



GEO-ENVIRONMENTAL CONSULTING ENGINEERS

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STUBBINS HOUSE, STUBBINS LANE, CLAUGHTON-ON-BROCK, PRESTON

REMEDIATION METHOD STATEMENT



Prepared for:

JWS Developments

Report Ref: BEK-21833-1 (Rev A)

March 2021



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Project Quality Assurance Information Sheet

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Report Title	Remediation Method Statement
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Date	March 2021
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Remediation Method Statement

PROJECT NO: 21833
REPORT REF: BEK-21833-1
DATE: March 2021

REVISION STATUS / HISTORY

Rev	Date	Issue / Comment	Prepared	Checked
A	7 April 2021	Minor Modifications	JM	MB

GENERAL REPORT LIMITATIONS

BEK Enviro Limited (BEK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and BEK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by BEK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

No part of this report may be copied or duplicated without the express permission of BEK and the party for whom it was prepared. Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

Unless explicitly agreed otherwise, in writing, this report has been prepared under BEK's limited standard Terms and Conditions as included within our proposal to the Client.

The report needs to be considered in the light of the BEK proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.



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Cassidy+Ashton 'Proposed Development Layout Plan' - Drawing No. 9009/L06/A
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1. INTRODUCTION

1.1.1 BEK Enviro Limited (BEK) has been commissioned by JWS Developments to prepare a method statement for the remediation works required at Stubbins House, Stubbins Lane, Claughton-On-Brock, Preston (hereafter referred to as 'the site').

1.1.2 The site occupies a roughly rectangular shaped plot of land, about 29 x 24 m, located to the southeast of Stubbins Lane. The site is part of a farm and comprises agricultural buildings, currently being used mainly for livestock. The site was generally level with a grass surface to the west of the building, and concrete surface to the north and east. In the south the surrounding area was unsurfaced. Surrounding the site was mainly farmland and farm buildings.

1.1.3 The site location is shown as Figure 1.

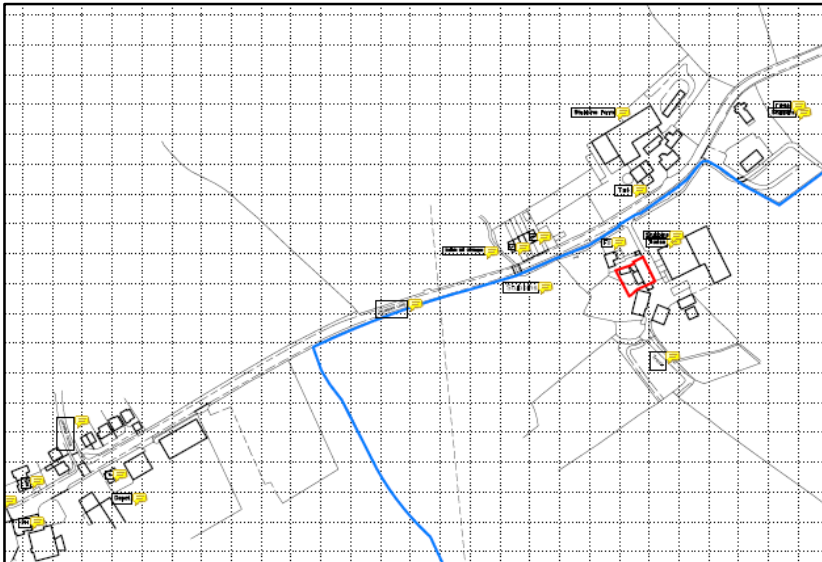


Figure 1: Site Location

1.1.4 It is understood that permission is to be sought for the to the redevelopment of the site for residential use and this will include the conversion of the existing stone barn into two houses, with car parking and gardens to the rear (south-west).

1.1.5 The proposed development layout plan is presented on the Cassidy+Ashton Drawing No. 9009/L06/A, a copy of which is presented in Appendix A.

1.1.6 The site has been subject to site investigation and quantitative risk assessment by PSA Design, the details of which are summarised in Section 2.

2. PREVIOUS SITE INVESTIGATION

2.0.1 The site has been subjected to previous site investigation and contamination assessment, the details of which are provided within the following reports:

- Worms Eye - Preliminary Risk Assessment (Desk Study) report – Stubbins House, Stubbins Lane, Cloughton-On-Brock, Preston, PR3 OPL [Stubbins Lane/PR3 OPL, dated 1 December 2017]
- PSA Design - Stubbins House, Stubbins Lane Phase 2 Geo-Environmental Investigation and Assessment Report – Report Ref: G3472, dated March 2021

2.0.2 The Phase 2 Geo-Environmental Investigation and Assessment Report forms the basis for the remediation works required at the site. The above reports should be read in conjunction with this report.

2.1 BEK Summary

2.1.1 The site investigation carried out by PSA Design (PSA) has been designed to provide indicative information for the ground conditions across the site with respect to the quantitative assessment of the potential risks associated with contamination and ground gas, as identified in the Desk Study.

2.1.2 The ground investigation consisted of the drilling of 5 window sample boreholes to assess the ground conditions at the site in preparation for the proposed re-development as a residential development with associated infrastructure. The investigation included the recovery of representative samples for chemical and geotechnical testing.

2.1.3 General ground conditions consisted locally of concrete in Borehole No WS1 overlying granular made ground topsoil over glacial deposits ('Firm brown/grey sandy silty clay). This was underlain by 'silty sands' in all locations. 'Grey/brown fine gravel' was encountered from depth 3.5 m to the base of the Borehole No WS3 (4.45 m).

2.1.4 No groundwater was encountered within the boreholes drilled across the site and there was no visual/olfactory evidence for the presence of contamination.

2.1.5 The samples recovered from site investigation have been tested for a wide range of contaminants of concern outlined within the Desk Study and based on observations made during the site investigation. The chemical test results have been compared to relevant generic assessment criteria to identify potential contaminants of concern.



- 2.1.6 Chemical test results confirmed that elevated concentrations of benzo(a)fluoranthene and dibenzo(ah)anthracene were present within the soils underlying the site. These contaminants of concern represent a potential risk to human health. Phytotoxic concentrations of zinc have also been encountered at the site.
- 2.1.7 No risks to controlled waters have been identified.
- 2.1.8 PSA Design conclude that there are elevated levels of contaminants for the proposed residential development and as such a moderate risk from soil contamination in this refined environmental model for the site. As such, remediation measures due to soil contamination risk are required for the site. This will need to take the form of a remediation strategy to assess the risks to the garden and landscaping areas, end users and to development workers.
- 2.1.9 The UK WIR Risk Assessment has been completed (17 March 2021) and this concludes that standard PE pipes will be suitable for use at this site.



3. REMEDIATION STRATEGY

3.0.1 In order to remove potential risks to the development and/or human health specific remediation and mitigation measures need to be carried out.

3.1 Contamination

Made Ground

3.1.1 To mitigate the potential risks to human health associated with ground contamination within the garden areas of the new residential development, the following works will need to be undertaken:

- (i) All soft landscaped/garden areas will be capped with a minimum of 600 mm of clean suitable soil (450 mm subsoil and 150 mm topsoil). The capping soils should be underlain by a 100 mm granular no-dig layer or a geotextile membrane to prevent mixing.

3.1.2 Soils used in the capping system will need to be tested and assessed to ensure suitability of use. All soil used in the capping system will need to be imported. Capping thickness will also require validation.

3.2 Imported Material

3.2.1 There may be a requirement to import suitable topsoil/subsoil for use in the landscape/garden areas of the development.

3.2.2 The suitability of the sub/topsoil and any other material imported to the site should be independently validated.

3.2.3 The details pertaining to the independent validation of material to be imported to the site are outlined within Section 4 of this report.

3.3 Off-Site Disposal

3.3.1 The chemical testing regime for off-site disposal may be different to the chemical testing required to assess the suitability of the soils for retention on site and the risks to human health. Therefore, additional assessment may be required to classify the soils for off-site disposal with testing criteria to assess whether the soil is hazardous, non-hazardous or inert waste.

3.3.2 However, existing laboratory test certificate will help inform the process. Any additional testing should also be used in the classification of the waste soils for off-site disposal.



3.3.3 The receiving landfill may require additional specialist laboratory testing to further characterise the material proposed for disposal against Waste Acceptance Criteria (WAC). We would recommend early consultation between the Contractor and the receiving landfill to determine any specific laboratory testing requirements.

3.3.4 Individuals/companies removing soils from the site are bound by a Duty of Care and as such this should only be undertaken by an authorised person. All waste movements should be accompanied by a waste transfer note.

3.4 Dewatering

3.4.1 Perched water was encountered in seven out of eight exploratory locations during the site investigation and it is likely it will be encountered during the development works.

3.4.2 If water entering any of the excavations is visually or olfactory affected by contamination then consideration should be made for watering. Any impacted water should be carefully pumped from the excavation direct into a tanker for off-site disposal. Water will be pumped from the near surface of the water and (as much as practicable) away from the sides of the excavation to avoid pumping up soils.

3.4.3 All pumping activities will be carefully monitored by BEK to watch for drawing in contaminated water from elsewhere on the site. Pumping will continue until visual/olfactory evidence of contamination has reduced/gone or as is considered reasonably practicable.

3.5 Construction Workers

3.5.1 It is recommended that construction personnel involved with direct contact with the soils at the site use appropriate PPE equipment (i.e. boots, gloves and overalls) together with hygiene facilities in accordance with general health and safety guidelines. The successful remediation/site works contractor should undertake a suitable risk assessment to confirm the appropriate level of PPE.

3.5.2 A copy of all reports relating to the site should be included in the site Health and Safety File and site workers should be made fully aware of the sites setting.

3.6 Concrete Mix Design

3.6.1 Precautions are required with respect to concrete classification. PSA recommends that as a minimum the design sulphate class for the site should comply with Concrete specification is DS-1 AC-2z

3.6.2 Confirmation that the correct concrete mix has been used on site is outside the BEK validation remit.



3.7 Unforeseen Circumstances

3.7.1 Any areas of previously unidentified potentially contaminated soils encountered during site construction works must be brought to the attention of BEK, to ensure that the recommendations herein apply. Any potentially contaminated soils should be left in-situ and subjected to further assessment, to potentially include further chemical testing and risk assessment.

3.8 Utilities

3.8.1 The UU UK WIR Risk Assessment has been completed for this site (17 March 2021) and this concludes that standard PE pipes will be suitable for use at this site.

3.9 Re-Use of Waste Soils on Site

3.9.1 The re-use of waste soils generated at the site should be covered through environmental permit exemptions (if applicable) and/or through the preparation of a Materials Management Plan as part of compliance with the Definition of Waste: Code of Practice (DoW:CoP).

3.10 Communication

3.10.1 It is recommended that regular communication is maintained between BEK and the Site Manager throughout the development works.

3.11 Statutory Consultation

3.11.1 We would recommend that a copy of the Remediation Method Statement is issued to the local authority for review/comment and approval.

3.11.2 The NHBC (or other insurer) may also require written approval of the remediation proposals from the regulators in order to satisfy their Land Quality Conditions.

3.12 Closure

3.12.1 Following satisfactory completion of remediation works, BEK will produce a Validation Report to demonstrate compliance with this Remediation Method Statement.

4. SUPERVISION & VALIDATION

4.1 Supervision of Works

4.1.1 The works will be supervised by an Engineer from BEK who will ensure the following verification procedures are adopted:

- (i) Liaison with the appointed groundwork/remediation contractor
- (ii) Inspection and supervision of the works
- (iii) Collection of samples and co-ordination of laboratory testing

4.1.2 The remediation areas will be checked and verified by the Engineer at key stages during the works, including:

- (i) Prior to/following placement of the capping soils to ensure suitability and capping thickness of suitably clean soils
- (ii) Recovery of validation samples, as required

4.2 Validation of the Works

4.2.1 Validation testing is required to ensure the remediation works have been undertaken in accordance with the methodology presented herein.

4.3 Capping Material

4.3.1 It is considered likely that topsoil will need to be imported for use in the gardens. Where possible, all imported soils should be sourced locally.

4.3.2 To confirm the suitability of the sub/topsoil it will be necessary to recover representative samples for chemical testing and assessment. We initially recommend that this consists of a minimum of 3 samples, however the sampling frequency may be varied at the discretion of the Engineer depending on the nature and variability of the soil.

4.3.3 The methodology to validate the quality of any imported material for use in the gardens will depend on source of those materials. Materials from a known source, where independent risk assessment has been carried out would require no further testing, provided it has been sampled on an appropriate density and has been proven fit for purpose in accordance with residential criteria.

- 4.3.4 Without any validatory information, all potentially suitable backfill material will be thoroughly assessed at source prior to importation onto the site. The Engineer will obtain samples from the identified sources, at a rate of between 3 and 5 samples per source depending upon the volume of material available.
- 4.3.5 It will also be necessary to carry out routine inspection and sampling during the importation process in order to confirm the material is consistent with the source testing and assessment.
- 4.3.6 The visual inspection shall ensure that the soil is visually acceptable for use and does not contain any deleterious material (i.e. glass, plastic, brick, concrete etc.).
- 4.3.7 Imported topsoil and subsoil being brought to the site should be tested for contamination to ensure that they are suitable for residential end use. Testing of imported soils can be undertaken upon import within a stockpile, or preferably upon placement within rear gardens areas. Testing will vary based on the source of the material.
- 4.3.8 Imported topsoil should be tested at a rate of 1 composite sample every 100 m³ of emplaced soil for greenfield sites increasing to 1 sample per 50 m³ for brownfield sites (with a minimum of 3 samples tested per imported topsoil source).
- 4.3.9 The sampling frequency may be varied at the discretion of the Engineer depending on the nature and variability of the imported material and its source.
- 4.3.10 Material to be used in the capping system (including the formation level subsoil) should be (as a minimum) tested for the following to MCERTS standard:

Arsenic	Zinc
Cadmium	Cyanide
Chromium	Phenols
Copper	Sulphate
Lead	Polycyclic Aromatic Hydrocarbons (PAHs)
Mercury	Total Organic Carbon
Nickel	Asbestos Screening

Table 1: Test Schedule for Soils to be used in Capping System

- 4.3.11 Following assessment of the source of material, it may be necessary to test for additional determinands. The assessment criteria for the determinands to be tested for are presented in Table 2.

4.4 Assessment Criteria

- 4.4.1 The following table provides a list of assessment criteria for assessing suitability of material to be used within the capping system.



4.4.2 The criteria have been sourced from the LQM/CIEH Suitable 4 Use Level (S4UL). In addition, the category 4 Screening Level (C4SL) for lead has been used and the Atkins ATRISKSIL screening level for cyanide has been used.

Contaminant of Concern	Assessment Criteria (mg/kg)
Arsenic	37
Cadmium	11
Chromium (total)	910
Copper	2400
Lead	210
Mercury	40
Nickel	180
Selenium	250
Zinc	3700
Cyanide	41
Acenaphthene	210
Acenaphthylene	170
Anthracene	2400
Benzo(a)anthracene	7.2
Benzo(a)pyrene	5
Benzo(b)fluoranthene	2.6
Benzo(ghi)perylene	320
Benzo(k)fluoranthene	77
Chrysene	15
Dibenzo(ah)anthracene	0.24
Fluoranthene	280
Fluorene	170
Indeno(1,2,3-cd)pyrene	27
Naphthalene	2.3
Phenanthrene	95
Pyrene	620
Asbestos	No Asbestos Detected

Table 2: Assessment Criteria for Imported Sub/Topsoil

4.5 Assessment of Chemical Test Results

4.5.1 BEK will be responsible for the assessment of all chemical test results to determine suitability of material to be used on site.

4.5.2 The assessment will be undertaken in accordance with current UK policy and guidelines and the method agreed with the local authority.

4.5.3 All chemical test results will be presented in the Validation Report.



4.6 Capping Thickness

4.6.1 The verification of the capping thickness will be done by the excavation of a series of trial holes. Alternatively it may be possible to place a measuring pipe in each garden area prior to placement of the cap. This can then be dipped and a capping thickness relative to previous ground level be determined.

4.6.2 The Engineer may take other measurements as required to verify the works have been carried out in accordance with this Method Statement.

4.7 Unexpected Area of Ground Contamination

4.7.1 As stated previously within this report the site has been subject to previous site investigation and as such, indicative ground conditions are known.

4.7.2 However if “any area of suspect material are encountered during the development of the site (i.e. that do not conform to the anticipated ground conditions)” appropriate action will be taken. This will initially include the cessation of work in the area of concern and information BEK, who will attend site and carry out further assessment.

4.7.3 As a minimum BEK will notify the local authority and prevent any additional work in the area pending further assessment which may include sampling, testing and risk assessment.



GEO-ENVIRONMENTAL CONSULTING ENGINEERS

5. REPORTING

- 5.1 On completion of the remediation and mitigation works, BEK will prepare a Validation/Completion Report.
- 5.2 The Validation Report will describe the works undertaken in order to satisfactorily demonstrate that the works have been completed successfully and will include the following:
- (i) A description of works undertaken
 - (ii) Record of any unforeseen contamination encountered during the works
 - (iii) Record of any material imported into the site for use in the garden/landscaped areas (if required)
 - (iv) Validation samples recovered and tested
 - (v) Assessment of the chemical test results
 - (vi) Photographs showing the remediation works being undertaken and completed.

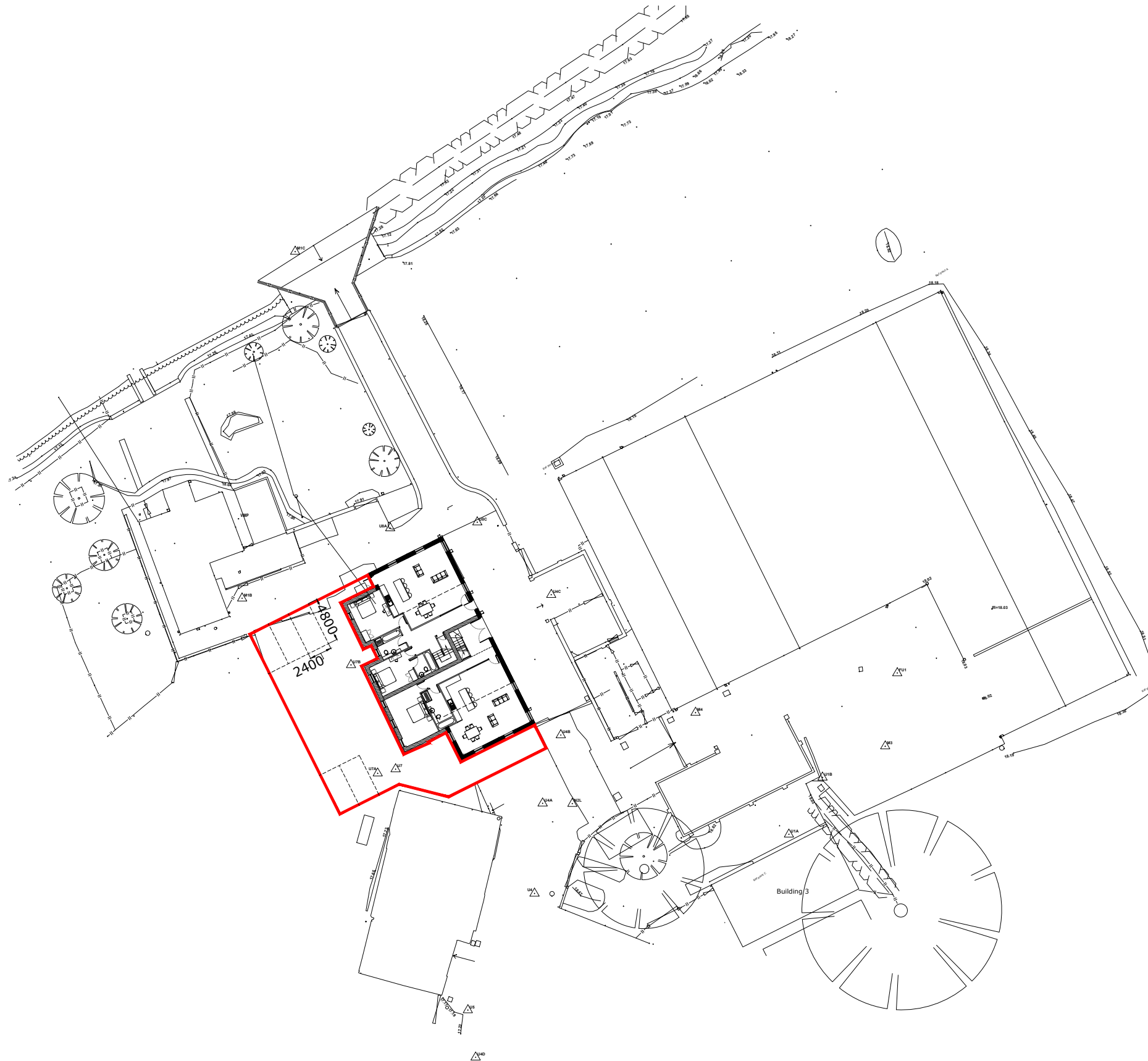
APPENDIX A

Drawings


This drawing is subject to copyright and is not to be reproduced in part or whole without approval.
Do not scale this drawing - check all dimensions on site.

Health & Safety Notes

- Contractor must ensure that all work on site is carried out in a safe & satisfactory manner, in accordance with Health & Safety At Work Act 1974, COSHH Regulations 2002 & requirements of C.D.M



Rev.	Description	Date
A	Parking areas and spaces revised	03.11.2017
P1	First Issue	18.09.2017


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Client Mr & Mrs Thompson
Project Mixed Use Residential And Employment Scheme

Drawing Title Proposed Site Plan		
Drawn by JP	Checked by ND	Date 18.09.2017
Status PRELIMINARY	Scale @ A3	1:500
Job no. 9009	Dwg.no. L06	Rev. A