Remediation Strategy

At:

Unit 1 & 2, The Malthouse Estate
Brighton Road
Shoreham-by-Sea
East Sussex
BN43 6RJ

For:

LIDL GmbH

Ref: 2272 15 03 20 RPT 01 REV 02 SS MP

Private and Confidential

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1.0 Introduction

1.1 Terms of Reference

Sevenoaks Environmental Consultancy Ltd (SEC) has been appointed by LIDL GmbH to provide Environmental Consultancy Services for the redevelopment of Units 1 & 2 of the Malthouse Estate, in Shoreham-by-Sea. A site location plan is presented as Figure 1.

In support of this redevelopment, SEC has prepared a Contaminated Land Remediation Strategy (this report), in support of a planning submission for the proposed LIDL supermarket development (ref: 2272 15 03 20 RMS Rpt 01 Rev 02 SS MP).

Since the initial formulation of the contaminated land condition (paragraph 13), additional data has been gathered, which indicates that a full-scale removal of the Made Ground is not necessary to safely redevelop this site. The report containing the new information is currently under review by the Local Authority. Therefore, until such time that a formal endorsement of the proposed remediation strategy described in that report is received, this Remediation Strategy must necessarily be considered as a provisional document.

1.2 Development Overview

The site is approximately 0.7 hectares and is to be redeveloped for commercial use, comprising a LIDL superstore with a customer car parking area. An illustrative plan of the proposed development is presented as Figure 2.

1.3 Previous Reports

Several previous geo-environmental site investigations have characterised the soil and groundwater conditions at the site. The information used to develop the Remediation Strategy was primarily extracted from the following reports;

Groundsure	Phase 1 Environmental Risk Assessment (Ref: GSC-40077-65260) Jul 2010
Waterman	Quantitative Env'tal Risk Assessment (EED13597-100-R-1-2-2-FA) Mar 2013
OPUS	Geo-Environmental Ground Investigation J-M0166.01 (Jul 2013)
SEC Ltd	Geo-Environmental SI Report (2272 15 03 15 Rev 02)

Those responsible for implementing the Remediation Strategy should be familiar with the contents of the previous reports in order to optimise their appreciation of the objectives of the scheme in the context of the local ground conditions and environmental constraints. For other readers, a brief summary of the main findings is presented in the following chapter.

1.2 Document Scope and Layout

The aim of this document is to indicate the working methods and waste disposal practices that need to be followed during the ground preparation works at this site.

The scope of the document does not extend to structural design of proposed buildings or new foundations. The intention is essentially to indicate the steps that will need to be undertaken to ensure that the site is suitable for use in the light of the previously discovered contamination, that there will be adequate records to demonstrate that this is the case and that the construction phase of the project can proceed with minimal exposure to any residual contamination.

The strategy outlined in the following chapters therefore focuses on the controls that will need to be in place to monitor excavations as the ground slab is removed and foundations prepared, the manner in which unexpected contamination encountered during this process is managed, and how the works will be validated to demonstrate compliance with planning conditions.

In addition, the report indicates situations where higher levels of environmental oversight are warranted, the objective being to leave the site in a condition that allows contractors that are not specialised in land contamination to continue redevelopment works with a reduced level of environmental oversight.

The document is composed of four main sections:

- An overview of the site characterisation and data interpretation;
- A description of the general earthworks strategy;
- Details of relevant design requirements and work practices; and
- Environmental management and validation reporting requirements

2.0 Site Description

2.1 Current and Former Land Use

The site operated until recently as part of Edwards Vacuum (formerly BOC Edwards), producing hydraulic vacuum pumps. The operations included metal machining and assembly and required the use and storage of various chemicals (including solvents and hydraulic fluid). The relevant part of an annotated former site plan (generated by Groundsure in 2010) is presented as Figure 3. Reportedly, there was a solvent storage area to the rear of Unit 2, although this was not indicated on the Groundsure plan.

Prior to that, a large engineering works had operated at the site (although the precise nature of the business is unknown) with a rail line serving a local chemical works and coal wharf running across part of the site. It is possible that it was initially used as a brickfield and later infilled.

2.2 Layout and Setting

At the time of reporting the site comprised two large rectangular warehouses with an open area laid to concrete hard standing between the two buildings. Access is from Brighton Road, which runs along the southern site boundary. There is an electricity substation abutting the northern site boundary. Which separates the site from a railway line. Commercial properties operate to the east and west. The current site layout can be seen on the Former Exploratory Hole Location Plan presented as Figure 4.

The site is located within a generally commercial / industrial setting approximately 80 m from Shoreham harbour.

2.3 Ground Conditions and Environmental Context

The site geology comprises relatively permeable Made Ground overlying a layer of sandy clay, which separates the surface deposits from the underlying Chalk aquifer.

There are three recognisably distinct layers within the Made Ground, including a dark silty pfa material, which, whilst occasionally absent, is generally present and directly overlying the sandy clay. The thickness of the Made Ground is variable but there is some evidence to suggest that it extends to greater depth in the south-eastern quarter of the site where it was proven to approximately 1.0 to 1.2 mbgl. Although perched water was not apparent during investigations, this could be due to a combination of minimal infiltration through the current concrete surface and the tendency for the silty pfa to be slow to release water. When excavations are open, one would expect a greater rate of infiltration and some consideration will therefore need to be given to water management.

The thickness of the brown sandy clay appears to be highly variable - the minimum proven thickness of the low permeability clay was 0.7 m at SE02, where a relatively shallow contour of the Chalk surface coincided with a deeper section of Made Ground.

Groundwater strikes occurred at approximately 6 mbgl, with water levels rising to approximately 4.5 to 5.0 mbgl and subsequently showing variation with tidal cycles.

A more comprehensive description of the nature and thicknesses of the various geological strata can be found in the most recent site investigation report (SEC - Feb 2015).

The most important features of the site hydrogeology are likely to be that the sandy clay layer demonstrably acts as a protective layer between the shallow Made Ground and the underlying Chalk Aquifer (as evidenced by the confined nature of the water table) and that the underlying, tidally influenced groundwater is in hydraulic continuity with the River Adur.

2.4 Nature and Distribution of Contamination

The contamination detected over the various phases of investigation, falls into three main categories connected with the former operational use of the site and its neighbours, as well as former infilling activities.

The contaminants of relevance to the remedial works are chlorinated solvents, asbestos and elevated sulphate (which has implications for foundation design).

Chlorinated Solvents

Concentrations of these compounds in the shallow Made Ground were relatively low (below generic health screening thresholds for commercial redevelopments), but potentially indicative of higher concentrations in areas not directly intercepted by an exploratory location. The elevated chlorinated solvent concentrations were more prevalent in two areas (the north west corner of the site and the east and north east of the site). It was thought likely that concentrations would be higher in the blackish grey pfa type material, and this was borne out by analytical findings.

Low-level chlorinated solvent contamination was present in groundwater, having probably arrived from off-site areas.

Asbestos

Occasional fragments of asbestos and fibres were encountered in the course of each of the last three site investigations, but there has been no indication of extensive deposition of waste asbestos containing materials. Furthermore, the quantitative analysis undertaken by SEC on Made Ground samples, where asbestos screening had detected loose fibres, showed that concentrations were minimal. Therefore, since the redevelopment scheme will effectively cap the site with regard to these non-volatile materials, there is no risk-based reason for their presence to trigger a major soil replacement exercise. However, strict controls will need to be in place and ready for deployment in the event that further, potentially significant impacts are uncovered during the construction works.

Sulphate

Elevated sulphate levels have been found at multiple locations across the site and carry attendant risks to buried concrete structures.

Ground Gas

There was little evidence of potentially significant concentrations of ground gases being generated at the site. Flow rates were negligible and the site has been categorised as Characteristic Situation 2 on the basis of isolated CO_2 concentrations exceeding 5%, rather than from direct evidence of the ground having the potential to generate ongoing high concentrations of ground gases.

Fuller descriptions and discussion of the contamination are presented in the SEC Site Investigation report.

3.0 Remedial Strategy

3.1 Scope and Objectives

The objectives of the remedial strategy are essentially threefold and aim to achieve a situation where it can be demonstrated that the ground conditions are such that;

- The external areas of the site do not present a significant human health risk to future site workers and/or visitors;
- The future employees and/or visitors are not exposed to significant health risk indoors (via inhalation of vapours); and
- The area of the site exposed in the course of the constructions works is not host to substantial levels of contamination that present a significant risk to surface waters or the ongoing resource potential of local aquifers.

The first of these objectives will be primarily met by the choice of hard cover in the car-parking area and the absence of soft landscaped areas. The only realistic prospect of future potentially significant health-risk, would arise if, on removal of the existing slab, a substantial /severe impact by volatile contaminants were to be discovered, in which case it would be addressed by source removal as described in more detail in the following chapter.

The second objective relates to minimisation of indoor exposure to vapours. In the event that contamination at the site is significantly more extensive than could reasonably have been foreseen from the earlier site investigation phases, various options are available. The simplest would involve some limited source removal of hotspots and verification sampling (see following chapter).

However, engineering solutions of the type already proposed for inclusion in the building design, could be enhanced to ensure an effective break of any potential pollutant linkage, should that be necessary. If this latter approach were to become a favoured option, the Planning Authority would need to be contacted to ensure that this would be sufficient to discharge the land contamination condition.

The third objective is related to the previous two insofar as the need for action would be dependent on the discovery of unforeseen levels of contamination or other significant deviations in the ground conditions from those observed during the investigation phases. As before, selective soils removal would be the control mechanism. Risks to controlled waters will be managed by Environmental oversight (and action where necessary) during relevant parts of the construction works and covered in a remedial validation report.

3.2 Overview

On account of the relatively low levels of contamination encountered and the nature of the end-use, it is not anticipated that major remediation works will need to be implemented at the site. Therefore, rather than actively seeking to remove or treat contaminated soils (other than where required for construction purposes), the strategy focuses on the planning for and management of unexpected contamination (if it

should be encountered), safe working practices and design considerations for engineered solutions to the low-level residual contamination.

Monitoring will be carried out during and after completion of excavations to ensure robust validation of the process and a technical report issued to provide a record of the final land condition.

Therefore, in this instance, the remedial strategy predominantly reduces to the provision of an environmental management framework to ensure specialist oversight and suitably qualified personnel are on-hand to inform decision making at the critical points of the development process.

If during the course of the preparatory civil engineering earthworks, it becomes apparent that the extent of contamination is materially different from our current understanding, this approach may need to be revised to incorporate additional elements (subject to regulatory approval).

3.2 Redevelopment Scheme –

The proposed redevelopment scheme is understood to comprise general civil works, excavation to accommodate building foundations, and disposal of soils (some of which may be contaminated) and re-grading of the site as necessary.

A major element of the redevelopment process will be the disposal of the excavated and broken out material. The use of relevant test results will enable the soils to be classified for direct disposal to landfill, for treatment or for recycling. The waste management tasks will be carried out in compliance with the relevant waste management legislation, including robust chains of custody for waste handling.

The main features of the proposed works include:

- Ensuring that remediation takes place in a secure site;
- Service diversion and/or protection as necessary;
- Soil excavation as necessary to facilitate construction of building foundations;
- Recycling of excavated materials where possible;
- Controlled disposal of net soil arisings;
- Protection of future maintenance workers accessing service trenches from residual contamination;
- Chemical resistant pipework;
- Certified installation of a vapour membrane with suitable chemical resistance; and
- Development of a remediation validation report.

SEC does not anticipate the need for major engineering works to dewater the site based on the nature of the ground and the quantity of water encountered during the site investigation works, although contractors should recognise the potential risk from extreme coastal weather conditions combined with increased infiltration once the slab is removed and plan accordingly.

As the works will inevitably result in soil disturbance, the potential impacts of this activity on site workers, future development workers and local ground and surface water has been considered. In summary, the works should not result in undue risks to site workers provided site personnel adhere to health and safety and other control measures referred to in this document.

Further details regarding working methods are provided in Sections 4 to 6 of this document.

4.0 Site Preparation and Earthworks

4.1 Layout of the Works and Site Security

Site traffic including all lorry movements will enter and exit the site via the southern access to Brighton road. The welfare and decontamination unit will also be situated in the south of the site, which will be close-boarded to prevent public access.

4.2 Site Clearance

SEC does not anticipate any significant environmental issues to arise during demolition of the existing buildings other than the appropriate removal of asbestos containing materials during which the demolition contractor will be responsible for health and safety of workers, visitors and/or other members of the general public.

Subsequent construction activities have the potential to mobilise contamination. Therefore, prior to removal of the slab, the existing deep groundwater monitoring wells should be decommissioned as an insurance against contamination entering the underlying aquifer. The procedure should be carried out in accordance with best practice for decommissioning redundant boreholes.

4.3 Services Diversion and Protection

It is understood that within the site itself most of the previous utility conduits will be retained during the earthworks and re-conected into during the construction phase. The main contractor will be responsible for confirming the entry point of existing and proposed underground services to the site and the proposed development and to make secure any locations that are identified. Standard health and safety best practice should be observed in this respect.

A number of minor works may therefore be required to isolate key services temporarily during construction and the service detection survey should be consulted in this regard.

As contingency against the discovery of unexpected contamination, all existing drainage manhole chambers in and around the vicinity of the soil excavation area which are to be retained will be isolated during groundworks to prevent any contamination from reaching the local drainage network during construction and care must be taken to ensure that this is not compromised during the subsequent works.

Where service infrastructure is to remain undisturbed (notably the electricity sub-station adjacent to the northern site boundary and surface water drainage along the rear of the site), excavations will be restricted to leave the recommended buffer zone.

4.4 Underground Structures

There is no intention to retain prior foundations and there is no perceived additional hazard relating to the presence of underground structures.

4.5 Foundation Design

Whilst it is beyond the scope of this document to recommend foundation designs, it is appropriate to include a comment here regarding the need to protect, as far as possible, the integrity of the sandy clay layer which currently affords the underlying aquifer some level of protection from surface spillages. This may have a bearing on any decisions relating to piling design, should that be the favoured option.

It is not within the scope of this report to make specific recommendations with regard to foundation design, but the high sulphate concentrations identified should be taken into account when selecting concrete formulations.

4.6 Unexpected Contamination – Discovery

4.6.1 Communication Structures

The works will be subject to two tiers of environmental oversight – depending on the sensitivity and relevance of the tasks being undertaken. Where the perceived chance of encountering undiscovered hotspots of contamination is greatest, a Watching Brief by a suitably qualified Geo-environmental Engineer/Scientist will be implemented, whereas for the remainder of the works programme, risks will be reported and managed via a Discovery Strategy (see Appendix B) the implications of which will be included within workers' site induction.

An essential aspect of this oversight is the need for the geo-environmental engineer to be fully appraised of the works timetable (and to be copied in on any proposed changes to the programme). This should ensure that a suitably qualified person is present at the optimum moments in the remediation to monitor, offer advice and collect samples for later validation purposes.

If unexpected contamination is encountered during the works, it will almost certainly occur during either removal of the existing ground slab, or during any excavations necessary for the laying of foundations.

4.6.2 Removal of the Slab

Whilst no site investigation can predict ground conditions with complete certainty, the shallow Made Ground at this site has been relatively well characterised. Consequently, we can be reasonably confident that the east and north-east of the site is the area where there is greatest risk of encountering higher concentrations of contamination than those already detected. Since this area coincides with the proposed footprint of the new building, it would be prudent to employ a higher level of oversight when this area is uncovered as this will provide the option of prompt field screening.

The apparent distribution of low-level asbestos in the east of the site is an additional reason to consider a Watching Brief while raising the slab on this side of the site as some forms of asbestos may not be immediately recognised by untrained personnel (see also asbestos protocols in Health & Safety Section). Whilst elevated VOC concentrations were recorded in the north west of the site, the use of this part of the site as a car park makes that area somewhat less sensitive, although a Watching Brief would still be beneficial in this area and may facilitate an efficient validation that portion of the site.
In addition to monitoring for visual and olfactory indications of odours, screening of soils with a PID will provide additional information to assist in selection of samples for validation testing and segregation of soil arisings as appropriate.

4.6.3 Construction Excavations

The other main work element where unexpected contamination might be encountered will be the excavation of Made Ground to accommodate foundations and or future service trenches. Regardless of whether any additional contamination hotspots ere encountered, the site excavations will generate a net surplus of materials to be disposed of off-site. A suitably qualified Geo-Environmental Engineer/Scientist should be on hand to oversee the excavation and removal of any severely impacted Made Ground that might be encountered, particularly in the east of the site.

In addition to monitoring for visual and olfactory indications of odours, screening of soils with a PID will provide additional information to assist in selection of samples for validation testing and segregation of soil arisings as appropriate.

4.7 Excavation of Contaminated Soils

The decision to remove soils or leave them *in situ* will be based in the first instance on professional judgement (informed by visual, olfactory indications and PID readings) as to whether contaminant concentrations are likely to exceed the current Commercial Screening Criteria (contaminant screening thresholds should predominantly be covered by the recently published C4SLs and S4ULs). Corroborative sampling and analysis of relevant samples from the base and sides of excavations will be carried out for later inclusion in a site Validation Report

Whilst volumes of soil arisings are expected to be relatively modest, based on the perceived low probability of severely contaminated pockets of contamination being encountered and the potential for relatively unimpacted soils to be used for backfilling purposes (subject to geotechnical constraints), some limited stockpiling will be required pending receipt of analytical testing for disposal purposes.

The Contractor will take care not to mix any apparently contaminated materials with those that do not appear contaminated.

Procedures shall be adopted that allow for the referencing of stockpiles on site in relation to the samples taken for chemical testing. As specified, detailed descriptions of excavated material and colour photographs of material stockpiled at the site prior to off-site disposal shall be obtained.

Material proposed for re-use on site will be tested to ensure that it conforms with the contaminant remediation objectives for existing soils (ie compliance with S4ULs and C4ULs for commercial end-use).

With regard to the overall extent of the excavations, this will be governed in part by the degree of contamination and in part by party wall issues (where a standard 45° angle will be used to prevent any impingement on structural integrity of adjacent foundations).

Soils will be assessed and graded as excavation proceeds in order to correctly classify materials for controlled off-site disposal. Further details are provided in the following section.

Consideration will be given to conducting works on a cellular basis, to minimise the area of open excavations, and to optimise the health and safety controls over the activities.

4.8 Classification of Material and Stockpiling

Excavated materials will be directed to the appropriate prepared stockpiling area for temporary storage using provisional classification based on professional judgement, PID readings and/or field test-kit results. Classification will ultimately be subject to independent chemical analysis including WAC testing where appropriate.

If excavated materials with noticeable high volatile emissions have to be temporarily stockpiled on site, then they will be required to be completely sheeted over, to minimise volatile and/or dust emissions to the surrounding environment.

The materials will be stockpiled and carefully segregated as the works progress with a view to recycling materials where possible to minimise lorry movements and reduce the landfill burden of the works.

Stockpiles will be physically separate to avoid cross contamination and sheeted where there is the potential to prevent enhanced leaching of contamination that may have been recently mobilised. The potential for pfa to hold quantities of water or solvent may mean that it is necessary to sheet above and below some stockpiles to ensure that potentially contaminated leachate does not re enter clean ground.

The complete works area will be operated as a contaminated site in accordance with HSE guidance during all earthworks and operations.

4.9 Waste Disposal

All wastes generated from the redevelopment works will be dealt with in full compliance with the statutory Duty of Care as defined by the Environmental Protection Act 1990.

Consignment notes will need to be issued for all waste loads and it is anticipated that a system of payment to the Waste Disposal Contractor will be based on the submission of completed notes. All wastes will be transported by registered carriers and deposited only at suitably licensed disposal sites based on the relevant chemical data.

Wastes will be transported by road. Whilst loading of lorries is anticipated to occur in a relatively clean area of the site on hard-standing, lorries will be sheeted to prevent release of any contaminated materials onto the public highway and all such lorries will be inspected (and jet-washed as necessary) prior to leaving the site.

4.10 Excavation Backfilling and Imported Materials

There is no anticipated requirement for importing material onto the site to fill excavations left by contaminated material (unless required for geotechnical reasons) because, in the event that some limited hotspots require removal, it is likely that other materials excavated for construction purposes would be acceptable for use as backfill subject to appropriate compaction. However, the current expectation is that there will be little or no requirement to remove soils on contamination grounds.

Any materials imported onto the site at a later stage for geotechnical reasons will be certified as "clean" and the ground compacted during backfilling to minimise subsequent uneven ground settlement.

4.11 Landscaped Areas

It is anticipated that "clean" growing medium will be imported for use in the narrow landscaped area running along the northern site boundary. A minimum thickness of 300mm certified "clean" topsoil will be provided and this material will be segregated from the underlying Made Ground by a geotextile marker layer that will effectively restrict vertical mixing.

Prior to the delivery of any imported material to site, the chemical data for the proposed material should be provided by the supplier to an Environmental Consultant and the Regulators for approval (all delivery tickets to be retained). Subject to existing and proposed site levels, re-use or removal and appropriate disposal of existing material might be required to facilitate the recommended cover system

4.12 Water Management

Based on the absence of perched groundwater in the various site investigations to date, SEC expects the excavations to remain dry in the absence of extreme weather conditions. However, if excavated and stockpiled, the pfa type material (which has the potential to hold large quantities of moisture *in situ*) may release potentially contaminated leachate and provision should be made for stockpile areas to be sheeted and bunded.

Provision should be made for collection and containment of what are anticipated to be modest quantities of water and there should be effective capacity to hold any potentially contaminated water at this location pending arrival of an appropriately licensed road tanker to dispose of such liquids.

There will also be a silt-buster water treatment unit on site to manage less contaminated water arisings which may then be discharged to foul sewer under an appropriate discharge consent. Any discharges from site to controlled waters will need to be appropriately consented by the Environment Agency.

4.13 Chemical Validation Testing Frequency

As indicated above, oversight of the works will be carried out by a mixture of Watching Brief and Discovery Strategy according to the sensitivity of the tasks being undertaken. Selection of samples for validation purposes will be undertaken by a suitably qualified environmental engineer.

Where unexpectedly elevated levels of contamination are encountered, validation samples will be collected from the base and sides of any excavation to confirm final site condition. Samples should be tested for VOCs where volatile chemicals residues are the trigger for soils removal.

Since asbestos impacted soils are only anticipated to be removed in the event that a substantial deposit of asbestos waste materials is encountered, visual indications (supported by photographic evidence) and discretionary sampling should be adequate in this regard.

The Environmental Engineer will have access to field test kits and a photo-ionisation detector (PID) to support his/her visual and olfactory observations. Field test kits may assist in rapid screening but are not considered to be essential. Validation samples will be taken at appropriate times throughout the works and used in the completion report.

Validation testing for the final pre-construction site condition should be undertaken on surface samples with an overall density equivalent to a sampling grid with 20 m spacing to provide general site coverage.

4.14 Protected Services

Any water supply pipe work will be resistant to diffusion by volatile organic compounds including chlorinated solvents, to protect it from possible residual contamination. The relevant water supply company will provide information regarding appropriate infrastructure.

All services, including foul drainage pipes will be placed in certified "clean" backfill.

4.15 Gas Protection Measures

The Contractor will be responsible for overseeing the installation of gas protection to the building. It is anticipated that a passively vented, solvent-resistant gas membrane would be employed but the Contractor will retain responsibility for commissioning a system that conforms with best practice guidance for Characteristic Situation 2 where volatile chemicals are a factor. It is expected that Council approval from the EHO for this aspect of the scheme would be sought in advance. For discharge of the planning condition, certification by an approved installer will need to be retained so that it can be included in the validation report.

5.0 Health & Safety

5.1 General

The project will be operated under the Construction Design and Management Regulations, 2007 (CDM) and the Control of Substances Hazardous to Health regulations, 1994 (COSHH).

All site works will be subject to CDM Regulations and all site-specific health and safety issues will be the direct responsibility of the Principal Contractor. The Contractor will also compile an active Site Health and Safety File (to be provided to the Client on completion of the works) and appoint an on-site Health and Safety Representative.

5.2 Contaminated Site Protocols

Full time supervision for the works will be the responsibility of the Resident Engineer (RE) of the Groundworks Contractor. Apart from supervising the works, the RE will be responsible for compliance with any agreed regulatory controls and will monitor safe working practices. All site staff will be inducted by the RE into the site hazards and safety procedures, and will be advised of the location of first aid and decontamination facilities.

Despite the degree of contamination enabling soils to be left *in situ* beneath future hard cover, the remediation works will be operated according to standard contaminated site protocols with clearly defined clean and dirty areas. Entry into the contaminated area will be via a decontamination unit with changing, washing and boot cleaning facilities.

All personnel involved in the excavation works will wear appropriate PPE as identified in the Health and Safety risk assessment for the project. Basic protective clothing will include overalls, gloves, steel toed boots, hard hat and when or where necessary safety spectacles. No eating, drinking or smoking will be allowed in contaminated areas.

5.3 Earthworks

In general, man entry into excavations will be discouraged and the use of machinery substituted wherever possible. All excavations will potentially have elevated emissions of hazardous vapours and dusts compared to the surrounding ground level.

Entry into excavations will be prohibited without due inspection and risk assessment by a competent person and due consideration of stabilisation measures (e.g. Trench box's). Tight excavations will be treated as confined spaces for health and safety purposes. Appropriate monitoring and team working procedures will be adopted in these circumstances.

Where excavations are shallow no special precautions are anticipated to be necessary.

5.4 Air and Dust Emissions

Given the nature of the ground and contaminants, despite the relatively short duration of open excavations and the hoarding round the site, it is important that the risks from dust emissions (either for on site workers or those working at adjacent properties) are appropriately managed. Risks will be higher in extended dry conditions and when handling pfa given its silty nature.

Asbestos

Buried asbestos debris was encountered in some exploratory holes and there is a possibility that this could be more widespread than previously thought. Some forms of asbestos may not be immediately recognisable by untrained personnel and therefore, a suitably experienced person will be on site to conduct a watching brief during excavation works.

Where more densely concentrated asbestos is encountered, the immediate control mechanisms will be based on damping down (potentially including the use of wetting agents given the presence of brown and blue asbestos) and temporarily covering excavations, pending attendance by a suitably qualified professional (if not already present) and potentially removal from the site by a specialist contractor with air monitoring. Also appropriate PPE will be available for such a contingency.

5.5 Explosive Ordnance

Whilst SEC is not aware of any UXO survey carried out specifically on this site, the fact that it has already been developed once since WWII, that the excavations are likely to be shallow and that the site's location has been looked at by UXO professionals who have initially suggested that the risks would be slight in regards to this site, means that UXO risks associated with the forthcoming phase of works are also slight.

Whilst not responsible for later phases of work, SEC recommends that site personnel conducting subsequent intrusive ground works are briefed with regard to explosive ordnance safety and awareness and are provided with unexploded ordnance site safety instructions. As a contingency measure, the resident engineer should have access to the expertise of a UXO surveyor in the event that any suspicious objects are encountered during the works.

6.0 Programme of Works

The main contaminated land aspects of the excavation works will be subject to confirmation following the receipt of returns from tendering contractors but it is anticipated that SEC will continue to be available to offer advice in this area as the redevelopment works progress to the more advanced phases of construction.

Site works are expected to commence and complete in spring - summer of 2015.

6.1 Validation Reporting

On completion of the remedial works, any relevant data gathered including analytical data, site photos, records of material movements including waste transfer notes will be compiled to generate a remedial works validation report, which should provide a clear record of the progression of works and final site condition.

General Limitations and Exceptions

1. The advice given in this report with respect to contaminated land/pollution is based on the guidelines available at the time of writing.

2. This report does not include for an assessment of above-ground structures on site for the presence of potential asbestos containing materials.

3. The Client is advised that the conditions observed on site by SEC at the time of the investigation or assessment are subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance or investigation and they may subsequently have become observable.

4. Comments made relating to land gas or groundwater conditions are based on observations made at the time of an investigation unless otherwise stated. However, land gas or groundwater conditions may vary as a result of seasonal or other effects. It would be prudent to conduct groundwater monitoring.

5. This assessment may be subject to amendment in light of additional information becoming available.

6. The findings and opinions conveyed in this report are based on information obtained from a variety of sources, including that from chemical testing laboratories, and which SEC has assumed are correct. Nevertheless, SEC cannot and does not guarantee the authenticity or reliability of the information it has relied upon. SEC can accept no responsibility for inaccuracies within the data supplied by other parties.

7. This report is written in the context of an agreed scope of work between SEC and the Client and should not be used in a different context. In light of additional information becoming available, improved practices and changes in legislation amendment or re-interpretation of the assessment or report in whole or part may be necessary after its original submission.

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13. The report is issued on the condition that SEC will under no circumstances be liable for any loss arising directly or indirectly from ground conditions between the boreholes or trial pits which have not been shown by the borehole, trial pits or other tests carried out during the investigation.

14. In addition, SEC will not be liable for any loss whatsoever arising directly or indirectly from any opinion given on the possible configuration of strata both between the borehole and/or trial pit positions and/or below the maximum depth of the investigation. Such opinions, where given, are for guidance only.

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17. It should be noted that the Made Ground depth recorded above is that encountered within the trial pits and exploratory holes undertaken during the phase of work to which this report pertains. Owing to the variable nature and unknown deposition criteria of Made Ground it is possible that deeper or more extensive areas of Made Ground may exist at this site which have not been revealed by the current work.

Appendix A

Figures

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This map is not to be relied upon for accuracy and is for identification purposes only

SITE: Units 1 and 2 The Malthouse Estate, Brighton Road, Shoreham-by-Sea, East Sussex, BN43 6RJ	**SCALE: NTS**	**JOB NO: 2272**	**Sevenoaks Environmental Consultancy Ltd**
FIGURE TITLE: Site Location Plan	**REV: 01**	**FIGURE NO: 1**	

Consultancy Ltd
Environmental
Services

JOB NO: 2222	FIGURE NO: 2
SCALE: NTS	REV: 0

FIGURE TITLE: Proposed site layout plan

SITE: Units 1 and 2 The Maltinghouse Estate, Brighton Road, Shoreham-by-Sea, East Sussex, BN43 6RJ

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SITE: Units 1 and 2 The Maltthouse Estate, Brighton Road, Shoreham-by-Sea, East Sussex, BN43 6RJ	**SCALE: NTS**	**JOB NO: 2272**	**Sevenoaks Environmental Consultancy Ltd**
FIGURE TITLE: Groundsure Annotated Former Site Layout	**REV: 01**	**FIGURE NO: 3**	

Consultancy Ltd Environmental Services	Figure 4	JOB: 2222
SITE: Units 1 and 2 The Maltbouse Estate, Burlington Road, Shoreham-by-Sea, West Sussex, BN43 6RA LPA: Adur District Council		
TITLE: Exploratory Hole Location Plan (All Holes)		