

Appendix A.

This intrusive ground investigation confirms the presence of made ground deposits at all exploratory locations, typically comprising dark brown to grey very gravelly silty sands and very sandy silty gravels containing angular to sub-angular fragments of concrete, brick, cinders, sandstone, limestone, and mudstone, locally with cobbles. These materials are underlain by natural brown to grey sandy and slightly gravelly silty clay with fine to medium sub-angular to sub-rounded sandstone and mudstone gravel, locally including thin interbedded layers of clayey or silty gravel, proven to depths between 4.0mbgl and 4.5mbgl.

17.2 Foundations & Floor Slabs

Variable ground conditions have been encountered. Taking account of the SPT`N` values recorded in the boreholes, foundations should bear at a minimum depth of 1.4mbgl. Reinforced strips should be adopted and may be designed on an Allowable Bearing Pressure (ABP) of 50kN/m². The natural clay soil underlying the foundations is of low shrinkability and there is no evidence of desiccation affecting these soils. Notwithstanding this, should tree planting be planned then foundation depths may require adjustment in accordance with the guidance contained in NHBC Chapter 4.2.

Fully suspended beam and block ground floor slabs are strongly recommended. Should ground bearing slabs be considered then they should be constructed on ground prepared as follows:

- Removal of all organic soils to min depth 300mm below slab underside
- Thorough compaction at reduced level
- Placement and compaction of DTp Type 1 subbase layers

As an alternative, piled ground beam foundations may be considered with 150mm diameter bottom driven steel cased piles supporting a notional 500mm x 450mm rc ground beam. For the purposes of preliminary design, 150mm diameter piles driven to the mudstone at 4mbgl will carry a SWL of 120kN. Beam and block floors will be adopted with piled ground beam foundations

17.3 Excavations

Excavations may be undertaken by light hydraulic excavators. Excavations in excess of 1.2mbgl within sand deposits will require side support.

17.4 Groundwater Management

Water was observed at all borehole locations. In these conditions, a prudent contractor would allow for pumping to maintain dry working conditions during foundation construction / service installations particularly during heavy and/or prolonged periods of precipitation.

18.0 CONCLUSIONS & RECOMMENDATIONS

The conclusions and recommendations hereunder are based on the salient sections of the report and should not be referred to in isolation of the relevant sections of the text. All recommendations are subject to Regulatory Authority review.

Table 21: Conclusions & Recommendations

Soil Contamination	The above human health risk assessment confirms no exceedances, hence no potential risk to human health is indicated. Notwithstanding the above, contractors must remain aware that disturbance of the ground may uncover unanticipated features which may give rise to considerations of contamination as far as the exposed conditions may have the potential to impact on receptors including <i>inter alia</i> humans, animals, controlled waters, or the fabric of buildings. Any such encounters will require the contractor to halt work, isolate the risk area, and summon CCG to site to determine the nature of the exposure and to determine an appropriate course of action. No remedial works area required under areas of permanent hard standing since the permanent hard cover will close all potential contamination pathways. It is recommended that site levels within newly created rear gardens be reduced by a minimum of 200mm below finished garden level, or to the surface of undisturbed natural drift deposits, whichever is the lesser, with site levels
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	being reconstructed by the placement of clean imported topsoil. All imported topsoil utilised with rear / front / communal areas should be placed under a strict validation regime comprising 1nr analyses per 50m³, with a minimum of 4nr analyses per material source.
Controlled Waters	The assessment confirms that no contaminants in the Groundwater Analysis prepared from window sample borehole WS4 exceed their respective AA-EQS guideline criteria, indicating no potential risk to controlled waters.
Concrete Specification	Based on the foregoing assessment, concrete in the ground should be specified to conform to the compositional requirements of Design Chemical Class DC-1 , as defined in BRE Special Digest 1: 2005.
Water Mains	The assessment indicates that the soil concentrations of pertinent hydrocarbon contaminant species are below the permitted threshold concentrations specified by the UKWIR for the adoption of PE water mains and therefore PE mains may be deployed. Good practice requires that mains be laid in a remediated alignment comprising of clean granular fill extending to 600mm + pipe diameter and to 300mm below pipe underside. Pipes should be laid in accordance with BS EN 12201-2 'Plastic piping systems for water supply, and for drainage and sewerage under pressure. Notwithstanding the above preliminary assessment, the developer should contact the relevant water supply company (United Utilities) to obtain concurrence with the recommendations given above and may be required to return a completed Risk Assessment.
Gas Risk Assessment	After 1 round of monitoring, a preliminary Gas Screening Value (GSV) of 0.0026l/hrs is calculated for CO₂. CH₄ has not been detected thus far during the monitoring programme. Using this preliminary GSV value, the risk to the proposed development was assessed in line with Situation A as defined in CIRIA C665, and on this basis the site complies with Characteristic Situation (CS) 1. It should be noted that the Characteristic Situation classification is to be confirmed following completion of the monitoring programme (5nr rounds remain), and the completed monitoring programme will be reported in an Addendum to this report.
Soakaway drainage	The results of 2nr tests carried out in accordance with BRE Digest 365 indicate that the ground conditions are unsuitable for adoption of soakaway drainage.
Groundwater Management	Groundwater was observed at all borehole locations. In these conditions, a prudent contractor would allow for pumping to maintain dry working conditions during foundation construction / service installations particularly during heavy and/or prolonged periods of precipitation.
Foundations & Ground Floor Slabs	See Section 17.0 for full discussion
Excavations	Excavations may be undertaken by light hydraulic excavators. Excavations more than 1.2mbgl will require side support.
Further Work	• Complete the ongoing gas – groundwater monitoring programme (5nr rounds remain) • Update Gas Risk Assessment (GSV Value and Characteristic Situation)