
Phase I Desk Study and Site Reconnaissance

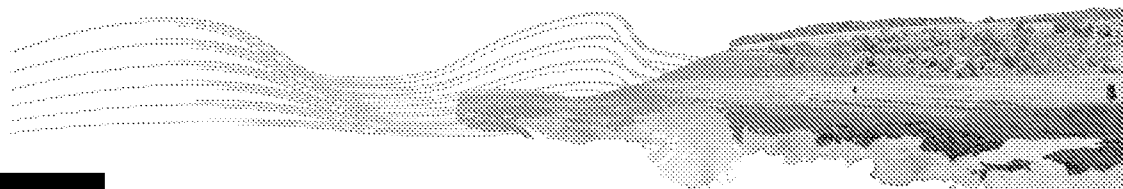
at 47 South Way, Bognor
Regis, West Sussex, PO21
5EY

for Mr Paul Nicol

Report Reference: LP2331/DS/1

Report Date: 7th October 2020

Leap Environmental Ltd
Head Office
The Atrium, Oursle Road,
Dorking, Surrey, RH4 1XA



Regional Offices: Kent, Midlands, South Coast, Thames Valley

TABLE OF CONTENTS

INTRODUCTION.....	I
1 Authority.....	I
2 Objective.....	I
3 Scope of Works.....	I
4 Previous Studies.....	2
5 Limitations.....	3
B PHASE I – Desk study.....	5
6 Environmental Setting.....	5
6.1 Site Location and Description.....	5
6.2 Geology.....	6
6.3 Hydrogeology.....	7
6.4 Hydrology and Flooding.....	8
6.5 Designated Environmentally Sensitive Sites.....	8
6.6 Ground Workings, Mining, Extraction and Natural Cavities.....	8
7 Site Usage.....	8
7.1 Evidence of Onsite Contamination.....	8
7.2 Neighbouring Land Use.....	9
7.3 Site History.....	9
7.4 Unexploded Ordnance (UXO).....	10
7.5 Waste Planning and Landfill Records.....	10
7.6 Radon.....	10
8 Previous Investigation Findings.....	10
C PRELIMINARY CONCEPTUAL SITE MODEL.....	12
9 Environmental Risk Assessment.....	12
9.1 Conceptual Site Model (CSM).....	12
9.2 Sources.....	12
9.3 Receptors.....	13
9.4 Pathways and Potential Contaminant Linkages.....	14
9.5 Qualitative Risk Assessment of Contaminant Linkages.....	14
9.6 Conclusions.....	14
10 Conclusions.....	15

APPENDIX A – Limitations

APPENDIX B – Figures

APPENDIX C – Photographs

APPENDIX D – Historic Maps and Environmental Database Searches

APPENDIX E – Qualitative Risk Assessment Model

EXECUTIVE SUMMARY

The site is located in a residential area of Bognor Regis and comprises a bungalow, a small driveway and front garden in the northwest of the site, and a large dominantly grassed back garden in the centre and southeast of the site. It is proposed to demolish the bungalow and construct two semi-detached bungalows with private gardens, a single storey garage and associated parking.

Prior to the construction of the present bungalow the site was undeveloped land with a possible land drain running along its southern boundary. The bungalow was built around the mid to late 1930s. The surrounding area was similarly mostly open greenfield until around 1900 when the area began to be redeveloped with mostly residential housing. Three schools were constructed on the site directly south and east of the site between 1930 and 1980. These were demolished in the early 2000s with new schools and a housing estate constructed.

The site is mapped as underlain by River Terrace Deposits and further underlain by Lambeth Group. Based on local boreholes groundwater is anticipated to lie between 3m and 6m bgl.

The site is not located within a flood risk zone.

The site is not affected by radon gas.

The desk study has not identified any significant potential sources of contamination on-site or off-site that could pose a risk to human health or controlled waters. It is considered that an intrusive investigation is not required for the site.

Signed:	 Lauren Stillwell Msci FGS
Countersigned:	 Kate Baker BSc. MEnvSc. CSci. ASoBRA (Human Health) RSoBRA (Controlled Waters)
Date:	7 October 2020
Revision:	Issue 1

INTRODUCTION

1 Authority

Leap Environmental Ltd (hereafter referred to as **LEAP**) has been appointed by Mr Paul Nicol to undertake a Phase 1 Desk Study of a site located at 47 South Way, Bognor Regis, PO21 5EY (Figure 1). The instruction was given in an email dated 28th August 2020 and signed by Mr Paul Nicol.

2 Objective

LEAP understands that the site is currently owned by Mr Nicol. It is proposed to demolish the current dwelling and construct two semi-detached bungalows with private gardens, a single-storey garage and associated parking as per the attached layout in Drawing POI-April 2020 of Appendix B.

The proposed development has been granted planning permission (BE/43/20/PL). Planning condition 11.1 requires a preliminary risk assessment be carried out, due to the identification of potential contamination on an area of land adjacent to the site. This report covers the requirements for the preliminary risk assessment included in the decision notice.

The objectives of this report are to:

- Provide preliminary information on the environmental quality of the ground present on the site;
- Assess the potential health and other environmental risks posed by the site to the proposed development and to other specifically identified receptors; and
- Assess the potential for offsite contamination to adversely affect the proposed development.

3 Scope of Works

This report provides a review of previous site investigation where **LEAP** has been able to locate that information from third party sources. The previous reports referred to are

detailed below. The following publicly accessible sources of information¹ have also been reviewed:

- BGS ‘Geology of Britain’ online viewer accessed on 14th September 2020;
- BGS Borehole log refs. SU90SW82 and SU90SW83;
- Defra ‘MAGIC’ website accessed on 14th September 2020;
- Groundsure.io website accessed on 14th September 2020;
- Envirocheck database report (256591689_I_I);
- Unexploded WWII aerial delivered bomb (UXB) regional risk maps produced by Zetica;
- Interrogation of the World Wide Web on 14th September 2020 for general information pertaining to the site history; and
- Interrogation of the Arun District Council and West Sussex County Council Planning Portals for the site and adjacent sites.

A site reconnaissance was carried out on 10th September 2020 and the current owner of the site was interviewed.

The Phase I desk study and site reconnaissance have been used to develop an initial conceptual site model, which forms the basis for any future site investigation strategy, if required.

The Phase I investigation is also referred to as a Preliminary Investigation².

Previous Studies

The site has not been subjected to any previous investigations however the land adjacent has recently been redeveloped and the following site investigation reports have been accessed from the planning portal for Arun District Council:

- Gifford, ‘Bognor Regis Community College: Contaminated Land and Geotechnical Desk Study’, Dated April 2007 (Ref: I3731/GE/R01);

¹ The report contains British Geological Survey materials ©UKRI 2020 and public sector information licensed under the Open Government Licence v3.0.

² BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites – Code of Practice.

- Zetica, 'Sitesafe Bomb Impact Desk Study at Bognor Regis Community Schools, Bognor Regis, West Sussex for Gifford', Dated 2nd October 2007 (ref: P0877/07/R1/B);
- Gifford, 'Bognor Regis Community College: Contaminated Land Site Investigation Interpretive Report', Dated January 2008 (Ref: I3731-GE-R03); and
- WYG Environment, 'Bognor Regis Community College, Youth Centre, A058249 – Ground Condition Assessment Report for West Sussex County Council', Dated 5th October 2009 (Ref: A058249).

As part of the planning application for the redevelopment of the schools to the south and southeast of 47 South Way, a preliminary desk study (Ref: I3731/GE/R01) and site investigation (Ref: I3731-GE-R03) were undertaken in 2007 and 2008. The desk study comprised a review of available environmental data and a site walkover around the school buildings. The site investigation comprised eight cable percussion (CP) boreholes to between 22.5m and 25m bgl and nineteen windowless boreholes to between 0.5m and 5.0m bgl. The trial holes targeted likely areas of contamination highlighted in the desk study, as well as ensuring general coverage across the site. Eleven groundwater and gas monitoring wells were also installed, and groundwater monitoring and sampling was carried out following the intrusive investigation. A UXO-based desk study was also carried out on the same site (Ref: P0877/07/R1/B).

A second intrusive investigation was carried out in 2009 (Ref: A058249) around a single storey teaching block within Bognor Regis Community College, to aid the proposed youth centre. Two CP boreholes were excavated to 10.2m bgl in July 2009, with gas/groundwater monitoring wells installed in both. The investigation was dominantly for geotechnical purposes however some environmental sampling was undertaken.

5 Limitations

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk.

Full details of the limitations are provided in Appendix A.

B PHASE I – DESK STUDY

6 Environmental Setting

6.1 Site Location and Description

The site is located at 47 South Way, Bognor Regis, West Sussex, PO21 5EY, as shown in Figure 1.

The approximate National Grid Reference of the site is 492260E 100220N. The site lies at an estimated elevation of 7.5m Above Ordnance Datum (mAOD).

6.1.1 General Description and Boundaries

A walkover survey was carried out on 10th September 2020 and photographs are included within Appendix C.

The site is approximately 0.08ha in size and comprises a bungalow in the northwest of the site with a small driveway and front garden, and a large back garden in the centre and southeast of the site. At the time of the site walkover the building was being rented out. The site as a whole is flat-lying.

The bungalow comprises brick on the outer surface of the lower portion of the building to the height of the windowsills with pebbledash/roughcast above. A small garage is present on the southern side of the building, and the edge of the eastern side of the building has a small patio made from concrete. The client indicated that the building was built in the early 1930s, that an asbestos survey had been carried out recently and that no asbestos was detected within the bungalow. LEAP has not had sight of that report. The front garden comprises gravels in front of the bungalow with broken concrete slabs in front of the garage. The client mentioned that these slabs were previously part of temporary runways for planes during World War II. The southern portion of the front garden is predominantly grass, and at the time of the walkover a car and a pile of bricks were being stored on the grass. The front garden is bordered by a brick wall with a hedge on the northwest side, and by a metal and wooden fence on the southwest.

The front and back garden are separated by a wooden fence with a gate. The garden is large (around 0.045 ha), flat-lying and mostly covered with a lawn. The most southeast edge of the garden comprises longer grass, weeds and two large trees. At the time of the site walkover items including garden furniture, toys, a shed, a boat and heras fencing were present in the back garden. The garden is bordered by a wooden fence on the southeast, by a hedge on the northeast and by a wooden and metal fence on the southwest.

The surrounding area is predominantly residential, with all the houses at the southern end of South Way of a similar style to the building present on site. A large complex is present to the

south comprising a primary school and a secondary school with associated sports pitches and fields, a nursery and a sports centre.

The site is bounded to the northwest by South Way with residential housing and a social club beyond, to the northeast and southeast by residential housing, and to the south and southwest by four relatively new residential houses and the leisure/school complex beyond.

6.2 Geology

The geology of the site has been ascertained by reference to the BGS website (www.bgs.ac.uk) and the Envirocheck report. The site is mapped as being underlain by River Terrace Deposits and further underlain by the Lambeth Group. The Lambeth Group is underlain at depth by the White Chalk Subgroup which outcrops around 350m to the north-northeast. It underlies the London Clay Formation bedrock which is overlain by the River Terrace Deposits around 315m to the south-southwest.

The previous investigations on the site to the south of 47 South Way are mapped as underlain by the same geological formations as 47 South Way in the north and centre of the site. The intrusive investigation encountered either topsoil or made ground from ground level to between 0.3m (topsoil and made ground) and 2.3m bgl (made ground only). These were underlain by multi-coloured sandy to very sandy clays, sandy gravelly clays, silty very clayey sands and clay with gravel horizons to the base of the majority of the boreholes, to a maximum depth of 24.0m bgl. Chalk was encountered in one of the boreholes at 22.4m bgl in the north of the site. In the investigation around the teaching block in 2009 the soils underlying the made ground were interpreted to be the Reading Formation of the Lambeth Group. There was no differentiation between the River Terrace Deposits or the Lambeth group in the 2008 intrusive investigation.

6.2.1 River Terrace Deposits

River Terrace Deposits consist of alluvium forming one of a series of level surfaces in a stream or river valley, produced as the dissected remnants of earlier abandoned floodplains. The deposits comprise sand and gravel, locally with lenses of silt, clay or peat.

6.2.2 Lambeth Group

The Lambeth Group (formerly known as Woolwich and Reading Beds) tend to consist of grey and grey-brown interbedded fine sands silts and clays. There are sometimes shelly beds at the top and bottom of the formation. Some very strong bands of weakly cemented shells and limestone can be encountered, particularly in the area between Lewisham and Bermondsey.

6.2.3 London Clay Formation

London Clay is found extensively throughout the London Basin. The Formation mostly comprises thoroughly bioturbated, slightly calcareous silty clay to very silty clay. Beds of clayey silt and silty fine grained sand are found increasingly towards the west of its subcrop towards Reading.

At outcrop The London Clay Formation is weathered to brown and may contain secondary carbonate nodules. This weathered or oxidized zone varies from about 3-6m in depth and may be less than 1m thick where the clay is overlain by superficial deposits. Below this it is generally blue grey in colour and fissured. The top few metres of unweathered clay and bottom of the weathered zone often contain gypsum crystals a source of sulphates.

London Clay is generally quite plastic and its volume change potential varies from medium to very high depending on the clay content

6.2.4 White Chalk Sub-Group

The White Chalk Subgroup is a very fine-grained white limestone consisting predominantly of the disaggregated skeletal remains of tiny planktonic algae and is composed of almost pure calcium carbonate. Layers of flint are common within the White Chalk Subgroup. Flint is composed of silica derived from the dissolved skeletons of siliceous sponges and microfossils.

The White Chalk Subgroup is a Major Aquifer in south-east England.

Chalk is particularly affected by weathering and the effects of dissolution. The top surface of the chalk is usually irregular and may include deep drift filled solution pipes for example. Chalk is also susceptible to frost action.

6.2.5 BGS Boreholes

The online BGS Geoindex (<http://www.bgs.ac.uk/geoindex/>) was reviewed for local geological and hydrogeological information. One borehole (ref: SU90SW83) was identified 85m north-northwest of the site, with a further borehole (ref: SU90SW82) located 325m southeast of site. Neither of the logs have interpreted geological formations from the ground conditions.

Borehole ref SU90SW83 encountered ground conditions comprising made ground of ash and brick rubble from ground level to 0.6m bgl, firm brown sandy clay to 1.6m bgl, medium dense brown fine sand to 2.9m bgl and yellowish brown sandy silty clay with occasional gravels to the base of the borehole at 4.6m bgl. Groundwater was encountered at 2.7m bgl.

Borehole ref SU90SW82 encountered gravelly topsoil from ground level to 0.7m bgl, firm yellowish brown sandy silty clay to 2.7m bgl and loose yellowish brown silty sand with occasional gravel to the base of the borehole at 4.6m bgl. Groundwater was encountered at 3.2m bgl.

6.3 Hydrogeology

The Environment Agency has designated both the superficial River Terrace Deposits and the Lambeth Group bedrock as Secondary A Aquifers. The Chalk underlying the site at depth (interpreted from the logs from the site to the south around 22m bgl) is a Principal Aquifer. According to the Envirocheck report the site is not situated within a groundwater Source Protection Zone (SPZ) and there are no current groundwater abstraction licences within 1000m of the site.

Groundwater monitoring carried out during both previous investigations on the site to the south. In the 2008 investigation groundwater monitoring encountered groundwater between 5.98m and 6.91m bgl, however in the 2009 investigation it was encountered between 1.42m and 1.64m bgl in the dominantly sand horizons in the Lambeth Group. One borehole in the 2009 investigation encountered a groundwater strike at 6.8m bgl, which suggests the shallow groundwater encountered may be perched water.

Based on the groundwater dips the 2008 investigation interpreted groundwater flow to be in a general easterly direction.

6.4 Hydrology and Flooding

There are no surface water features within the site, adjoining the site boundary or within 250m of the site and no current licenced surface water abstractions within 500m.

The site is not located in an area where the BGS considers there is potential for groundwater flooding of property which is situated below ground e.g. basements. However, a potential for groundwater flooding at surface is recorded 15m to the south of the site.

According to the Envirocheck report the site is not located within a flood zone.

6.5 Designated Environmentally Sensitive Sites

There are no designated environmentally sensitive sites within 250m of the site boundary.

6.6 Ground Workings, Mining, Extraction and Natural Cavities

There are two recorded BGS historical mineral sites within 500m of the site. The closest is located 226m northeast of the site and was opencast mined for common clay and shale. There are no active groundworks or mineral mining listed on Envirocheck and the site is not situated within an area affected by coal mining.

7 Site Usage

7.1 Evidence of Onsite Contamination

A walkover survey was carried out on 10th September 2020 of the residential property.

The car currently being stored on site could be a possible source of contamination, however there was no evidence of oil or fuel leaks or spillages. There were no other observed features on site that were considered to be possible sources of contamination.

7.2 Neighbouring Land Use

The site is located in a residential area with few possible sources of contamination observed during the site walkover or through a review of the relevant contemporary trade directory entries within 250m of the site listed in the Envirocheck report.

An electrical substation is situated adjacent to the southeast boundary of the site. Although it appears to be relatively new and within a recent housing development, a substation is mapped to this location from at least 1975. A car breakdown and recovery service facility are recorded approximately 135 m to the east of the site. However, further research determined that this was a private house.

7.3 Site History

The contaminative and development history of the site has been ascertained with reference to the Ordnance Survey historical maps, internet searches and information provided by the client.

The site was undeveloped land from the earliest map dated to 1877 with a possible land drain running along its southern boundary and onwards to the west. A residential property with the current footprint was constructed sometime in the mid-late 1930s. At this time, the drain was discontinued further to the west.

The surrounding area was similarly mostly open greenfield land which began to be redeveloped from around 1900 onwards, predominantly from the village/parish of South Bersted to the east of the site. The largely residential development began slowly at first then increased from around the 1930s. Around this time a secondary school was built to the east of the site, followed by a junior school in the early 1960s and an infant school in the 1980s. The schools remained until the early 2000s when all three schools were demolished and a new primary school, secondary school a nursery and leisure centre were constructed. Some land in the northeast and southwest of the former school was also redeveloped into new residential housing, including the land directly east-southeast of the site.

There were a small number of brick fields in the general area from around 1910, the closest of which was 225m northeast of the site. These are the ceased BGS recorded mineral sites discussed in Section 6.6 which appear to have been built over during the construction of the residential areas.

7.3.1 Other Evidence

Information from the Planning Portal, internet searches and information from the client suggest that the new school and leisure complex to the south of the site was commissioned in the late 2000s and completed in the early 2010s. The housing development adjacent to the southeast applied for planning around the same time as the school/leisure complex (within the same parcel of land) and was built around 2015.

7.4 Unexploded Ordnance (UXO)

The risks from unexploded ordnance have been assessed in accordance with CIRIA guidance³. A non-UXO specialist preliminary screening assessment has been carried out. The risks have been assessed by considering firstly the likelihood of military activities on, or in the vicinity of the site as determined from the desk study and historical review. Secondly the risk of UXO has been assessed by reference to the unexploded WWII aerial delivered bomb (UXB) regional risk maps produced by Zetica.

The Zetica risk maps indicate a moderate risk of UXO beneath the site, however a low risk area is located 250m west of the site. A Bomb Impact Desk Study (Ref: P0877/07/R1/B) was produced for the former Bognor Regis School and the surrounding land as part of the planning application process for the redevelopment and construction of the new education and leisure facilities. The desk study interpreted a low risk of UXO on site and in the surrounding area. Therefore the UXO risk for the site is rated as low.

7.5 Waste Planning and Landfill Records

There are no areas of historical or active landfill, waste treatment, management or disposal sites listed within 500m of the subject site.

7.6 Radon

According to the Envirocheck report database, the site is not located within a radon affected area with less than 1% of homes above the action level for radon. Therefore, no special protective measures are required in the construction of buildings on this site, in respect of radon gas.

8 Previous Investigation Findings

The desk study for the site to the south identified little evidence of potential sources of contamination. Former above ground oil tanks previously used for heating all the school buildings were noted however there was no evidence of spillages around the areas the oil boilers previously located. An electrical substation to the west of the college building and staining on the outside of a workshop within Bognor Regis Community College were also identified as possible sources of contamination. However the risk of potential contaminant linkages from the sources to receptors were considered to be low to moderate or lower.

The site investigation in 2008 targeted the sources of contamination highlighted in the desk study, as well as providing general coverage of the site. Sampling and subsequent laboratory

³ CIRIA C681 2009. Unexploded ordnance (UXO) - A guide for the construction industry

testing of the made ground and natural soils identified exceedances in PAHs in one sample of made ground and one of natural, as well as five exceedances in extractable petroleum hydrocarbons and very marginal heavy metal exceedances. Marginal exceedances were recorded in total PAHs of two samples of groundwater taken following the investigation however were not considered to be a concern.

Environmental sampling and laboratory testing during the site investigation in 2009 didn't identify any contaminants in significantly elevated concentrations. Overall, it was interpreted that there was no risk to human health based on the concentrations detected.

Relatively little contamination was identified in either of the intrusive investigations around the potential sources. The site has now been redeveloped and as such it is anticipated that any contamination present will have been remediated. Furthermore, as groundwater flow is likely to flow in an easterly direction, the subject is upstream of the site to the south. Therefore, the risk of contamination from the site to the south impacting the subject site is considered by LEAP to be very low.

C PRELIMINARY CONCEPTUAL SITE MODEL

9 Environmental Risk Assessment

The initial site conceptual model is used to identify geotechnical and geoenvironmental hazards and the qualitative degree of risk associated with them. In terms of the geoenvironmental assessment the conceptual site model is used to identify potential sources of contamination, potential receptors and pathways by which the two may be connected. These are known as possible contaminant linkages and it is these contaminant linkages that are key to contaminated land risk assessment.

9.1 Conceptual Site Model (CSM)

A risk-based approach is used to assess contaminated or potentially contaminated land within the UK. For a potential risk to exist, there must be a contaminant linkage in place, i.e. there must be a source of contamination, a potential receptor, and a pathway linking the two.

In order to quantify the magnitude of the risk, it is necessary to first calculate the potential exposure of the receptor as a result of all the individual active contaminant linkages affecting that receptor. Secondly it is necessary to ascertain “what is an acceptable exposure level for each of the identified receptors and contaminants?”. Various numerical models are available to aid in the assessment and these are discussed in more detail in section 9.5 below.

The purpose of the Conceptual Site Model, in this instance, is to identify all of the potential contaminant linkages by considering, in turn, the potential sources, receptors and pathways.

9.2 Sources

9.2.1 Onsite Sources

Based on a review of the available site information the following contaminants of concern are proposed:

Table 1: Onsite sources of contamination

Source	Contaminants of Concern
Made ground beneath the building and driveway	Heavy metals, PAHs, Petroleum Hydrocarbons, Asbestos
Leakages from vehicles on site	Petroleum Hydrocarbons

The building on site was constructed in the 1930's and made ground may be present beneath. There are no records from the time of construction, and potentially contaminated soils may have been used. Based on the size of the building and the front drive the volume of made ground is likely to be very small. There also may be hydrocarbon contamination from leakages

of oil or fuel from vehicles of various owners parked on site over the years. Though the main drive in front of the garage is concrete it was damaged at the time of the site walkover, and may have been for several years, which creates a pathway for hydrocarbons to more easily reach the soils beneath. Leakages from cars parked on the grass on the front drive will also result in a higher likelihood of hydrocarbons contaminating the soils. In both cases the leakages are likely to be small and localised.

9.2.2 Offsite Sources

The desk study has highlighted the following potential off-site sources of contamination:

Table 2: Offsite sources of contamination

Source	Distance from Site (m)	Contaminants of Concern
Electrical substation	0 (adjacent to southern corner)	PCBs

An electrical substation is labelled on historical maps from the 1970's, though may have been constructed earlier as it was likely related to the former schools on the site to the south. Its construction pre-dates the ban on PCBs and thus they may be present within the structure of the substation.

As previously discussed in Section 8 there is not considered to be a risk of contamination from the site to the south.

9.3 Receptors

Potential receptors are those which may be impacted by any of the contaminants of concern identified above, and include the following:

- Future residents
- Construction workers
- Groundwater – Secondary A Aquifer (River Terrace Deposits and Lambeth Group)
- Material construction of buildings and infrastructure
- Neighbouring properties

There are no surface waters in close proximity to the site and so are not considered to be a receptor.

9.4 Pathways and Potential Contaminant Linkages

The development will include private gardens. All potential contaminant linkages involving resident humans and soil contaminants will be active i.e. direct ingestion of soil, ingestion of soil attached to plants as well as via plant uptake, inhalation of indoor and outdoor vapour and of dust tracked back into the house and finally ingestion of water carried by plastic water pipes through contaminated ground.

Ground workers are at risk as a result from all of the above, except for those involving edible plants.

The site is underlain by a Secondary A Aquifer. Hence there is a potential pathway for leachate from soil contaminants and for mobile liquid contaminants to enter the groundwater. The water table could be between 3.0m and 6.0m, based on the previous investigations and previous boreholes, which increases the distance contaminants have to travel to reach the groundwater thus reducing the likelihood.

9.5 Qualitative Risk Assessment of Contaminant Linkages

Risk levels within the preliminary CSM are determined on a qualitative basis following review of the available desk-based information. The significance of particular contaminant linkages is dependant both upon the severity and likelihood of the risk. These two factors are summarised in the following tables.

The potential contaminant linkages are summarised in the table appended in Appendix E and given a qualitative risk classification in accordance with current guidance. The details of the risk assessment methodology are presented in Appendix E.

9.6 Conclusions

There are no potential contaminant linkages on site which are considered to be a significant risk. The risk of contaminants from made ground beneath the building to future residents via ingestion and inhalation pathways is considered to be a low risk. The volume of made ground is likely to be very small based on the size of the building/ front garden and so is unlikely to contain significant volumes of contaminants. Groundworkers and construction workers have a slightly higher risk of exposure however such risks are readily mitigated by the use of appropriate PPE.

The risk of exposure to asbestos in the made ground is slightly higher than for other contaminants and is rated as low to moderate because of the potential hazards associated with inhaling asbestos fibres. All other potential contaminant linkages are considered to be a very low to low risk.

The risk of PCB contamination on site is also considered to be low because PCBs are not very mobile in water, so any contamination is likely to be limited to the soils directly beneath the electrical substation. Groundwater flow is anticipated towards the south and any PCBs mobilised will move away from the site.

10 Conclusions

Overall, it is considered that there are no significant risks of potential contaminant pathways from sources either on site or off site. Therefore, an intrusive investigation is not required on site.

APPENDIX A – Limitations

Limitations

LIMITATIONS

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Unless explicitly agreed otherwise in writing, this report has been prepared under LEAP's standard terms and conditions, as included in the quotation for this works.

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed. LEAP cannot be held responsible for any disclosures or changes in regulation that are provided post production of this report, and will not automatically update the report.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development and site usage, timescales or clients specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an overall assessment of ground conditions on site. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode⁴, although this is subject to the restrictions imposed on the investigation as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and

⁴ BS EN 1997 Eurocode 7- Geotechnical Design - Part 1: General Rules (2004) and Part 2: Ground Investigation and Testing (2007)

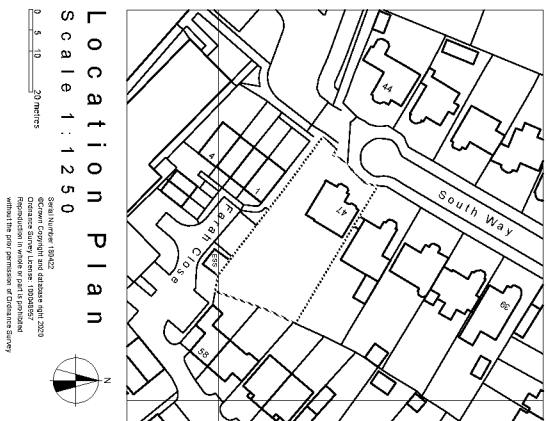
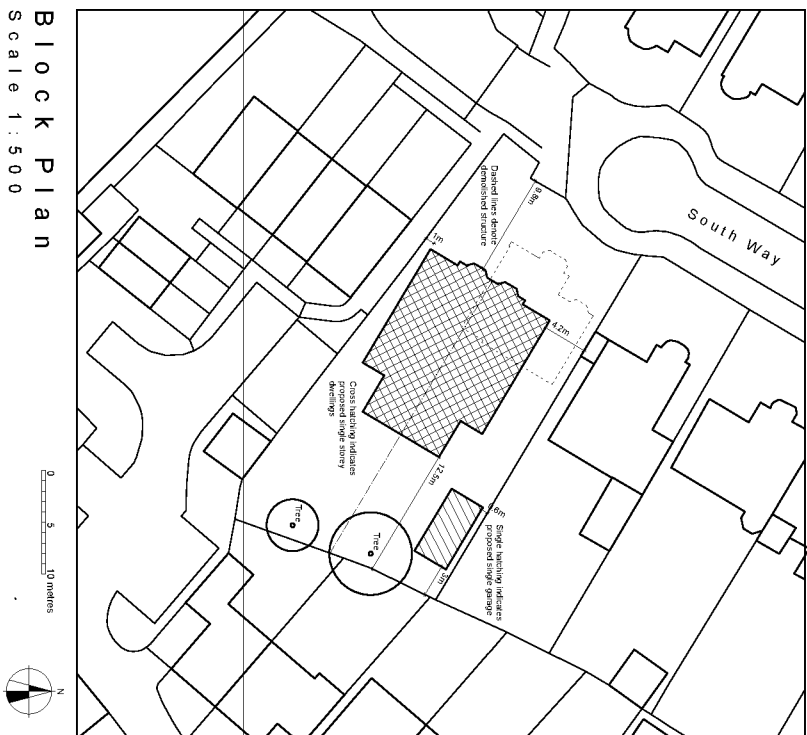
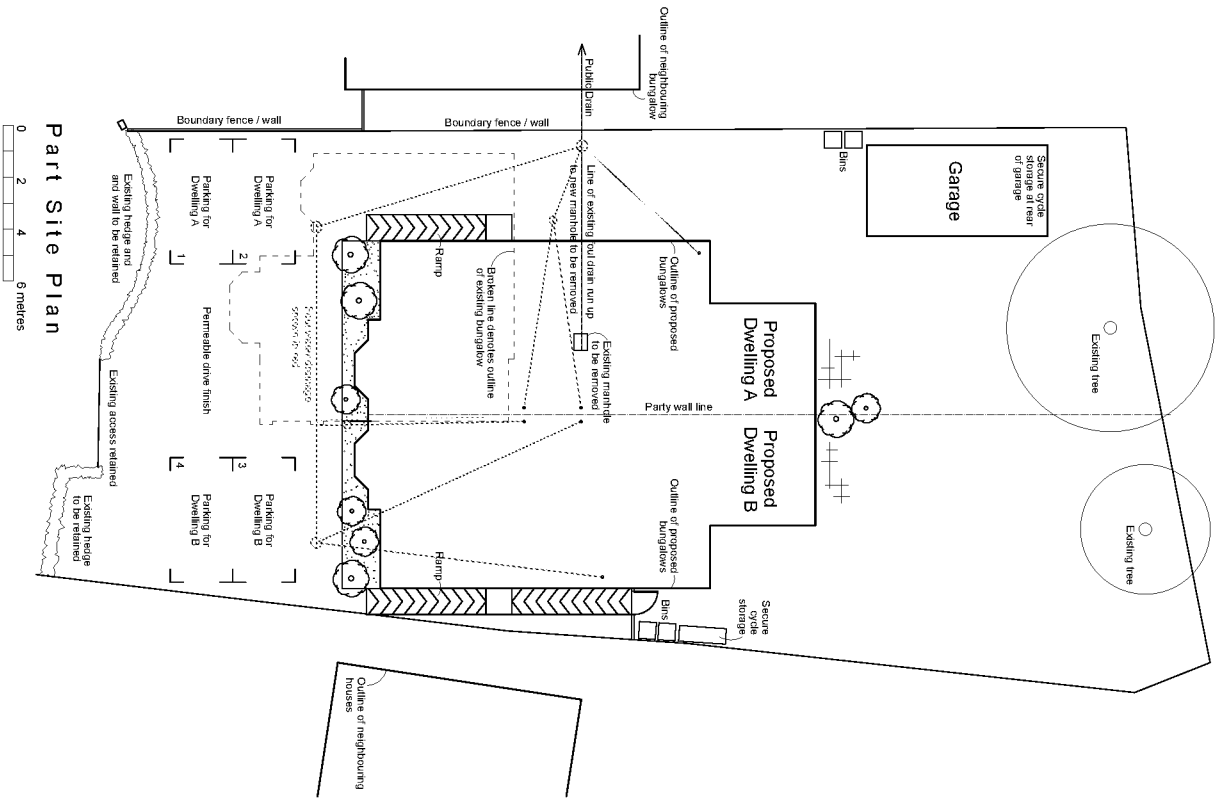
structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this report will not meet the requirements of a Geotechnical Design Report (GDR), and should therefore be used for preliminary guidance only.

The presence of asbestos may be noted during the site walkover survey, intrusive investigations and/or from the results of contamination testing. However, this report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

APPENDIX B – Figures

Figures

This drawing and its contents are the strict copyright of Architectura Design. No reproduction without permission. Do not scale. Written dimensions to be used where given. All dimensions and details to be checked on site. FOR PLANNING PURPOSES ONLY



Architectura
Architectural Design & Drawing Service

Proposed Replacement Dwellings
at
47 South Way, Bognor Regis
for
Mr P Nicol
Drawing P01 April 2020 Scale 1:200, 1:500&1:1250@A3
Proposed Drawing - Site, Block and Location Plans

APPENDIX C – Photographs

Photographs



Front of the bungalow (facing east)



Front of the bungalow, garage and front driveway (facing east-southeast)



Broken slabs on driveway



Car and bricks stored on grass portion of the front garden (facing south)



Grass portion of the front garden (facing southwest)



Back of house and back garden (facing west-northwest)