WATERLOOVILLE

DRAWING DETAIL
TOPOGRAPHICAL SURVEY
Sheet 1 of 9

CLIENT	SCALE
STONEBOND PROPERTIES LIMITED	1:100

SURVEYOR RB	SURVEY DATE 13/06/2025	CHECKED BY OT	APPROVED BY OT	DWG STATUS FINAL
DRAWING NUMBER			REVISION	ISSUE DATE

78296TVLS_01		15/08/2025
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TOPOGRAPHICAL & MEASURED BUILDING SURVEYS

[illegible]

DRAWING NOTES

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

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Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Surveyed physical features may not necessarily represent the legal boundary line.

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

General

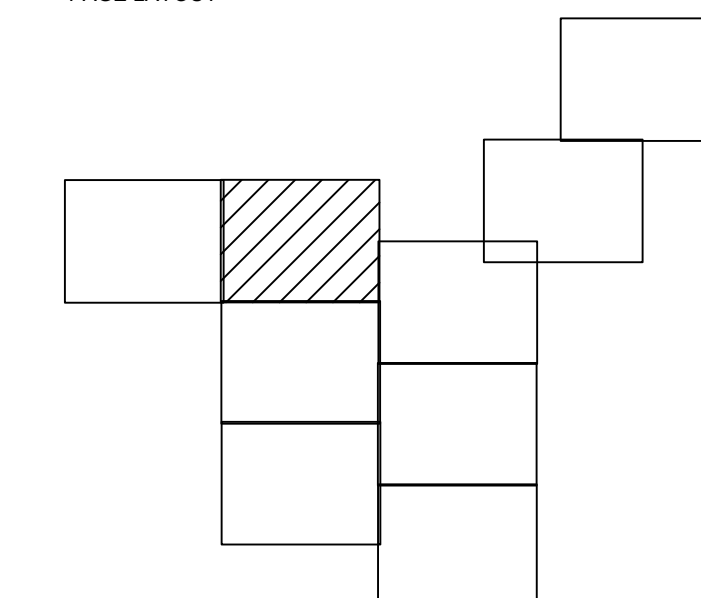
The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

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This drawing should only be scaled using digital methods.

PAGE LAYOUT



SURVEY CONTROL CO-ORDINATES		EASTINGS		NORTHINGS		LEVEL	DESCRIPTION
ST01	009872.589	111230.580	94.163				
ST02	009844.728	111216.833	94.029				
ST03	009872.337	111229.166	94.163				
ST04	009914.423	111212.935	92.408				
ST05	009919.323	111146.352	92.185				
ST06	009991.109	111688.982	90.098				
ST07	009906.919	111146.352	92.185				
ST08	009936.798	111130.458	91.847				
ST09	009946.065	111146.352	92.185				
ST10	009871.583	111130.458	91.847				
ST11	009877.371	111130.458	91.848				
ST12	009877.371	111130.458	91.848				
ST13	009907.716	111196.028	91.542				
ST14	009842.085	111130.458	91.848				
ST15	009952.012	111290.744	90.088				
ST16	009952.012	111290.744	90.088				
ST17	009952.018	111682.912	91.763				
ST18	7200.134	111130.458	91.847				
ST19	7200.134	111130.458	91.847				
ST20	47004.203	111232.210	56.732				
ST20G	47007.115	111232.210	53.130				
ST21	7201.104	111350.114	49.502				
ST21G	7203.042	111350.114	46.837				
ST22	47004.092	111073.394	56.732				
ST22G	47002.198	111158.202	56.438				
ST23	47004.092	111073.394	56.732				

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.000, using GPS Smartnet.

To avoid discrepancies within the survey, adding to the survey or setting out point from the survey, any coordinated data must be directly derived from the original survey control. Survey Solutions are not responsible for any third-party adding survey data to the existing information.

REV	DESCRIPTION	DRAWN	APPR
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LONDON-EAST / MANCHESTER / NEWCASTLE / NORWICH / NOTTINGHAM / THAMES VALLEY

PROJECT TITLE
RADNELL CRANCE, RADNELL RD.

FADNELL GRANGE, FADNELL RD
WATERLOOVILLE

DRAWING DETAIL
 100% COMPLETE - 100% COMPLETE

TOPOGRAPHICAL SURVEY
Sheet 2 of 9

CLIENT	SCALE
全商會聯合會、全商會發展委員會、全商會聯合會	4-100

STONEBOND PROPERTIES LIMITED				1:100
SUBJECT	SUBJECT DATE	CHECKED BY	APPROVED BY	DWG STATUS

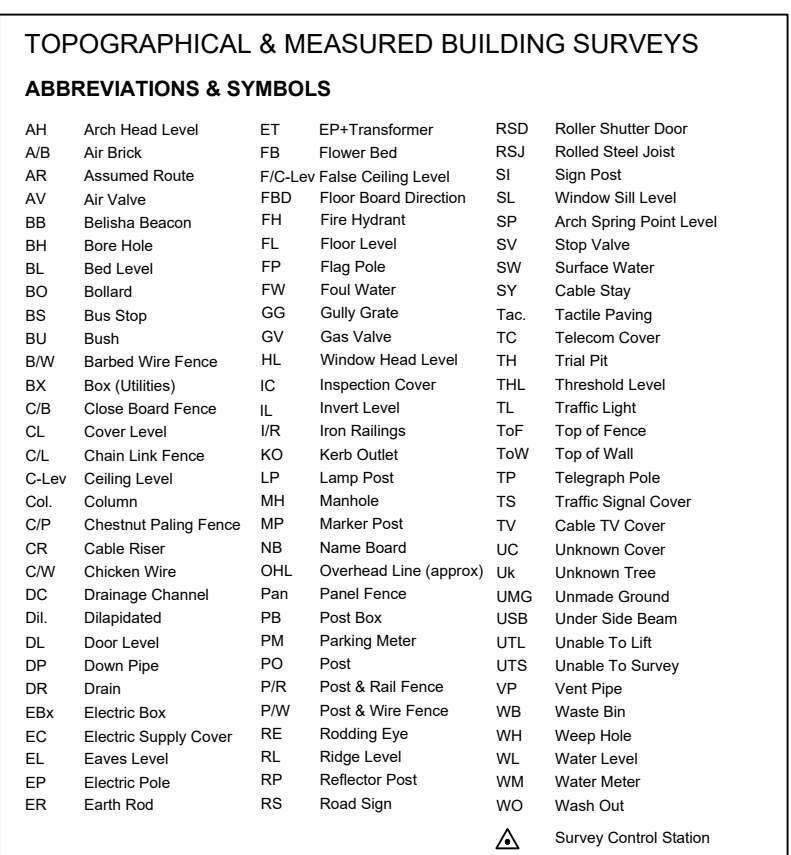
SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG STATUS
RB	13/08/2025	OT	OT	FINAL

DRAWING NUMBER	REVISION	ISSUE DATE
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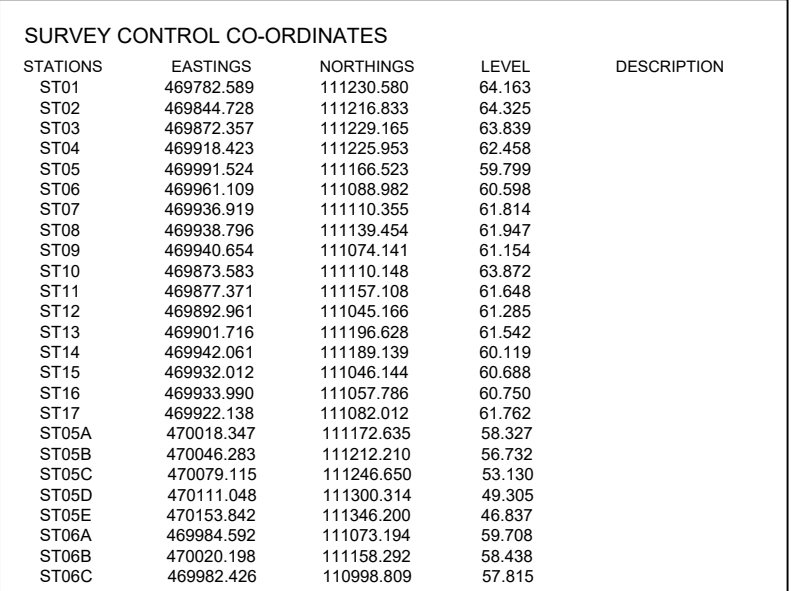
762901VLS_02		13/06/2023
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ICES

producing rapid and significant



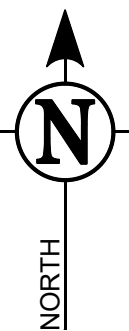
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REV	DESCRIPTION	DRAWN	APPR	DATE
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SURVEYOR RB	SURVEY DATE 13/08/2025	CHECKED BY OT	APPROVED BY OT	DWG STATUS FINAL
DRAWING NUMBER 78296TVLS_04			REVISION	ISSUE DATE 15/08/2025





ABBREVIATIONS & SYMBOLS

[illegible]

DRAWING NOTES

Topographical Surveys

Trees are drawn to scale showing the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof line details are indicative only and taken externally from ground level.

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Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m above the floor level and the wall assumed to be vertical.

General

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work. Any

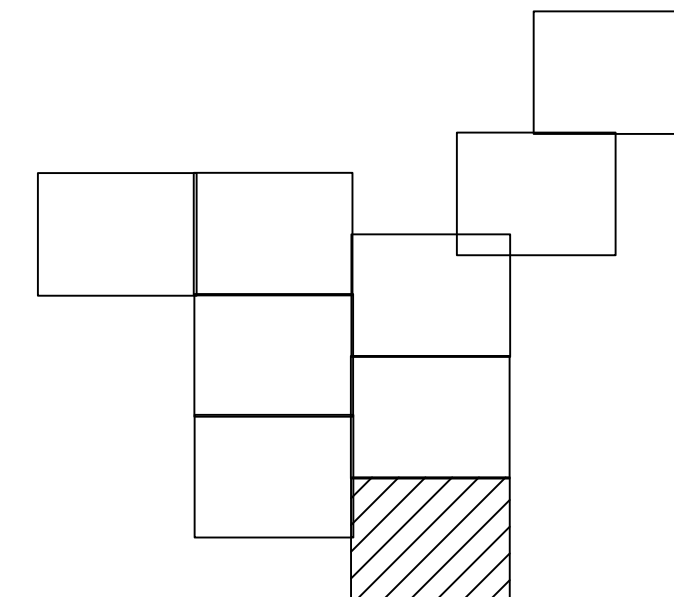
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This drawing should only be scaled using digital methods.

PAGE LAYOUT



SURVEY CONTROL CO-ORDINATES

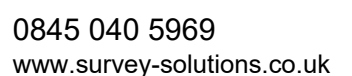
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ST03	498737.37	111226	165	638	
ST04	499018.42	111226.55	62	638	
ST05	499991.342	11106.523	59	799	
ST06	499961	11106.862	60	518	
ST07	499236.19	11106.862	60	518	
ST08	499991.058	111102.454	61	6147	
ST09	499991.058	111071.544	61	6147	
ST10	499873.583	111101.168	61	6372	
ST11	498777.371	111117.046	61	638	
ST12	499991.058	111065.186	61	6280	
ST13	499961.716	111106.628	61	6142	
ST14	499991.058	111106.628	61	6142	
ST15	499932.012	111046.144	60	6189	
ST16	499933.900	111071.786	60	6137	
ST17	499933.900	111062.611	62	763	
ST18	47018.347	111071.735	55	7320	
ST19	470346.203	111071.735	55	7320	
ST20	47079.115	111060.50	55	7432	
ST21	47079.115	111300.314	59	4006	
ST22	470153.464	111346.205	59	4006	
ST23	469894.052	111073.194	58	5076	
ST24	47023.196	11158.292	58	4818	
ST25	469882.435	111073.194	58	5076	

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.000, using GPS Smartnet.

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V	DESCRIPTION	DRAWN	APPR	DATE
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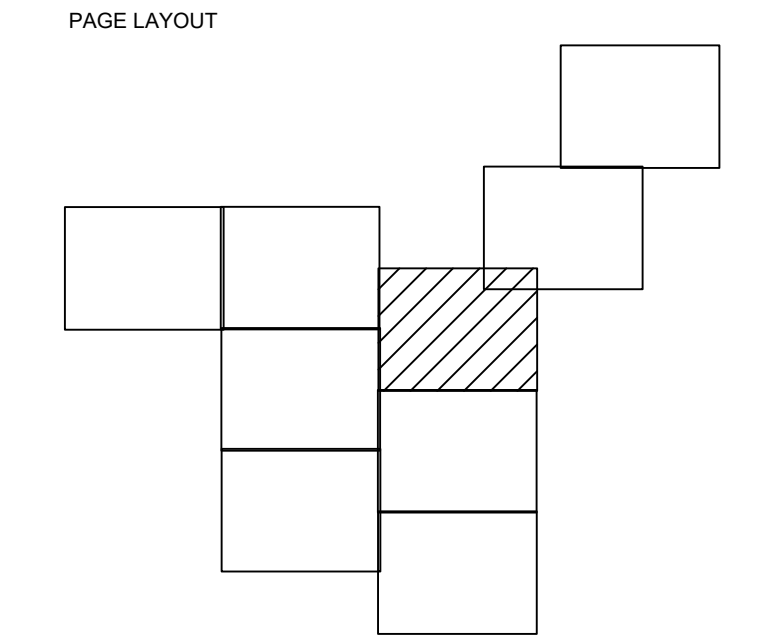
PROJECT TITLE
PADNELL GRANGE, PADNELL RD
WATERLOOVILLE

DRAWING DETAIL
TOPOGRAPHICAL SURVEY
Sheet 5 of 6

CLIENT STONEBOND PROPERTIES LIMITED	SCALE 1:100
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RB	13/08/2025	OT	OT	FINAL
DRAWING NUMBER			REVISION	ISSUE DATE
8206TV/LS-05				15/09/2025



[illegible]

SURVEY CONTROL CO-ORDINATES				
STATIONS	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
S100	499782.549	1112250.580	84.163	
S101	4998447.228	1112170.833	84.525	
S102	4998732.337	1112209.145	84.638	
S103	4998732.337	1112209.145	84.638	
S104	4999151.324	1111665.382	83.790	
S105	4999111.109	1111686.822	83.989	
S106	4999368.119	1111133.874	84.814	
S107	4999326.795	1111345.454	84.617	
S108	4999404.654	111078.714	81.154	
S109	4999326.795	1111110.148	83.642	
S110	4997327.337	1111071.628	84.688	
S111	4999020.261	1110545.136	81.219	
S112	4999222.012	1110465.144	80.842	
S113	4999424.051	1110648.139	80.085	
S114	4999222.012	1110465.144	80.780	
S115	4999333.990	1110652.871	80.790	
S116	4999222.012	111062.871	81.762	
S117	4999333.990	111172.839	82.727	
S118	4999046.293	111062.871	81.762	
S119	4999070.115	111064.650	81.150	
S120	4999127.117	111030.214	80.303	
S121	4999333.990	111062.871	81.762	
S122	4999333.990	111062.871	81.762	
S123	4999404.652	111073.194	80.785	
S124	4999222.012	111062.871	81.762	
S125	4999482.438	1110668.810	81.516	

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.000, using GPS Smartnet.

The level datum established for this survey is related to Ordnance Survey (OS)

REV	DESCRIPTION	DRAWN	APPR	DATE
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<h1 style="text-align: center;">SURVEY SOLUTIONS</h1>	
LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING SITE LAYOUT MORTISING	0845 400 5969 www.surveysolutions.co.uk
(PISCOPOL - PLYMOUTH) (BRIMINGHAM) (CROYDON) (DUNDEE) (GLASGOW) (LEEDS) (LONDON) (DUNDEE) / (LONDON) (LTD) (MANCHESTER) (NEARCASTLE) (NORTHAMPTON) (NOTTINGHAM) (THAMES VALLEY)	
PROJECT TITLE PADNELL GRANGE, PADNELL RD WATERLOOVILLE	
DRAWING TITLE TOPOGRAPHICAL SURVEY Sheet 7 of 9	
CLIENT STONEBROOK PROPERTIES LIMITED	
SURVEYOR REB	SURVEY DATE 13/08/2025
DRAWING NUMBER 7829PEVL8_07	CHECKED BY DT
APPROVED BY REVISION	
SCALE 1:100	
DWG STATUS FINAL	
ISSUE DATE 15/08/2025	
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ABBREVIATIONS & SYMBOLS

[illegible]

Topographical Survey

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General

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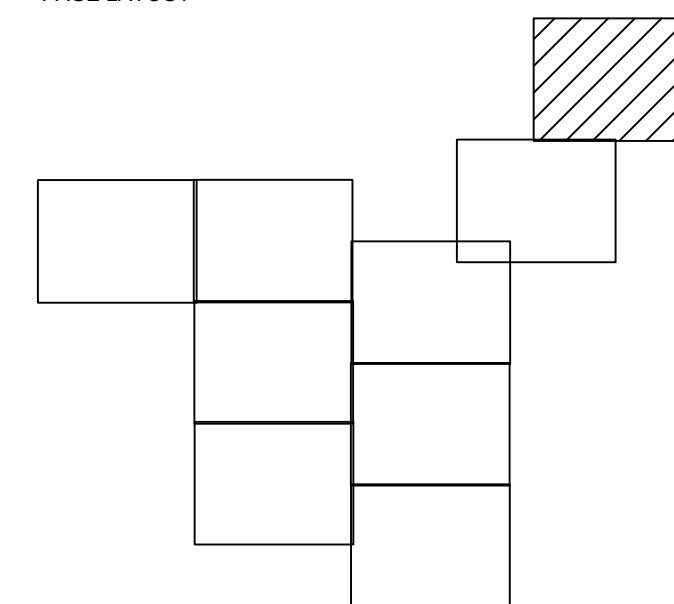
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This drawing should only be scaled using digital methods.

PAGE LAYOUT



SURVEY CONTROL CO-ORDINATES					DESCRIPTION
STATION	EASTINGS	NORTHINGS	LEVEL		
ST01	499782.889	111220.580	64 163		
ST02	499844.728	111220.580	64 165		
ST03	499844.728	111220.165	63 408		
ST04	499916.423	111220.580	63 409		
ST05	499991.324	111166.325	63 999		
ST06	499981.919	111066.325	63 999		
ST07	499936.919	111101.325	61 814		
ST08	499936.796	111102.464	61 847		
ST09	499940.000	111101.464	61 854		
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ST11	499877.371	111071.168	63 162		
ST12	499892.961	111046.168	61 209		
ST13	499903.012	111066.168	61 542		
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ST18	470018.118	111172.825	56 722		
ST19	470046.203	111212.310	56 732		
ST20	470039.158	111246.650	56 732		
ST21	470111.048	111530.214	49 300		
ST22	470111.048	111530.214	49 300		
ST23	499994.092	110771.394	56 706		
ST24	470200.198	111520.262	56 438		
ST25	499882.438	110666.809	56 706		

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.000, using GPS Smartnet.

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V	DESCRIPTION	DRAWN	APPR
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PROJECT TITLE
PADNELL GRANGE, PADNELL RD
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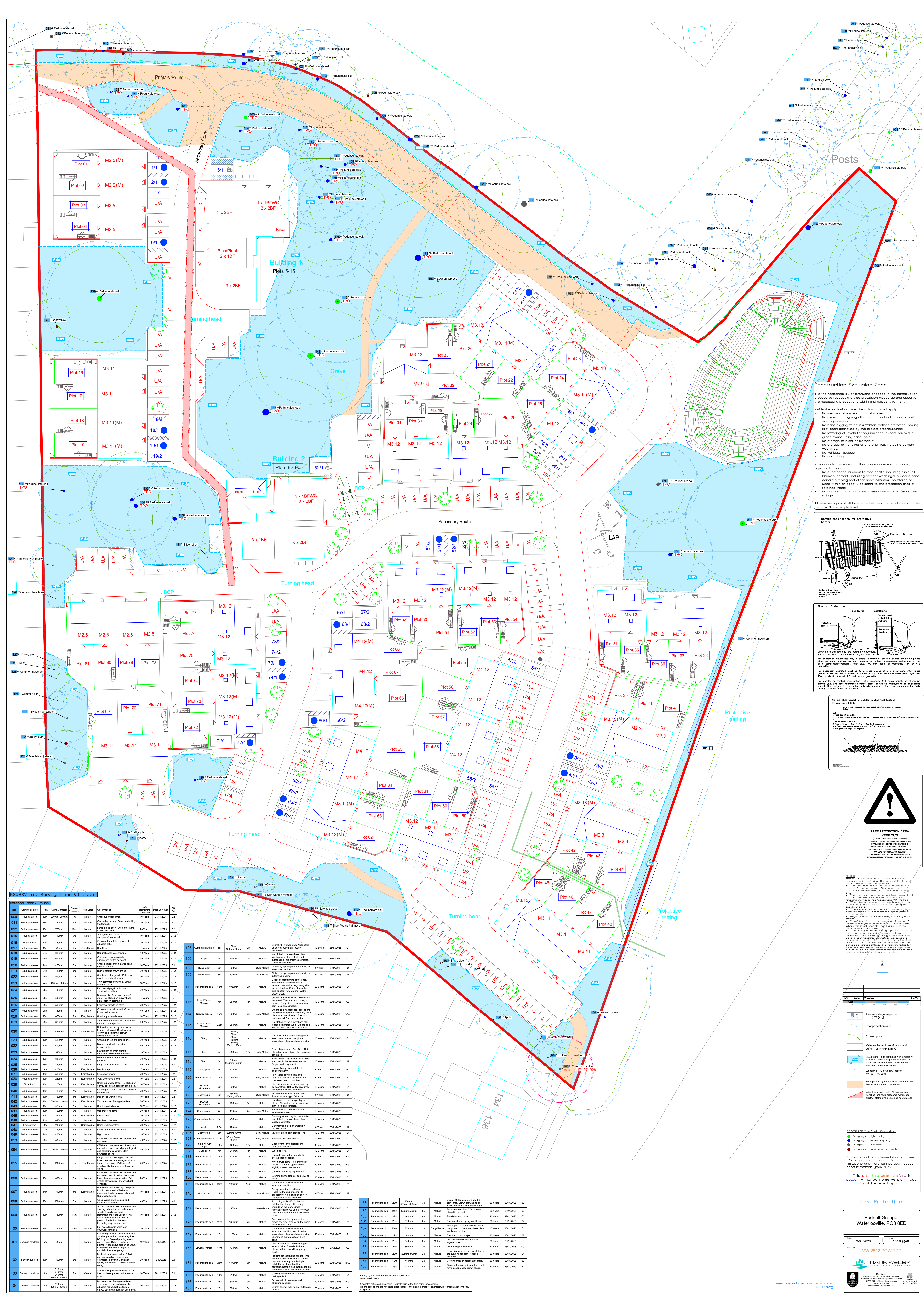
DRAWING DETAIL
TOPOGRAPHICAL SURVEY
Sheet 9 of 9

CLIENT	SCALE
STONEBOND PROPERTIES LIMITED	1:100

SURVEYOR RB	SURVEY DATE 13/08/2025	CHECKED BY OT	APPROVED BY OT	DWG STATUS FINAL
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78296TVLS_09		15/08/2025





APPENDIX D GEOTECHNICAL SITE INVESTIGATION



Preliminary Investigation Report

at

**Padnell Grange, Padnell Road, Cowplain, Waterlooville,
Hampshire PO8 8ED**

for

Stonebond Properties (Guildford) Limited

**Reference: 22035/PIR Rev I.0
August 2025**

Control Document

Project

Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED

Document Type

Preliminary Investigation Report

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FINAL

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This is not a valid document for use in the design of the project unless it is titled Final in the document status box.

Current regulations and good practice were used in the preparation of this report. The recommendations given in this report must be reviewed by an appropriately qualified person at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.



Commission

This document comprises the Preliminary Investigation Report (PIR) and incorporates the results, discussion, and conclusions to this intrusive works. General site data is recorded below:

Commission Record	
Client	Stonebond Properties (Guildford) Limited
Site Name	Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire PO8 8ED
Grid Reference	SU699111
Soils Limited Quotation Ref	Q29811 rev2 dated 4 th June 2025.
Clients Consultant Long Form Appointment	ST0186-1560439 version 4, dated 10 th July 2025

The record of revision is presented below:

Record Of Revisions		
Revision	Date	Reason
1.0	August 25	First Issue to Client

Note: The latest revised document supersedes all previous revisions of the PIR produced by Soils Limited.

Documents associated with this development that must be referred to are given below.

Record Of Associated Documents			
Reference	Type	Date	Creator
	None		

Caveats

Whilst reasonable skill and care has been taken to determine the site history and the environmental setting within the time constraints applied by the project, it should be appreciated that uncertainties may occur owing to the natural variability of soil material within a defined area or as a result of unknowns that are associated with contaminated land assessment in general. The site conditions may be different from that indicated by this Preliminary Investigation, particularly on a site with a history of past development. No responsibility can be accepted should such conditions alter the recommendations made in this report.

Without a drainage survey it is not possible to establish if the surface water drainage is to the main drainage system or soakaways. If there are soakaways on-site, they could act as a potential source. The geology on-site to an extent may determine if soakaways were likely to have been adopted.

Ordinary watercourses (OWs) are defined as rivers (which are not designated as main rivers), streams, ditches, drains, culverts, cuts and sewers (other than public sewers). This includes all OWs that are not mapped. Ordinary watercourse consent (OWC) is required from the Lead Local Flood Authority (LLFA) when changing/adapting/adding to the cross sections of OWs. Installations of any structure or obstruction into an OW that

impedes the flow without consent is prohibited by the Land Drainage Act 1991 Section 23.

Failure to remove obstructions may result in legal action by the LLFA with powers under Section 25 of the Land Drainage Act 1991.

Soils Limited suggest surveying the site for OW usually seen in rural areas as boundary ditches in order to avoid potential impacts to residents downstream and prosecution. OWC can be applied for from your LLFA.

This Preliminary Investigation does not include a detailed UXO risk assessment, it does however contain a basic assessment in accordance with CIRIA C681 and C785. In preparing a Preliminary Investigation reference is made to historical maps and web based sources to assess the risk of the site potentially having been impacted by bombing during the World Wars. The data readily available is not necessarily definitive. Certain areas were bombed heavily such as centres of industrial manufacture, airfields, shipyards, docklands, railways sidings and junctions. The assessment is based on the likely area risk, bomb patterns (i.e. lines of recorded bomb impacts with gaps where an impact would be anticipated) and the age of structures on and in close proximity to the site.

Explanations

The Preliminary Investigation Report was undertaken to advise the client on the risk pertaining to the site, with special reference to historic and current potential contaminative activities and processes. This also included the assessment of their impact on current and future sensitive receptors such as human health, controlled waters, ecological features, building structures and services.

During the site walkover observations were made in relation to current activities, evidence of historical activities, sources of potential contamination such as fuel storage tanks, oil drums and chemical storage and evidence of contamination. The walkover also looked for evidence of soil contamination in the form of staining odours and stressed or discoloured vegetation.

To assess the vulnerability of groundwater to contamination, consideration must be given to the leaching characteristics of the overlying soils and the characteristics of the strata in the unsaturated zone. Information on the geological strata such as lithological type and permeability characteristics has been combined with the physical properties of the soil to produce varying degrees of vulnerability.

The object of the historic map study was to report on the evidence of site history and redevelopment of the site and its environs from available County Series and Ordnance Survey Maps dating from the mid to late 19th Century to the present day as downloaded from Landmark Environmental.

The published maps only represent a “snap shot” of the site and its environs at the date of the survey. The detail of the information recorded can vary between epochs, map scale and county areas. It should be noted that changes in land uses, processes or activities may have occurred outside of published epochs and these may not have been recorded on subsequent epochs. Also note that as methods of projection, production and recording have changed over time, this can result in geo-reference errors that may indicate the established site boundary is off-centre from its true location on older historical maps. Where this is potentially significant it will be noted.

Any distances quoted for features remote from the site have been scaled from the maps and are only approximate. Where dates have been noted in brackets, these are the actual dates applicable to the map editions and may not reflect the date of the original survey it is based on. The information reported might not represent all pertinent information that could be obtained. The interpretation of the maps and/or other data commented on in this report is subjective.

As part of the review of the historical plans, only features considered to have or to have had a potential contaminative impact on the site and usually within a notional 250m radius are discussed. The north point and approximate extent of the site are indicated on each figure.

Dataset survey is undertaken, and the extent of the search has initially been limited to a radius of 250m as it is considered that sources of contamination beyond 250m are unlikely to impact on the site.

The BGS soil chemistry for environmental assessments dataset coverage, was developed from BGS G-BASE and Imperial College Wolfson Atlas data. It contains estimated ambient As, Cd, Cr, Ni and Pb background concentrations for rural topsoils across Great Britain. It also contains the locations and measured concentrations (mg kg⁻¹) of As, Cd, Cr, Cu, Ni, Pb, Sn and Zn in urban topsoil samples, collected from geochemical surveys in 23 major urban centres.

In accordance with CIRIA C681 and C785 a review has been undertaken of the historic maps and the Zetica UXO risk website.

Legislation and Liability

The primary legislative mechanism for contaminated land management in the UK is Part 2A of the Environmental Protection Act, 2021 (EPA). Part 2A was introduced into the EPA under Section 57 of the Environment Act 1995 to help deal with the substantial legacy of land contamination. The legislation provides powers in relation to the identification, remediation and apportionment of liability for contaminated land. Part 2A applies where there is unacceptable risk, assessed on the basis of the current use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission.

Under Part IIA of the Environment Act 2021, Local Authorities are required to identify contaminated land and serve on every person who is an appropriate person a remediation notice setting out what is to be done by way of remediation and the period within which it must be done.

If the person who caused, or knowingly permitted, the contaminating substance cannot be found, the owner and/or, occupier for the time being, of the property can be the appropriate person.

Under the legislation, Contaminated Land is defined as: -

“Land which is in such a condition by reason of substances in, on or under the land that significant harm is being caused or that there is a significant possibility of such harm being caused or that pollution of controlled waters is being, or is likely to be caused.”

Where the Act defines harm as:

“harm to the health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property.”

and pollution of controlled waters is defined as: -

“the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter.”

In addition, The Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 introduced the supplementary definition of harm to include: lasting exposure to any person resulting from the after-effects of a radiological emergency, past practice or past work activity.

With regard to contaminated waters, the Environment Act 1995 amends the Water Resources Act 1991 and provides the Environment Agency with the power to force clean-up of historical contamination by issuing a Works Notice, with remediation paid for by the responsible parties.

The Groundwater Regulations (1998) stated that entry of List 1 substances into groundwater must be prevented, and List II substances must be controlled.

This PIR was made to comply with planning requirements and only covers contaminative land issues unless otherwise specifically noted.

Limitations and Disclaimers

This Preliminary Investigation Report relates to the site located at Padnell Grange, Padnell Road, Cowplain, Waterlooville, Hampshire, PO8 8ED and was prepared for the sole benefit of the Client for the brief described in the Commission of this report.

The contents, recommendations and advice given in the report are subject to the Terms and Conditions given in the Soils Limited Quotation and the subsequent Clients Purchase Order.

Soils Limited disclaims any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report has been prepared by Soils Limited, with all reasonable skill, care and diligence within the terms of the contract with the Client, incorporation of our General Conditions of Contract of Business and taking into account the resources devoted to us by agreement with the Client.

The report is personal and confidential to the Client and Soils Limited accept no responsibility of whatever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report wholly at its own risk.

The Client may not assign the benefit of the report or any part to any third party without the written consent of Soils Limited.

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

There may be other sources of information not included in those listed that hold data relevant to the Preliminary Investigation Report undertaken at the site that could materially affect the conclusions made in this report.

It should be noted that a detailed survey of the possible presence or absence of invasive species, such as Japanese Knotweed, is outside of the scope of investigation.

Ownership of land brings with it onerous legal liabilities in respect of harm to the environment. "Contaminated Land" is defined in Section 57 of the Environment Act 2021.

Where a contaminative use is identified in the Preliminary Investigation Report this does not determine whether contamination has actually occurred, or if it has the degree to which it may have taken place. An intrusive investigation(s) and analysis is required to establish the nature and degree of any contamination present.

All works are undertaken in the context of, and in compliance with, BS10175+A2 2017 and LCRM (EA 2021) and all other pertinent planning, standards, documentation and guidance appropriate to the site at the time of production which may include, but are not necessarily limited to, documents provided by BS/CEN/ISO, NHBC, AGS, CIEH, CIRIA, SoBRA and CLAIRE.

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Appendix B Country Series and Ordnance Survey Maps

Appendix C Landmark Envirocheck Report

Appendix D Site Sensitivity Maps

Appendix E Local Authority Search Data

Appendix F Site Photographs

Appendix G Risk Assessment Criteria

Section I Site Conditions and Proposed Development

I.1 Site Walkover

A site walkover was undertaken in July 2025, by Soils Limited. The notes of the site walkover are presented in Table 1.1 and Table 1.2.

Table 1.1 Site Walkover Record (On-site)

Use of Site	The site comprised the main former residential house, Padnell Grange set within large gardens. There was a disused courtyard to the rear (south) of the site and converted farm buildings currently being used by a charitable trust. The grounds surrounding Padnell Grange comprised predominantly open land but with wooded locations of mature trees.
Structures	Main structures included the main house (Photo 1), a building to it's rear (west) and a courtyard surrounded with dilapidated buildings (Photo's 2 and 3) on the south of the site.
Site Topography	The site topography was undulating, most notably with a dip down to the southeast of the site by 2 – 3 degrees varying with the topography.
Site Covering	Majority of the site was grass topped (Photo 4), with mature trees dotted about the site (Photo 5), and hedgerows/soft landscaping around the former house (Photo 6). There was a tarmac roadway and hardstanding around the former house and farm buildings (Photo's 2 and 3). A gravel topped area featured towards the northwest onsite (Photo 5).
Vegetation	Majority of the site was grass topped (Photo 4), with mature trees dotted about the site (Photo 5), and hedgerows/soft landscaping around the former house (Photo 6).
Potential Contamination Sources	Potential Asbestos containing roofing materials on dilapidated farm buildings (Photo 7).
Odour	None noted.
Drainage	Mains drainage runs were observed onsite (Photo 8).

Table 1.2 Site Walkover Record (Off-site)

Use of Land	N – Small woodland followed by residential houses within private gardens. E – Golf course. S - Residential houses within private gardens. W - residential houses within private gardens, school playing field beyond with primary school and Cowplain Activity Centre.
Area Topography	Undulating, most notably with a dip down to the southeast by <2 – 3 degrees varying with the topography.
Vegetation	Very green surrounding area with high levels of vegetation, grass/shrubs in gardens and public open spaces, and mature trees and shrubs, in gardens, golf course etc.
Potential Contamination Sources	None observed.

I.2 Site Drainage

Via surface drainage, which are anticipated to be connected to the mains system.

I.3 Site Photographs

The site photographs have been included within Appendix F.

I.4 Proposed Development

The proposal comprised the demolition of the existing dilapidated farm buildings and ancillary buildings pertaining to the former house of Padnell Grange, and the erection of multiple buildings to create a housing development with 86No. residential dwellings, the majority of which are to be semi-detached and short terrace blocks. The former house was to be renovated into 5No apartments, and there were to be 2No. additional apartment blocks housing 6No. apartments each. There was to be both hard and soft landscaping onsite with private gardens and adjoining access roads and drives. The 3No apartment blocks looked to be set within public open space – residential.

In compiling this report reliance was placed on drawing SK03 / SK05 dated Feb 2025, produced by OSP Architecture. The recommendations provided within this report are made exclusively in relation to the scheme outlined above, and must not be applied to any other scheme without further consultation with Soils Limited. Soils Limited must be notified about any change or deviation from the scheme outlined.

The proposed development plans have been provided in Appendix A.

Section 2 Geology, Hydrogeology, Hydrology and Radon

2.1 Anticipated Geology

The 1:50,000 BGS Geology map showed the main part of the site to be situated on the London Clay Formation bedrock, and on the northwest corner the site was situated on the underlying soils of the Lambeth Group. There was anticipated to be some Made Ground overlying part of the site as noted in the Artificial Ground and Landslip Map found in Appendix D.

2.1.1 Made Ground

Made Ground comprises material that has been placed by man or spread by man. It can comprise demolition material from former structures on the site or imported material placed to raise levels. Its composition can be very variable both laterally and with depth and may contain putrescible matter and voids.

2.1.2 London Clay Formation

The London Clay Formation in the Hampshire region comprises silty and sandy clay, clayey and sandy silt, silty sand; sporadic claystones and thin beds of flint pebbles. The formation includes the Bognor Sand, Whitecliff Sand, Durley Sand, Portsmouth Sand and Nursling Sand Members. Crystals of gypsum (Selenite) are often found within the weathered part of the London Clay, and precautions against sulphate attack to concrete are sometimes required.

The lowest part of the London Clay Formation rests on the Reading Formation (Lambeth Group).

2.1.3 Lambeth Group

The Lambeth Group (formerly the Woolwich and Reading Beds) occurs in the London and Hampshire Basins, where it directly overlies the Chalk or Thanet Sand Formation, and is succeeded by the Harwich and London Clay Formations. The Lambeth Group comprises vertically and laterally variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate.

The top of the Lambeth Group is marked by the eroded or interburrowed surface at the base of the overlying Thames Group. The uppermost part of the Lambeth Group can be the Reading Formation or the Woolwich Formation, depending on the local succession, or the Upnor Formation, depending on the depth of pre-Thames Group erosion. The Lambeth Group is overlain by sands, silts, clays or gravel beds of the Harwich Formation, depending on the local sequences, or gravelly sandy clays at the base of the London Clay Formation.

The base of the Lambeth Group is taken at the base of the Upnor Formation. In the Hampshire Basin and the west of the London Basin, the Lambeth Group overlies the Chalk Group. In the centre and east of the London Basin it overlies the Thanet Formation, and in Suffolk the Ormesby Clay Member of the Lista Formation.

2.2 Hydrogeology

Table 2.1 presents the hydrological data that is relevant to the site.

Table 2.1 Hydrogeological Assessment

Hydrogeological Data		Comment
On-site Aquifers	Superficial	None recorded
	Bedrock	London Clay Formation: Unproductive Aquifer ² Lambeth Group: Secondary Bedrock Aquifer ¹ - Productive Bedrock Aquifer
Groundwater Vulnerability		Majority of the site Unproductive Aquifer. North west corner Secondary Bedrock Aquifer - Medium Vulnerability.
Source Protection Zones (SPZ)		Inner Zone 1c (inner protection Zone) onsite Zone III (Total Catchment) zone of special interest onsite associated with the underlying chalk at depth.
Abstraction	Potable	None
	Non-potable	945m E
Sensitive Land Uses		None
Surface Water Features		73m E
Flood Risk from Rivers or Seas		None
Flood Risk from Surface Water		None
Flood Risk from Groundwater		Limited Potential for Groundwater Flooding to Occur on Northwest Corner Onsite Remaining Site No Potential.

Note(s): ¹Secondary A are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. ² Unproductive strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Any works or development which has the potential to have an impact on surface water, aquifer or groundwater quality must be approved by the Environment Agency prior to implementation.

2.3 Hydrology

The approximate elevation of the site was ~60 - 65m Above Ordnance Datum (AOD). The anticipated groundwater flow direction is given in Table 2.2.

Table 2.2 Hydrological Assessment

Type	Direction	Notes
Surface water	SE	In line with overall topography of the area sloping down by <2 – 3 to the southeast.
Groundwater	SE/E	In line with overall topography of the area sloping down by <2 – 3 degrees to the southeast

2.4 Radon Gas

The site is in a lower probability radon area where less than 1% of homes are estimated to be at or above the Action Level. Therefore, no radon protective measures are necessary in the construction of new dwellings or extensions.

Section 3 Site History

3.1 Historic Map Study

The historic maps referred to are appended to this report (Appendix B).

Table 3.1 Historic Development of the Site

Site History	Date Range	
	From	To
The earliest published plan of the site shows Padnell Brick and Tile Works located on the south of the site with associated buildings arranged around a courtyard (possibly Farm Buildings), a main L shaped building of Padnell Grange was around 20m north of the courtyard and buildings, facing east with a rectangular building to its rear (west). A Clay Mill and small buildings were located within the northeast corner, and a Clay Pit on the northwest corner. There was a Pond 20 x 15m on the southeast and a Pond 15 x 8m on the east.	1868	1870
The Brick and Tile Works had been extended over the eastern part of the site near the Clay Mill. The original buildings around the courtyard were now labelled Padnell.	1870	1897
There was a Pond 60 x 20m across the southwest boundary (this was no longer in place on the 1909 map). A Kiln was noted within the northwest corner onsite (no longer in this location on the 1909 map).	1897	1932
The Brick and Tile Works was now labelled as Disused. The Clay Pit onsite was no longer labelled as such, it did not appear to have been filled in on the map which showed a change in level around the perimeter. A 35 x 13m rectangular shape potentially a building was located north of the centre of site, this was no longer present on the 1953 map – potential for associated Made Ground. A small rectangular building was immediately to its north (no longer present after the 1973 map).	1932	1942
An approximately 17 x 10m building was on the map west of the courtyard buildings, this was confirmed on the 1947 aerial photograph.	1942	1953
The 1953 map showed the old Brick Kiln and Tile Works machinery on the east of the site to have been dismantled and removed.	1953	1960
The 1960 map showed a Glasshouse around 30 x 17m south of the courtyard buildings, this appeared as a normal building structure without glass on the 1973 map.	1960	1932
The 1962 map showed a building measuring around 30m x 5m, southeast of the main courtyard buildings.	1962	1970
The courtyard buildings appeared to have been extended to the north.	1970	1973
The site was labelled Padnell Grange on the 1973 map. The 1973 map showed the Ponds (20 x 15m and 15 x 8m) east on site were no longer present – this was corroborated by the site walkover which showed that there are still natural depressions in these locations, and they do not appear to have been infilled.	1973	1992
The 1992 map showed the buildings south and east of the courtyard buildings to have become adjoined, this was confirmed by the 1999 aerial photograph.	1992	2025
The 2025 aerial photograph shows the main former house of Padnell Grange to be adjoined with the building to its west.	2025	Present

Table 3.2 Historic Off-site Development

Off-site Development	Date Range	
	From	To
The earliest published plan of the area shows the wider area predominantly comprised open land, with woodland to the north/northeast. A Clay Pit was labelled 25m northeast (labelled Old Clay Pit and therefore disused on the 1897 map). The Clay Pit onsite extended 15m to the west. Machinery for the Padnell Brick and Tile Works extended 130m to the east from site, with a Brick Kiln 120m east. There was a Pond 25m diameter 75m southeast and a Pond 20m diameter 110m west (no longer recorded after the 1949 aerial photograph). Orchards were noted 85m east.	1868	1870
A Clay Pit was labelled in Padnell Cuts Wood 140m north (labelled Old Clay Pit on subsequent maps and therefore disused).	1870	1897
The 1897 map showed the onsite Clay Pit to have extended to 75m west. Old Clay Pits were labelled immediately north of site in Padnell Cuts Wood. A Pond 10m diameter was noted in the Clay Pit 15m northwest (no longer present on the 1970 map).	1897	1909
The 1909 map showed a new Kiln located 50m northwest, not present after the 1953 map. The onsite Clay Pit had extended 120m to the west.	1909	1932
The 1932 map showed a polygonal Pond around 50m x 20m <5m north (no longer present after the 1954 map. A Pond was 100m west of the Clay Pit (no longer recorded after the 1970 map due to housing developments). The Orchards were no longer present 85m east.	1932	1953
The 1953 map showed the old Brick Kiln and Tile Works machinery on the east of the site to have been dismantled and removed.	1953	1960
Continued residential development was shown on the map from 100m west.	1960	1969
The 1969 map showed residential development of private houses with private gardens on Padnell Cuts Wood from 40m northeast. The Clay Pit was no longer present in this location. An Electrical Sub-Station was noted on this development, 230m northeast. The 1970 map showed this development to have continued west, at a minimum distance of 60m. There were Electrical Sub-Stations 85m northwest, and 190m northwest.	1969	1973
Further residential development had encroached to the immediate west and southern boundaries.	1973	1982
A Golf Course was noted immediately east of the site boundary and extending to the northeast and southwest.	1982	2016
A Pumping Station was noted 220m northeast.	2016	Present

Table 3.3 Potential Sources of Pollution Indicated from Historic Maps

Source	Direction	Distance (m)	Date Range	
			From	To
On Site				
Padnell Brick and Tile Works	0	0	1868	1932
Clay Mill (and workings)	0	0	1868	1953
Clay Pit – Potential Made Ground	0	0	1868	Present
Pond 20 x 15m	0	0	1868	1973
Pond 15 x 8m	0	0	1868	1973
Pond 60 x 20m	0	0	1897	1909
Kiln	0	0	1897	1909
Potential Made Ground – 13 x 35m	0	0	1933	Present
Made Ground (small building)	0	0	1933	Present
Potential ACM on dilapidated buildings	0	0	Unknown	Present

Source	Direction	Distance (m)	Date Range	
			From	To
Off Site				
Old Clay Pits	N	<5	1897	1969
Pond 50m x 20m	N	<5	1932	1954
Pond 10m diameter	NW	15	1897	1970
Clay Pit	NE	25	1868	1897
Kiln	NW	50	1897	1953
Pond/Old Chalk Pit 25m diameter	SE	75	1868	1942
Electrical Sub-Station	NW	85	1969	Present
Pond	W	100	1932	1970
Pond 20m diameter/Old Chalk Pit	W	110	1868	1949
Orchards	E	110	1868	1932
Brick Kiln	E	120	1868	1953
Clay Pit onsite extending to maximum 120m west	W	0 - 120	1868	1962
Padnell Brick and Tile Works Machinery	E	130	1868	1953
Clay Pit	N	140	1870	1897
Electrical Sub-Station	NW	190	1969	Present
Pumping Station	NE	220	2016	Present
Electrical Sub-Station	NE	230	1969	Present

3.2 Bomb damage and the potential for Unexploded Ordnance

Based on the assessment of the historical maps, and the ZeticaUXO Risk Maps [online, accessed 6th August 2025], the site is in a moderate bombing density area from WW2 ordnance (areas indicated as having a bombing density of 15 to 49 bombs per 1000acre).

It is therefore recommended that a specialist UXO risk assessment is undertaken to determine the risk to the proposed construction phase of the development.

Section 4 Environmental Records and Consultation

4.1 Dataset Information

A copy of the report is appended to this report in Appendix C and summarised in Table 4.1, Table 4.2 and Table 4.3.

Table 4.1 Environmental Significance of Data

Source	Direction	Distance (m)
Contaminated Land Register Entries and Notices	None	None
Discharge Consents ¹	NE	169
Integrated Pollution Prevention and Control	None	None
Local Authority Pollution Prevention and Controls	None	None
Local Authority Pollution Prevention and Control Enforcements	None	None
Nearest Surface Water Feature	E	73
Pollution Incidents to Controlled Waters (Significant Incidents only)	None	None
Prosecutions Relating to Authorised Processes	None	None
Registered Radioactive Substances	None	None
Substantiated Pollution Incident Register ²	S	251
Nearest Potable Abstraction Point	None	None
Nearest Non-Potable Abstraction Point	E	945
Water Industry Act Referrals	None	None
Source Protection Zones ³	Onsite	0
Extreme Flooding from Rivers or Sea Without Defences	None	None
Flooding from Rivers or Sea Without Defences	None	None
Areas Benefiting from Flood Defences	None	None
Flood Water Storage Areas	None	None
Flood Defences	None	None
BGS Recorded Landfill Sites	None	None
Historical Landfill Sites	None	None
Licensed Waste Management Facilities	None	None
Local Authority Recorded Landfill Sites	None	None
Potentially Infilled Land (Non-Water) ⁴	Onsite	0
Potentially Infilled Land (Water) ⁵	Onsite	0
Registered Landfill Sites	None	None
Registered Waste Transfer Sites	None	None
Registered Waste Treatment or Disposal Sites	None	None
Control of Major Accident Hazards Sites (COMAH)	None	None
Notification of Installations Handling Hazardous Substances	None	None
Planning Hazardous Substance Consents	None	None

Note(s): ¹ Sewage Discharges - Pumping Station - Water Company. ² Sewage Materials: Grey Water. ³ Inner Zone I/c (inner protection Zone) onsite Zone III (Total Catchment) zone of special interest onsite. ⁴ Multiple onsite. ⁵ Multiple onsite.

The contemporary trades listed in Table 4.2 are only those considered to be viable potential sources of contamination that could impact the site.

Table 4.2 Contemporary Trade Directory

Contemporary Trade Directory within 250m	Direction	Distance (m)	Status
Albany Engineering Services Ltd	N	82	Inactive

Contemporary Trade Directory within 250m	Direction	Distance (m)	Status
Oliver Richard Motor Vehicle Engineer	SW	86	Active
Widen Electronic Solutions - Manufacturers & Assemblers	W	114	Inactive
Down To Earth Drainage & Guttering - Commercial Cleaning Services	NW	224	Inactive

Table 4.3 Geological Hazards

Source	Onsite Type
Coal Mining Affected Areas	None noted
Mining Instability	None noted
Natural and Mining Cavities	Mining Cavity 25m NE ¹ 169m NE (Unknown x 15) 222m NE (Sinkhole x 1) ²
Potential for Collapsible Ground Stability Hazards	Very Low Hazard Potential
Potential for Compressible Ground Stability Hazards	Very Low Hazard Potential
Potential for Ground Dissolution Stability Hazards	No Hazard potential
Potential for Landslide Ground Stability Hazards	Very Low Hazard Potential
Potential for Running Sand Ground Stability Hazards	Low Hazard Potential
Potential for Shrinking or Swelling Ground Stability Hazards	Moderate Hazard Potential

Notes: ¹ Historical brick and tile works. ² Natural cavities likely to be associated with Chalk underlying the Lambeth Group.

4.2 Site Sensitivity Maps

No other significant potential sources of contamination were shown on the Landmark Envirocheck Site Sensitivity Maps, which have not been listed in Table 4.1, Table 4.2 and Table 4.3, and copies of which are appended to this report (Appendix C).

4.3 Regulatory Enquires

As part of the Preliminary Investigation Report the local authority was contacted and asked to provide any information on potential risks pertaining the site. The information provided by the local authority has been presented in Appendix E. A summary of pertinent information is outlined below:

At the time of report writing, a Local Authority enquiry was in progress and will be updated into a future revision of this report. Appendix E has therefore been left blank at this stage.

4.4 Soil Geochemistry

The results of this survey are contoured on the Landmark Environmental check report (Appendix D). The results of the local soil chemistry are presented in Table 4.4.

Table 4.4 Soil Geochemistry

Determinant	Indicated Soil Geochemistry (mg kg ⁻¹)
Arsenic	<15
Cadmium	<1.8

Determinant	Indicated Soil Geochemistry (mg kg⁻¹)
Chromium	60 - 90
Lead	100 - 200
Nickel	15 - 30

No exceedances above the recommended GAC for the 'residential with homegrown produce' end user.

Section 5 Data Collection Summary

5.1 General

Table 5.1 summarises the site Environs, which include geology, hydrogeology, the risk from radon and potential risk from flooding.

Table 5.1 Site Environs

Environs	Summary
Geology	London Clay Formation Bedrock over majority of site and underlying Lambeth Group to northwest corner of site.
Hydrogeology	The London Clay Formation bedrock was unproductive strata and act as an aquiclude to the deep groundwater regime. Lambeth Group classed as Secondary Bedrock Aquifer - Productive Bedrock Aquifer.
Source Protection Zone (SPZ)	Inner Zone I c (Inner protection Zone) onsite associated with the sub-surface chalk. Zone III (Total Catchment) zone of special interest onsite associated with the sub-surface chalk.
Surface Water Flow	SE in line with overall topography of the area.
Groundwater Flow	SE in line with overall topography of the area
Radon	The site is in a lower probability radon area where radon protective measures are necessary in the construction of new dwellings or extensions.
Flooding	The site had Limited Potential for Groundwater Flooding to Occur on the Northwest Corner Onsite Remaining Site No Potential.
Geological Hazard	Natural and Mining Cavities - 169m NE (Unknown x 15) Natural 25m NE 222m NE (Sinkhole x 1) Potential for Collapsible Ground Stability Hazards - Very Low Hazard Potential Potential for Compressible Ground Stability Hazards - Very Low Hazard Potential Potential for Ground Dissolution Stability Hazards - No Hazard potential Potential for Landslide Ground Stability Hazards - Very Low Hazard Potential Potential for Running Sand Ground Stability Hazards - Low Hazard Potential Potential for Shrinking or Swelling Ground Stability Hazards - Moderate Hazard Potential
Local Authority Response	At the time of report writing, a Local Authority enquiry was in progress and will be updated into a future revision of this report.
Soil Chemistry	No exceedances above the recommended GAC for the 'residential with homegrown produce' end user.
Ecological	General woodland and vegetation in private gardens.

Table 5.2 provides a summary of potential on-site and off-site contamination sources identified during the study of the historic maps, the Landmark Envirocheck Dataset Report and the Site Walkover.

Table 5.2 Summary of Potential Contamination Sources

Contaminative Source	Direction	Distance (m)	Date Range		Data Source
			From	To	
On-Site					
Padnell Brick and Tile Works	0	0	1868	1932	HM
Clay Mill (and workings)	0	0	1868	1953	HM
Clay Pit – Potential Made Ground	0	0	1868	Present	HM/DS
Pond 20 x 15m	0	0	1868	1973	HM
Pond 15 x 8m	0	0	1868	1973	HM
Pond 60 x 20m	0	0	1897	1909	HM
Kiln	0	0	1897	1909	HM
Potential Made Ground – 13 x 35m	0	0	1933	Present	HM
Made Ground (small building)	0	0	1933	Present	HM
Potentially Infilled Land (Non-Water)	-	0	Unknown	Present	DS
Multiple Onsite					
Potentially Infilled Land (Water)	-	0	Unknown	Present	DS
Multiple Onsite					
Potential ACM on dilapidated buildings	0	0	Unknown	Present	SW
Off-Site					
Old Clay Pits	N	<5	1897	1969	HM
Pond 50m x 20m	N	<5	1932	1954	HM
Pond 10m diameter	NW	15	1897	1970	HM
Clay Pit	NE	25	1868	1897	HM
Kiln	NW	50	1897	1953	HM
Pond	SE	75	1868	Present	HM
Albany Engineering Services Ltd	N	82	Inactive	Unknown	DS
Electrical Sub-Station	NW	85	1969	Present	HM
Oliver Richard Motor Vehicle Engineer	SW	86	Active	Present	DS
Pond	W	100	1932	1970	HM
Pond 20m diameter/Old Chalk Pit 25m diameter	W	110	1868	1949	HM
Orchards	E	110	1868	1932	HM
Widen Electronic Solutions - Manufacturers & Assemblers	W	114	Inactive	Unknown	DS
Brick Kiln	E	120	1868	1953	HM
Clay Pit onsite extending to maximum 120m west	W	0 - 120	1868	1962	HM
Padnell Brick and Tile Works Machinery	E	130	1868	1953	HM
Clay Pit	N	140	1870	1897	HM
Electrical Sub-Station	NW	190	1969	Present	HM
Pumping Station	NE	220	2016	Present	HM
Down To Earth Drainage & Guttering - Commercial Cleaning Services	NW	224	Inactive	Unknown	DS
Electrical Sub-Station	NE	230	1969	Present	HM
Substantiated Pollution Incident Register	S	251	Unknown	Unknown	DS
Note(s): SW – Site walkover, HM – Historic Maps, DS – Datasheet, GC – Geochemistry, LA – Local Authority, GE Google Earth					

Section 6 Preliminary Conceptual Site Model

6.1 Sources and Pathways of Contamination

The Landmark Site Specific Envirocheck Report and Site Walkover have been used to identify potential contaminative sources. These sources have been presented in Table 5.2. An assessment of the likely pathways and the likelihood of each contaminative source that was considered a risk has been presented in Sections 6.2 to 6.4.

6.2 Potential Pathways

A review of the potential pathways on and off the site has been undertaken based on the site, ground conditions, hydrology and scientific knowledge of the behaviour of the contaminants in the ground. The pathways applicable to the site and the proposed development have been marked in Table 6.1.

Table 6.1 Applicable Pathways

Pathway	Present	Comment
Inhalation of dust	✓	Future users of the site (End Users) Construction workers on-site (Site Workers)
Inhalation of vapour/gases	✓	Service and maintenance workers (Site Maintenance)
Ingestion and absorption via direct contact	✓	Site neighbours and wider public (Off-site Users)
Migration via surface runoff	✓	Surface Water
Migration in solution via groundwater	✓	Shallow Aquifer Deep Aquifer
Migration of gases via permeable soils	✓	Future users of the site (End Users) Construction workers on-site (Site Workers) Service and maintenance workers (Site Maintenance) Site neighbours and wider public (Off-site Users) Buildings and Confined Spaces
Direct contact with construction material	✓	Buried Structures
Services and utilities	✓	Buried Services

6.3 Potential Sources of On-site Contamination.

The sources are presented in Table 6.2.

Table 6.2 On-site Potential Contamination Sources

Source	Likely	Reasoning
Padnell Brick and Tile Works	✓	Onsite, duration of operation.
Clay Mill (and workings)	✓	

Source	Likely	Reasoning
Clay Pit – Potential Made Ground	✓	
Pond(s)	✓	Appear to be natural soils from site walkover without infill but needs confirmation.
Pond 60 x 20m	✓	Short duration, now under building on site. but needs confirmation.
Kiln	✓	Potential waste/clinker.
Potential Made Ground – 13 x 35m	✓	Unknown fill material.
Made Ground (small building)		
Potentially Infilled Land (Non-Water) Multiple Onsite		
Potentially Infilled Land (Water) Multiple Onsite		
Potential ACM on dilapidated buildings	✓	Fragments of ACM.

6.4 Potential Off-site Sources of Contamination

These sources have been presented in given in Table 6.3.

Table 6.3 Off-site Potential Contamination Sources

Source	Direction	Distance (m)	Likely	Reasoning
Old Clay Pits	N	<5	✓	Proximity to site, unknown fill material.
Pond 50m x 20m	N	<5	✓	
Pond 10m diameter	NW	15	✓	
Clay Pit	NE	25	✓	
Kiln	NW	50	✓	Up hydraulic gradient
Pond	SE	75		Remains a Pond presently.
Albany Engineering Services Ltd	N	82		Topographically distant. Off hydraulic gradient.
Electrical Sub-Station	NW	85		Topographically distant.
Oliver Richard Motor Vehicle Engineer	SW	86		Off hydraulic gradient.
Pond	W	100		
Pond 20m diameter/Old Chalk Pit 25m diameter	W	110		
Orchards	E	110		
Widen Electronic Solutions - Manufacturers & Assemblers	W	114		
Kiln	E	120		
Clay Pit onsite extending to maximum 120m west	W	0 - 120	✓	Proximity to site.
Padnell Brick and Tile Works Machinery	E	130		Off hydraulic gradient.
Clay Pit	N	140		
Electrical Sub-Station	NW	190		Topographically distant.
Pumping Station	NE	220		Off hydraulic gradient.
Down To Earth Drainage & Guttering - Commercial Cleaning Services	NW	224		Topographically distant.
Electrical Sub-Station	NE	230		Off hydraulic gradient.

Source	Direction	Distance (m)	Likely	Reasoning
Substantiated Pollution Incident Register	S	251		

6.5 Potential Contaminants

Table 6.4 presents the range of possible contaminants associated with the onsite and off-site activities and sources identified following a review of historical maps and datasets.

Table 6.4 Potential Contaminants

Potential Contaminative Sources	Contaminants / Chemical Properties
Potential ACM	Asbestos
Padnell Brick and Tile Works; Clay Mill (and workings)	Metals, Semi-metals and non-metals, PAHs, TPHs, pH, Asbestos, Ground Gas
Potentially Infilled Land (multiple, water and non-water, onsite)/ Clay Pit – Potential Made Ground Onsite	Metals, Semi-metals and non-metals, PAHs, TPHs, pH, Asbestos, Ground Gas
Kilns on and off site	Metals, Semi-metals and non-metals, PAHs, TPHs, pH, Asbestos, Ground Gas
Made Ground/ Potentially Infilled Land (multiple, water and non-water, off site)/ Old Clay Pits/Ponds offsite	Metals, Semi-metals and non-metals, PAHs, TPHs, pH, Asbestos, Ground Gas

6.6 Potential Exposure Receptors

The assessment for potential receptors is presented in Table 6.5.

Table 6.5 Potential Receptors

Potential Receptor	Present
Human Health	
Future users of the site (End Users)	✓
Construction workers on-site (Site Workers)	✓
Service and maintenance workers (Site Maintenance)	✓
Site neighbours and wider public (Off-site Users)	✓
Groundwater /	
Controlled	
Waters	
Surface Water	✓
Shallow Aquifer	✓
Deep Aquifer	✓
Buildings &	
Materials	
Buildings and Confined Spaces	✓
Buried Structures	✓
Buried Services	✓
Ecosystems	
Flora and fauna	✓

6.7 Preliminary Conceptual Site Model and Risk Assessment

A preliminary risk assessment has been undertaken based on the proposed development. The assessment has been based on the likelihood of the presence of a pollutant linkage.

A pollutant linkage is the relationship between a contaminant source, a pathway and a receptor. Unless all three elements of a pollutant linkage are present, a risk is not considered to exist. Each of the three elements has been considered within Table 6.1 to Table 6.5. The preliminary conceptual site model and risk assessment is presented in Table 6.6. The classification tables on which the level of risk has been determined have been modified from 'Contaminated land risk assessment: A guide to good practice, 2001, CIRIA C552' and are presented in Appendix G.

Table 6.6 Preliminary Conceptual Site Model and Risk Assessment Methodology

Source (Table 6.2 & Table 6.3)	Potential Contaminant (Table 6.4)	Exposure Pathway (Table 6.1)	Receptor (Table 6.5)	Initial Assessment from Preliminary Investigation Report Information			Comments	Proposed Investigation
				Severity	Probability	Risk		
Potential ACM on dilapidated buildings Padnell Brick and Tile Works; Clay Mill (and workings) Potentially Infilled Land (multiple, water and non-water, onsite)/ Clay Pit – Potential Made Ground Onsite Kiln On-site historic and current site usage.	Metals, Semi-metals and non-metals, PAHs, Asbestos	Inhalation of dust	Site Workers/Site Maintenance	Medium	Low	Moderate/Low	Site located on bedrock of the London Clay Formation on the majority of the site apart from the northwest corner, which was classified as unproductive strata and would act as an aquiclude to the groundwater receptors.	Phase II ground investigation to confirm the ground conditions present and chemical testing prior to undertaking a generic quantitative risk assessment.
			End Users	Medium	Low	Moderate/Low		
			Off-site Users	Medium	Unlikely	Low		
	PAHs, TPHs, Ground Gas	Inhalation of vapour/gases	Site Workers/Site Maintenance	Mild	Unlikely	Very low	Northwest of site overlying the Lambeth Group which was classed as a Secondary Bedrock Aquifer and could support shallow groundwater.	
			End Users	Minor	Unlikely	Very low		
			Off-site Users	Minor	Unlikely	Very low		
	Metals, Semi-metals and non-metals, PAHs, TPHs, pH	Ingestion and absorption via direct contact	Site Workers/Site Maintenance	Medium	Low	Moderate/Low		
			End Users	Medium	Unlikely	Low		
			Off-site Users	Minor	Unlikely	Very low		
	Metals, Semi-metals and non-metals, PAHs, TPHs, pH	Migration via surface runoff	Surface Water	Minor	Unlikely	Very low		
			Shallow Aquifer	Minor	Unlikely	Very low		
			Deep Aquifer	Minor	Unlikely	Very low		
		Migration in solution via groundwater	Surface Water	Minor	Unlikely	Very low		
			Shallow Aquifer	Medium	Unlikely	Low		
			Deep Aquifer	Minor	Unlikely	Very low		
	PAHs, TPHs, Ground Gas	Direct contact with construction material	Buried Structures	Mild	Low	Low		
			Buried Services	Mild	Low	Low		
			Site Workers/Site Maintenance	Mild	Low	Low		
		Migration of gases via permeable soils	End Users	Minor	Unlikely	Very low		
			Off-site Users	Minor	Unlikely	Very low		
			Building and Confined Spaces	Minor	Unlikely	Very low		
Made Ground/ Potentially Infilled Land (multiple, water and non-water, offsite)/ Old Clay Pits/Ponds offsite Kiln Off-site sources from which potential contamination would have migrated onto the site.	Metals, Semi-metals and non-metals, PAHs, Asbestos	Inhalation of dust	Site Workers/Site Maintenance	Medium	Low	Moderate/Low	Site located on bedrock of the London Clay Formation on the majority of the site apart from the northwest corner, which was classified as unproductive strata and would act as an aquiclude to the groundwater receptors.	Phase II ground investigation to confirm the ground conditions present and chemical testing prior to undertaking a generic quantitative risk assessment.
			End Users	Medium	Low	Moderate/Low		
			Off-site Users	-	-	-		
	PAHs, TPHs, Ground Gas	Inhalation of Vapour/gases (including Radon)	Site Workers/Site Maintenance	Mild	Low	Low	Northwest of site overlying the Lambeth Group which was classed as a Secondary Bedrock Aquifer and could support shallow groundwater.	
			End Users	Minor	Unlikely	Very low		
			Off-site Users	-	-	-		
	Metals, Semi-metals and non-metals, PAHs, TPHs, pH	Ingestion and absorption via direct contact	Site Workers/Site Maintenance	Mild	Unlikely	Very low		
			End Users	Mild	Unlikely	Very low		
			Off-site Users	Minor	Unlikely	Very low		
	Metals, Semi-metals and non-metals, PAHs, TPHs, pH	Migration via surface runoff	Surface Water	Minor	Unlikely	Very low		
			Shallow Aquifer	Minor	Unlikely	Very low		
			Deep Aquifer	Minor	Unlikely	Very low		
		Migration in solution via groundwater	Surface Water	Minor	Unlikely	Very low		
			Shallow Aquifer	Mild	Low	Low		
			Deep Aquifer	Minor	Unlikely	Very low		
	PAHs, TPHs, Ground Gas	Direct contact with construction material	Buried structures	Minor	Unlikely	Very low		
			Buried Services	Minor	Unlikely	Very low		
			Site Workers/Site Maintenance	Medium	Unlikely	Low		
		Migration of gases via permeable soils	End Users	Medium	Unlikely	Low		
			Off-site Users	-	-	-		
			Building and confined spaces	Mild	Low	Low		

Section 7 Recommendations

7.1 General

Based on the information obtained during the compilation of this Preliminary Investigation and the preliminary conceptual site model, a potential for a **very low, to moderate/low** risk of contamination has been identified.

7.2 UXO

It is recommended that a specialist UXO risk assessment is undertaken to determine the risk to the proposed construction phase of the development.

7.3 Radon

The site is in a lower probability radon area where less than 1% of homes are estimated to be at or above the Action Level. Therefore, no radon protective measures are necessary in the construction of new dwellings or extensions.

7.4 Proposed Further Site Works

The general requirements for further environmental investigation are presented in Table 7.1.

Table 7.1 Proposed Further Environmental Investigation

Proposed Works	General Purpose	Required
Investigatory Holes	To collect sufficient samples for a robust assessment	✓
Laboratory Testing	To quantify the risks identified in the Conceptual Site Model	✓
Risk Assessment	Assess pollutant linkages based on current contaminated land guidance and screening criteria's	✓
Borehole well installation	To allow for continued groundwater and/or gas monitoring	✓
Remediation	If the site-specific risk assessment reveals that the site was contaminated	TBC
Validation & Verification	To validate and verify the remedial objectives based on the site-specific risk assessment	TBC

Note(s): TBC – To be confirmed

7.5 Discovery Strategy

There may be areas of contamination not identified during the course of the investigation. Such occurrences may also be discovered during the demolition and construction phases for the redevelopment of the site.

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