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Development at Land Behind 34 Station Road

Remediation Strategy

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Document Control

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Client:	Oakstown Properties Ltd
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1.0 Introduction

RB Geotechnical has been commissioned by Oakstown Properties Ltd (The client) to prepare a Remediation Strategy for the proposed development at Land Behind 34 Station Road, Skelmanthorpe, West Yorkshire.

The site has been the subject of a Phase II Interpretative Report, source referenced below:

- RB Geotechnical, Phase II Interpretative Report, Development at Land Behind 34 Station Road, RBG257, January 2022.

2.0 Report Objectives

The purpose of this Remediation Strategy is to identify and evaluate feasible remedial methods and to validate the successful implementation of site remediation to ensure a safe and regulatory compliant redevelopment of the site.

3.0 Proposed Development

The proposed development is to comprise the construction of a residential dwelling, with space for car parking and a small, landscaped garden.

The proposed development and exploratory hole location plan is included as Appendix A.

4.0 Existing Information

The site was historically undeveloped up until the early 1900s when a row of buildings across the centre of the site were built. By the 1980s these buildings have been demolished, with two new buildings which were also demolished recently prior to this new development.

It is likely that these old buildings will have resulted in Made Ground across the site which could contain a number of contaminants.

A number of infilled land features were identified within 250m of the site boundary, mainly associated with old quarries, ground workings and a nearby colliery.

Due to the potential risk for onsite soil contamination from Made Ground and off-site contamination in the form of ground gases, a Phase II Intrusive Investigation was recommended.

The site was also found to be in an area of possible shallow coal which could have been mined in the past, in addition to a nearby historical colliery which indicates mining activity in the close surrounding area. It was found that the nearby coal seams to the site were identified to have been widely worked in the past. It was therefore concluded that a risk of potential unrecorded mine workings exists on the site, and therefore a Phase II Intrusive Investigation was deemed necessary to properly assess this risk.

A Phase II Intrusive Investigation was therefore carried out comprising three Rotary Open Hole Boreholes to assess for mine workings and to allow for a ground gas assessment and three hand excavated trial pits to allow for soil testing.

. The following ground model was established:

- A reworked sandy topsoil fill material was encountered from ground level to 0.40mbgl (metres below ground level), containing fragments of Mudstone. This was found to be underlain by an initially weathered but becoming intact Mudstone.
- Groundwater was not encountered in any exploratory holes undertaken;
- A total of four soil samples were collected and tested for a range of soil contaminants. Elevated levels of Arsenic, Chrysene, Benzo(a)Pyrene and Dibenzo(a,h)perylene were encountered in HP01,

HP02 and HP03 at depths of 0.10mbgl to 0.15mbgl. All of these hand pits were carried out in proposed soft landscaped areas and therefore, remedial measures are deemed necessary here; and

- Ground Gas Monitoring did not encounter any elevated levels of Carbon Dioxide or Methane and therefore the site was classified as having a CS score of CS1, whereby no ground gas protective measures were deemed necessary.

It was established that in order to be sure that no real risks exist from these contaminated soils, then remedial measures will be necessary to remove any encountered Made Ground from all proposed soft landscaped garden areas.

5.0 Site Specific Risk Assessment

Table 5.1 sets out the site-specific risk pathways identified that could potentially be present on the following the construction of the new houses on this site. These pathways are based on the findings of the intrusive investigations.

Table 5.1 Identified Site Specific Risks

Source	Receptor	Pathway	Comment
Possible contaminated soils containing Heavy Metals and TPH	End Users	Ingestion of contaminated soil or dust, through skin contact or inhalation in proposed new soft landscaped areas. Inhalation of TPH related gas vapours	Excavation of top 600mm of soils across all proposed soft landscaped areas. Replacement with minimum 300mm clean imported topsoil where necessary.

	Construction Workers	Ingestion of contaminated soil or dust, through skin contact or inhalation.	Skin contact will be minimised through the use of PPE and suitable washing facilities. The presence of all elevated contaminants will be noted on the construction file.

6.0 Remedial Objectives

Based on the above risk assessment, the following remedial objectives have been established for this site:

- Break any potential human exposure pathways to contaminated soils;
- To protect all construction and ground workers who will be exposed to the soil and thus be potentially exposed to the contaminants within it; and
- To satisfy the requirements of the regulatory authorities (i.e., the Local Planning Authority, Environment Agency and National House Builders Council).

7.0 Remedial Recommendations

The Phase II Intrusive Investigation identified potential risks to the future end users of the site and therefore remedial measures will need to be implemented to ensure safe development. The following remedial measures have been devised for the site:

- In proposed soft landscaped areas in South West of the site, excavation of top 600mm of current soils to ensure a sufficient thickness has been removed. This will be in line with reduction of site levels in this part of the site. Replacement with clean cover of at least 300mm of imported topsoil.

- Raised planting bed is proposed in the North East corner of the site, whereby newly imported topsoil will be placed.

All site workers will be made aware of the potential for contamination in the soils and a programme of works will be identified to protect workers handling any soil. The method of site working will be in accordance with all necessary guidelines set out by HSE and CIRIA. Washing facilities will be provided and site workers will be encouraged to wash prior to eating and use appropriate PPE when on site to minimise any skin contact with the soil.

8.0 Validation of Remedial Measures

8.1.1 Site Workers

All site works will be carried out in accordance with HSE and CIRIA, with appropriate PPE worn at all times and suitable washing facilities made available. Where any additional areas of odorous, discoloured or suspicious material is identified during construction, RB Geotechnical must be contacted and will return to site to investigate and make necessary recommendations.

8.1.2 Excavation of Contaminated Soils

Removal of minimum 600mm thickness of soils in proposed soft landscaped areas in South West of site. Upon excavating, all known contaminated soils must either be immediately transported off site to an appropriate place of disposal, or placed in a suitably quarantined area on site, whereby cross contamination with non-contaminated soils is not possible. Photographic evidence required to show lowering of site levels/removal of soils from proposed garden areas.

8.1.3 Imported soils to site

Prior to importation of any soils to the site which are to be used to backfill the excavated areas, suitable certification will be provided by the client or whomever is providing the imported material, in accordance with YALPAG (verification requirements for cover systems), and to be included within the validation report and approved by RB Geotechnical.

The Laboratory testing certificate will include an assessment of metals, TPH, PAH and Asbestos, with the provider of the imported soils providing the test results. Test results will be assessed against the same screening values used shown in Appendix B. Imported topsoil's must also be as specified in BS3882:2007, which relates to nutrient content of topsoil and phytotoxic contamination.

In accordance with YALPAG, it is essential that the imported material is either placed in its intended area straightaway or stockpiled in a suitable quarantine area to prevent on-site contamination.

8.1.4 Placement of Imported Soils

A clean capping layer of at least 300mm topsoil is required in proposed soft landscaped area in South West of site.

As before, suitable test certification will be provided by the client or whomever is providing the material, to be approved by RB Geotechnical.

8.1.5 Physical Validation

Following completion of the placement of this clean imported material, the thickness of the placed capping layer will be verified by excavating a hole in the placed soil. The excavation must show that levels have been reduced by a minimum of 600mm and a replaced with a minimum of 300mm of clean topsoil in proposed garden areas. The excavations must be sufficient to enable RB Geotechnical to physically confirm that the correct specified thickness of imported material has been placed. RB Geotechnical will record the depths placed by measuring with a tape measure and by taken photographs of each pit.

All soft landscaped gardens will also be digitally photographed by an RB Geotechnical engineer following placement of the new capping layer.

All photographs and records will be included within the validation report.

9.0 Waste Removal

In accordance with the European Waste Directive, all waste removed from site will be disposed of to a suitably licenced tip. All waste transfer documentation must be provided by the client. This will be included within the validation report.

10.0 Validation Report

Following successful implementation of the above remedial measures RB Geotechnical will produce a validation report which will set out the works carried out and will assess the significance of any further risks that remain. All data received during the remedial works will form part of the Validation Report.