



Geo-Environmental

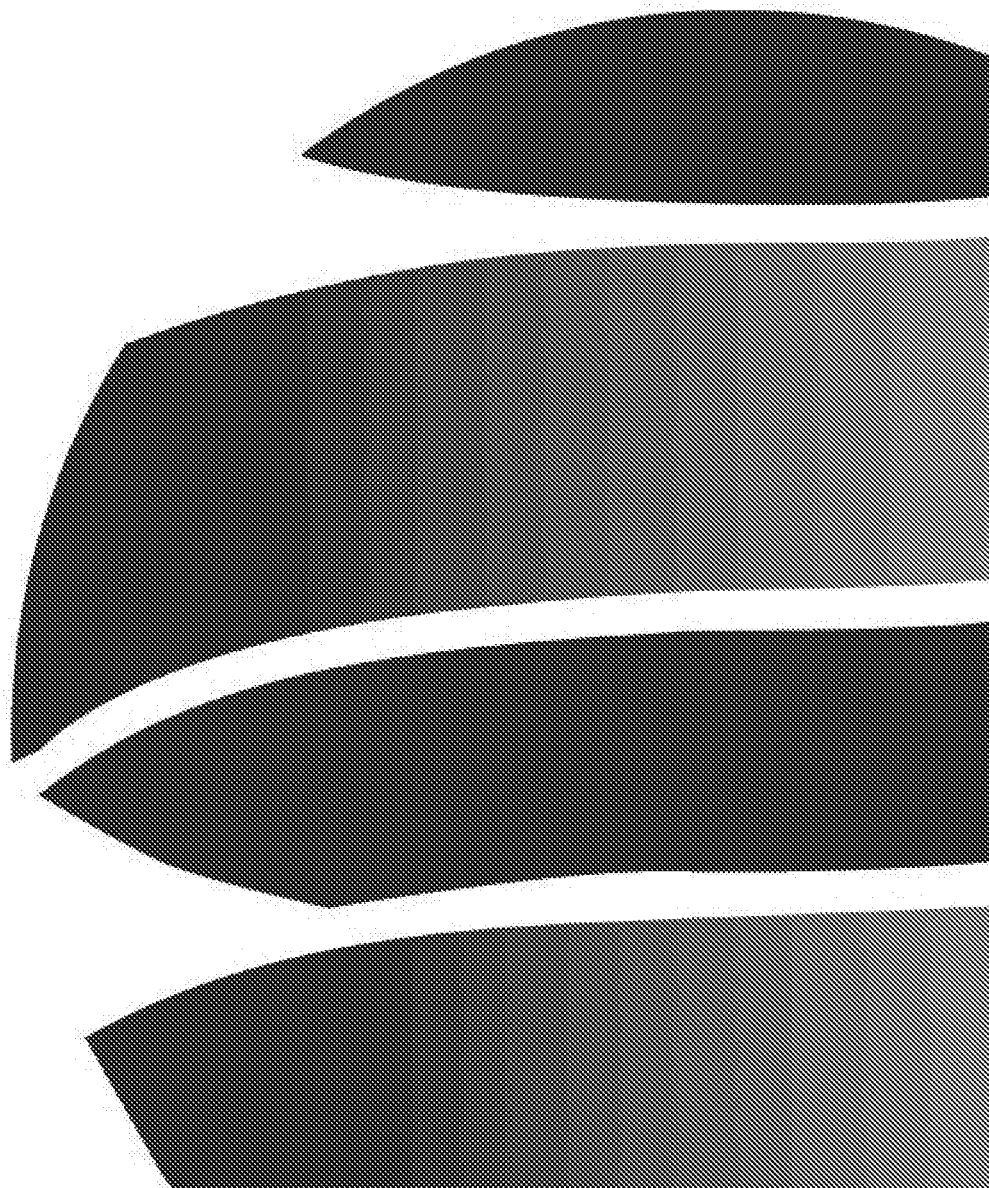
SOIL RESOURCE PLAN

for the site at

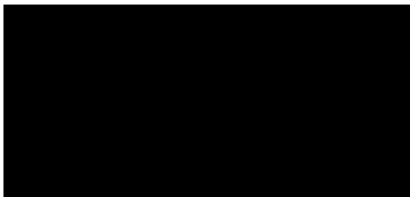
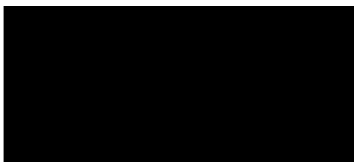
**LIDSEY ROAD, WOODGATE,
CHICHESTER, WEST SUSSEX,
PO20 3SU**

on behalf of

THAKEHAM CLIENT LTD





Report:	SOIL RESOURCE PLAN
Site:	LIDSEY ROAD, WOODGATE, CHICHESTER, WEST SUSSEX, PO20 3SU
Client:	THAKEHAM CLIENT LTD
Date:	27/01/2021
Reference:	GE192231-SRP-JAN21
Version:	2.0
Prepared by:	
	LUCY HOLFORD BSc (Hons) FGS CONSULTING ENGINEER
Reviewed by:	
	KATIE BRAYNE CSci, BSc (Hons), MSc, FGS, MEnvSc REGIONAL MANAGER - EAST
Authorised by:	
	JONATHAN TINGLEY CEnv, BEng (Hons), MSc, FGS, MEnvSc TECHNICAL DIRECTOR

Geo-Environmental Services Ltd

Unit 7, Churchyard Farm, Churchfield Road, Hove, Brighton, BN1 9QJ



AMENDMENT RECORD

Revision ref.	Date	Reasons for amendment	Author	Reviewed By	Authorised By
1.0	23/12/2020	First issue	LH	KB	GE
2.0	27/01/2021	Updated site plan for topsoil storage locations	KB	KB	JT



CONTENTS

1.0	INTRODUCTION	1
1.1	General	1
1.2	Form of Development	1
1.3	Objectives	1
1.4	Site Description	1
1.5	Standards	1
1.6	Soil Sampling and Laboratory Testing	1
1.7	BS3882 Topsoil Analysis	2
1.8	Conditions	3
2.0	Recommendations	4
2.1	Stripping, Handling and Preparing Topsoil.....	4
2.2	Storage.....	4
2.3	Spreading Topsoil	4
2.6	Stockpile Plan	5
2.7	Supervision.....	5
3.0	Discovery Strategy	6

FIGURES

Figure 1	Site Plan
Figure 2	Proposed Stockpile Location and Residential Development Plan
Figure 3	Excluded Topsoil area Stockpile Location and Residential Development Plan



1.0 INTRODUCTION

1.1 General

Geo-Environmental Services Limited was instructed by Thakeham Client Ltd to conduct a Soil Resource Plan for the proposed development at Lidsey Road, Woodgate, Chichester, West Sussex PO20 3SU.

1.2 Form of Development

It was understood that the development proposals were to comprise the construction of residential properties with private gardens, access roads and associated infrastructure.

1.3 Objectives

A planning application has been submitted and the council have requested that a soil resources/mitigation plan is submitted alongside the application.

1.4 Site Description

The site is located approximately 6.44km north of Bognor Regis, 10.94km east of Chichester, 26.07km west of Worthing and 40km east of Portsmouth.

At the time of the previous investigations, the site comprised a roughly rectangular grassed field, which was generally flat and level. On the eastern side of the site was a single large two storey detached house with garage and indoor swimming pool with gardens on the eastern and western sides. The former greenhouse/nursery had recently been demolished and the site cleared.

The site was bounded by mature trees and hedges, with a ditch along Lidsey Road, which formed the eastern boundary. A large oak tree was noted centrally within the western portion of the site.

The surrounding area comprised a small field and a public house to the north, residential properties to the east and south and a large commercial nursery to the west.

1.5 Standards

Where practicable, the subsequent environmental assessments were undertaken in accordance with the following documents and guidance:

- British Standards Institute - Code of Practice for Site Investigations (BS5930:2015).
- British Standards Institute - Investigation of Potentially Contaminated Sites - Code of Practice (BS10175:2011+A1:2013).
- British Standards Institute - Soils for Civil Engineering Purposes (BS1377:1990).
- British Standards Institute - Specification for Topsoil and Requirements for Use (BS3882:2015).
- DEFRA - Construction Code of Practice for the Sustainable Use of Soils on Construction Sites 2009

1.6 Soil Sampling and Laboratory Testing

Geo-Environmental have completed two phases of investigation to date –

- GE18390 – October 2019 - Ground Appraisal Report (Ref: GE18390-GAR-OCT19)



- GE18679 – June 2020 - Further Investigation Letter Report (GE18679/AP02/200626)
- GE19231 – January 2021 – Agricultural Land Assessment (GE19231-ALA-JAN21)

During the previous intrusive investigation (GE18390-GAR-OCT-19) four Topsoil samples were taken within the depth range of 0.10m and 0.15m bgl to target the various layers of Topsoil. Sample locations were spread across the proposed development area.

Soil samples were placed into plastic containers for general inorganic analysis and into amber jars for organic analysis. Samples were stored in temperature-controlled conditions from sampling until receipt at the laboratory from which time sample preparation and storage was determined by testing requirements and in line with the laboratory's protocols.

The presence of contaminants was identified on site and additional investigation was recommended. A wooden electrical box with a concrete base was noted on site. Samples of this material were taken and confirmed that the base had been shuttered with asbestos containing materials. Furthermore, plastics, bricks and concrete were observed with the soil mass during the investigation. It was recommended that a cover system be used for the private gardens and any soft landscaping around plots 1-9 and plots 73 and 74. The original investigation also identified the requirement for barrier pipe protection. For further details, please refer to the reports referenced above. It should be noted a Local Authority approved RSVP will be required to outline the soils being removed and a validation report produced once works are completed as part of any required planning condition.

1.7 BS3882 Topsoil Analysis

In addition to the geochemical testing, all 4 samples of Topsoil were sent for classification to BS 3882:2015 for their suitability for reuse as Topsoil. Table 1 below, presents a summary of the results.

Sample	BS 3882:2015 Requirements	TP3 (0.10m)	TP4 (0.10m)	TP5 (0.10m)	TP6 (0.15m)
Carbon Nitrogen Ratio	<20:1	47	15	23	27
Total Nitrogen %	>0.15	0.04	0.2	0.14	0.09
Extractable Potassium mg/l	121 to 1500	75.1	205	119	76.4
Extractable Magnesium mg/l	51 to 600	120	200	180	150
Extractable Phosphate mg/l	16 to 140	61	6.7	5.2	5.7
*Sand Content %	<85	12.9	14.4	193	18.9
*Silt Content %	0 to 65	71.5	70.8	67.2	64.5
Clay Content %	5 to 20	15.6	14.8	13.5	16.6
Stones > 2mm %	30	2.6	7.70	1.6	0.7
Stones > 20mm %	10	<1	<1	<1	<1
Stones > 50mm %	0	<1	<1	<1	<1
Total Variable Contaminants %	<0.5	0.0	0.0	0.0	0.0
Plastics %	<0.25	<0.01	<0.01	<0.01	<0.01
Sharps	0	0	0	0	0
# Multipurpose Topsoil Pass/Fail	N/A	Fail	Fail	Fail	Fail
# Low Fertility Topsoil Pass/Fail	N/A	Fail	Pass	Fail	Fail

*Depending on the percentage of other constituents

although they fail in some areas the topsoil is suitable for re-use throughout the remaining clean areas of the site

Table 1 -Soil Classification of samples against BS3882:2015 requirements



The physical make-up of the soils (sand, silt, clay & stone content) was generally suitable with soils being classified as being a silt loam. The samples failed on either Carbon Nitrogen Ratio, Total Nitrogen, Extractable Potassium, or Extractable Phosphate and silt content, therefore did not comply with the requirements for British Standard Multipurpose Topsoil. If the Topsoil is moved, stockpiled and seeded in line with best practice during the development process an improvement in the nutrients may occur but this would be subject to additional analysis and assessment prior to re-use. The addition of nutrients may still be required when the topsoil is to be re-used subject to the quality of the soils at that time.

1.8 Conditions

The data collected from the previous investigations have been used to provide an interpretation of the environmental conditions pertaining to the site. The recommendations and opinions expressed in this report are based on the data obtained. Geo-Environmental takes no responsibility for conditions that either have not been revealed in the available records, or that occurs between or under points of physical investigation. Whilst every effort has been made to interpret the conditions, such information is only indicative and liability cannot be accepted for its accuracy.

It should be noted that in particular the concentrations and levels of mobile liquid and gaseous materials are likely to vary with time. The results obtained may therefore only be representative of the conditions at the time of sampling. This report should not be taken as any guarantee that a site is free of hazardous or potentially contaminative materials.

Information contained in this report is intended for the use of the Client, and Geo-Environmental can take no responsibility for the use of this information by any party for uses other than that described in this report. Geo-Environmental makes no warranty or representation whatsoever express or implied with respect to the use of this information by any third party. Geo-Environmental does not indemnify the Client or any third parties against any dispute or claim arising from any finding or other result of this investigation report or any consequential losses.



2.0 Recommendations

2.1 Stripping, Handling and Preparing Topsoil

It is understood that topsoil is to be stripped from all areas excluding the former garden Nursery area (TP1 and TP2) and residential property (WS7), see Figure 3 for excluded areas. The topsoil will be temporarily stockpiled prior to re-use with proposed locations indicated on Figure 2. During the previous investigation Topsoil was recorded at depths of between 0.15 and 0.25mbgl.

The best practice for stripping soil prior to the commences of work on site is as follows:

In order for the topsoil to maintain its quality, it is essential that soil is stripped, handled and moved using suitable machinery and in the appropriate conditions of weather and soil moisture. If sustained heavy rainfall (>10mm in 24h) has occurred, then the ground work should be suspended and not restarted until the ground has dried for at least one day or once a suitable moisture content has been reached. Furthermore, the soil should not be stripped if it is waterlogged, frozen/covered by snow or when there are pools of surface water.

Appropriate machinery should be selected based on the size of the site, volume of soil and haul distance. A detailed soil stripping plan should be followed to reduce soil compaction on site. This plan should include the soil units to be stripped, haul routes and phasing of vehicle movements. Topsoil and subsoil should be stripped and kept separately. In addition, it is best practice to keep topsoil of different quality separate from each other.

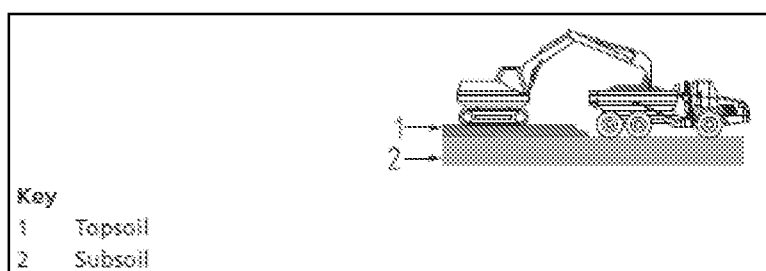


Figure 1 – BS3882 Preferred method of stripping topsoil

2.2 Storage

The quality of topsoil reduces when it is stored. In order to minimise the loss of soil quality, the site of the stockpile location should be prepared thoroughly beforehand by being graded and any rubbish or demolition debris removed. The soil heaps should be tipped loosely and the surface firmed and shaped to help shed water. Furthermore, the location of the stockpile should be chosen to avoid any risk of muddy water run off either directly or indirectly into watercourses.

If the soil is to be stockpiled for a period more than six months, it is good practice for it to be sown with vegetation such as deep rooting grass/legume seed mix. This will help maintain the soil structure, aeration, minimize weed colonization and help stabilize the stockpile. The stockpile should be managed to restrict self – seeding.

2.3 Spreading Topsoil

Prior to the spreading of topsoil, the area on which it is to be placed should be de-compacted to increase permeability. The minimum rooting depth typically should be 450mm for grass, 600mm for shrubs and 900mm for trees. However, the topsoil spread should not usually exceed 300mm, with suitable loosened subsoil providing the remainder of the depth. It is particularly important to not over-compact topsoil during spreading as this prevents

plant root growth and functioning as well as altering water attenuation and drainage. The 'loose-tipping' method, shown in Figure 2, is an effectivity method of avoiding over compaction by using tracked hydraulic excavators working in strips from ground not yet loosened.

Ripping equipment can be used to loosen over-compacted subsoil, if necessary. The ripping should only be done while the subsoil is sufficiently dry that it shatters. In small areas, such as gardens, a small tracked excavator with a 'tine attachment' or hand cultivation should be used. Extra attention is required to not overwork the soil, especially with inappropriate machinery, can damage the soil structure and increases the risk of erosion and runoff. Additionally, any object or stones greater than 75mm should be removed from the prepared surface prior to the spreading of the soil.

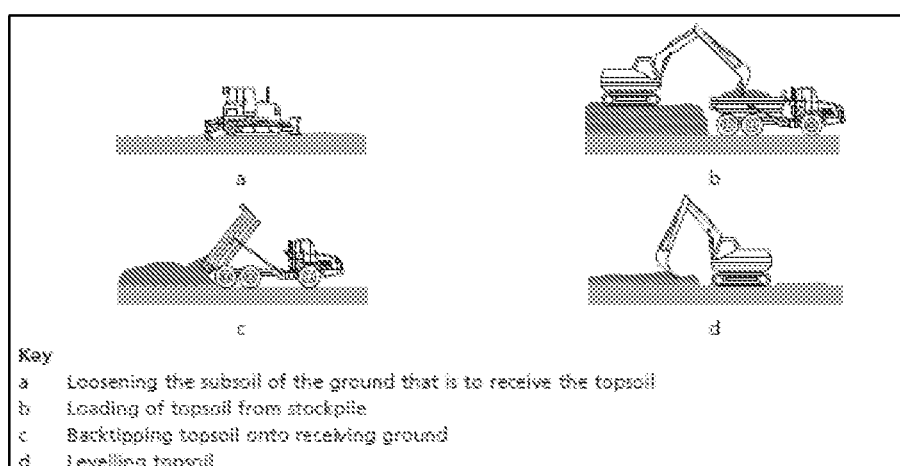


Figure 2- BS3882 The loose tipping method for placing topsoil

2.6 Stockpile Plan

A plan has been provided which indicates three stockpiles of topsoil that will be located in the south, north east and north west of the site within areas of proposed rear residential gardens. The haul road is also mapped on the drawing and is presented in Figure 2.

The following volumes have been provided by Thakeham Client Limited.

Topsoil Stockpile Location	Volume (m ³)
South	2000
North East	1400
North West	730

Table 2 – Estimated Topsoil Stockpile Volumes

2.7 Supervision

It is understood the person responsible for the soil management on site will be the site manager.



3.0 Discovery Strategy

Whilst an intrusive investigation has been undertaken on the site, it remains possible that unexpected soil conditions may be encountered during the process of construction.

Examples may include oily pockets within the soil, pockets of cement boarding or fibrous materials within the soil, black ashy materials, soils exhibiting strong odours, brightly coloured materials and former structures or brickwork.

Should previously undiscovered conditions be encountered during construction by the ground workers, this should be reported to the site manager immediately in order that any necessary inspection may be made. Records should be kept, and samples submitted for analysis where conditions encountered are not as anticipated. The results of any such testing should be sent to the authorities for consultation.

Depending on the type, nature and extent of any such 'discovery', it may be necessary to halt works in that location until such time as the assessment has been completed. This should be reviewed on a 'discovery' specific basis and in conjunction with regulatory consultation.

As a general guide, where such unexpected conditions are encountered the following approach is recommended:

- All discoveries are to be reported to the Site Manager immediately and works at that location are to halt until further notice;
- The Site Manager is to report any such discoveries to the Client and the Consultant;
- Following notification from the Site Manager, the Consultant shall discuss the discovery with the Local Authority and if considered necessary, arrange to meet an Officer on site to view the discovery;
- The Consultant shall attend the site to record the location, extent and nature of the discovery and implement an appropriate sampling and analysis regime, taking due account of the type and nature of the discovery, known and probable land uses in that area of the site;
- Where remedial action is required, regulatory consultation and approval will be sought;
- A record will be produced by the Consultant and held on site (with copies held by the Consultant, Client and Local Authority), detailing the discovery, assessment works undertaken, findings thereof, confirmation either of no action required or detailing the remedial action taken and validation thereof.

The process is shown overleaf:

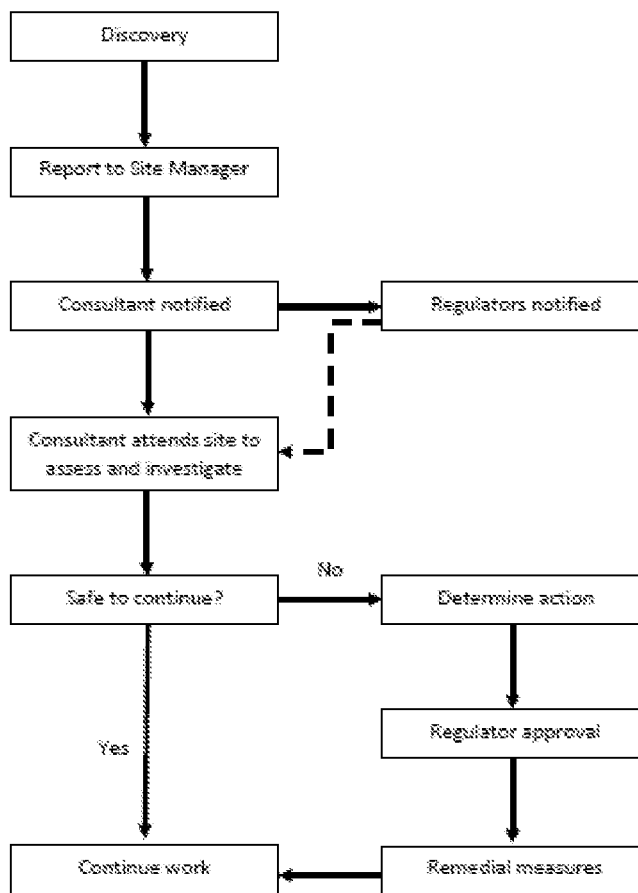
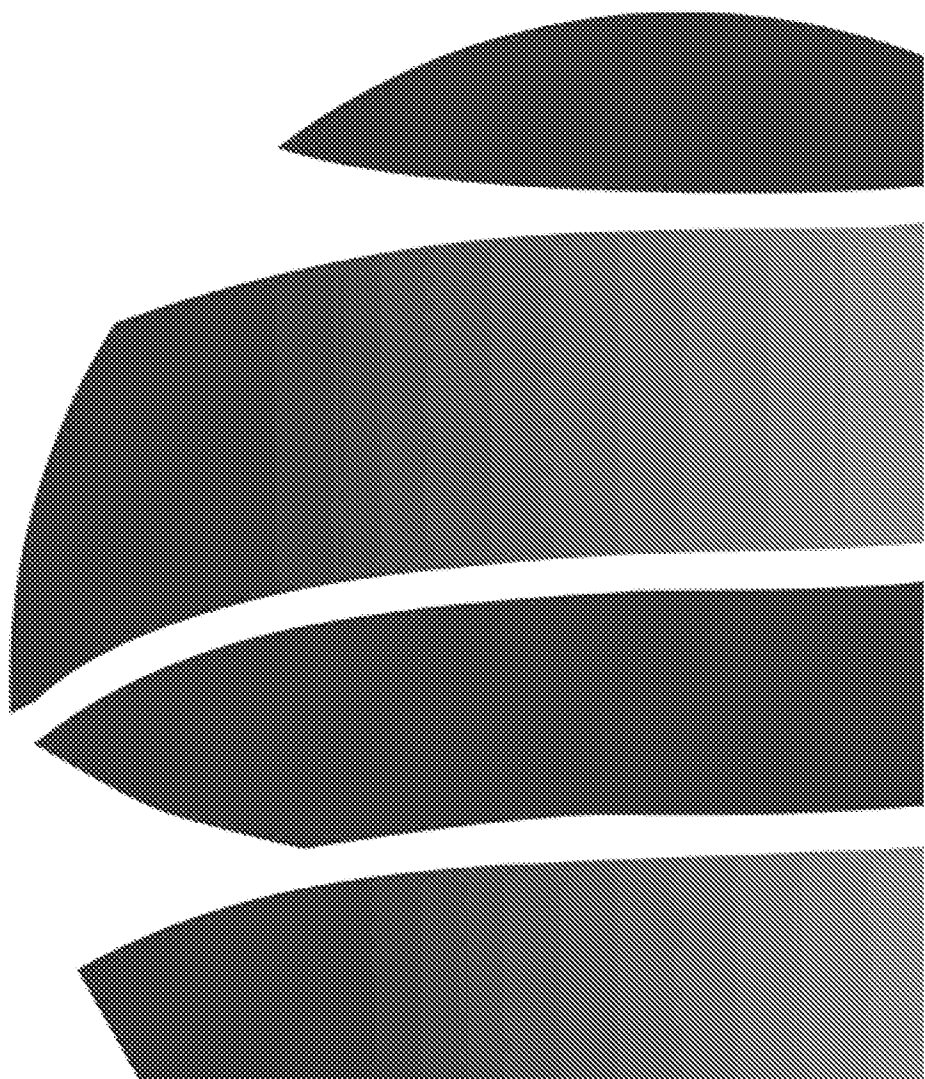


Chart 1: Discovery Strategy Process

A copy of the discovery strategy should be lodged on site, and provisions made to ensure that all workers are made aware of their responsibility to observe, report, and act on any potentially suspicious or contaminated materials they may encounter.

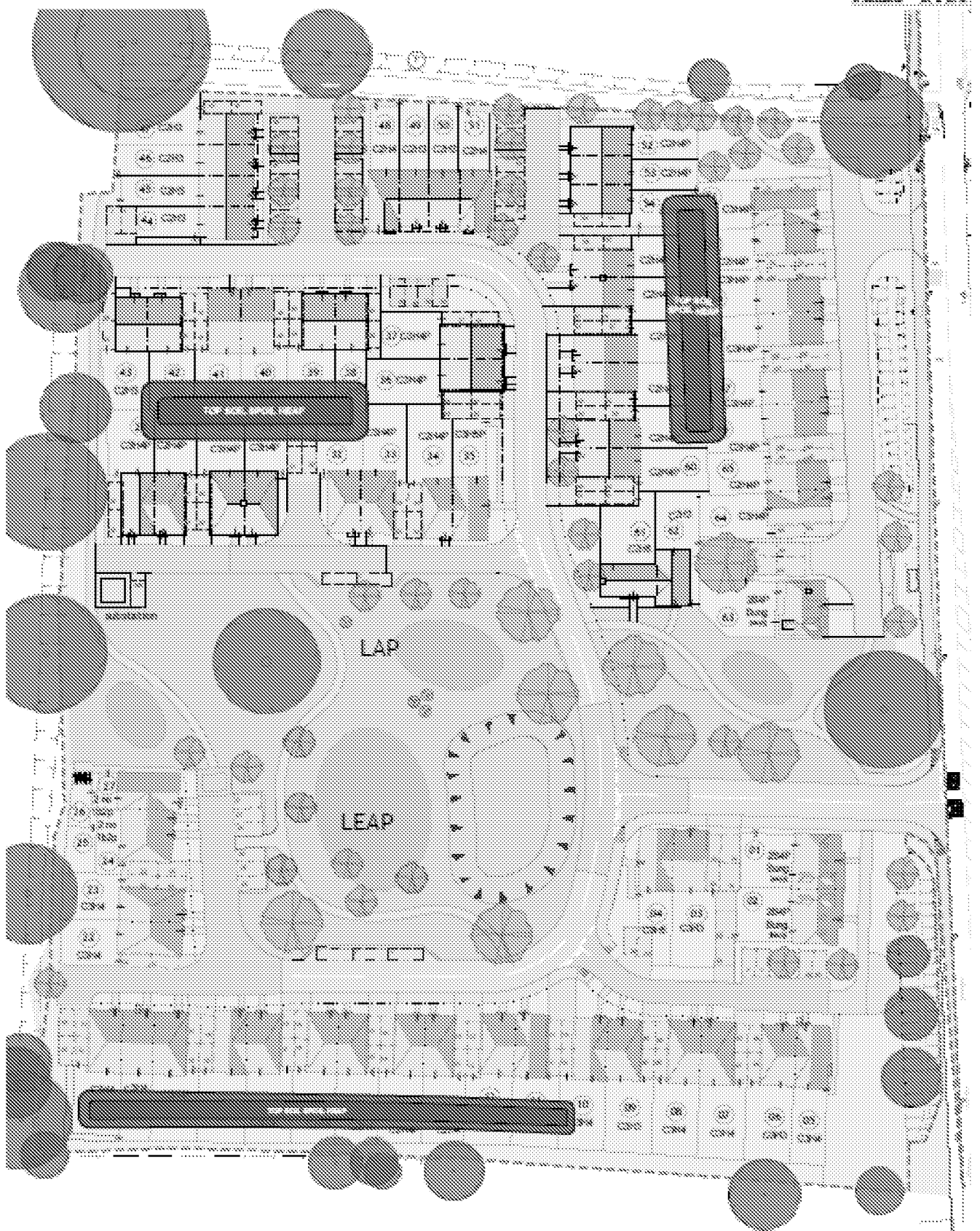


FIGURES





Project: Land Off Lidsey Road, Woodgate		Title Site Location Plan	
Client: Thakeham Homes Ltd		Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net	 Geo-Environmental
Ref No: GE19231	Revision: v1		
Drawn: KB	Date: 23/12/2020		
Figure: 1	Scale: Not To Scale		



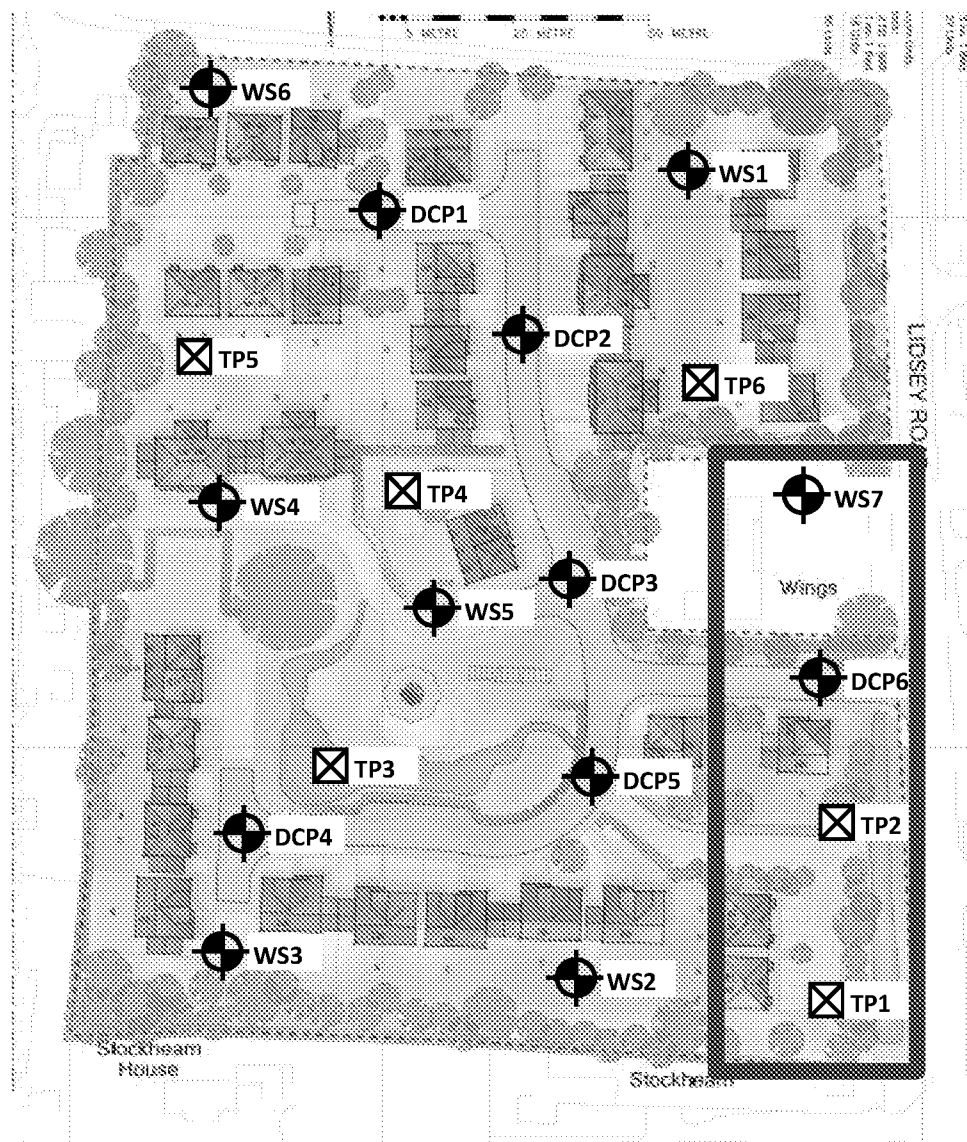
Residential Development at Lidsey Road
Woodgate
Site: T0001, T0002, T0003
For Thakeham Client on behalf of Southern Housing Group



Project: Land Off Lidsey Road, Woodgate			Title	Topsoil and Haul Road Locations
Client: Thakeham Client Limited			Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net	
Ref No: GE19231	Revision:	2		
Drawn: KB	Date:	23/12/2020		
Figure: 2	Scale:	NTS		



Geo-Environmental



Project: Land Off Lidsey Road, Woodgate		Title	Excluded Topsoil Area Strip (Previous SI Ref GE18390)	
Client: Thakeham Client Limited		Geo-Environmental Services Ltd Unit 7 Danworth Farm, Cuckfield Road Hurstpierpoint, West Sussex BN6 9GL +44(0)1273 832972 www.gesl.net		 Geo-Environmental
Ref No: GE19231	Revision: v1			
Drawn: KB	Date: 23/12/2020			
Figure: 3	Scale: Not To Scale			