WILSON BAILEY
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Carters Barn
Sherrington
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Tel: 01985 850882

1 February 2018

Your ref:
Planning ref:
Our ref: J17027dbc04a

**RE: OLD MACHINE STORE SITE, VINYL WORKS DEVELOPMENT, HAYES**

**CONTAMINATED LAND RELATED PLANNING CONDITION NO 16 FOR THE CONSENTED MIXED USE REDEVELOPMENT OF THIS SITE**

This site has been the subject of a multi phased desk study and ground investigation carried out by different consultant teams. This report is intended to provide a summary of the works within the context of Planning Condition No 16 and to confirm the requirement for remediation necessary to comply with the requirements of Part C of the condition.

Planning Condition No 16 states the following;

*(i) The development of the relevant building hereby permitted shall not commence until a scheme to deal with contamination has been submitted in accordance with the Supplementary Planning Guidance on Land Contamination and approved by the Local Planning Authority (LPA). The scheme shall include all of the following measures unless the LPA dispenses with any such requirement specifically and in writing:*

*a A desk-top study carried out by a competent person to characterise the site and provide information on the history of the site/surrounding area and to identify and evaluate all potential sources of contamination and impacts on land and water and all other identified receptors relevant to the site;*

*b A site investigation, including where relevant soil, soil gas, surface and groundwater sampling, together with the results of analysis and risk assessment shall be carried out by a suitably qualified and accredited consultant/contractor. The report should also clearly identify all risks, limitations and recommendations for remedial measures to make the site suitable for the proposed use.*

*c A written method statement providing details of the remediation scheme and how the completion of the remedial works will be verified shall be agreed in writing with the LPA prior to commencement.*

The following reports have been provided in order to address the above condition and are discussed in this report;

- Merebrook Ground Investigation / Geo-Environmental Assessment (report reference GEA-19579G-16-230 dated August 2016) which also makes reference to several phases of investigation works across the wider Vinyl Works Site by others;; and
- Supplementary Due Diligence Desk Study and Ground Investigation Report prepared by Wilson Bailey Partnership (report reference J17027dbc02 dated September 2017).

**Part A of the Planning Condition**

Information contained within the Merebrook Ground Investigation Report together with supplementary information provided within the Wilson Bailey Supplementary Report is deemed to constitute an appropriate and robust desk study that has identified and assimilated the relevant information in order to provide an assessment of the significance of any risks posed to potentially sensitive receptors.

These reports have concluded that whilst locally significant contamination has been encountered elsewhere within the wider former industrial site, no indications of significant contamination have been identified within this development site. The desk study research has been supplemented with ground investigation works in compliance with Part B of the Planning Condition.

**Part B of the Planning Condition**
The Ground Investigation report by Merebrook has confirmed the anticipated ground conditions and has not identified the presence of significant concentrations of a wide range of potential soil contaminants.

This investigation work has however been limited by scope and access to the building at the time of those works but did identify the presence of 'tunnels' below the northern part of the site, although these were not discussed in more detail.

A supplementary phase of ground investigation was carried out by Wilson Bailey as part of a due diligence exercise to cross check the findings of the Merebrook works and to provide supplementary information with regards to ground conditions, soil contamination, presence of groundwater and soil gasses.

This supplementary phase of works also included exploration of the tunnels beneath the northern part of the site which were fully investigated and assessed.

Summary Discussion of the Ground Investigation Findings with regards to Contamination

Marginally elevated concentrations of Arsenic and Lead have been encountered within the made ground at this site with regards to the proposed land use of residential but without private gardens or the potential for growing homegrown vegetables in ground, which is consistent with the consented development proposals. The presence of elevated arsenic and lead are not perhaps unexpected due to the historical urban and industrial setting of the site. Elevated concentration of a wide range of other contaminants have not been encountered.

Samples of groundwater which were recovered and submitted for laboratory analyses have not indicated the presence of elevated concentrations of potential chemicals of concern with respect to the established groundwater sensitivity of the site and its surroundings.

Soil gas monitoring was carried out as part of both phases of ground investigation. The initial phase of works carried out by Merebrook included monitoring that did not indicate the presence of onerous soil gas conditions, although due to the relatively limited scope of these works, the monitoring did not extend to include a period of low atmospheric pressure. Additional monitoring carried out by Wilson Bailey Partnership as part of the supplementary phase of due diligence works including additional gas monitoring during period of low atmospheric pressure and indicated similar results. On the basis of this robust assessment, soil gas protection is not considered necessary as part of the proposed development at this site.

**Part C of the Planning Condition**
In the light of the additional ground investigation works and monitoring carried out by Wilson Bailey Partnership, following on from the initial phase of works by Merebrook, a Remediation Strategy has been formulated.

The main elements of works required under the finalised Remediation Method Statement are summarised as follows;

- Provision of a 300mm thickness of clean cover system to areas of proposed managed planting;
- Validation of imported materials required to be used to form the above clean cover system;
- Inspection of formation levels to areas of managed planting as part of a check for any gross contamination / presence of asbestos fragments, with any remediation works required to remove any such contaminants carried out in agreement with the Local Authority; and
- Maintenance of a Watching Brief for contaminated land in order to ensure that should any unexpected pockets of contamination or any suspicious soils be encountered, they may be appropriately investigated, assessed and remediated as necessary in consultation with the Regulatory Authorities.

Wilson Bailey will be undertaking remediation inspections and management of contaminated land aspects of the development on behalf of the developer and will be responsible for the collation of records required as part of the preparation of a Verification Report summarised as follows;

- Results of laboratory testing to substantiate the quality and chemical acceptability of imported soils used to form the clean cover system;
- Confirmation of the placement of these soils to the required 300mm depth below finished ground level;
- Inspection of formation levels to proposed areas of managed planting in order to check for gross contamination and potential presence of asbestos, with details of any remediation works deemed necessary in agreement with the Local Authority;
- Confirmation of the geo-environmental watching brief being maintained, and details of any works required as part of these works;
- Photographic records of key stages of work;
- Details of waste disposal of soils removed to form the proposed basement and the reduced level formation to areas of managed planting; and
- Records of any materials reuse on site.

The Verification Report will need to be provided to the Local Authority for clear Part C of the Contaminated Land Related Condition No 16, with this information also required to be issued to Building Control to resolve any Land Quality Conditions associated with the development.

We trust that this letter provides sufficient information although please do not hesitate to contact me should you have any queries or questions.

Yours sincerely
Wilson Bailey Partnership

Dominic Brightman
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WILSON BAILEY
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25 September 2017

Your ref:
Planning ref:
Our ref: J17027dbc02b

Enya MacLiam Roberts
Planner
Lichfields
14 Regent's Wharf
All Saints Street
London
N1 9RL

Dear Ms MacLiam Roberts,

**RE: OLD MACHINE STORE SITE, VINYL WORKS DEVELOPMENT, HAYES**
**PRE-PURCHASE DUE DILIGENCE DESK STUDY AND SITE INVESTIGATION**

This letter provides our review of the ground conditions and likely development issues and challenges and is based upon the a pre-purchase desk study, review of previous reports carried out by others and provided for our review, and a limited phase of contaminated land targeted ground investigation.

This letter is provided in accordance with our standard terms, conditions and limitations and provides a suggested scope of further ground investigation work that is necessary to complete the design of the proposed mixed use commercial and residential development scheme.

For clarity and reference, this report provides a summary of the findings of the conclusions and design advice presented in the previous works.

**Current Site Description**
The site is currently occupied by an existing one and two storey former industrial building that forms part of the larger former record factory, record sleeve printing works and record production facility.

At the time of investigation the building was dilapidated and in a state of significant disrepair and was being used as a materials storage area for the adjoining development site, with parts of the site fully occupied by pallets of various construction materials together with various cable reels, timber and metal stockpiles.

**Development Proposals**
The site is to be developed through the demolition of the existing building. The northern part of the overall building footprint is then to be redeveloped through the construction of a new cinema building, whilst the southern part of the site is to be redeveloped by the developer through the construction of a new apartment block rising to 7 storeys over a podium deck and semi-basement level car.

At ground level there are no proposed areas of soft landscaping that form part of the development area, although there are areas of external hardstanding. An area of landscaping that appears to include areas of planting within raised planters and at ground level is proposed directly to the north of the site although it is understood that this is the responsibility of the vendors to provide as part of the cinema construction.

It is anticipated that this area of soft landscaping to the north will be formed using imported and certified clean and suitable topsoil by others such that this space can be discounted with regards to ground contamination for the development.

**Desk Study Summary Including Review of Vendors Reports**

The desk study has comprised a review of the previous report by others together with supplementary and confirmatory desk study research as required and a walkover survey carried out as part of the limited phase of contaminated land focused ground investgiation.by Wilson Bailey.

The site is shown to have initially formed part of a brick field used to excavate clay for the manufacture of bricks, with the existing mainline railway indicated to have been present to the south of the site. Subsequent historical maps studied indicate that the site was subsequently developed as part of a larger gramophone factory with various above ground tanks indicated to have been present. This use is indicated to have continued to the most recent map studied, which dates from 2012, subsequent to which the wider site has been redeveloped following closure of the factory, through the construction of a number of new buildings as part of a mixed use development comprising apartments, offices, education and community facilities.

The site is not indicated to be located within an area that may be affected by Radon and no issues of potential environmental significance, other than the former factory use, have been identified in the immediate vicinity of the site.

The previous reports indicate that the ground conditions across this site and the larger former gramophone factory to comprise up to about 2.00 m of made ground overlying River Terrace Gravel and subsequently the London Clay.

The previous ground investigation carried out on behalf of the vendor within this land parcel has included a number of shallow boreholes and trial pit together with limited soil contamination testing. This previous investigation essentially confirmed the anticipated ground conditions and did not indicate the presence of any visual or olfactory indications of ground contamination although marginally elevated concentrations of lead and arsenic were identified.

Across the wider site it is known that there have been numerous issues relating to buried asbestos and other ground contamination requiring remediation works.

**Site Investigations Scope**

From the review of the vendors report, it was identified that only two of the 10 soil samples that were submitted for laboratory testing were recovered from the area of the proposed basement within the development area and no waste testing was carried out.

Due to the presence of a semi-basement, waste disposal costs were identified as a significant potential risk item, with the absence of sufficiently detailed information within the vendors report preventing a robust and detailed waste assessment.

Following on from this review, Wilson Bailey Partnership have subsequently carried out a limited contaminated land focused ground investigation within the area of the proposed new semi-basement in order to confirm the prevailing ground conditions, install a monitoring well to confirm groundwater conditions and recover representative soil samples for suitable contamination and waste acceptance testing. A series of six boreholes was therefore drilled in accessible locations within the existing building to depths of up to 4m below ground level.

Following on from this initial phase of investigation we have carried out a return visit with the assistance of a two man crew and a mechanical excavator in order to investigate the location and extent of a series of underground ducts that were identified as potentially being present beneath the flor slab to the existing building.

Additional soil gas monitoring was also carried out during a period of low atmospheric pressure to supplement the findings of the initial phase of works by others.

**Ground Conditions**
The borehole have essentially confirmed the anticipated ground conditions in that beneath substantial and multi layered 300mm thick concrete ground floor slab, variable made ground comprising a brown reworked clay with brick, gravel and chalk fragments was encountered to depths of between 0.60 m and 1.50 m below ground level, beneath which dense becoming very dense sandy gravel of the River Terrace Deposits were encountered.

The boreholes did not encounter groundwater and a return visit to monitor the installed groundwater monitoring standpipe has not indicated the presence of groundwater to a depth of up to 3.00 m below ground level within this part of the site.

The results of testing carried out on selected representative soil samples recovered from the boreholes are enclosed and have not indicated the presence of widespread ground contamination. Marginally raised, but not elevated concentrations of lead and ash related poly-aromatic hydrocarbons have been encountered, which is consistent with the urban setting of the site, although these concentration are not considered elevated with respect to the proposed development of the site that is not to include areas of 'in ground' soft landscaping or private gardens. No detectable concentrations of asbestos were identified.

**Underground Ducts**
Beneath the ground floor slab, within the northern part of the site, a series of interlinked man-accessible ducts were encountered.

The location of these ducts and a cross section through them is included as part of the site plan together with a selection of photographs.

At various locations along the line of these ducts, steel access manholes are located within the roof of the duct in the floor slab above, with piles of debris present beneath the manhole. This debris includes rags, waste wire and metal and occasional extraneous matter including shoes and tin cans.

There are no identifiable indications of any further ducts elsewhere within other parts of the site, although much of the site is currently used for the storage of construction materials and elsewhere is inaccessible and heavily soiled.

The ends of each of the ducts is currently infilled with rubble including soil, brick, blocks and metal. In a number of instances the remains of steps rising up towards the ground floor slab were noted, although further investigation was not possible.

The ducts appear to be formed of precast concrete sections which have been bedded into a concrete foundations that has been benched to either side of the lower part of the duct, as indicated on the attached sketch cross section.

**Geotechnical Comments and Discussion**
<u>Foundations</u>
Due to the magnitude of the anticipated foundation loads associated with the proposed new building together with the requirement for widely spaced columns and a partial basement level it is considered unlikely that spread or pad foundations would be viable. For the purposes of a design check to robustly confirm this a preliminary foundation bearing pressure of 200 kPa could be used, although a further check on foundation pad bases sizes would be required in order to confirm that these loads to not result

in an excessive loading and therefore settlement within the underlying London Clay, which could further reduce allowable bearing pressures.

It is considered that cfa bored piles would be the most appropriate foundation solution for the proposed new building and the vendors report included deeper boreholes that provide suitable information to assist with the detailed design of piled foundations by the Structural Engineers.

Obstructions and Difficult Dig Zones

It is likely that obstructions associated with the foundations and ground structure of the existing building will be encountered as part of the redevelopment ground works. The existing building is understood to be founded upon pad foundation to 1.25 m below ground level.

Should the locations of any piles correspond with the location of the ducts, then the ducts will need to be broken out and removed, or the pile locations redesigned so as to avoid the obstruction.

The ducts and their roof sections have been found to be heavily reinforced, which may present a challenge for demolition, which should require careful consideration as part of the demolition works.

Concrete Class

Laboratory testing of selected soil samples has indicated that buried concrete should be designed in accordance with the requirements of classes DS-2 and AC-2

Tree Influence

The site is devoid of vegetation and the basement floor slab of the proposed semi-basement car park is anticipated to be founded within the non-plastic granular soils of the Lynch Hill River Terrace Gravel such that additional precautions for floor slabs are not anticipated.

CBR Information for the Design of Hardstanding Areas

The formation level of new areas of hardstanding at ground level around the proposed building will be within the made ground and as such should be designed on the basis of a CBR of less than 2% in accordance with best practice.

Soakaways

The vendors ground investigation report indicates that soakaways should be eminently suitable although it is understood that infrastructure drainage is provided as part of the wider development, which discharge into larger attenuation crate systems and soakaways, such that a site specific requirement for independent soakaways is not envisaged.

Unexploded Ordnance

Whilst we are not specialists in the field of UXO Threat Assessments, as the site is currently occupied by the full extent of a building that was constructed during the pre-war period and remained unaffected by wartime bomb damage, the risk of unexploded ordnance on site is likely to be negligible.

**Contamination Assessment**

Soil Contamination

The soil contamination testing carried out as part of both phases of works have not indicated the presence of raised concentrations of potential soil contaminants and the waste acceptance testing or representative soil samples has indicated that foundation and basement excavation arisings are likely to be classified as Inert Waste for landfilling purposes.

As with any brownfield site there remains a risk of localised variations in the ground conditions and the potential deliberate burial of waste materials such as asbestos, although the ground investigation works have not identified any indications of these potential issues of concern.

A requirement for remediation in the form of clean capping in soft landscaping and effective materials management across the site has been identified.

There remains a potential presence of localised contamination associated with the underground ducts on site, although the ground investigation works carried out within the constraints of the site at the time of the works have not indicated and widespread concerns with regard to ground contamination.

Groundwater Contamination

Groundwater was not encountered as part of this phase of investigation, although groundwater sampling did form part of the initial phase of works carried out by others. Samples of the groundwater were recovered and tested for a range of potential chemicals of concern, with the results not indicating elevated concentrations of a wide range of potential contaminants with regards to the assessed potential sensitivity of the groundwater setting of the site and its immediate surroundings.

A requirement for remediation with regards to groundwater contamination has not been identified

Soil Gas

Soil gas monitoring carried out during both phases of investigation works at this site has included monitoring at low atmospheric pressures and has not indicated the presence of onerous conditions of concern.

A requirement for remediation with respect to mitigating the risk of soil gas ingress into the completed development has not been identified

We trust that this letter provides sufficient information although please do not hesitate to contact me should you have any queries or questions.

Yours sincerely
Wilson Bailey Partnership

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Encs