



46 BLYTHWOOD ROAD, STROUD GREEN, LONDON

HYDROLOGICAL & GEOTECHNICAL ASSESSMENT
FOR
FG PLUS

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P10130

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Prepared for:
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The Building Centre,
26 Store Street,
London.
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This report has been prepared in accordance with GRM's Accredited Quality Procedures.

If you have any queries regarding this report please contact the project manager in the first instance.

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Issue	Description of Revision		Signature



Land Appraisal | Environmental | Geotechnical | Design | Mining | Inspections

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1 INTRODUCTION

1.1 PREAMBLE

GRM Development Solutions Limited (GRM) has been appointed by FGPlus (Client) to undertake a Hydrological and Geotechnical Assessment for the site at land adjoining no.46 Blythwood Road, Stroud Green. The site works reported within this document comprise the intrusive ground investigation, geotechnical testing, groundwater monitoring and soil infiltration analysis. This site investigation is intended to provide information that will assist decision making by identifying potential geotechnical and hydrological issues and determine cost-effective development solutions.

The hydrological and geotechnical assessment produced in this report supplements the Basement Impact Assessment (ref: 2147/BIA, dated July 2021) completed for this site which required a ground investigation to be carried out.

GRM Standard Limitations of Reporting are provided in Appendix A of this report.

The Client proposes to redevelop part of the garden area and a single garage at 46 Blythwood Road and construct a part two-storey part three-storey residential house. The proposal includes a basement and gardens to the front and rear of the new property. The outline development proposals provided by the Client are presented in Appendix B.

1.2 OBJECTIVES OF THE SITE APPRAISAL

The principal aims of the Hydrological and Geotechnical Assessment are as follows:

- a) Obtain information, from easily accessible sources, about the soil and groundwater conditions within the area of the site.
- b) Determine the possible ground-related geotechnical and hydrological hazards within the site boundaries that may affect the proposed development and surrounding area.
- c) Provide preliminary development recommendations.
- d) Provide advice on further works required for the cost-effective reduction of risks to the development.

Whilst every effort has been made to pre-empt the likely requirements of the Local Authority and other regulators, they are likely to have specific requirements that will need to be discussed and addressed at a later date.

2 SITE LOCATION AND EXISTING CONDITIONS

2.1 INFORMATION SOURCES

In addition to the general sources of information listed in Appendix A (i) the Client has supplied the following information that has been used in the assessment of the site:

- The location of the site
- Proposed development layout (Ref: 2147-SK01/01, dated January 2022)
- Basement Impact Assessment (Ref: 2147/BIA, dated July 2021)

2.2 SITE DESCRIPTION

2.2.1 Geographical Setting

The site is located at land adjoining no.46 Blythwood Road (part of the garden and single garage) within the southern area of Haringey Borough, 7.4km north of London city centre. The National Grid Reference (NGR) for the approximate centre of the site is TQ 3060 8777. A Site Location and Boundary Plan is presented in Appendix C.

The western boundary is formed by a row of detached garages, the southern boundary by an apartment building and associated parking areas, the northern boundary by Blythwood Road and the eastern boundary by the property no.46 Blythwood Road.

The topography of the site slopes down from the north west corner towards the south east. The adjoining site and building to the east are constructed on sloping ground with the natural grade being approximately 9 degrees. As such, there is an approximate 2m drop in ground levels across the plot from the west to east.

2.2.2 Site Inspection Observations

The site is approximately 0.017ha in area and is occupied by a detached garage (one of the row of garages extending offsite) within the north western area of the site. The site is a grassed area and is bound by wooden fences to the south, east and west and temporary fencing to the north. There are felled trees within the northern site area.

There is a paved path alongside the property at no.46 which separates the proposed site area from the adjacent property to the east. The ground level is stepped on either side of this path with the onsite level in the rear garden being approximately 1m to 2m higher than the levels of the rear garden offsite to the east.

2.3 PROPOSED DEVELOPMENT

The proposed development will involve the demolition of the existing garage within the north western area and the excavation of a part two-storey part three-storey house and basement. Site levels will require adjustment to suit access, the new basement and proposed landscaping to the front and rear of the property. It is proposed the basement will be supported by a retaining wall to the full perimeter.

2.4 ANTICIPATED GEOLOGY

The BGS Geological Sheet for this area shows the site will be underlain by solid geology of London Clay Formation comprising clay and silt. The BGS indicates there are no Superficial Deposits underlying the site. It is anticipated that the London Clay Formation is likely to be weathered near the surface.

Made ground can be expected due to the development of nearby residential buildings and hardstanding. Buried sub-structures may also be present.

2.5 HYDROGEOLOGICAL INFORMATION

The Environment Agency has classified the underlying London Clay Formation as an Unproductive Aquifer.

No detailed information regarding the depths to groundwater is available based on nearby BGS borehole records. The site is not recorded to be within a Groundwater Source Protection Zone.

The site is not within an area indicated to be at risk of groundwater flooding.

2.6 HYDROLOGICAL INFORMATION

Information available online and a walkover of the surrounding area suggests the nearest surface water features include:

- An inland river is located 70m north east. During a walkover of the surrounding area, this watercourse feature was observed to be a ditch along the south of the covered reservoir to the north east of the site.
- There is a covered reservoir located 110m north east of the site owned by Thames Water.
- Finsbury Park Pond located 980m west of the site.
- A pond in Hampstead Heath located 2.9km to the south west of the site.
- Thames River 9.7km to the south flowing to the east.

It is considered that due to the large distance of the ponds and Thames River, these are unlikely to impact or be impacted by the proposed development.

The Strategic Flood Risk Assessment (SFRA) completed by JBA consulting in February 2015 has been reviewed together with the Preliminary Flood Risk Assessment (PFRA) and Surface Water Management Plan (SWMP) for the London Borough of Haringey by Capita Symonds which was published in 2011. The former deals with flooding from rivers and the sea whilst the latter reports by Capita Symonds deals with local flood risk (i.e. flooding not from main rivers or the sea).

The site lies within Flood Zone 1 (i.e. is not prone to flooding from rivers or the sea). Additionally, the Environment Agency's internet based flood risk maps suggest there is a low risk from surface water flooding broadly along the northern-most extent of the site. This is supported by Haringey SFRA.

The PFRA and SWMP indicates that the site is at a low risk from surface water flooding and states that there are no recorded incidents of sewer flooding which have affected the site area. However, the SWMP indicates the site is potentially within a 'critical drainage area'.

3 SITE INVESTIGATION

3.1 FIELDWORK

The ground investigation has been designed in accordance with the general comments outlined in Appendix A (iv).

The ground investigation fieldwork was conducted on 15th September 2022 with a groundwater monitoring visit completed on 5th October 2022. A single Cable Percussion Borehole, BH01, was progressed to 15m below existing ground level and installed with a monitoring standpipe. The exploratory hole location plan and exploratory hole log are presented in Appendix D and Appendix E respectively.

A logger transducer (data logger) was also installed after completing the borehole (collected during the recent monitoring visit) and used for monitoring the levels and presence of groundwater.

3.2 GROUND CONDITIONS

The following ground conditions were encountered during the intrusive investigation:

- Disturbed topsoil
- Made Ground
- London Clay Formation

Disturbed Topsoil

Disturbed topsoil was encountered from surface to a depth of 0.3m begl, and comprised slightly sandy, gravelly silt with frequent roots and gravels of quartzite, concrete, metal rebar, plastic, tile and brick.

Made Ground

Made ground was encountered to a depth of 2.0m begl and comprised soft to firm, orangish brown, slightly sandy, gravelly clay with infrequent roots and gravels of chert, quartzite, metal rebar, concrete and brick. This is further underlain by soft, brown mottled grey and orange, slightly silty, slightly gravelly, clay with gravels of mudstone, this was inferred to be reworked natural ground.

A Standard Penetration Test N-value of 5 was recorded at a depth of 1.2m. Utilising the empirical relationship formulated by Stroud (1974) where undrained shear strength is related to SPT N-values and a factor based on plasticity, this was indicative of low strength soils at 1.2m depth.

London Clay Formation

The weathered London Clay Formation was encountered below the made ground and re-worked natural soils to a depth of 13.2m begl. The strata typically comprised firm, brown becoming brown mottled grey with depth, locally slightly silty, clay. Infrequent pockets of orange slightly sandy silt were recorded below the shallow soils to depths of 8.0m begl.

Standard Penetration Test N-values ranged from 9 to 11 at 2m to 4m depth, 13 to 14 at 5m to 6.5m depth, 17 to 19 at 8m to 9.5m depth and 19 to 22 at 9.5m to 11m depth. Utilising the empirical relationship formulated by Stroud (1974) where undrained shear strength is related to SPT N-values and a factor based on plasticity, these are indicative of medium strength soils at 2.0m to 6.5m and high strength soils at 8m to 11m depth.

The London Clay Formation was interpreted from depths of 13.20m begl and comprised stiff, greyish brown clay. Its full thickness was not penetrated.

A Standard Penetration Test N-value of 38 was recorded at 14.5m depth. Utilising the empirical relationship formulated by Stroud (1974) where undrained shear strength is related to SPT N-values and a factor based on plasticity, this is indicative of very high strength soils at 14.5m depth.

Rare finely disseminated selenite/pyrite crystals were recorded between depths of 7.0m and 14.5m begl. These are known to occur within the London Clay Formation based on BGS data.

3.3 GROUNDWATER OBSERVATIONS

A groundwater strike was not recorded during the fieldwork. A groundwater monitoring visit was undertaken on 5th October 2022 with a data logger deployed for the intervening period. In summary, there was no standing water recorded over the course of the monitoring period.

4 HYDROLOGICAL ASSESSMENT

The assessment undertaken below is based on the guidance developed by Haringey Council, documented in Draft Basement Development Guidance Note, dated June 2012. The guidance states hydrological and hydrogeological surveys are required to ensure the proposed development provides satisfactory drainage on site and to reduce the risk of flooding with necessary mitigation measures in place.

The assessment also follows the London Borough of Camden (Camden Geological, Hydrogeological and Hydrological Study. Guidance for Subterranean Development, Issue 01, November 2010) as it is now widely known and is considered to provide a robust approach to issues of potential concern.

4.1 SURFACE FLOW AND FLOODING

4.1.1 Surface Water Flooding

The proposed development is not located in an area considered at significant risk of flooding according to the findings from the SFRA and Haringey Surface Water Management Plan (SWMP), although it is potentially indicated to be within a 'critical drainage area'. In addition, the EA online flood maps also show that there is a low flooding risk from surface water across the northern area of proposed site. The SFRA and EA maps indicate that the site and nearby areas are at low flooding risk from sewer, reservoir and fluvial/tidal watercourses.

An appropriate drainage system for the proposed development must be designed to mitigate risks from flooding on site and surrounding areas. As such, the proposed development has been reviewed to assess for any potential hydrological issues.

The new development will likely incorporate foul and surface water drainage with a new connection to the existing combined sewer. Based on information provided, the proposed development is expected to incorporate rainwater recycling, and all paved surfaces will be permeable. The proposals therefore will have a similar impact as the existing site and surrounding condition.

In addition, the proposal has indicated that integral pumped device and anti-flood valve will be installed for the basement and areas lower than the existing sewer levels to protect the site from sewer flooding. The proposal will employ suitably sized pumps and rising mains to discharge the drainage from the building and external areas into the existing gravity system.

Furthermore, it is proposed that SUDS and/or suitable onsite attenuation will be incorporated in the design to ensure no significant increase in the surface water runoff would occur as a result of the proposed development occupying a large footprint of the existing garden.

4.1.2 Surface Water Drainage

The existing proposal suggests there will be an increase in hardstanding across the site. In addition, although the basement will be located predominantly within the footprint of the new three-storey dwelling, the subterranean floor will slightly extend below the rear and front garden. These sections of the garden are proposed to be terraced. However, the proposed surface water runoff strategy for the new development will likely incorporate SUDS or similar permeable paving as this will ensure there will be no net increase in man-made impermeable area, and therefore no significant increase or material change in runoff rate or volume as a result of the proposed basement construction. As such, a similar discharge rate is expected as that of the existing site and adjacent properties and the new development is not expected to significantly change the surface water runoff profile of the site.

In consideration of the above, the proposed basement will not result in changes to the profile of inflows (either instantaneous or long-term) of the surface water received by nearby properties or downstream watercourses given that the new development is not expected to adversely affect the runoff. As such, there is no significant flooding risk for nearby properties from the proposed development or flow changes received by downstream watercourses.

4.1.3 Infiltration Testing

Falling head tests were conducted to test the infiltration of water into the London Clay Formation. The results showed that the water did not discharge into the London Clay but into the made ground/re-worked natural soils above, suggesting that the London Clay has a very low permeability in comparison to the disturbed soils above. As such development of the site will not significantly reduce infiltration into the London Clay.

4.2 GROUNDWATER FLOW AND FLOODING

The site is not within an area impacted by groundwater flooding according to online EA maps and Haringey SFRA. The published geological mapping and the recent site investigation indicates the site is underlain by the London Clay which is classified as an Unproductive Aquifer. This refers to the bedrock with low permeability that has no significance for water supply or river base flow.

The recent monitoring visit has confirmed that there is no groundwater present. In addition, a review of the logger data suggests there was no groundwater present during the three weeks monitored in BH01. It is also considered that even if groundwater is present, this would likely be limited perched volumes within the natural strata and unlikely to be contributors to base flow for nearby surface water features. As such, and given the large distances to surface water features, the introduction of new retaining features and basement will not impact on the groundwater flow received by nearby watercourses.

5 RISK ASSESSMENT

Based upon the information above, any surface water infiltration for the existing garden mostly occurs into the near surface soils comprising disturbed topsoil/made ground and is likely vertically impeded by the low permeability London Clay which will continue with the proposed development and extent of proposed front and rear garden areas. In addition, proposed SUDS; including rainwater recycling and permeable surfaces to reduce the peak surface water runoff rate from the site which will only assist in controlling and improving the current conditions and control of surface water and flooding risk.

The permeability of the London Clay is considered to be very low, in addition to the lack of groundwater recorded, therefore it is unlikely a discernible damming effect on groundwater flow would occur with the construction of basement retaining walls for the proposed development. Although, there may be small seepages in areas that were not explored during the recent investigation. It is prudent to consider the migration of rainwater and prevention of a damming effect where small seepages are encountered by new retaining walls.

6 GEOTECHNICAL ASSESSMENT

6.1 GEOTECHNICAL TESTING

Geotechnical tests were selected to provide the parameters necessary for the budgetary design of the development including foundations and infrastructure.

Due to the presence of selenite/pyrite crystals within the London Clay Formation four samples of the weathered London Clay and one sample of the London Clay Formation were tested for water soluble sulphates and pH to the BRE Special Digest 1. The full laboratory results are presented in Appendix F and summarised in the table below;

Unit	Water Soluble Sulphate (mg/l)	Acid Soluble Sulphate (%)	Total Sulphur (%)	pH
Weathered London Clay Formation	1,800 – 3,200	0.23 – 0.66	0.19 – 1.84	6.9 – 7.8
London Clay Formation	1,100	0.23	0.31	8.4

Historically, extensive research into the geotechnical properties of the London Clay has been undertaken, and this shows it to typically be of high volume potential. Accordingly, at this stage, it should be assumed that the cohesive made ground and London Clay have a high volume change potential.

6.2 ENGINEERING GROUND TREATMENT

A working platform will be required for any piling plant. It is recommended that the design of the working platform is carried out as soon as possible. The working platform certificate requires signing by the Principal Contractor for the site. An allowance for this, and responsibility for the design of the platform (estimated at a minimum 600mm thick if constructed without reinforcement), should be made in tender packages and site programmes.

Retaining structures will be required for the basement due to close proximity of existing buildings. The design of the basement will need to consider support in the temporary and permanent conditions and account the need to maintain the stability of excavation and surrounding structures, particularly the neighbouring properties to the west and east. Consultation regarding the installation method and design of any temporary and permanent retaining features should be sought from qualified specialists.

6.3 EXCAVATION CONDITIONS

Excavation of the materials encountered during the ground investigation should be readily achieved using conventional hydraulic excavation techniques. No trial pit stability observations are available, however, based on the results of the borehole and observation of similar soils seen on other sites, it is likely that shallow excavations will be generally stable in the short term.

Granular soils, where encountered within the made ground, are liable to collapse without warning; this situation is likely to be exacerbated by water ingress although no groundwater strikes were recorded. The observed groundwater conditions suggest that the use of conventional sump pumping would be adequate to control any water ingress if encountered during excavation works.

Larger excavations, particularly for the basement, will need lateral support to prevent side wall collapse during construction of this feature. Excavation stability for the basement construction should be maintained by providing full support to the side walls in line with the necessary Temporary Works procedures and Code of Practices. Where personnel are required to enter excavations, a risk assessment should be carried out and should consider the support to the excavations in order to comply with normal safety requirement.

6.4 EXISTING STRUCTURES / SUBSTRUCTURES

Currently, the site is used as a garden for the adjacent property no.46 to the east and there are existing garages to the west. There are likely to be live buried services below the footpath along Blythwood Road immediately north of the site. Consideration should be taken in regards to the proposed development and mitigating against any potential impact it may have on these nearby structures and utilities.

The depths of the existing foundations of the adjacent properties should be considered during the designing process of the proposed development to mitigate against ground instability (further discussed in Section 5.8). It should be noted that the settlement of the original surrounding structures will have likely finished.

It was not possible to undertake trial holes during the recent site works adjacent to the existing structures due to spatial constraints. As such, it is recommended that during site clearance in preparation for construction, the existing adjacent foundations are inspected to determine appropriate measures to prevent instability.

6.5 FOUNDATIONS

The untreated made ground and low strength natural strata is considered unsuitable as a bearing stratum and all new foundations should be carried down through it to found on the more competent natural cohesive strata. It is recommended that a piled solution is employed for the proposed structure due to:

- The proposed development will include a basement and to achieve anticipated loadings for a three-storey building, deep foundations beyond 10m depth are required to bear into the stiff, high strength cohesive strata.
- Bored piles would minimise vibration risk to the adjacent structures and nearby services and substructures.

A piling specialist will need to be approached to provide pile dimensions and safe pile capacities. They are likely to require provision of the cable percussion borehole log (presented in Appendix E) to provide information for detailed design. Consideration should be given to nearby structures and infrastructure and achieving sufficient penetration to resist heave, when choosing the appropriate pile type. Whilst piled foundations would end bear beneath the influence of trees, the piles and ring beams should be designed to resist potential heave, down-drag and negative skin friction.

A testing regime and objectives of the works will need agreeing with regulatory and warranting bodies prior to works. The pile design will need to be justified to the warranting bodies and the justification should be included within the piling contract.

6.6 BASEMENT CONSTRUCTION & FLOOR SLAB

It is considered that the proposed construction of the basement may result in an unloading of the London Clay Formation at formation level resulting in elastic heave and long-term swelling of the clay. Unloading of the underlying London Clay will cause reduction in vertical stress and induce heave to take place. These movements will likely be mitigated to some extent by the structural loads applied from the proposed development, although it is likely that the basement floor slab will need to be designed to accommodate heave movement.

An allowance should be made for the basement floor slab to be suspended over a void or use of suitable vertical void former the heave zone due to influence of trees (felled trees within the northern site area) and potential heave from unloading the clay unless the slab can be suitably reinforced to cope with these movements.

6.7 BURIED CONCRETE

Due to the presence of selenite/pyrite crystals within the London Clay Formation the Design Sulphate Class for buried concrete has been assessed in accordance with requirements of BRE Special Digest 1 (2005), 'Concrete in Aggressive Ground'. Taking into account the aggressive ground conditions and static groundwater conditions, a 'worst case scenario' has been considered using the water soluble sulphate, pH and Total Potential Sulphate and presented in the table below.

Unit	Design Sulphate Class	ACEC Class
Weathered London Clay Formation	DS-5	AC-4s
London Clay Formation	DS-3	AC-2s

6.8 SLOPE STABILITY AND RETAINING STRUCTURES

The site topography slopes down gently down to the south east, in line with the surrounding topography. Retaining structures are noted adjacent the eastern and northern boundaries, associated with adjacent properties. There is a minimal risk of slope instability occurring on the site at present gradients. However, grading of the site, removal of trees/vegetation from existing slopes, cut and fill operations and interference with drainage around the existing slope, the cutting of the toe or surcharging of the crest of existing slopes may cause instability and failure to occur.

Any new proposed gradients should be designed so that instability does not occur. Based on the latest proposed development plan, reinforced concrete retaining walls are proposed adjacent to site boundaries which should mitigate the risk of slope instability to the adjacent structures.

There are two neighbouring properties, a residential property to the east and detached garages to the west. Although depths of these foundations are not known at this stage, the foundations of these structures are expected to be shallow relative to the proposed basement. These properties are likely to be located within the affected zone of ground movement due to lateral deflection of the proposed retaining walls and vertical settlement of new foundations. As such, detailed structural proposals will be required to ensure stability of adjacent properties in both the temporary and permanent conditions.

7 CONCLUSIONS

The proposed redevelopment at no.46 Blythwood Road is suitable assuming compliance with all the recommendations contained within this report and Basement Impact Assessment report, dated July 2021.

The hydrological assessment has revealed that the site will not have an adverse impact on drainage or flood risk on either the site or surrounding area. The geotechnical assessment suggests there may be some impacts to the surrounding site area due to ground movement and heave associated with the construction of the basement and considerations should be given when finalising the design of the proposed development to mitigate against instability.



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GENERAL APPRAISAL COMMENTS

i INFORMATION SOURCES

Where available the following sources have been used for the identification and assessment of potential ground hazards:

- Relevant British Standards
- British Geological Survey (BGS) Geology Map Scale 1:10,000 for local area
- British Geological Survey (BGS) Geology Map Scale 1:50,000/1:63,320
- BGS Memoir
- BGS Borehole Records
- BGS online viewer: <http://www.bgs.ac.uk/data/mapViewers/home.html>
- Environment Agency Groundwater Vulnerability Maps
- Historical Ordnance Survey (OS) Maps
- Environmental Data Report
- Environment Agency Website: <http://www.environment-agency.gov.uk/>
- Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, UKWIR, 2010.
- Coal Authority Records / Coal Mining Report
- DEFRA/Environment Agency Contaminated Land publications and DoE Industry Profiles
- BRE Guide BR211 (2015), 'Radon: Guidance on protective measures for new buildings'
- HPA-RPD-033 (2007), 'Indicative Atlas of Radon in England and Wales'
- PHE-CRCE-032 (PHE, 2017), Radon in Homes in England: 2016 Data Report
- CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings'
- BS8485:2015, 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'
- Other technical references used throughout this document are detailed in the text.

ii CONTAMINANTS OF CONCERN

The DoE Industry Profiles are normally used to assess likely contaminants from past land use and potential nearby industrial sources. For land uses where no profile is available, likely contaminants of concern are selected by GRM based on past experience of similar sites, a general screening suite of contaminants covered by CLEA and common contaminants from the Industry Profiles.

- | | | |
|------------|-------------------|--|
| · Arsenic | · Copper | · Water soluble sulphate |
| · Cadmium | · Nickel | · PAH (polycyclic aromatic hydrocarbons) |
| · Chromium | · Zinc | |
| · Lead | · Phenols | |
| · Mercury | · cyanide (total) | |
| · Selenium | · pH | |

Asbestos and PCBs are listed in the vast majority of profiles. PCBs are listed as the profiles expect electricity substations and switch boxes on all industrial sites. There is the potential for asbestos containing material to be mixed up with made ground, following any demolition works.

iii CONCEPTUAL MODEL METHODOLOGY

The consideration of contamination is based upon the principles of risk assessment, using the 'source-pathway-receptor' model in order to establish the presence, or potential presence, of a pollutant linkage.

To create a risk, contamination must have the potential to cause harm to susceptible targets or receptors such as humans, the water environment or the built environment. The potential for harm to occur requires three conditions to be satisfied to form a pollutant linkage:

- The presence of substances that may cause harm (SOURCE).
- The presence of a target which may be harmed (RECEPTOR).
- The existence of a plausible migration route between the source and the receptor (PATHWAY).

In the absence of a plausible pollutant linkage there is no risk. Where a potential linkage is identified in order for it not to pose a risk to the identified receptor it must be broken.

iv INTRUSIVE INVESTIGATION SAMPLING METHODOLOGY

The ground investigation (including fieldwork, sampling, monitoring and laboratory analyses) has been designed to identify and assess potential ground related problems and to allow cost effective solutions to be advised. It has been planned on the basis of the desk study, site inspection and the proposed development layout (where available). All fieldwork and soil descriptions were carried out in general accordance with relevant British Standards.

The exploratory holes have been positioned and advanced to depths to determine the general ground/groundwater/gas conditions below the site. A general grid pattern has been adopted, where possible, to provide sufficient information based on the current proposed layout scheme. Some holes have been targeted at particular hazards identified in the Phase I assessment. The resultant exploratory hole density is considered to be commensurate with the complexity of the site conditions and detail of information required for this phase of the investigation.

v GROUND GAS RISK ASSESSMENT METHODOLOGY

Gas monitoring programmes undertaken by GRM are designed to broadly comply with the recommendations outlined in CIRIA Report C665 'Assessing risks posed by hazardous ground gas to buildings' (2007) and BS8576 'Guidance on Investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs) (2013).

To assess the risks posed by ground gases such as radon, carbon dioxide and methane, the relevant current guidance has been used. For radon the site has been assessed following the guidelines in 'Radon: guidance on protective measures for new dwellings (BR211: 2015)'. For methane and carbon dioxide the primary guidance document used to determine if protection measures are required is *BS8485:2015 Code of practice for the design of protective measures from methane and carbon dioxide ground gases for new buildings*. This uses hazardous gas flow rates (Q_{hg}), which are gas concentrations multiplied by borehole flow rates, to derive a Gas Flow Rate (GSV) for the site. The gas regime is then determined based on the GSV and other limiting factors such as gas concentrations.

Where flow is not recorded during the monitoring a default flow rate of 0.1l/hr will be used in the assessment to produce a positive result.

vi HUMAN HEALTH RISK ASSESSMENT METHODOLOGY

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Guidance contained in the Environment Agency's CLEA Reports has been used to assess the risks posed to human health.

For residential developments that include domestic gardens the default Tier 1 Assessment Criteria (TAC) for 'residential land with plant uptake' are used, i.e. a female with a start age class of one and an end age class of six. All pathways are considered including the consumption of home-grown vegetables.

For residential developments that do not include domestic gardens the default Tier 1 Assessment Criteria (TAC) for 'residential land without plant uptake' are used, i.e. a female with a start age class of one and an end age class of six. All pathways are considered except the consumption of home-grown vegetables. For commercial/industrial developments the default Tier 1 Assessment Criteria (TAC) for 'commercial/industrial' are used, i.e. a female with a start age class of sixteen and an end age class of eighteen. All pathways are considered except the consumption of home-grown vegetables.

The TAC used by GRM include Category 4 Screening Levels (C4SLs) published by DEFRA, values calculated by GRM using the CLEA v1.071 risk assessment, and values and Suitable for Use Levels (S4UL) developed by LQM/CIEH. The TAC used in the assessment are selected based on the lowest site specific SOM values returned as part of the chemical analysis.

Where soil chemical analysis results are found to exceed the TAC, Site-Specific Risk Assessments may be undertaken using the CLEA v1.071 risk assessment software using the age classes and pathways described above.

vii **RISK TO SITE WORKERS – GENERAL COMMENTS**

The risks to site workers are similar to those posed to site end users, although likely to be less severe due to the site workers' shorter exposure to the identified contamination. However, site workers (particularly groundworkers) are more likely to come into direct contact with contaminated soils due to the nature of their work. On this basis ground and construction workers should be provided with basic Personal Protective Equipment based on the site's general health and safety risk assessment, but including as a minimum safety footwear, gloves and overalls.

A site specific risk assessment should be carried out for all hazards identified within the ground investigation in accordance with current health and safety legislation. This assessment should identify any measures required to further reduce risks i.e. providing further Personal Protective Equipment, welfare facilities and if necessary preventing access to certain areas.

Demolition and dismantling of existing structures on the site must be carried out to a safe and acceptable standard, in accordance with current UK guidance and best practice. Whilst not ground related, asbestos and hazardous substances surveys should be conducted prior to any demolition.

Any unusual colours, odours and suspicious ground should be reported immediately to site management and then GRM.

Whilst this appraisal has considered the long-term effects of contamination, GRM can also help during the formulation of Health and Safety documentation, if required.

viii **CONTROLLED WATERS RISK ASSESSMENT METHODOLOGY**

Where the desk study and fieldwork do not reveal a potential source of contamination no leachate or groundwater testing will be performed. Where a potential source is identified the testing will comprise leachate testing on the material considered most likely to pose a risk, groundwater testing will be undertaken if water is present at shallow depth.

The UK Drinking Water Standards (UKDWS) or Environmental Quality Standards (EQS) are usually adopted for comparison with the leachate/groundwater test results. When the most sensitive receptor is considered to be the aquifer (groundwater) UKDWS will be adopted as the Initial Tier 1 screening values. Where the most sensitive receptor is a surface water feature the EQS values will be used as Initial Tier 1 Screening values.

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ix CONSTRUCTION MATERIALS RISK ASSESSMENT METHODOLOGY

The 'screening levels' adopted for the assessment of risk to construction materials are taken from the following documents:

- UK Water Industry Research (UKWIR) Contamination thresholds for sub-surface water pipes, for the protection of buried pipes.
- Building Research Establishment (BRE) Special Digest SD1 (2005), 'Concrete in Aggressive Ground', for the protection of buried concrete.

x WASTE DISPOSAL, SITE WASTE MANAGEMENT PLANS AND MATERIAL MANAGEMENT PLANS

Under current Waste Management Regulations, waste soil materials produced from the site will require characterisation to enable it to be disposed of correctly.

The chemical analysis results included in this report should be provided to the relevant landfill operators to establish the characterisation of the waste, confirm its suitability for landfill disposal and provide estimated costings. If material is classified as hazardous, then the site will need to be registered with the Environment Agency prior to the movement of the waste. Depending on the receiving landfill's current permit, further chemical analysis, incorporating Waste Acceptance Criteria (WAC) leachate analysis, may be required.

All materials removed from the site will be classified as 'waste' and therefore must be removed by a suitably licensed carrier of waste. This applies whether or not the waste is contaminated. All waste removed to landfill will attract Landfill Tax.

The developer/builder is likely to be classed as the waste producer and therefore, has a duty of care to ensure that all waste is disposed of appropriately. This includes ensuring the waste carrier is licensed and disposes of the waste to a suitably licensed landfill site. They are also required to keep a paper trail from 'cradle to grave' including copies of the waste disposal tickets.

Efficient materials management on site is recommended as it can lead to significant cost savings when compared to the traditional side casting or single stockpile of arisings. GRM can assist in the production of Material Management Plans under the CL:AIRE Definition of Waste: Code of Practice. The DoWCoP enables:

- The direct transfer and re-use of clean naturally occurring soil materials between sites, and
- The re-use of both contaminated and uncontaminated materials on their site of origin and between sites within defined Cluster projects.

GRM can also undertake the role of Qualified Person and submit the DoW CoP project Declaration.

Likewise making the site as volume neutral as possible will reduce the costs of development. Whilst not a statutory requirement, Site Waste Management Plans allow better waste management practices, help to reduce the amount of waste produced and identify best environmental disposal options. Implementing a Site Waste Management Plan (SWMP) can reduce costs (increasing business profits) and maximise resource efficiency.

xi GEOTECHNICAL ASSESSMENT GENERAL COMMENTS

Where finished floor levels of proposed structures have not been provided by the Client, then for the purposes of initial assessment, GRM will assume that finished levels will not vary appreciably from the existing ground levels. If the depths of any underground engineering works (i.e. sewers, pumping stations

etc.) are unknown they will not be taken in to account in the assessment and it will be assumed that any such works will not compromise foundation or ground stability.

Should the development proposals or finished levels be different from these assumptions then the comments/recommendations in the Geotechnical Assessment may require revising.

It should be noted that the results of window sampling and/or cable percussive boreholes may not give a true indication of a soils actual engineering properties (i.e. stability, mass structure etc). GRM consider that that prior to development trial pitting should be undertaken to confirm the recommendations in the Geotechnical Assessment.

xii GEOTECHNICAL ASSESSMENT – ENGINEERING GROUND TREATMENT

Near surface soils have the potential to be disturbed by weathering and site traffic. Precautions should always be taken to avoid this, as excessive disturbance may leads to more onerous floor slab designs, road cap thickness and increased amounts of off-site disposal etc.

Near surface soils may need treatment or reinforcing to allow safe movement of construction plant and labour. An assessment by the contractor should be undertaken once the type of machinery/plant needed to complete the development is known.

xiii GEOTECHNICAL ASSESSMENT – EXCAVATIONS

Excavation instability (over-break) can result in damage to existing services or structures (e.g. foundations, roads or boundary walls/fences) both on and off-site, as well as increased foundation concrete costs. In order to minimise this, all excavations deeper than 1.2m deep (or any excavation within 1.5m of any existing structure or service) should be supported. Full support should be provided to the full depth of all near vertically sided excavations in made ground, soft and very soft clays and granular soils. A reduction to intermediate support should be acceptable within firm and stiffer natural clays.

Wherever possible, man entry into excavations should be prevented; however, where this is not possible, entry to, and time spent in, excavations should be kept to a minimum.

The build program should be tailored to reflect the impact that deep excavations through potentially unstable strata can have on adjacent properties, so that they are not undermined.

All excavations on site should be in accordance with HSE guidelines and stability should be practically maintained at all times. Reference should be made to HSE construction information sheet No. 8 (Revision 1) 'Safety in Excavations'.

Care should be taken to ensure that falls from excavation faces do not adversely affect the integrity of foundation concrete.

If contaminated water enters excavations it should be removed and transported to an appropriate treatment facility by a suitably licensed carrier before construction begins.

xiv GEOTECHNICAL ASSESSMENT – SUBSTRUCTURES

Where practicable, existing buried construction should be fully removed; however, if this is not practicable all new foundations should be carried down to fully penetrate it and it should be broken well away from all new structures.

There may be existing structures and/or infrastructure in close proximity to the proposed development. New build foundations may be constructed next to pavements with existing underground services beneath them, or excavations may be required near existing footings associated with adjacent properties. These potential hazards need to be taken into consideration when designing foundations and the groundworker needs to be made aware of their potential impact during the redevelopment works. Foundations close to existing underground services or buildings may require alternative foundation techniques (such as piling) to protect the integrity of these structures.

The contractor for the works should carry them out in such a fashion so as to not cause excessive overbreak, concrete usage or undermine existing buildings/roads/ services that are to be retained.

xv GEOTECHNICAL ASSESSMENT – SOAKAWAYS

Soakaway testing in trial pits by GRM is broadly carried out in accordance with BRE DG 365 (2016). The testing comprises the excavation of a test pit to a suitable depth, and the placement of water into the pit. The level of water present is then monitored over time. For borehole installations, the permeability testing (falling head/rising head) is undertaken in accordance with BS5930.

If it is decided to proceed with the use of soakaway drainage, then the following general points should be noted:

- Soakaways should not be placed so that water can be discharged through potentially contaminated made ground.
- The Environment Agency may require soakaways to be sealed systems such that only roof run off falls to soakaway.
- Interceptors are likely to be required for soakaways for highway drainage. The adopting authority for the highways should be consulted at the earliest opportunity regarding the use of soakaways for highways drainage.
- Consideration of site levels and slopes should be taken into account during the design.
- The construction of all soakaways should be in accordance with the current building regulations.
- Soakaways should not be placed within 5m of a proposed building.
- Placement of soakaways needs to be considered so as to avoid ponding of water down slope.
- The base of a soakaway should not be below the highest recorded water level.
- The Environment Agency prefer 1m of dry soil to be present between the base of a soakaway and the water table to provide attenuation for contamination.

xvi GEOTECHNICAL ASSESSMENT – FOUNDATIONS

If soft or hard spots are encountered during foundation excavation then they should be replaced with suitably compacted material or the footings deepened to suitable strata, to avoid differential settlement.

If strata of differing bearing character (e.g. sand and clay) are encountered at foundation levels within the excavations for a single plot then the excavation depths should be altered as appropriate to ensure the foundations rest on a single stratum, or strata that will not induce differential settlement. Where this is impractical then GRM should be contacted to assess a reinforced concrete detail or an alternative foundation solution (e.g. piles or vibro-replacement).

NOTES ON LIMITATIONS

General

GRM Development Solutions Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement had been executed, or with whom an assignment had been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from GRM Development Solutions Limited; a charge may be levied against such approval.

GRM Development Solutions Limited accepts no responsibility or liability for:

- a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and
- b) the consequences of this document being used by any third party with whom an agreement has not been executed.

Phase I Environmental Audits/ Desk Studies

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, GRM Development Solutions Limited reserves the right to review such information and as considered necessary and appropriate to modify the opinions accordingly. It should be noted that any risks identified in a Phase 1 report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Environmental Audits (Contamination Investigations)

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated with potential human targets, building materials, and controlled waters.

The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to the areas unoccupied by the building(s) on the site and by buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues need to be resolved.

For these reasons if costs have been included in relation to site remediation these must be considered as provisional only and must, in any event, be confirmed by a commercial adviser.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. Whilst exploratory testing is intended to gain an accurate representation of the site, the very nature of sampling and testing is such that it cannot ensure that all localised conditions are detected.

The risk assessment and opinions provided take in to consideration, inter alia, currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

Phase II Geo-environmental Investigations (Combined Geotechnical and Contamination Investigations)

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, geotechnical characteristics, and ground and groundwater conditions to provide a reasonable assessment of the environment risks together with engineering and development implications. If costs have been included in relation to site development a commercial adviser must confirm these.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site for each of the exploratory holes. There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time the site work was conducted. It should be noted that groundwater levels will vary owing to seasonal, tidal and weather related effects. The scope of the investigation was selected on the basis of the specific development proposed by the Client and may be inappropriate to another form of development or scheme.



The risk assessment and opinions provided take in to consideration, inter alia, currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

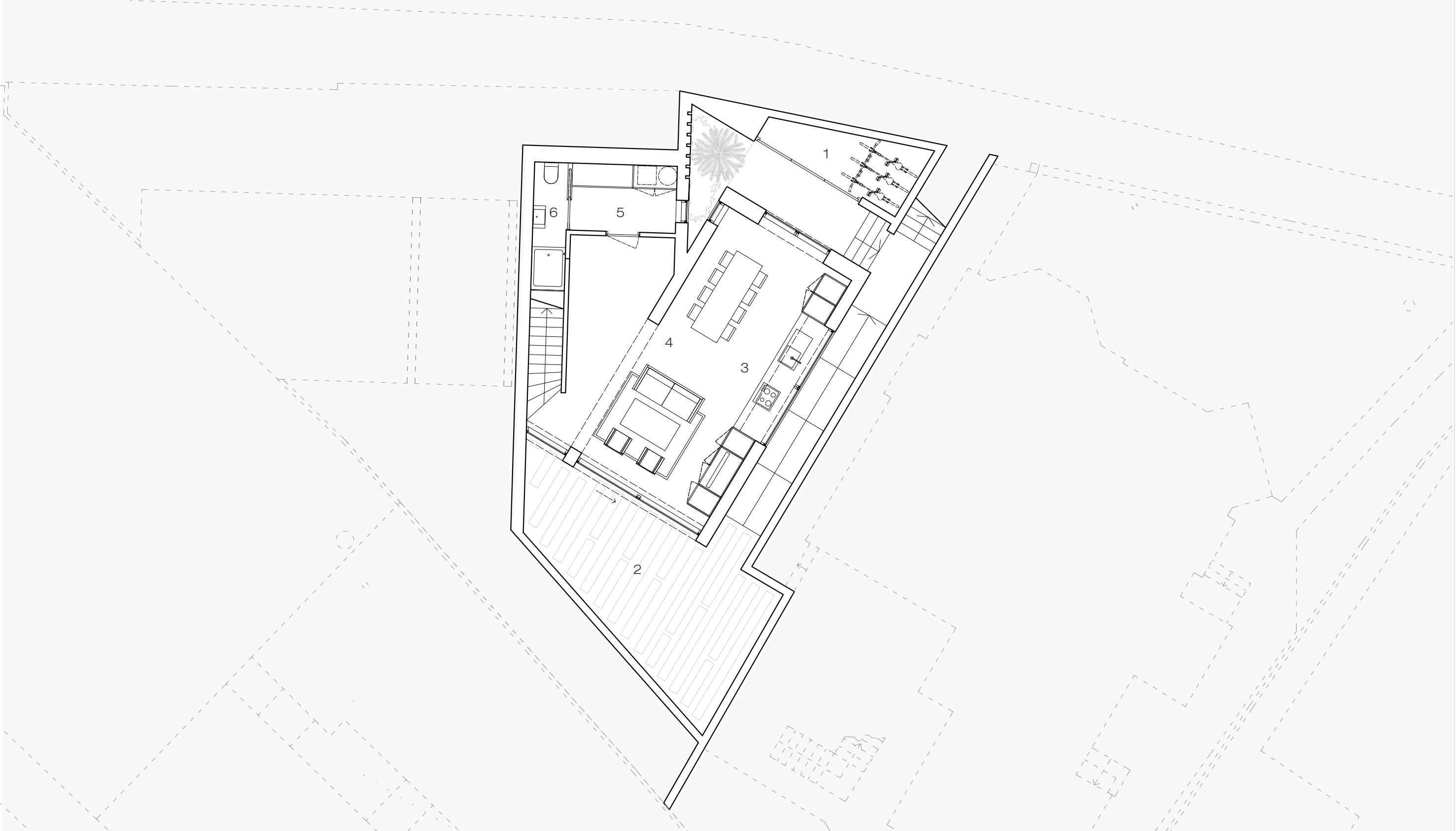


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4.1.1 Lower Ground Floor Plan

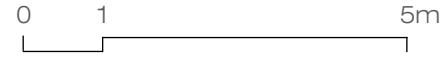


0 1 5m

Scale: 1:100 / A3

- 1. Bike store
- 2. Terrace
- 3. Kitchen
- 4. Living/dining
- 5. Utility room
- 6. Bathroom

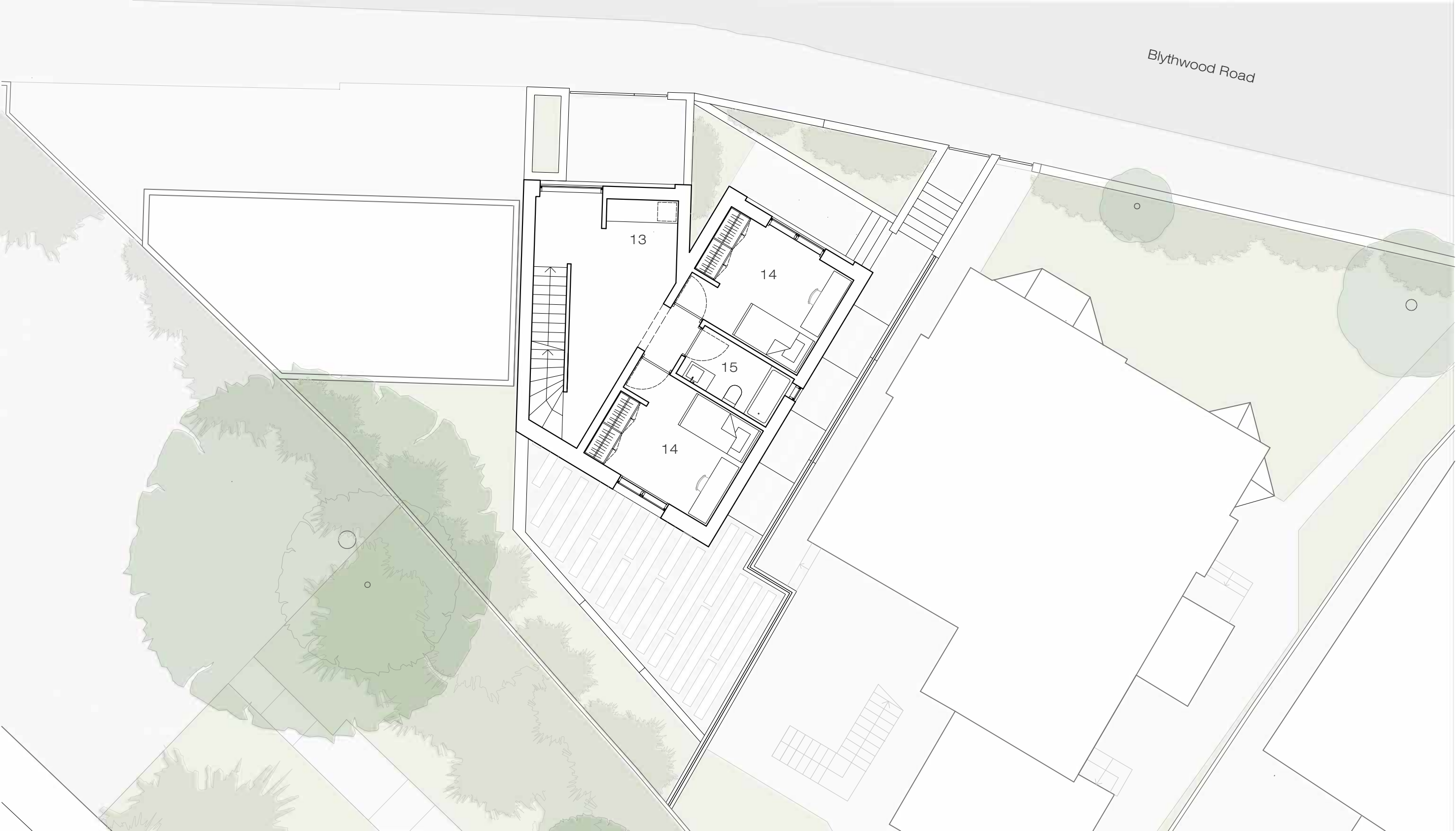
4.1.2 Ground Floor Plan



Scale: 1:100 / A3

- 7. Bin store
- 8. Entrance
- 9. Lobby
- 10. Coat cupboard
- 11. Bedroom
- 12. En-suite bathroom

4.1.3 First Floor Plan



0 1 5m

Scale: 1:100 / A3

- 13. Laundry corner
- 14. Bedroom
- 15. Bathroom

4.1.4 Second Floor Plan



0 1 5m

Scale: 1:100 / A3

- 16. Desk corner
- 17. Studio/guest room
- 18. Bathroom
- 19. Terrace

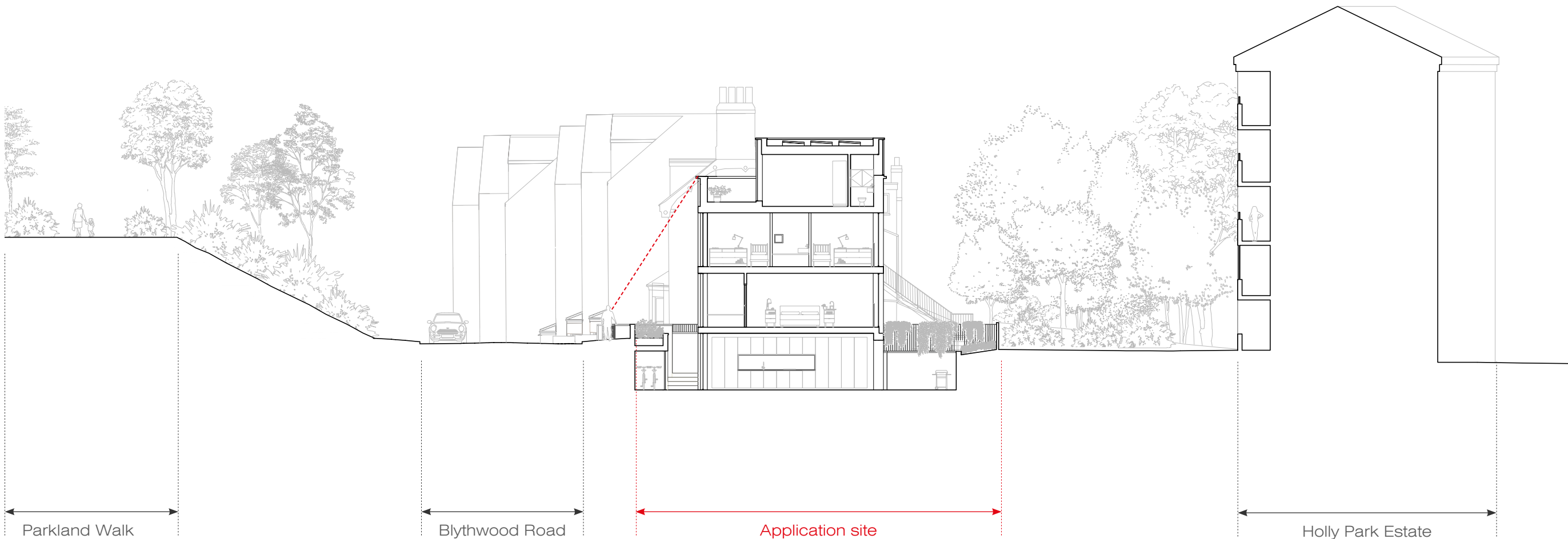
4.1.5 Roof Plan



0 1 5m

Scale: 1:100 / A3

4.4 Proposed Section AA - REV A



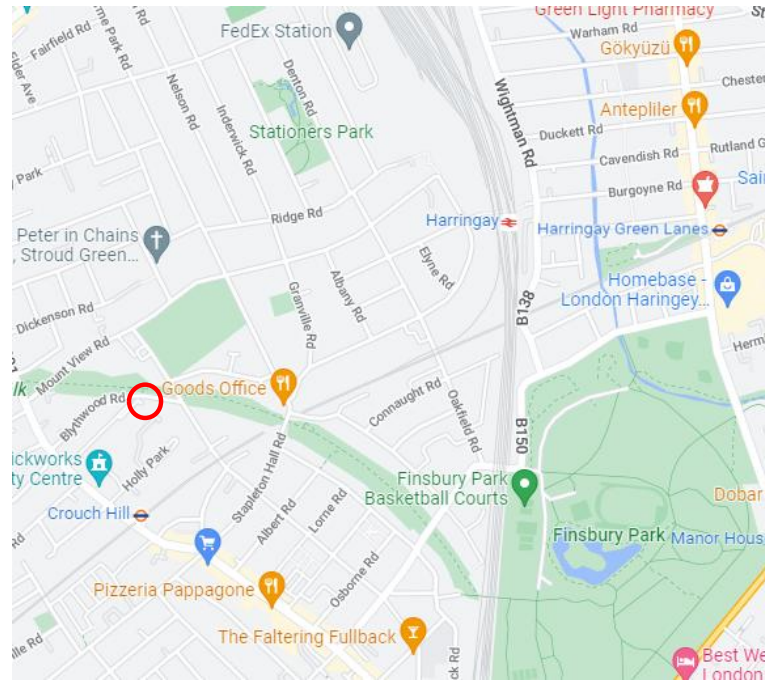
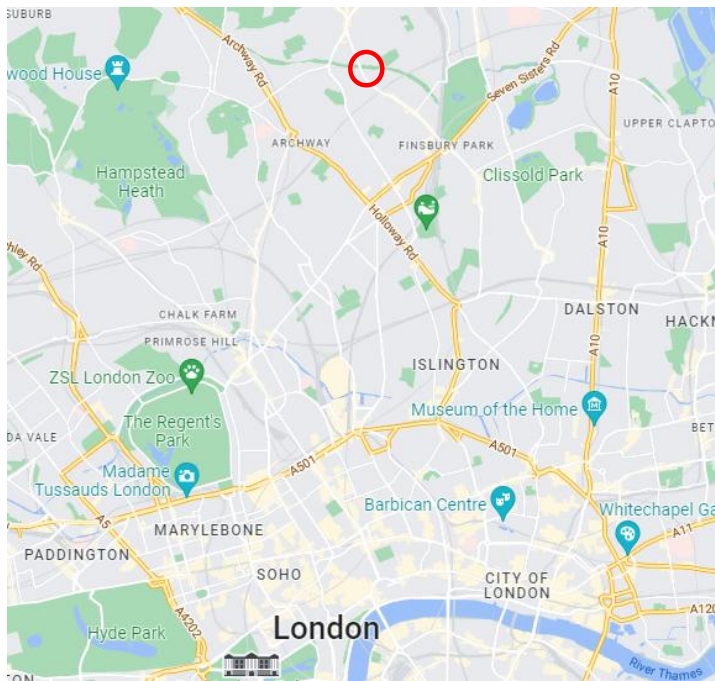
----- Upper floor is set back from street frontage
and not visible from streetscape level



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- DO NOT SCALE
- NOTES:
-  Site Location
 -  Site Boundary



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CLIENT:	
FG Plus	
PROJECT:	
46 Blythwood Road, Stroud Green	
TITLE:	
Site Location and Boundary Plan	
SCALE@SIZE:	ISSUE:
NTS	FINAL
DESIGN/DRAWN:	DATE:
SS	Oct 2022
PROJECT No:	DRAWING No:
P10130	1
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DO NOT SCALE

NOTES:



Cable Percussion Borehole
(with gas and water
monitoring standpipe)



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CLIENT:

FG Plus

PROJECT:

**46 Blythwood Road,
Stroud Green**

TITLE:

Exploratory Hole Location Plan

SCALE@SIZE:

NTS

ISSUE:

FINAL

DESIGN/DRAWN:

SS

DATE:

Oct 2022

PROJECT No:

P10130

DRAWING No:

2

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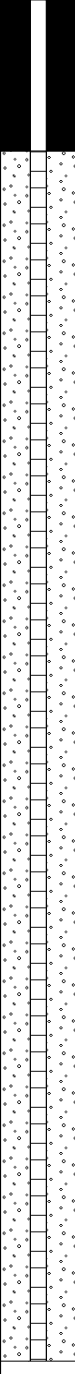
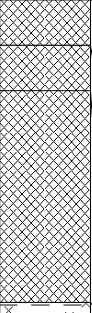
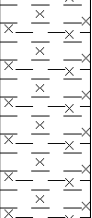
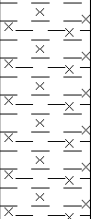
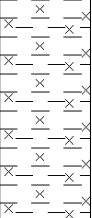
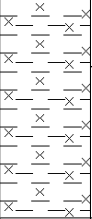
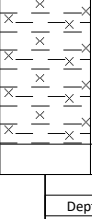
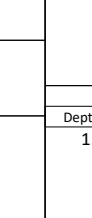
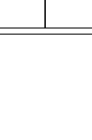
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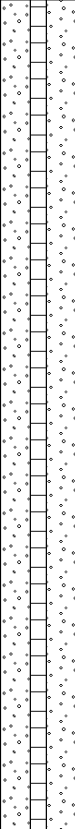
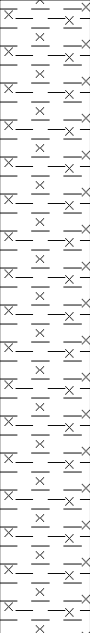


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		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Cable-Percussion Borehole			Borehole No. BH01 Sheet 1 of 2			
Site Name: 46 Blythwood Road, Stroud Green							Ground Level (mAOD)			
Client: FG Plus					GRM Project Ref: P10130		Coordinates 530606 E 187772 N			
Install	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	SPT Value						
		0.20	ES		0.30			Turf over dark brown, slightly sandy, gravelly, SILT. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded, quartzite, concrete, metal rebar, plastic, tile and brick. Frequent roots. DISTURBED TOPSOIL	1	
		0.50	D							
		0.50	ES							
				1.20	D	N=5 (1,1/1,1,1,2)	0.60		Soft to firm, orangish brown, slightly sandy, gravelly, CLAY. Sand is fine to coarse. Gravel is fine to coarse, angular to sub-rounded, quartzite, chert, metal rebar, concrete and brick. Infrequent roots. MADE GROUND	
		1.20	S							
		1.50 - 2.00	B							
				2.00	D	N=9 (1,1/2,2,2,3)	2.00		Soft, low strength, brown mottled grey and orange, slightly silty, slightly gravelly, CLAY. Gravel is fine to coarse, sub-angular to sub-rounded, mudstone. MADE GROUND	2
		2.00	S							
		2.50	D							
				3.00	D	N=8 (1,2/2,2,2,2)			Firm, medium strength, brown, slightly silty CLAY with infrequent localised orange slightly sandy silt pockets. WEATHERED LONDON CLAY FORMATION	3
		3.00 - 3.50	B							
		3.00	S							
				3.50	D					
				4.00	D					
				4.00	S					
				4.50	D	N=11 (2,2/2,3,3,3)				
				5.00	D					
				5.00	S					
		6.00	D	N=13 (2,2/2,3,4,4)						
		6.00 - 6.50	B							
		6.50	D							
		6.50	S	N=14 (2,3/3,4,4,3)						
		7.50	D							
		8.00	D							
		8.00	S	N=17 (3,3/3,4,5,5)	8.00		Stiff, high strength, brown mottled grey, locally slightly silty, CLAY. Rare finely disseminated pyrite and fine to medium, selenite crystals. WEATHERED LONDON CLAY FORMATION	8		
		9.00	D							
Crew: Borehole Solutions		Logger: SS		Chiselling Details						
Equipment: Cable Percussion Rig				Depth Top		Duration		Remarks		
Groundwater Remarks: Groundwater strike not encountered.				Casing Diameter by Depth						
				Depth Base		Diameter		Remarks		
General Remarks:				1.00		150				
Hole Started: 15/09/2022		Hole Complete: 15/09/2022		Version: FINAL		Scale: 1:50				

		GRM Development Solutions Ltd Laurus House, First Avenue, Centrum 100, Burton-on-Trent, DE14 2WH Tel (HQ): 01283 551249 Email: info@grm-uk.com		Cable-Percussion Borehole			Borehole No. BH01 Sheet 2 of 2																						
Site Name: 46 Blythwood Road, Stroud Green							Ground Level (mAOD)																						
Client: FG Plus					GRM Project Ref: P10130		Coordinates 530606 E 187772 N																						
Install	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description																					
		Depth (m)	Type	SPT Value																									
		9.00 - 9.50	B	N=19 (3,4/4,5,5,5)	13.20			Stiff, high strength, brown mottled grey, locally slightly silty, CLAY. Rare finely disseminated pyrite and fine to medium, selenite crystals. WEATHERED LONDON CLAY FORMATION	10																				
		9.50 9.50	D S																										
		10.50	D	N=22 (5,5/5,5,5,7)						14.50			Stiff, high strength, grey mottled brown, CLAY. Rare finely disseminated pyrite. LONDON CLAY FORMATION	11															
		11.00 11.00	D S																										
		12.00 12.00 - 12.50	D B	N=27 (5,5/6,6,7,8)											15.00			Very stiff, high strength, greyish brown CLAY. LONDON CLAY FORMATION	12										
		12.50 12.50	D S																										
		13.50	D	N=38 (6,6/9,9,9,11)																			End of Borehole at 15.000m	13					
		14.00 14.00 - 14.50	D B																										
		14.50 14.50	D S																										14
Crew: Borehole Solutions		Logger: SS		Chiselling Details																									
Equipment: Cable Percussion Rig				Depth Top		Duration		Remarks																					
Groundwater Remarks: Groundwater strike not encountered.				Casing Diameter by Depth																									
				Depth Base		Diameter		Remarks																					
General Remarks:				1.00		150																							
Hole Started: 15/09/2022		Hole Complete: 15/09/2022		Version: FINAL		Scale: 1:50																							



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4161



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Leicester
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GRM Development Solutions

Laurus House
First Avenue
Centrum 100
Burton Upon Trent
DE14 2WH

Analytical Test Report: L22/04772/GRM - 22-29316

Your Project Reference:	P10130 46 Blythwood Road, Storud Green		
Your Order Number:	GRM/P10130	Samples Received / Instructed:	20/09/2022 / 20/09/2022
Report Issue Number:	1	Sample Tested:	20/09 to 29/09/2022
Samples Analysed:	5 soil samples	Report issued:	29/09/2022

Signed

Peter Swanston
Technical Manager
CTS Group

Notes:**General**

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Moisture Content was determined in accordance with CTS method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received.

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

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L22/04772/GRM - 22-29316

Project Reference - P10130 46 Blythwood Road, Storud Green

Analytical Test Results - Chemical Analysis

Lab Reference			260187	260188	260189	260190	260191
Client Sample ID			BH01	BH01	BH01	BH01	BH01
Client Sample Location			-	-	-	-	-
Client Sample Type			-	-	-	-	-
Client Sample Number			-	-	-	-	-
Depth - Top (m)			3.00	6.00	9.00	12.00	14.00
Depth - Bottom (m)			3.50	6.50	9.50	12.50	14.50
Date of Sampling			15/09/2022	15/09/2022	15/09/2022	15/09/2022	15/09/2022
Time of Sampling			-	-	-	-	-
Sample Matrix			Clay	Clay	Clay	Clay	Clay
Determinant	Units	Accreditation					
Water soluble sulphate	(mg/l)	u	3200	3100	1800	3000	1100
Acid Soluble Sulphate	(%)	u	0.66	0.35	0.66	0.23	0.23
Total Sulphur	(%)	UKAS	1.84	0.26	0.19	0.27	0.31
pH Value	pH Units	MCERTS	6.9	7.5	7.8	7.6	8.4



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Sample Descriptions

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
260187	BH01	-	-	-	Brown clay with rare organic matter	-	-	100
260188	BH01	-	-	-	Brown clay	-	-	100
260189	BH01	-	-	-	Brown clay	-	-	100
260190	BH01	-	-	-	Brown clay	-	-	100
260191	BH01	-	-	-	Brown clay	-	-	100



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Sample Comments

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
260187	BH01	-	-	-	
260188	BH01	-	-	-	
260189	BH01	-	-	-	
260190	BH01	-	-	-	
260191	BH01	-	-	-	



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Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
ASSO4S	MS - CL - Acid Soluble Sulphate	Oven Dried	Passing 2mm test sieve	Determination of total sulphate in soils by acid extraction followed by ICP analysis
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis
1377TS-ELT	BS1377 Total Sulphur Content by HTC	Oven dried	BS1377 : Part 1 : 2016	Total Sulphur Content testing of Soil in accordance with BS 1377 : Part 3 : 2018 + A1 : 2021 Clause 7.10 (using Eltra CS-800 Analyser)



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Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Observations on receipt

A - No date of sampling provided

C - Received in inappropriate container

H - Contains headspace

T - Temperature on receipt exceeds storage temperature

R - Date of sampling to receipt insufficient to allow analysis to be completed without deviation, Please note this is only a deviation if 'X' is also recorded against the sample

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
260187	BH01	-	-	-	MS - CL - pH in Soils	R
260188	BH01	-	-	-	MS - CL - pH in Soils	R
260189	BH01	-	-	-	MS - CL - pH in Soils	R
260190	BH01	-	-	-	MS - CL - pH in Soils	R
260191	BH01	-	-	-	MS - CL - pH in Soils	R



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