Kier Building UK
Kier Construction
London

Matt Davis
Kier Construction London
2 Langston Road
Loughton
IG10 3SD

T: 02084183917

London Borough of Camden 2nd Floor
Jonathan McClue
5 Pancras Square c/o Town Hall, Judd Street
London
WC1H 9JE

12 September 2016

Dear Jonathan McClue,

I write in regards to the Project – Greenwood Place Resource Centre and Planning Condition 2 of Application No: 2015/3151/P.

Condition 2

The development hereby approved shall not commence until such time as a suitably qualified chartered engineer with membership of the appropriate professional body has been appointed to carry out further ground investigation to ascertain the ground conditions in the area of the proposed basement detect and limit the extent of any buried stream channel beneath the site and to identify the configuration of the foundations to the neighbouring buildings. A qualified engineer would also be required to approve and monitor the critical elements of both permanent and temporary basement construction works throughout their duration to ensure compliance with the design which has been checked and approved by a building control body.
Details of the appointment and the appointee's responsibilities shall be submitted to and approved in writing by the local planning authority prior to the commencement of development. Any subsequent change or reappointment shall be confirmed forthwith for the duration of the construction works.

To satisfy this Condition, please find details of the appointment with our qualified chartered engineers and their responsibilities on this Project.

Yours sincerely

Matt Davis
Project Manager

Clarification

For the avoidance of doubt, Campbell Reith Hill LLP is the Civil & Structural Engineering Consultant who provided the Scope of Works to Geosphere Environmental.
Geosphere Environmental carried out the physical works and analysis of the site.
Both Consultants have been fully appointed by Kier Construction London for the scheme.

Qualified Chartered Engineer and Consultant

Campbell Reith Hill LLP

Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

Kier's Responsibilities for the Civil & Structural Design – Scope of Services

This scope is for the clarification purposes and is to be read in conjunction with Schedule 3: The Civil and Structural Engineering Services and Schedule 5: Design Responsibility Matrix.

Kier also uses its own Designer Competency Assessment document to confirm that those who are appointed to fulfil design services have the necessary skills, knowledge, experience and organisational capability in accordance with Regulation 8 of the Construction Design and Management (CDM) Regulations 2015.

Campbell Reith Hill LLP is to progress the structural and civil design through RIBA stages 3 and 4. This initial information will inform package scope and requirements in order to allow Kier to provide a robust price in the later stages of the PCSA period. Subsequently this will be further developed for construction purposes in sufficient time to allow the Main Contract works to proceed.

Qualified Chartered Engineer and Design Consultant

Geosphere Environmental

Brightwell Barns,
Ipswich Road,
Brightwell,
Suffolk, IP10 0BJ

Kier's Responsibilities for the Site Investigation Consultant – Scope of Services

The scope of works for the Ground Investigation was specified by Campbell Reith Hill and reviewed by Kier Construction London. This document can be found further within this letter.

Designer Competency Assessment

Please find Campbell Reith Hill's and Geosphere's completed and approved Designer Competency Assessment on the following 22 Pages. As well as Supporting Information Document.
The following table aligns with the requirements of PAS 91 2013 and Safety Schemes in Procurement (SSIP) Forum.

KIER

Construction Division

Designer Competency Assessment Form (Consultants, Sub-Contractors and Sub-Consultants)

Project:	Greenwood Centre Project	***Client:***	London Borough of Camden	***Reference:***	
Contractor/Consultant:	Campbell Reith Hill LLP				
Key Contact	Alex Forbes	***Telephone:***	01737 784 500	***E-Mail:***	alexforbes@campbellreith.com
Date completed by designer	February 2016	***Name and date of reviewer by Kier***	ANDREW JENKINS 29/03/16	***Revision***	

The following table aligns with the requirements of PAS 91 2013 and Safety Schemes in Procurement (SSIP) Forum. This document is used within Kier to confirm that those who are appointed to fulfil design services have the necessary skills, knowledge, experience and organisational capability in accordance with Regulation 8 of the Construction Design and Management (CDM) Regulations 2015.

Note: If you are completing this form and you have SSIP Accreditation for <u>DESIGN</u>, you may go directly to Questions 10 -14. Please enclose a copy of your SSIP Accreditation Certificate (for Design) when returning this completed form. If you only have a Accreditation for CONSTRUCTION works, please follow the notes in the comments column below.

	Criteria & Standard to Achieve	Typical Examples of Evidence	YOUR Evidence *that you could use to demonstrate you meet the required standard.*	Comments
	<u>Stage 1 Assessment</u>			
1.	**Health and safety policy and organisation for health and safety**			
	You are expected to have and implement an appropriate policy, regularly reviewed, and signed off by the Managing Director or equivalent. The policy must be relevant to the nature and scale of your work and set out the responsibilities for health and	A signed, current copy of the company policy (indicating when it was last reviewed and by whose authority it is published).	Refer to Section 6 of the Supporting Documentation	Not applicable if organisation has SSIP Certification for Construction Works

KIER CONSTRUCTION LTD

DESIGNER COMPETENCY ASSESSMENT FORM

Reference No: KBA-FO-0141:

GEL Project No: 1655,SI

Designer Competency Assessment Form

CHAS Accreditation Certificate

Organisation Chart including Structure and Duties

Generic Risk Assessment and Method Statement (See note on questionnaire)

Example of Company Work Experience

Curriculum Vitae

ADDRESS Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ
TELEPHONE 01603 298076
FAX 01603 298075
EMAIL info@geosphere-environmental.co.uk

Designer Competency Assessment Form (Consultants, Sub-Contractors and Sub-Consultants)

Project:	Greenwood Place, Camden, London, NW5 1LB	***Client:***	Kier Construction Ltd	***Reference:***	
Contractor/Consultant:	Geosphere Environmental Ltd	***GEL Project Number:***	1655,SI		
Key Contact	Stephen Gilchrist	***Telephone:***	01603 298 076	***E-Mail:***	stephen@geosphere-environmental.co.uk; (Engineer); anne.davies@geosphere-environmental.co.uk (Administration)
Date completed by designer	16 February 2016	***Name and date of reviewer by Kier***		***Revision***	

The following table aligns with the requirements of PAS 91 2013 and Safety Schemes in Procurement (SSIP) Forum. This document is used within Kier to confirm that those who are appointed to fulfil design services have the necessary skills, knowledge, experience and organisational capability in accordance with Regulation 8 of the Construction Design and Management (CDM) Regulations 2015.

Note: If you are completing this form and you have SSIP Accreditation for DESIGN, you may go directly to Questions 10 -14. Please enclose a copy of your SSIP Accreditation Certificate (for Design) when returning this completed form. If you only have a Accreditation for CONSTRUCTION works, please follow the notes in the comments column below.

	Criteria & Standard to Achieve	**Typical Examples of Evidence**	**YOUR Evidence** *that you could use to demonstrate you meet the required standard.*	**Comments**
	Stage 1 Assessment			
1.	**Health and safety policy and organisation for health and safety**			
	You are expected to have and implement an appropriate policy, regularly reviewed, and signed off by the Managing Director or equivalent. The policy must be relevant to the nature and scale of your work and set out the responsibilities for health and safety management at all levels	A signed, current copy of the company policy (indicating when it was last reviewed and by whose authority it is published).	N/A – CHAS certified	Not applicable if organisation has SSIP Certification for Construction Works

	within the organisation.			
2.	**Arrangements**			
	These should set out the arrangements for health and safety management within the organisation and should be relevant to the nature and scale of your work. They should set out how the company will discharge their duties under the CDM Regulations. There should be a clear indication of how these arrangements are communicated to the workforce.	A clear explanation of the arrangements which the company has made for putting its policy into effect and for discharging its duties under the CDM Regulations.	N/A – CHAS certified Also ISO 9001:2008 certified	
3.	**Competent advice – corporate and construction-related**			
	Your organisation, and your employees, must have ready access to competent health and safety advice, preferably from within your own organisation. The advisor must be able to provide general health and safety advice, and also (from the same source or elsewhere) advice relating to construction health and safety issues.	Name and competency details of the source of advice, for example a safety group, trade federation, or consultant who provides health and safety information and advice. An example from the last 12 months of advice given and action taken.	N/A – CHAS certified NEBOSH Certificate held	Not applicable if organisation has CHAS for Construction Works

4.	**Training and information**			
	You should have in place, and implement, training arrangements to ensure your employees have the skills and understanding necessary to discharge their duties as contractors, designers or Principal Designers. You should have in place a programme for refresher training, for example a Continuing Professional Development (CPD) programme or life-long learning which will keep your employees updated on new developments and changes to legislation or good health and safety practice. This applies throughout the organisation - from Board or equivalent, to trainees.	Headline training records. Evidence of a health and safety training culture includes; records, certificates of attendance and adequate health and safety induction training for site-based workforce. Evidence of an active CPD programme. Sample 'toolbox talks'.	N/A – CHAS certified All site personnel hold CSCS cards and undertake regular training.	
5.	**Individual qualifications and experience**			
	Employees are expected to have the appropriate skills, knowledge and experience for the assigned tasks, unless they are under controlled and competent supervision.	Details of qualifications and/or experience of specific corporate post holders for example Board members, health and safety advisor etc. Other key roles should be named or identified	N/A – CHAS certified Also ISO 9001: 2008 certified See CV's	

		and details of relevant skills, knowledge and experience provided. **For contractors:** details of number/percentage of people engaged in the project who hold an occupational certification (e.g. CSCS). **For site managers,** details of any specific training such as the Construction Skills CITB 'Site Management Safety Training Scheme' certificate or equivalent. **For professionals and office-based staff,** details of qualifications and/or professional institution membership. **For site workers**, details of any relevant qualifications or training such as S/NVQ certificates. Evidence of a company-based training programme suitable for the work to be carried out.		
6.	**Monitoring, audit and review**			
	You should have a system for monitoring your procedures, for auditing them at periodic intervals, and for reviewing them	Could be through formal audit or discussions/reports to senior managers. Evidence of recent monitoring	N/A – CHAS certified Also 9001:2008 certified	Not applicable if organisation has SSIP for Construction Works

	on an ongoing basis. For sub-contractors the minimum standard for these procedures should be UKAS Accredited ISO 9001 or OHSAS 18001. Certification.	and management response. Copies of site inspection reports. Copy of ISO 9001 or OHSAS 18001 Certificate (sub-contractors).		
7.	**Workforce involvement**			
	You should have, and implement, an established means of consulting with your workforce on health and safety matters.	Evidence showing how consultation is carried out. Records of health and safety committees. Names of appointed safety representatives (trade union or other). For those employing less than five, be able to describe how you consult with your employees to achieve the consultation required.	N/A – CHAS certified	
8.	**Accident reporting and enforcement action; follow-up investigation**			
	You must have records of all reportable events under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR) for at least the last three years. You should also have in place a system for reviewing all	Evidence showing the way in which you record and investigate accidents and incidents. Records of last two accidents/incidents and action taken to prevent recurrence. Records of any enforcement action taken over the last five	N/A – CHAS certified	Not applicable if organisation has SSIP for Construction Works

	incidents, and recording the action taken as a result. You should record any enforcement action taken against your company over the last five years, and the action which you have taken to remedy matters subject to enforcement action.	years, and what action was taken to put matters right (information on enforcement taken by HSE over the last five years is available on the HSE website). For larger companies, simple statistics showing incidence rates of major injuries, over seven-day injuries, reportable cases of ill health and dangerous occurrences for the last three years. Records must include any incidents that occurred whilst the company traded under a different name, and any incidents that occur to direct employees or labour-only sub-contractors.		
9.	**Sub-contracting/consulting procedures (if applicable)**			
	If you intend to sub-contract, you must have arrangements in place for appointing competent sub-contractors/consultants. You should be able to demonstrate how you ensure that subcontractors will also have arrangements for appointing competent sub-	Evidence showing how you ensure sub-contractors are competent. Examples of sub-contractor/consultant assessments you have carried out. Evidence showing how you require similar standards of	N/A – CHAS certified All intrusive works are carried out in-house.	

	contractors or consultants. You should have arrangements for monitoring sub-contractor performance.	competence assessment from sub-contractors/consultants. Evidence showing how you monitor sub-contractor performance.		
10.	**Hazard elimination and risk control (Consultants with Design Responsibility only)**			
	You should have, and implement, arrangements for meeting your duties under regulations 9, 11, 12 and 13 of the CDM Regulations.	Evidence showing how you : • Ensure cooperation and coordination of design work within the design team and with other designers/contractors; • Ensure that risks are eliminated, reduced or controlled and relevant information provided Examples showing how the principles of prevention have been followed through design. A short summary of how changes to designs will be managed.	N/A – CHAS certified	*Note: The emphasis here should be on practical, appropriate and proportionate measures which reduce particular risks arising from the design, not on lengthy procedural documentation highlighting generic risks.*

Designer Competency Assessment Form (Consultants, Sub-Contractors and Sub-Consultants)

	Stage 2 – Project specific assessment			
	Issue (Project Specific)	**What objective evidence is Kier Group looking for?**	**YOUR Evidence** *that you could use to demonstrate you meet the required standard.*	**Comments**
11.	**Work experience**			
	You should give details of relevant experience in the field, scope and project size of work for which you are applying. Justify your competence and resources to carry out this project with respect to the CDM Regulations.	A simple record of recent relevant projects/contracts should be provided with the phone numbers/addresses of contacts who can verify that work was carried out with due regard to health and safety. Please include relevant cross reference to staff members who will be working on this project. This should be sufficient to demonstrate your ability to deal with the key health and safety issues arising from the work you are applying for. Where there are significant shortfalls in your previous experience, or there are risks associated with the project which you have not managed before, an explanation of how these shortcomings will be overcome.	All project records are governed by our ISO: 9001 QA system and all details relevant to works and H&S are kept within a job specific 'project information sheet' and all site specific H&S data is recorded within a site works RAMS 'Risk Assessment and Method Statement' document. Hard and electronic copies are recorded. Relevant company experience, company structure are attached. A generic RAMS is attached. A site specific RAMS will be issued once the scope of works are finalised. We are fully competent and have a proven track record with dealing with all key H&S issues arising from the work we are applying for.	Attached to the back of this submission: ○ Company organisation structure ○ Generic RAMS document (A site specific RAMS will be provided subject to confirmation of the updated scope of works to be reviewed by Andy Jenkins) ○ Various project examples

Designer Competency Assessment Form (Consultants, Sub-Contractors and Sub-Consultants)

	Issue (Project Specific)	What objective evidence is Kier Group looking for?	**YOUR Evidence** *that you could use to demonstrate you meet the required standard.*	Comments
12	Provide details of the organisational structure relevant to this project.	Sufficient to demonstrate team competence as, although we expect all relevant staff to be aware of the CDM Regulations, individual staff members will have different capabilities. Linked with question 14 below we are looking to establish that either the job designer(s) are each fully competent OR that the senior designer is fully competent and checks all CDM issues with each job designer.	Please see the company organisation chart from the previous section. All site works will be undertaken by the project manager (a geotechnical / geoenvironmental consultant) who will be responsible for organising, undertaking and reporting all works. Internally they will be supported by the management who keep a 'hands on' and supervisory stance on all work undertaken by GEL. The project engineer will be directly guided by the health and safety manager and directors of the company.	CV's of staff involved in the project are required. CVs for the following consultants are attached: ○ Stephen Gilchrist ○ Jim Dawson ○ Lianne Fountain ○ Ian Cowell ○ Graeme Cheshire ○ Stuart Donkin ○ Steven Ivison All work is carried out in-house.
13	What element of your duties will you out source?	If this is the case, state which elements will be outsourced and confirm how these elements of the service will be incorporated into the design output?	Laboratory testing will be out-sourced. All other aspects of the work will be carried out in-house	Where this is a separate organisation, Kier may require that organisation to complete this Designer Competency Assessment form specific to them.

14	How do you ensure adequate information is appropriately communicated, for example, how it is provided in, or with, the design or survey?	Kier requires details of all residual risks to be noted on any drawing/report using the ⚠ symbol. Information should include consideration of, but not limited to risks associated with:- Stability, contamination, materials, fire, complicated or unusual elements or sequences of construction, maintenance, use (whether a workplace or not), demolition etc.	All of our findings and data are subject to communication in the form of a technical report. As we specifically target elements of risk (i.e. contamination) these are highlighted in depth as per set guidance and British Standard documents. Any health and safety aspects will be covered in our site specific and bespoke RAMS. This will be communicated in the form of verbal 'tool box talk' to the relevant on-site parties and all involved parties that fall under the RAMS must read and sign for confirmation of adequate communication.	

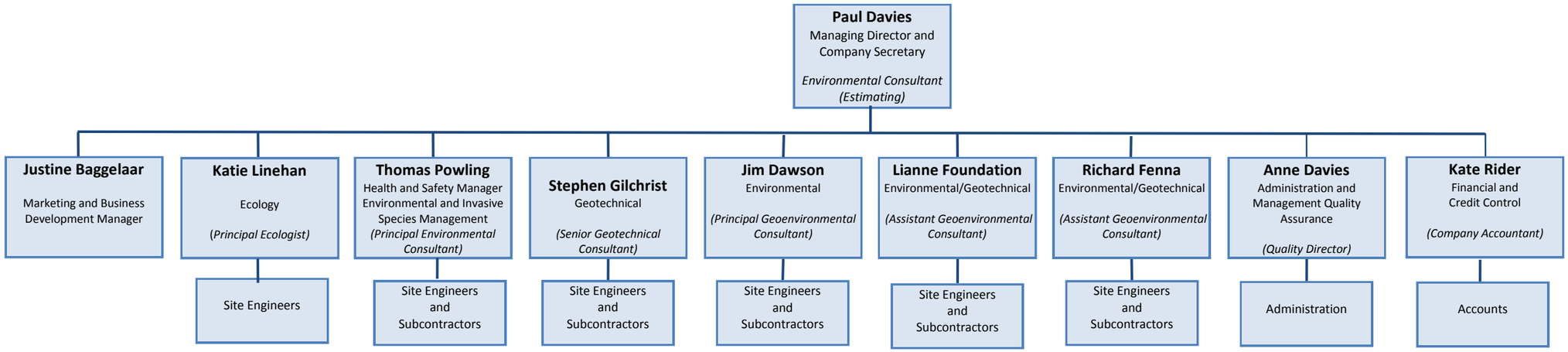
Guidance Notes and Recommendations for Use

General

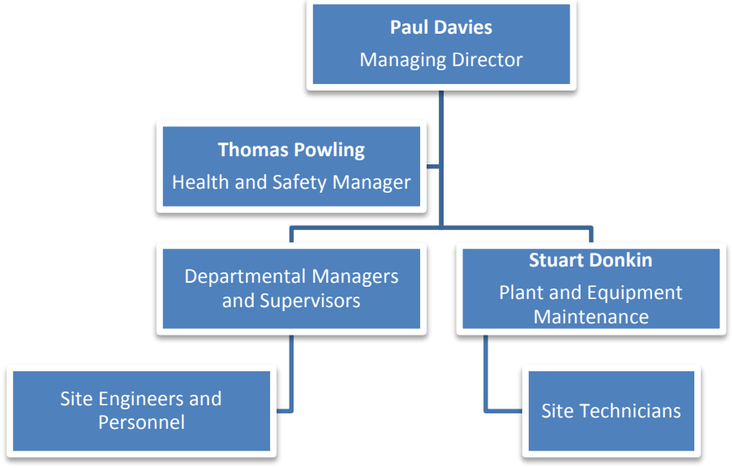
1. The checking of competency of personnel/organisations involved in construction projects is a requirement under the CDM Regulations. The competency should be checked for every consultant/survey organisation/provider of reports at prequalification/tender stage and prior to appointment to ensure they are competent to carry out the works
2. Completion of this assessment is mandatory prior to confirmation of appointment
3. Make it clear that the main intention of this assessment is in connection with the designer/consultant competence to comply with the CDM Regulations in relation to projects, not Health and Safety at Work of their own office
4. It is not expected that all designers/surveying/reporting companies will be able at the first interview to answer all the issues, but the more they are able to respond to the more effective the assessment process will be. The object is to assess competence and increase awareness of CDM issues and the need for procedures
5. Preferred to be completed at interview in order to ensure responses are true and not "manufactured"


SSIP
SAFETY SCHEMES IN PROCUREMENT
FOUNDER MEMBER
CHAS
CONTRACTORS HEALTH & SAFETY ASSESSMENT SCHEME
Certification Mark
www.chas.co.uk
Assessment Scheme
Certificate of Accreditation
This is to certify that
Geosphere Environmental Ltd
is accredited within the Contractors Health and Safety Assessment Scheme (CHAS) having demonstrated compliance with and sound management of current basic health and safety legislation.
Valid until: 21 August 2016
Working in partnership with business
020 8545 3838 – to verify
www.chas.co.uk

SENIOR LEVEL ORGANISATION STRUCTURE / RESPONSIBILITIES



HEALTH AND SAFETY ORGANISATION CHART



geosphere environmental ltd

Investigate Design Resolve

RISK ASSESSMENT AND METHOD STATEMENT

FOR A GROUND INVESTIGATION WORKS

For

Kier Construction Ltd
1st Floor
Building 7400
Cambridge Research Park
Waterbeach
Cambridge
CB25 9TN

Ref: Kier/Competency Questionnaire/TP,AD /03-11-15/V1
Issue Date: 3 November 2015




ADDRESS
Brightwell Barns, Ipswich Road, Brightwell, Suffolk, IP10 0BJ

TELEPHONE
01603 298076

FAX
01603 298075

WEBSITE
www.geosphere-environmental.co.uk

DOCUMENT ISSUED RECORD

Client:	Kier Construction Ltd
Project:	Cambridge Science Park, Cambridge

Risk Assessment Prepared by:	Tom Powling		Date:	3 November 2015
Risk Assessment Approved by:	Paul Davies		Date:	3 November 2015

REVISION RECORD

Revision	Date	Document	Prepared By:	Admin

AMENDMENT RECORD

Revision	Date	Amendments

CONTENTS

1. INTRODUCTION

This generic Risk Assessment and Method Statement will be issued to all site operatives and relevant parties before site work commence. This document provides information about works undertaken on behalf of Kier Construction Ltd, the personnel undertaking the work and how site operatives can participate in the safe completion of the works. All works undertaken are assessed on a site by site basis.

2. HEALTH AND SAFETY

Geosphere Environmental Ltd is dedicated to operating sites that provide a safe working environment that is free from health hazards for everyone affected by our activities.

A copy of our Health, Safety and Welfare Policy Statement is shown below. The full copy of our Health and Safety Policy is available on request. A copy of our Environmental Policy Statement is also attached.

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HEALTH, SAFETY AND WELFARE POLICY STATEMENT

The philosophy of the Geosphere Environmental Ltd is an un-equivocal and clear commitment to ensure the Health, Safety and Welfare of its employees, and others that may be affected by its undertakings.

The Company will:

- Provide necessary resources to achieve policy implementation ensuring the Health, Safety and Welfare of its own and sub-contractor employees whilst at work.
- Provide adequate information, instruction, training and supervision to all employees to ensure that they properly discharge their responsibilities and duties.
- Provide and maintain safe plant, equipment and systems of work.
- Continually improve upon health and safety performance and systems.
- Regularly set objectives and review performance.
- Carry out its activities in compliance with the requirements of current safety legislation.
- Promote a proactive safety culture.
- Ensure safe access and egress.
- Provide adequate and appropriate Personal Protective Equipment.
- Identify hazards, assess and evaluate their risks, and introduce controls throughout all the company's work activities to ensure the health and safety of its employees and others.

The Directors are responsible for ensuring that this policy is implemented, reviewed at least once a year, and that the necessary resources are provided.

Paul Davies, Director and Company Secretary
Geosphere Environmental Ltd February 2015 / V6

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ENVIRONMENTAL POLICY STATEMENT

Geosphere Environmental Ltd undertakes a wide range of Environmental Consultancy Services and activities across the United Kingdom, and recognises that protection of the environment is an integral part of its business. **Geosphere Environmental Ltd** endeavours to undertake works in an environmentally responsible manner.

Geosphere Environmental Ltd will comply with legislation, customer and other requirements that apply to its activities. Geosphere Environmental is committed to preventing pollution and aims to minimise the environmental impact of its activities by:

- Working closely with stakeholders, including clients, sub-contractors, statutory authorities and local communities;
- Minimising noise;
- Preventing pollution of water, land and air;
- Minimising waste and reusing or recycling materials;
- Disposing of waste responsibly;
- Protecting wildlife and habitats;
- Protecting archaeological remains and heritage buildings.

Geosphere Environmental Ltd will continually improve environmental performance, including encouraging and recognising contributions from employees. The company will check compliance with environmental requirements and review performance regularly.

To meet these goals, an Environmental Management System is in place that will comply with the International Standard ISO 14001. This includes setting objectives and targets:

- Implementing procedures to control activities and providing training to ensure that employees and sub-contractors understand their environmental responsibilities. The Directors are responsible for developing, implementing and maintaining this system.
- The Directors are responsible for ensuring that this policy is implemented, reviewed at least once a year, and that the necessary resources are provided.

Paul Davies, Director and Company Secretary
Geosphere Environmental Ltd February 2015 / V5

3. SCOPE OF WORKS

Any ground investigation works carried out for Kier Construction will be assessed on a site by site basis and may include the following works:-

- Review available site information including available utility drawings
- Conduct a site walkover
- Drilling of cable percussion boreholes
- Form a number of small diameter window sample using a compact rubber track mounted percussive window sampling rig
- Excavate a number of machine excavated trial pits
- Install groundwater and ground gas monitoring wells
- Return visits to monitor ground gases within monitoring wells
- Carry out geotechnical laboratory testing and chemical contamination analyses
- Prepare an interpretative engineering report with discussion and recommendations in relation to geotechnical and geoenvironmental aspects of the project.

All works will be supervised by an experienced Consultant.

The positions of the proposed exploratory holes will be marked and shown on a site location plan.

The locations of the proposed exploratory holes may be repositioned as necessary due to buried services and/or restrictions of access.

The proposed positions for the exploratory holes are to be agreed on site with the Client.

Consultant	**Geosphere Environmental Ltd**
	- Telephone 01603 298076
Project Engineer	- Stephen Gilchrist (Mobile 07714 586 943)
Project Director	- Paul Davies (Mobile 07748 647 370)
Health and Safety Director	- Thomas Powling (Mobile 07748 645 268)
Client/Developer/Site Owner	**Kier Construction Ltd**
Contact	- Name TBC (Mobile *****, if known)

4. EMERGENCY RESPONSE CONTACT DETAILS

Fire	- **999**
Electricity	**TBC**
	- Telephone TBC
Gas	**TBC**
	- Telephone TBC

Water	**TBC** - Telephone TBC
Sewage	TBC - Telephone TBC
Communications	**TBC** - Telephone TBC
Accident and Emergency Department	**TBC** - TBC – List address, road name, town, postcode Telephone TBC
Nearest Public Welfare facilities (if not onsite – toilet, running water)	- TBC

5. EMERGENCY ACTIONS

Fire	○ If possible and without risk, make one attempt to extinguish the fire using the appropriate fire extinguisher(s) from a local designated fire point or Geosphere Environmental Ltd vehicle. If it is assessed that the fire is likely to become beyond control: ○ TELEPHONE THE FIRE AND RESCUE SERVICE ○ RECORD AND REPORT THE INCIDENT TO PROJECT DIRECTOR ASAP
Personal Injury	○ Make area safe ○ If injuries serious or area cannot be made safe TELEPHONE EMERGENCY SERVICES ○ Administer first aid/make casualty comfortable as appropriate ○ RECORD AND REPORT THE INCIDENT TO PROJECT DIRECTOR ASAP
Electricity Cable Strike	○ Mark and clear the area of all personnel and equipment. ○ On no account touch the plant responsible for the strike. ○ If it is possible, locate the local isolator and isolate the supply. ○ Drivers of excavators should remain in their cab until the electricity supply has been switch off. It may be possible to drive the excavator away so that it is no longer in contact with the cables, but it must be safe to do so ○ If it is necessary to evacuate the excavator, if on fire, jump clear, keeping feet together and avoid holding onto the plant, or anything nearby. ○ Damage to the site supply, contact the site management. ○ Damage to a main supply, contact the supply authority.
Gas	○ Mark and clear the area of all personnel and equipment. ○ If it is possible, locate the local gas stopcock and isolate. ○ Inform the gas utility supplier on the emergency response number ○ Contact other emergency service(s) if the situation demands it.
Suspected UXO Discovery	○ Mark and clear the area of all personnel and equipment. ○ Inform site management ○ Consult with UXO Professional ○ INFORM POLICE if recommended by UXO Professional.

Fuel Spillages	○ Mark and clear the area of all personnel and equipment. ○ Make an attempt to contain any spillage by utilising an emergency spill kit or use other local absorbent material. (sand, rags etc) ○ Contact other emergency service(s) if the situation demands it.
Water and Effluent systems	○ Mark and clear the area of all personnel and equipment. ○ If it is possible, locate the local water stop-cock and isolate. ○ Damage to the site supply, contact the site management. ○ Damage to a main supply, contact the supply authority.
Communications	○ Mark and clear the area of all personnel and equipment. ○ Contact the supply authority

6. SITE EMERGENCY INFORMATION

Emergency Muster Point	To be determined on site upon receiving Kier induction
Location of First Aid Facilities	To be determined on site
Name of Site First Aider	To be confirmed

6.1 Welfare Arrangements

If not provided on-site by a principal contractor - details of the nearest public welfare facilities are listed in the emergency contact details in Section 5.

If arrangements have been made by the principal contractor, familiarise all operatives with them on induction and risk assessment process.

7. PLANT, EQUIPMENT AND SITE OPERATIVES

7.1 Light Cable Percussion Boreholes

The drilling works will be carried out using a Dando 1500 cable percussion boring rig and associated equipment which will be towed by a 4WD road vehicle and operated by a two man crew.

The drilling works will be undertaken by the follow experienced drilling crew:

Name: Richard Walter (Lead Driller) - Name: Graeme Cheshire (Assistant Driller)
Type of vehicle: Ford Ranger - Registration Number: Ford Ranger

7.2 Window Sample Boreholes and/or Dynamic Probing

The window sampling will be carried out using a Global GEO drive sampling operated by a two man crew.

The window sampling crew will consist of the following experiences operatives.

Name: TBC	-	Mobile: TBC
Type of vehicle: TBC	-	Registration Number: TBC

7.3 Trial Pitting

The trial pits will be carried out using a wheeled mechanical excavator with operator and supervised by an experienced Consultant. The machine and operator are supplied by a plant hire company.

Trial pitting will be carried out by a Consultant from Geosphere Environmental Ltd. Details of their vehicle and registration number are given below:

Name: TBC	-	Mobile: TBC
Type of vehicle: TBC	-	Registration Number: TBC

7.4 Gas Monitoring

A GA2000 gas analyser is used to monitor ground gas levels and flow within the standpipes installed within the boreholes.

Gas monitoring is carried out by an experienced technician and is monitored at approximately weekly intervals for a period of six weeks as recommended by current guidelines.

8. SITE WELFARE AND FIRST AID ARRANGEMENTS

All site personnel will be equipped with suitable personal protective equipment (PPE) and mobile phones.

All personnel will wear high visibility jackets or vests where deemed necessary. Any visiting engineers from associated professional advisers will also be expected to wear a high visibility vest or jacket, if appropriate.

All site operatives should wash their hand before eating and drinking. All sites are designated as No Smoking Areas. If appropriate to the site and site works, a welfare facility will be made available.

First aid equipment is carried in all Company vehicles. If any site operative feels unwell or has an accident, appropriate first aid should be administered as soon as possible. A full account of the incident should be recorded on the operatives return to work.

9. PERSONAL PROTECTIVE CLOTHING

Although protective equipment should be worn at all times, it should not be used as an alternative to taking proper controls and adopting safe systems of work. All equipment should be in good conditions and fit for purpose and should fit properly. Site operatives should know how to use all equipment and if more than one item is worn at once, it should not reduce the effectiveness of any piece of the equipment. Maintenance of equipment is essential and all items should be cleaned and stored away after each use.

The following procedures and rules must be followed at all times:

- Hard hats, hi visibility jackets or vests, steel toe capped boots must be worn at all times
- Disposable gloves should be worn when handling potentially contaminated soil samples
- If a highly toxic material such as asbestos, biological material or a radioactive substance is suspected to be present in significant concentrations, it will be necessary to wear additional protection, up to fully impermeable suits that envelope the whole body
- All site operatives have a responsibility to report any failure of safety equipment or facilities immediately so that remedial action can be taken

Care should be taken to ensure that any potentially contaminated gloves, footwear etc does not come into contact with personal clothing to avoid the spread of contamination.

Ear defenders will also be provided for use in any location where exposure to significant noise levels is unavoidable (e.g. working with window sampling rig, concrete breakers or drilling).

Plant operators and vehicle drivers must wear safety helmets when out of their cabs.

10. GENERAL SITE RULES

Geosphere Environmental Ltd intends to pursue a policy of health and safety for all site operatives, including contractor workers. The following general site rules apply:

- All site works will begin with a 'tool box talk' style briefing outlining the scope of works and any site specific hazards that may be present. In addition, emergency procedures will be outlined including any specific to the site being worked on. All staff, including subcontractors and visitors to the works, will be required to sign the hazard assessment to show they have understood the risks present.
- Suitable protective clothing and equipment will be worn at all times.
- All operatives are adequately instructed and trained to work on site and to operate site equipment. Whilst training, operatives must be under strict supervision of a competent person at all times.
- Visitors to the site will be supervised at all times.
- All personnel must wear hard hats when in the vicinity of the drilling rigs.
- Details of underground services, installations and workings are obtained (these must be provided by the Client) before beginning any drilling or excavations.
- The area of drilling will be adequately fenced and warning notices are displayed when in the vicinity of the public.
- Where drilling is to take place in the vicinity of buried services or overhead cables then all reasonable precautions will be undertaken as in accordance with the BDA manual for land drilling.
- The site will be kept in a tidy state and clean of all debris. All sites, on completion of the work, will be left clean and tidy with the exploratory holes infilled.
- All machinery and equipment that is used on site must be operated with the correct guarding for the machinery.
- All equipment used on site should be maintained to an acceptable level of operating safety and, if required, maintenance records/inspection certificates are kept and updated regularly.

- Where appropriate, inspection certificates will be regularly checked where the equipment is subcontracted.

Any necessary access restrictions should be clearly indicated Routes should not be used by vehicles for which they are inadequate or unsuitable. Uneven or soft ground should be avoided if by traversing such areas vehicles might overturn or shed their loads.

Any potentially dangerous obstructions such as overhead electric cables or pipes containing, for example, flammable or hazardous chemicals, should be identified and avoided.

It is possible to contract tetanus from handling contaminated soil; therefore it is strongly recommended that all site operatives are vaccinated against tetanus by their Doctor. Vaccine boosters will periodically be required.

Care should be taken when working in the vicinity of areas infected with rats e.g. foul sewers and drainage systems to ensure that proper precautions are taken to prevent catching Weil's disease. Proper precautions include not handling rats, whilst working, covering all cuts and broken skin with waterproof plasters, wearing protective clothing and good personal hygiene following contact with contaminated materials or animals.

11. HEALTH AND SAFETY PROCEDURES

11.1 Responsibility

Health, safety and welfare matters are the overall responsibility of Paul Davies (Managing Director). Day to day health and safety matters is the responsibility of Tom Powling (Health and Safety Manager).

All employees have a 'duty of care' under current legislation to:

- Co-operate with Supervisors and/or Managers on health and safety matters
- Not interfere with anything provided to safeguard their health and safety
- Take reasonable care of their own health and safety
- Report all health and safety concerns to an appropriate person.

11.2 Health and Safety Audit of Site Works Activities

Risk assessments will be carried out by the Project Manager/Project Engineer. The findings of the risk assessments will be reported to the Health and Safety Manager, who will approve action required for controlling risk. The relevant Project Manager/Project Engineer will be responsible for ensuring the action is implemented. The Health and Safety Manager will check that the actions have removed/reduced the risks. Assessments will be reviewed annually or when the work activity changes.

11.3 Maintenance of Fieldwork Plant and Equipment

All in-house fieldwork equipment will be maintained by Basil Fagg. The Health and Safety Manager is responsible for ensuring maintenance procedures are drawn up and all identified maintenance is implemented. Any faults with equipment should be reported to the Health and Safety Manager.

Any equipment used on a subcontract basis is regularly checked for maintenance reports/inspection certificates.

11.4 Safe Handling and Use of Substances

The Health and Safety Manager is responsible for identifying substances which need a COSHH assessment. He will check that new substances can be used safely before they are purchased and ensuring that all relevant employees are informed about the COSHH assessments. All COSHH assessments will be reviewed annually or when any activity changes.

11.5 Work Related Ill Health, First Aid and Accidents

All accidents and work-related ill health must be reported in the accident book. The Managing Director is responsible for reporting incidents, accidents, diseases and dangerous occurrences to the relevant enforcing Authority. The Managing Director is also responsible for investigating work-related causes of sickness or absences and is responsible for investigation these to prevent a future recurrences.

11.6 Monitoring Procedures

The following checks are carried out to ensure safe working practices are being followed:

- Safety audits and review
- General and site specific risk assessments
- Detailed task specific risk assessments
- Health and Safety meetings
- Incident and accident investigation

11.7 Fieldwork Operations

First-aid kits are kept in all company vehicles. Before going on site the first aid kit should be checked so that it contains adequate equipment.

Weil's disease can be contracted if working on sites near foul sewers and drainage systems, if anyone visits the doctor with a 'flu' like-illness or persistent and severe headaches it is essential that they inform him of the nature of work so that Weil's disease can be excluded.

Due to the possibility of contracting tetanus from handling contaminated soil, it is recommended that site operatives are vaccinated against tetanus and that periodic boosters are administered.

Care should be taken by covering all cuts and broken skin with waterproof dressing whilst working on site, wearing protective clothing and good personal hygiene should be followed after contact with contaminated materials or animals.

Site work must not be undertaken by employees who are unfit due to ill health.

Ear defenders must be worn where any employee works with plant and machinery which is noisy. Suitable hearing protectors will be provided by the company.

If, for any reason, an employee is unable to wear hearing protection provided, they should inform an appropriate responsible person immediately so that an alternative can be found.

Employees likely to be exposed to noise levels of 80 dBA or above, will be provided with training and hearing protection, which they may wear at their discretion. Employees exposed to noise levels of 85 dBA or above must wear suitable hearing protection provided.

11.8 Service and Utility Avoidance

The Project Manager/Project Engineer, with the full assistance of the Client, must do all that is reasonably practicable to establish the location of any underground services prior to intrusive works in accordance withHSG47 – Avoiding danger from underground services. This may include reference to:

- **CLIENT SUPPLIED** public utility drawings. These must be up to date, relevant and include all, areas works are to be taken place
- **CLIENT SUPPLIED** site drawings including private and local service runs
- Evidence of trench scarring
- Local site management knowledge of service runs
- Locations of manholes and demarcated pipe runs e.g. fuel or slurry pipelines
- Locations of tanks

If information regarding the presence of underground services is unavailable at the time of the fieldwork, the site is likely to contain a high density of services or pipelines or the works are close to known underground services, then the following additional tasks may be undertaken:

- Service and utility tracing (incorporating electromagnetic and ground penetration radar techniques) and production of a site service drawing
- Site attendance by public utility company personnel
- Positive **LOCATION** of utilities by hand excavation, excluding use of forks, picks, bars and other pointed tools

Immediately prior to intrusive works, the **ABSENCE** of services at a particular location will be confirmed by the works area should be scanned with a Cable Avoidance Tool and if deemed necessary and practicable, excavation of a hand dug or vacuum excavated pit to 1.2m.

Awareness should always be made however, that some services, particularly sewers, may be beyond hand/vacuum excavation depths and as such excavation/drilling must always be undertaken with care. Unexpected occurrences of warning tape, slabs, clean granular fill, or disturbed ground may indicate the close proximity of a service.

11.9 UXO Avoidance

Prior to site works commencing the likelihood of UXO occurrence will be ascertained in accordance with the guidance in CIRIA document C681, 'Unexploded Ordnance (UXO) - A guide for the Construction Industry'. Initially this will be undertaken by reference to bomb density maps available online or preliminary UXO risk assessments as applicable. Sites indicated as having no significant or low risk will generally not require additional mitigation measures other than an awareness of the potential for UXO and the emergency procedure should a suspicious object be discovered.

Sites designated as having a medium or high risk will require additional mitigation measures in place, prior to intrusive works and these may include, but not be limited to:

- UXO consultant attendance during works
- Magcone survey
- Radar survey

11.10 Trial Pit Investigations

The cable avoidance tool (CAT) will be used to check for the presence of any services prior to excavation.

Site operatives must maintain a safe working distance from the excavator to protect themselves against the possibility of electrocution in the event of the excavator accidently penetrating a buried power line.

Excavations should not be located near overhead power lines unless absolutely necessary.

If working in the vicinity of overhead power lines, warning notices and signs must be posted.

Trial pits deeper than 0.6 m depth should generally not be entered. However, if entry is deemed necessary, the walls of the trial pit must be shored up or battered back to a safe angle to minimise the risk of sidewalls collapsing. Trial pits greater than 0.6 m depth should not be entered where there is evidence, or suspicion of, unstable walls, flooding, methane gas or other hazardous gases.

If trial pits need to be left open and unattended the hole must be fenced off to prevent access or adequately covered to stop people or livestock falling into the hole.

On completion of the investigation all holes must be infilled and the surface made safe.

11.11 Drilling Operations and Window Sampling Investigations

Guidance is given in the British Drilling Association (BDA) Health and Safety Manual for Land Drilling. The following general rules should apply:

- No operative will be permitted to work on a drilling site unless they are adequately instructed and trained or are under the strict supervision of a competent person
- Visitors to the site will be supervised at all times
- All personnel must wear hard hats when in the vicinity of the drilling rigs
- Before commencing any drilling operations the drilling contractor will take reasonable steps to obtain details of underground services, installations and workings
- When near the public, the drilling rig will be fenced off and warning notices displayed
- Any local safety regulations will be observed
- If drilling is to take place in the vicinity of buried services or overhead cables then all reasonable precautions will be undertaken in accordance with the BDA guidelines
- The site will be kept in a tidy state and clear of all debris
- All machinery and equipment on site will be operated with the correct machine guarding

- All equipment used on site will be maintained to an acceptable level of operating safety and, if required, have an inspection certificate signed by a competent person
- All equipment and machinery shall be operated in a safe manner
- All sites, on completion of drilling, will be left clean and tidy with the boreholes infilled

Any necessary access restrictions should be clearly indicated. Routes should not be used by vehicles for which they are inadequate or unsuitable. Uneven or soft ground should be avoided if by traversing such areas vehicles might overturn or shed their loads. Any potentially dangerous obstructions such as overhead electric cables or pipes containing, e.g. flammable or hazardous chemicals, should be identified and avoided.

11.12 Investigation of Contaminated Sites

All site works and activities are carried out in accordance with BS 10175 'Code of practice for the investigation of potentially contaminated sites', 2001; 2013.

Be aware that harmful substances are not always obvious or visible. A Desk Study/Preliminary Investigation should be undertaken to establish possible hazards and to ensure necessary protective equipment is used. Risk assessments should be carried out to establish controls to minimise risks from identified hazards. General safety measures for potentially contaminated sites include:

- Wear protective clothing
- Locate operations up wind of investigation
- Never enter holes or pits
- Never eat, drink or smoke on site
- Maintain the highest level of personal hygiene
- No contaminated material should remain on the outside of the sample container
- Trial holes must be covered with Inert clean material

11.13 Awareness of Other Possible Hazards

Site operatives should also be vigilant and be aware of other possible hazards that may be found on site. These could include any of the following:

- Substances that may cause or produce fire, gas or explosion
- Physical hazards e.g. buried pits, lagoons and unstable ground
- Structural hazards e.g. underground tanks and unstable buildings
- Chemical hazards e.g. stored or spilt liquids, gases or solids
- Unilluminated places
- Hypodermic needles.

12. SUPERVISION AND TRAINING

12.1 In-house Personnel

All site operatives are trained and experienced in the use of the exploratory equipment.

All operatives are thoroughly briefed on all aspects of the works involved by the Project Engineer before any work is carried out on site and issued with written instructions. Specific hazards will be drawn to their attention together with the method of control and reporting procedures.

All Consultants and site personnel employed by Geosphere Environmental Ltd hold current CSCS cards.

Initial induction training will be provided by the relevant Section Mangers/Supervisors. The induction training must include all relevant health and safety issues.

General task related training will be monitored and supervised by the relevant Section Manager but may be delegated to any competent and experienced senior staff. Each employee will remain under supervision until they are deemed competent to work unsupervised. The training and competence records will be maintained by the Health and Safety Director.

12.2 Subcontracted Personnel

All drilling personnel hold current CSCS cards.

13. RISK ASSESSMENT AND HAZARD IDENTIFICATION

Anticipated hazards for this investigation are:-

- Asbestos containing materials (ACMs)
- Buried services
- Confined spaces
- Contaminated ground
- Overhead high voltage cables
- Fly-tipped materials
- General public access/site deliveries
- Ionising radiation
- Lone working
- Manual handling
- Movement of plant
- Noise/vibration
- Objects falling from height
- Operation of Kanga Loader
- Restricted height
- Steep ledges
- Travel (to and from site)
- Unexploded ordnance (UXO)
- Use of bentonite/cement grout
- Vehicle traffic management / Plant
- Working near deep water

- Working near or close to railway
- Working on slope or unstable ground
- Dust
- Work equipment.

Risk assessments for each anticipated hazard are included overleaf. The assessment contains the control measures required to minimise the risk.

HAZARD RISK ASSESSMENT

Client:	Kier Construction Ltd
Activity:	Boreholes, Window Sampling, Trial Pitting and Gas Monitoring.

KEY TO ABBREVIATIONS

Severity (S):	**x**	**Likelihood (L):**	**=**	**Risk Rating**	
No Injury	= 1	Extremely Unlikely	= 1	0 – 5	Low (L)
Minor Injury	= 2	Unlikely	= 2	6 – 11	Medium (M)
Major Injury	= 3	Likely	= 3	12 – 16	High (H) (RIDDOR)
Death	= 4	Very likely	= 4		

RESIDUAL RISK (after applying control measures):- **L** = Low; **M** = Medium; **H** = High

Who is Affected:		**C/F:**	
CO	Construction operatives	P	Include item in H&S Plan
MP	Maintenance personnel	F	Include item in H&S File
GP	General public/Client employees	D	Delete from future assessments
		A	Action required

All working hazards are assessed on the basis of competent contractors being appointed to carry out the work involved.

HAZARD RISK ASSESSMENT

Significant Hazard	Who is at Risk	Severity (S)	Likelihood (L)	Initial Risk Rating	Mitigation/Control Measures	Residual Risk	C/F
Asbestos containing materials (ACMs)	CO	4	2	8	If ACM is suspected, do not disturb, if practical cover material and seek advice from environmental engineer. If samples are to be recovered, ensure the correct PPE/RPE is worn and double bag and clearly identify samples collected.	L	
Buried services (including damage to existing services, causing disruption to user or injury, e.g. electrocution or gas leaks)	CO	4	2	8	Consult service drawings before starting work, visual inspection of site surface, scan with CAT, and dig inspection pit if any doubt. Any service clearance work including utility tracing should be undertaken in accordance with HSG47 – Avoiding danger from underground services. **BE AWARE OF GAS AND WATER IN THE AREA OF INVESTIGATION.**	L	
Confined spaces (including toxic gases, use of breathing apparatus and explosive atmosphere)	CO	4	2	8	Not normally undertaken during routine environmental and site investigation works however, Specific risk assessment/method statements needed, including details of any emergency and rescue procedures. Workers must check for and document any flammable or toxic gases and oxygen content. Workers must have received up-to-date confined space training and competent in use of breathing apparatus. Workers may require 'permit to work' and should wear appropriate PPE. Workers must use EX rated equipment if flammable atmosphere is present.	L	
Contaminated ground (including contact with potentially contaminated soils, groundwater, surface water and gasses)	CO	3	2	6	Handle soil with care and wear PPE including gloves, overalls and boots. Respiratory protective equipment (RPE) to be available in case serious contamination is found. Consult in-house geoenvironmental engineer if serious contamination suspected or found. Excavation/drilling within the vicinity of landfill, hydrocarbon vapour sources of old coal working will require gas monitoring during the works.	L	
Overhead high voltage cables	CO	4	2	8	Check vertical distance between rig and cable. If less than 6 m clearance move hole position. If raining at time of work more than 6 m clearance will be required, as a result move or postpone hole excavation.	L	
Fly-tipped material (including sampling from; excavation or removal of potentially contaminated soils)	CO	4	2	8	Take care when excavating through fly-tipped materials. Assume that the material is potentially contaminated. Handle potentially contaminated soils with care, avoiding direct contact with soil by wearing appropriate PPE including gloves, overalls and boots. RPE to be available in case of finding serious contamination. Consult in-house geoenvironmental engineer if serious contamination is suspected or identified for advice.	L	
General public access/site deliveries (including any conflict with public/other site users)	CO GP	3	2	6	If general public or other site users are in close contact with the working area then appropriate warning signs and suitable protective barriers or enclosures should be used. All site staff to wear hi-visibility vests in trafficked areas.	L	

Significant Hazard	Who is at Risk	Severity (S)	Likelihood (L)	Initial Risk Rating	Mitigation/Control Measures	Residual Risk	C/F
Ionising radiation	CO	4	2	8	Specialist site specific risk assessments should be prepared and recommended controls implemented if radioactive contamination is suspected.	L	
Lone working	CO	3	2	6	If working alone (solo site visits, early starts, late finishes or weekend work) then staff must inform manager of the hours they intend to work. All operatives working alone must be contactable by mobile phone.	L	
Manual handling (including loading/ unloading of equipment, samples and supplies)	CO	3	2	6	Use 'good lifting techniques' as directed by manual handling training. Do not lift any item which is too bulky to handle unaided. Before picking up heavy or awkward items ensure suitable space is available in which to put them down. Some items may need more than one person to lift if in excess of 25kg for a man and 20kg for a woman.	L	
Movement of plant (including any movement of contractors plant, equipment and personnel)	CO	4	2	8	Contractors staff to take account of entrance and exit routes from site, access limitations in public areas including pavement and highway and must take the appropriate protection measures to safeguard against collision.	L	
Noise/Vibration (including annoyance to general public and neighbours)	CO	4	2	8	Adhere to any restrictions on working hours. Minimise use of generators and pneumatic equipment / power tools. Ear defenders must be worn when operating noisy equipment. Each worker must be provided with their own ear defenders.	L	
Objects falling from height	CO	3	2	6	If fieldwork operatives are working in areas where there is a risk of objects falling from height safety helmets must be worn. Do not stand underneath any machinery being craned about on site.	L	
Operation of Kanga Loader	CO	3	2	6	Only suitably trained Geosphere Environmental Ltd employees to operate Kanga Loader and its attachments.	L	
Restricted height (including access, working area and adequate headroom)	CO	4	2	8	All proposed exploratory locations should be assessed to ensure that a suitable access route exists and that there is a safe, level area with adequate headroom to carry out the excavation or to erect and operate the drilling equipment.	L	
Steep ledges	CO	3	2	6	Workers should be at least 1 m from any steep ledge or drop. Use warning signs and protective fences, if necessary.	L	
Travelling (to and from site)	CO	3	2	6	Vehicle checks to be performed before travelling. Distractions must be removed or controlled to minimise the risk of collision and seatbelts must be worn at all times. Persons on medication should not drive vehicles.	L	
Unexploded Ordnance (UXO)	CO	3	2	6	Risk of UXO should be assessed by desk study. Look for evidence of ordnance manufacturer, wartime bombing or firing/ bombing range. All exploratory hole locations to be scanned by UXO Specialist prior to excavation. Any suspected UXO should be scanned by Specialist Engineers. If suspected UXO is detected, stop work, clear site and refer to UXO specialists for advice.	L	
Use of bentonite/ cement grout (including potential inhalation of dust and chemical burns)	CO	3	2	6	The use of bentonite and cement is restricted to experienced trained technicians. Clean and absorb spills immediately. Wash after handling. Do not get in eyes, on skin and	L	

Significant Hazard	Who is at Risk	Severity (S)	Likelihood (L)	Initial Risk Rating	Mitigation/Control Measures	Residual Risk	C/F
					avoid ingestion and inhalation. Store in a cool, dry well ventilated area. Use personal protective clothing for eyes, mouth and nose when bentonite and cement is airborne. Avoid skin contact with wet concrete and use protective clothing such as goggles, face mask, long sleeved shirts, long trousers, safety boots and waterproof gloves. If wet concrete or mortar gets into Wellington boots remove them immediately and thoroughly wash the skin and inside of boots before proceeding with the job.		
Vehicular traffic management / Plant	CO	3	4	12	Ordinarily subcontractor to set up traffic management system as described in their Method Statement. Geosphere employers are to ensure that their actions minimise the impact to moving vehicles. Geosphere employees will ensure that hi-vis clothing is worn and that all site vehicles are equipped with orange flashing lights.	L	
Working near deep water	CO	1	3	3	All fieldwork operatives working near or over deep water must wear appropriate safety equipment including life jackets and will need ready access to buoyancy aids. Carry out work at low tide.	L	
Working near or close to railway	CO	2	1	2	No cable percussion boreholes (i.e. tall equipment) located near railway. Only small plant (window sample rig) working near adjacent railway. May need to reassess after initial site inspection.	L	
Working on slope or unstable ground	CO	1	2	2	All proposed working areas should be assessed to ensure that a suitable access route exists and that there is a safe, level area with adequate headroom to carry out the excavation or to erect and operate the drilling equipment.	L	
Dusts	CO	2	1	2	If dust generation is occurring from activity, apply relevant PPE (dust mask for required CE grade), stop work and apply mitigation measures to prevent further generation – i.e. damping down. If dust is a general problem on site – halt works, apply PPE as above and inform the site manager to take action.	L	
Work Equipment	CO	1	2	2	All work equipment is either non-mechanical hand tools or insulated battery powered (e.g. CAT scanner). All tools should be inspected prior to use for breakages / damage and replaced as necessary and manual handling risks mitigated as above. All equipment is reviewed bi-yearly as part of our ISO:9001 accreditation.	L	

ON-SITE LOG AND HAZARD RISK ASSESSMENT

Enter any unexpected occurrences or potential hazards below.

Significant Hazard	Who is at Risk	Severity (S)	Likelihood (L)	Initial Risk Rating	Mitigation/Control Measures	Residual Risk

HAZARD RISK ASSESSMENT FORM

Client:	Kier Construction Ltd
Activity:	Boreholes, Window Sampling, Trial Pitting, Gas Monitoring

We the undersigned, have received, read and understood the risks and the site specific precautions listed above.

Risk Assessment Issued to: (to be signed by all fieldwork operatives working on the above site).

Company: Geosphere Environmental Ltd Name: *[All site workers to sign RAMS]*	Signed:	Date:
Company: Kier Construction Ltd Name: *[All site workers to sign RAMS]*	Signed:	Date:
Company: Name:	Signed:	Date:
Company: Name:	Signed:	Date:
Company: Name:	Signed:	Date:
Company: Name:	Signed:	Date:

14. NOISE AND VIBRATION ASSESSMENT

Noise levels vary considerably during drilling and dynamic sampling operations, both from the rig and the sampling procedures. Where a site operative works with plant or machinery which is noisy, suitable hearing protectors will be provided and must be worn. If a site operative is unable to wear the hearing protection provided, for any reason, then they should inform an appropriate responsible person immediately so that an alternative can be found.

If other site users are in close vicinity to the drilling operations then a hearing protection zone will be established around the working area. Hearing protection should be worn by all other site personnel entering the hearing protection zone. The general public should not enter the hearing protection zone.

HSE inspectors have concluded that, under normal operations, there are no known hazards from vibration to personnel associated with the operations of a light cable percussion rig or dynamic sampling rig.

15. COSHH ASSESSMENT

The control of substances hazardous to health regulations (COSHH) apply to almost all processes in all industries. They require employers to demonstrate that they are adequately controlling exposure to their employees.

The potentially hazardous materials to be used on site during comprise the following:

- Cement powder
- Bentonite (Granules, pellets and powder)
- Diesel
- Petrol
- Oil and lubricants

Cement and bentonite are used on site in higher quantities and therefore the hazard data sheets for these materials are included overleaf.

Petrol and diesel will be used in small quantities as fuel for the drilling rig/window sampling rig. The fuel will be contained in the fuel tanks of the rigs or within the reserve supplies in the correct containers. Refuelling will only be done without the engine running to minimise the risk of fire.

All materials are to be handled sensibly to minimise any risk to users. Protective gloves must be used to prevent skin contact with cement and bentonite power.

COSHH Hazard Data Sheet for Cement

Uniclass L621
CI/SfB Yq2

Health and Safety Information – Blue Circle Portland Cements

This datasheet provides the information required by the Chemicals (Hazard Information and Packaging) Regulations.

IRRITANT

Blue Circle™

HEALTH & SAFETY INFORMATION
BLUE CIRCLE PORTLAND CEMENTS

Autumn 2006

BLUE CIRCLE PORTLAND CEMENTS

1. Identification of Substance/ Supplier Section

An odourless white to grey powder mainly insoluble in water. When water is added it becomes a binder for construction applications. This datasheet applies to the following Blue Circle cements:

- Portland (CEM I) cements
- Mastercrete Original
- Extra Rapid
- Cement
- Procem
- Portland Limestone Cement
- Ferrocrete
- Sulfacrete
- Snowcrete
- Phoenix
- Microcem
- CEMblend.

Lafarge Cement United Kingdom
Manor Court
Chilton OX11 0RN
Technical helpline: 0870 609 0011

2. Composition/Information on Ingredients

2.1. Chemical Description

The principal constituents of these cements are calcium silicates, aluminates, ferro-aluminates and sulfates. Small amounts of alkalis, lime and chlorides are also present together with trace amounts of chromium compounds. Additional constituents may also be present eg pulverized-fuel ash, limestone, and granulated blastfurnace slag. CAS: 65997-15-1.

2.2. Hazardous Ingredients

a) The lime, calcium silicates and alkalis within the cement are partially soluble and when mixed with water will give rise to a potentially hazardous alkaline solution.

b) Hexavalent chromium salts in these cements are soluble and when mixed with water, will give rise to a potentially hazardous solution.

3. Hazards Identification

When cement is mixed with water such as when making concrete or mortar, or when the cement becomes damp, a strong alkaline solution is produced. If this comes into contact with the eyes or skin it may cause serious burns and ulceration. The eyes are particularly vulnerable and damage will increase with contact time.

Strong alkaline solutions in contact with the skin tend to damage the nerve endings first before damaging the skin, therefore chemical burns can develop without pain being felt at the time.

Cement mortar and concrete mixes may until set cause both irritant and allergic contact dermatitis:

- Irritant contact dermatitis is due to a combination of the wetness, alkalinity and abrasiveness of the constituent materials.
- Allergic contact dermatitis is caused mainly by the sensitivity of an individuals skin to hexavalent chromium salts.

4. First Aid Measures

Eye Contact

Wash eyes immediately with clean water for at least 15 minutes and seek medical advice without delay.

Skin Contact

Wash the affected area thoroughly with soap and water before continuing. If irritation, pain or other skin trouble occurs, seek medical advice. Clothing contaminated by wet cement, concrete or mortar should be removed and washed thoroughly before use.

Ingestion

Do not induce vomiting. Wash out mouth with water and give patient plenty of water to drink.

Inhalation

If irritation occurs, move to fresh air. If nose or airways become inflamed seek medical advice.

5. Fire Fighting Measures

Cements are not flammable and will not facilitate combustion with other materials.

6. Accidental Release Measures

6.1. Personal Precautions

(See 8.3. overleaf)

6.2. Method of Cleaning

Recover the spillage in a dry state if possible. Minimise generation of airborne dust. The product can be slurried by the addition of water but will subsequently set as a hard material. Keep children away from clean up operation.

7. Storage and Handling

7.1. Storage

Bags should be stacked in a safe and stable manner.

7.2. Handling

When handling cement bags due regard should be paid to the risks outlined in the Manual Handling Operations Regulations. Some bags may have a small amount of cement on the outer surface. Appropriate personal protective clothing (see 8.3) should therefore be used whilst handling.

7.3. Control of Hexavalent Chromium

From 17 January 2005, those cements which naturally contain more that 2 ppm of soluble hexavalent chromium (chromium (VI)) by dry weight of cement, will be treated with a chemical reducing agent (such as ferrous sulfate) that maintains the level of hexavalent chromium in the cement to below 2 ppm by dry weight of cement. The effectiveness of the reducing agent reduces with time, therefore cement bags and/or delivery documents will contain information on the period of time ('shelf life') for which the manufacturer has established that the reducing agent will continue to limit the level of hexavalent chromium to less than 2 ppm by dry weight of cement. They will also indicate the appropriate storage conditions for maintaining the effectiveness of the reducing agent.

Blue Circle™ is a brand of LAFARGE

COSHH Hazard Data Sheet for Cement

BLUE CIRCLE
PORTLAND CEMENTS

If cements are incorrectly stored, or used after the end of the declared 'shelf life', the level of hexavalent chromium may rise above 2 ppm by dry weight of cement, with a consequent increase in the potential risk of allergic contact dermatitis.

Note: White Portland cement is typically low in soluble hexavalent chromium and would be exempt from these requirements

8. Exposure Controls

8.1. Workplace Exposure Limits (WEL's)

WEL's 8hr Time Weighted Average (TWA)

Total inhalable dust	10mg/m³	8hr TWA
Respirable dust	4mg/m³	8hr TWA

8.2. Engineering Control Measures

Where reasonably practicable, dust exposures should be controlled by engineering methods.

8.3. Recommended Protective Equipment

Respiratory Protection

Suitable respiratory protection should be worn to ensure that personal exposure is less than the WEL.

Hand and Skin Protection

Protective clothing should be worn which ensures that cement, or any cement/water mixture eg concrete or mortar, does not come into contact with the skin. In some circumstances such as when laying concrete, waterproof trousers and wellingtons may be necessary.

Particular care should be taken to ensure that wet concrete does not enter the boots and persons do not kneel on the wet concrete so as to bring the wet concrete into contact with unprotected skin.

Should wet mortar or wet concrete get inside boots, gloves or other protective clothing then this protective clothing should be immediately removed and the skin thoroughly washed as well as the protective clothing/footwear.

Eye Protection

Dust-proof goggles should be worn wherever there is a risk of cement powder or any cement/water mixtures entering the eye.

9. Physical/Chemical Properties

9.1. Physical Data

Physical state	Particulate
Mean particle size	5–30 micron
Odour	Not applicable (N/A)
pH	pH of wet cement 12-14
Viscosity	N/A
Freezing point	N/A
Boiling point	N/A
Melting point	N/A
Flash point	Not flammable
Explosive properties	Not explosive
Density	2800-3200 kg/m³
Solubility	N/A

9.2. Chemical Compounds

Mainly a mixture of: $3CaO.SiO_2$, $2CaO.SiO_2$, $3\ CaO.Al_2O_3$, $4\ CaO.Al_2O_3$, Fe_2O_3, $CaSO_4$.

Contains less than 1% crystalline silica.

10. Stability and Reactivity

Conditions contributing to chemical instability: None.

Hazardous decomposition products: None.

Special precautions: None.

11 Toxicological Information

11.1. Short Term Effects

Eye Contact

Cement is a severe eye irritant. Mild exposures can cause soreness. Gross exposures or untreated mild exposures can lead to chemical burning and ulceration of the eye.

Skin

Cement powder or any cement/water mixture may cause irritant contact dermatitis, allergic (chromium) dermatitis, and/or burns.

Ingestion

The swallowing of small amounts of cement or any cement/water mixtures is unlikely to cause any significant reaction. Larger doses may result in irritation to the gastro intestinal tract.

Inhalation

Cement powder may cause inflammation of mucous membranes.

11.2. Chronic Effects

Repeated exposures in excess of the WEL have been linked with rhinitis and coughing. Skin exposure has been linked to allergic (chromium) dermatitis. Allergic dermatitis more commonly arises through contact with cement/water mixtures than dry cement.

12. Ecological Information

12.1. Aquatic Toxicity Rating

LC50 aquatic toxicity rating not determined. The addition of cements to water will, however, cause the pH to rise and may therefore be toxic to aquatic life in some circumstances.

12.2. Biological Oxygen Demand (BOD)

Not applicable.

13. Disposal Considerations

Dispose of empty bags or surplus cement to a place authorised to accept builder's waste (non-hazardous materials landfill).

Keep out of the reach of children.

14. Transport Information

Classification for conveyance: Not required.

15. Regulatory Information

15.1. Chemicals (Hazard Information & Packaging) Regulations

Classification: Irritant.

15.2. Risk Phrases

- Contains chromium (VI). May produce an allergic reaction.
- Risk of serious damage to eyes.
- Contact with wet cement, wet concrete or wet mortar may cause irritation, dermatitis or burns.
- Contact between cement powder and body fluids (eg sweat and eye fluid) may also cause skin and respiratory irritation, dermatitis or burns.
- R 37/38/41/43.

15.3. Safety Phrases

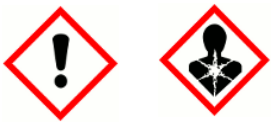
- Avoid eye and skin contact by wearing suitable eye protection, clothing and gloves.
- Avoid breathing dust.
- Keep out of reach of children.
- On contact with eyes or skin, rinse immediately with plenty of clean water. Seek medical advice after eye contact.
- S 2/22/24/25/26/37/39.

16. Legislation and Other Information

- CONIAC Health Hazard Information Sheet No 26, Cement.
- Health & Safety at Work Act 1974.
- Control of Substances Hazardous to Health (Regulations).
- HSE Guidance Note EH40 (Workplace Exposure Limits).
- Any authorised manual on First Aid by St. Johns/St. Andrews/Red Cross.
- Manual Handling Operations Regulations 1992.
- Environmental Protection Act.

The information in this datasheet is accurate at the time of printing, but Lafarge Cement UK reserve the right to amend details as part of their product development programme. HS:3:10/06

COSHH Hazard Data Sheet for Bentonite



MATERIAL SAFETY DATA SHEET
OSHA Hazard Communication Standard
29 CFR 1910.12000

U. S. Department of Labor
Occupational Safety and Health Adm.
OMB 1218-0072

Identity (used on label): Bentonite Powder

SECTION I

Manufacturer : PDSCo
P.O. BOX 507,
105 West Sharp Street
El Dorado, AR 71730

Emergency Phone : (800) 243-7455
Information Phone : (870) 863-5707

SECTION II HAZARDOUS INGREDIENTS

Hazardous Components	OSHA PEL	TLV	Other Limits	%
Crystalline Quartz CAS# 14808-60-7 (naturally occurring contaminant)	-	-	*	2-6%
Respirable Crystalline Quartz			**NIOSH**	
present (TWA)	0.1 mg/m^3	0.1 mg/m^3	50ug/m^3	<2%
proposed (TWA)	-	50ug/m^3	-	-
Nuisance Dust				
Respirable	5 mg/ m^3	5 mg/ m^3	-	-
Total Dust	15 mg/ m^3	10 mg/ m^3	-	-

*** Warning:** This product contains a small amount of crystalline silica which may cause delayed respiratory disease if inhaled over a prolonged period of time. Avoid breathing dust. Use NOISH/MSHA approved respirator when TLV for crystalline silica may be exceeded. IARC Monographs on the evaluation of the Carcinogenic Risk of Chemicals to Humans (volume 42, 1987) concludes that there is "limit evidence" of the carcinogenicity of crystalline silica to humans. IARC classification 2A.

SECTION III PHYSICAL CHEMICAL CHARACTERISTICS

Boiling Point	:	N/A
Vapor Pressure (mm Hg at 20^{0}C)	:	N/A
Vapor Density (Air = 1)	:	N/A
Solubility in Water	:	Negligible
Appearance & Odor	:	Pale grey to buff powder or granules, odorless.
Specific Gravity	:	2.5
Melting Point	:	N/A
Evaporation Rate	:	N/A

SECTION IV FIRE AND EXPLOSION HAZARD DATA

Flash Point	:	N/A
Flammable Limit	:	N/A
LEL	:	N/A
UEL	:	N/A
Extinguishing Media	:	Not Applicable
Special Fire Fighting Procedure	:	Inorganic mineral/non-flammable.
Unusual Fire and Explosion Hazards	:	N/A

COSHH Hazard Data Sheet for Bentonite

SECTION V REACTIVITY DATA

Stability	:	**Unstable**			**Stable**	**X**	
Conditions to Avoid	:	None Known					
Materials to Avoid	:	None Known					
Hazardous Decomposition	:	None Known					
Hazardous Polymerization	:	**May Occur**			**Will Not Occur**	**X**	

SECTION VI HEALTH HAZARD DATA

Routes of Entry	:	**Inhalation:** Yes **Skin:** No **Ingestion:** No
Health Hazards (Acute-Chronic)	:	May cause delayed respiratory disease if dust inhaled over a prolonged period of time.
Carcinogenicity	:	N/A **NTP:** No **IARC:** Yes **OSHA Req:** No IARC Monographs on the evaluation of the Carcinogenic Risk of Chemicals to Humans (volume 42, 1987) concludes that there is "limited evidence" of the carcinogenicity of crystalline silica to humans. IARC classification 2A.
Sighs and Symptoms of Exposure	:	Excessive inhalation of dust may result in shortness of breath and reduced pulmonary function.
Conditions Aggravated by Exposure	:	Individuals with pulmonary and/or respiratory disease including but not limited to asthma and bronchitis be precluded from exposure to dust.
Emergency First Aid	:	Eyes: Flush with water. Gross inhalation of dust: Remove to fresh air. Give oxygen or artificial respiration if necessary. Get medical attention immediately.

SECTION VII PRECAUTIONS FOR SALE HANDLING AND USE

In Case Released or Spilled	:	Vacuum if possible to avoid generating airborne dust. Avoid breathing duct. Wear an approved respirator. Avoid adding water, the product will become slippery when wet.
Waste Disposal	:	Consult appropriate Federal, State, and Local regulatory agencies to ascertain proper disposal procedures.
Caution In Handling and Storing	:	Avoid breathing dust, use NOISH/MSHA approved respirator when TLV limits for Crystalline Silica may be exceeded.
Other Precautions	:	Slippery when wet.

SECTION VIII CONTROL MEASURES

Respiratory Protection	:	OSHA standard 1910.134 or ANSI Z88.2-1980 specification.
Ventilation	:	Local and mechanical exhaust as appropriate.
Protective Gloves	:	Not Required.
Eye Protection	:	Recommended.
Other Protection Equipment	:	Not required for normal use.
Work/Hygienic Practices	:	Normal personal hygiene required.

ON-SITE COSHH ASSESSMENT

Substance (Substance Description, Name, Type, if known)	**Location or Usage and Persons at Risk**	**Substance Form** (including Liquid, powder, fibrous etc)	**Mitigation/Control Measures** (including environmental)

16. SAFE SYSTEMS OF WORK AND METHOD STATEMENTS

Task specific Method Statements for each site activity are given below.

Approximate exploratory hole locations are shown on the site plan, subject to working space and buried service restrictions. A copy of the plan is held by the supervising Environmental Consultant and is also shown at the end of Section 3.

All positions should be assessed to ensure suitable access is available onto each position and that the working area is safe and level.

If suspected unexploded ordnance is encountered, the site operatives must cease site operations and instructions should be sought from Geosphere Environmental Ltd or the on-site UXO professional (if contracted).

METHOD STATEMENT - CABLE PERCUSSION BORING

- The proposed borehole locations are assessed to ensure that a suitable access route exists and that there is a safe, level area with adequate headroom on which to erect the boring rig.
- Positions are set out and scanned with a cable avoidance tool (CAT) to avoid disturbance to services.
- Any temporary fencing required is erected around the working area.
- Where insufficient information exists regarding buried services, a hand dug pit is excavated to 1.2 m depth to inspect for the presence of services. If services are encountered, the pit and services are logged and the borehole relocated.
- If deemed clear of services, then cable percussion drilling with suitable equipment to reach the required depth is carried out in accordance with standard boring practice.
- Sampling and in-situ testing are carried out in accordance with BS 5930, BSEN 1997, Geosphere Environmental Ltd's Health and Safety Policy, guidance document issued by the British Drilling Association (BDA) and the Project Engineer's instructions.
- Recovered samples will be taken and labelled with project name and number, hole number, sample number and depth.
- The lead driller is responsible for reporting the ground conditions encountered to the Project Engineer at the end of each borehole or the end of each working day.
- When appropriate, boreholes may be backfilled with arisings, bentonite or well pack and any hard surfacing reinstated with concrete.
- When required monitoring wells, or piezometers are installed in accordance with the specific contract requirements.
- Any surplus arisings and spoil are spread out around the borehole, stored elsewhere on site, or removed as necessary.

Dando Light Cable Percussion Drilling Rig –Technical Specifications

- **Engine Type (drilling functions)** = Hatz 1D81C
- **Power** = 8.1 Kw @ 2250rpm 11bhp
- **Output Torque** = 33 Nm @ 2250rpm
- **Max Derrick SWL** = 4000kg
- **Winch Single Line Pull** = 1500kg
- **Track Width** = 780mm

- **Dimensions (mm):**
- Base Unit = 1470mm
- Base Unit Low Mast = 3000 (height below sheave); 3325 (above sheave)
- Base Unit Lower-Mid Mast = 3500 (height below sheave); 3825 (above sheave)
- Base Unit Higher-Mid Mast = 4000 (height below sheave); 4325 (above sheave)
- Base Unit High Mast = 4500 (height below sheave); 4825 (above sheave)

- **Weights (kg):**
- Overall Rig Weight = 146
- Tracks Only = 510
- Mast Unit Only = 352
- Track & Base Unit Only = 1110

- **Drilling Depths And Diameters:**
- 4 Inches (100mm) = 46 metres (150 feet)
- 6 Inches (150mm) = 26 metres (85 feet)
- 8 Inches (200mm) = 20 metres (65 feet)

METHOD STATEMENT - ROTARY OPEN HOLE DRILLING AND CORING

- The proposed borehole locations are assessed to ensure that a suitable access route exists and that there is a safe, level area with adequate headroom on which to erect the drilling rig.

- Positions are set out and scanned with a cable avoidance tool (CAT) to avoid disturbance to services.

- Where insufficient information exists regarding services, a hand dug pit is excavated to 1.2 m depth to inspect for the presence of services. If services are encountered, the pit and services are logged and the borehole relocated.

- If deemed clear of services, then rotary drilling and coring with suitable equipment and flush to reach the required depth will be carried out, in accordance with standard drilling practice and specific instructions given to the driller.

- Sampling and in-situ testing are carried out in accordance with BS 5930, BSEN 1997, Geosphere Environmental Ltd's Health and Safety Policy, guidance documentation issued by the British Drilling Association (BDA) and Geosphere Environmental Ltd's specific instructions. The lead driller is to report the ground conditions encountered to the Project Engineer at the end of each borehole or the end of each working day.

- When appropriate, boreholes may be backfilled with arisings, bentonite or well pack and any hard surfacing reinstated with concrete.

- Recovered samples will be taken and labelled with project name and number, hole number, sample number and depth.

- If underground workings or suspected workings are encountered, the driller must immediately cease drilling and seek instructions from Geosphere Environmental Ltd' Project Engineer.

- If required, the atmosphere at the borehole position and in the workings should be monitored for concentrations of ground gases (methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide). Geosphere Environmental Ltd' Project Engineer should be notified immediately if any elevated levels of gas are detected.

- Any borehole that intercepted workings or suspected workings should be temporarily sealed as soon as practicable with bentonite, to reduce the risk of spontaneous combustion and minimise the likelihood of hazardous gases moving off-site within the exposed workings.

- If required, the concentrations of gases in the existing borehole installations should be monitored and compared with the readings taken before the rotary drilling commenced.

The Technical Specifications of a Rotary Drilling Rig are shown below.

Rotary Drilling Rig (Mtec 6) –Technical Specifications

- Pullback: 6000kgf
- Feed force: 4500kgf
- Width: 1400mm
- Length (drilling): 3400mm
- Rotary head max torque: 5200Nm
- Max spindle speed: 450rpm
- Max rod clamp handling diameter: 220mm

The design brief for the MTec 6 was to create the most versatile and safe machine available in this size. This track-mounted unit offers a full range of features including -

- remote tracking/rigging controls
- arm-mounted drilling controls that can be moved to either side of the rig
- on board flush pump
- hydraulic winch
- high-torque high-speed rotary head with side shift
- hydraulic rod clamps/breaker

Rotary drilling Rig (GEO205) – Technical Specifications

- Wheel centre base: 1080mm
- Width, fixed type: 1100mm
- Pad width: 230mm
- Feed Stroke: 2400mm
- Feed Stroke Conversion: 1400mm
- Feed/Retract: 2500kg
- Rotary Head Max Torque: 3100Nm
- Max speed: 1 km/hr
- Engine power: 31Kw
- Approx. drill rig weight: 2350kg
- 0-300rpm Torque Rotary Head with 4 Ranges
- Hydraulic Clamp/Breaker For Max 220mm Diameter
- 1000kg Hydraulic Winch
- 10,000kg Casing Extractor

METHOD STATEMENT - PERCUSSIVE WINDOW SAMPLING USING A GLOBAL GEO DRIVE SAMPLING RIG WITH OPTIONAL WELL INSTALLATION

- Positions will be set out by Geosphere Environmental Ltd or the Client's representative as appropriate.
- Service information to be provided by the Client. A cable avoidance tool (CAT) will be used as a matter of course to check for the presence of detectable services.
- Erect any temporary fencing considered necessary.
- If any doubt exists as to the presence of services, the window sample borehole will be commenced with a hand excavated inspection pit.
- If deemed clear of services, percussive window sampling will be carried out to the requisite depth in accordance with standard practice.
- The working area required for operation is in the order of 3 m by 2 m. The holes created will be up to approximately 110 mm in diameter.
- Sampling and in-situ testing are carried out in accordance with BS 5930, BSEN 1997, Geosphere Environmental Ltd's Health and Safety Policy, guidance documentation issued by the British Drilling Association (BDA) and Geosphere Environmental Ltd's specific instructions.
- The window samples will be laid out on polythene for inspection and logging, by experienced technicians.
- Subsamples will be sealed into suitable containers and labelled with project name and reference, borehole reference, sample reference and depth in metres.
- If required HDPE perforated pipes will be installed in the window sample boreholes with a granular surround and capped with a gas valve. A stop cock type cover will be concreted into the ground at ground surface, to protect the installation.
- If instructed the atmosphere at the window sample hole should be monitored for ground gases (methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide). The Project Engineer should be notified immediately if any elevated levels of gas are detected.
- Holes may be backfilled with soil, pea gravel, bentonite or well pack. With prior agreement, grouting of boreholes can be carried out and hard surfacing reinstated as appropriate.

Global GEO Drive Sampling Rig – Technical Specification

Track-mounted Unit:	
Dimensions (mm) with mast retracted	2600 L x 600 W x 1270 H
Dimensions (mm) with mast elevated with baskets	2600 L x 600 W x 2700 H
Gross Weight	702 kg

** Width is 1200 mm with tool carriers fitted*

Engine:	
Yanmar Diesel engine LA series	
Diesel: Max. output	10 HP
Start Mechanism	Honda HP500H, Dydrostatic belt driven.

Hydraulics:	
Cylinder Pullback	2500 max pressure giving 8 tonnes pullback using single pump.
Pump	Twin pump hydraulic system 20 ltrs per min at 2000 rpm.

Hammer Mechanism:	
Drop Weight (free fall)	50 or 63.5 kg interchangeable
Drop Height	500 or 760 mm interchangeable
Max. Sampling Diameter	150 mm
Max. Sampling Depth	15 metres (dependent on ground conditions)
Sound Level	85 dB (A) at 10 metres from hammer weight

METHOD STATEMENT - GAS AND GROUNDWATER MONITORING

- Locate borehole positions and clear position of vegetation, if necessary.
- Open cover and attach gas flow detector on the infra-red gas analyser to the gas valve. Open gas valve and record gas flow.
- Disconnect gas flow detector and attach gas analyser. Open valve and record ground gas readings.
- Remove bung from installation pipe and use dip-meter/interface probe to record the groundwater level and the thickness of any non aqueous phase liquid within the borehole installation.
- Monitoring of ground gas and groundwater from borehole installations will include peak and steady concentrations for methane, carbon dioxide and oxygen as well as a record of the magnitude of flow from the installation. A record of the weather conditions at the time of monitoring will also be made.
- If water samples are required, purge the boreholes and then take water samples in amber jars. If contaminated, any purged water shored be stored and disposed of appropriately.
- Label sample jars with project name and number, hole and sample number. Samples during hot weather will be transported in cool box and transferred to the laboratory as soon as possible.
- If no water samples are required, replace bung after monitoring of the groundwater levels. Make sure the gas valve is closed.
- Every effort should be made to monitor each installation.

METHOD STATEMENT - CONCRETE CORING AND SURFACE BREAK OUT

The fieldwork is anticipated to follow the procedures detailed below:-

- Positions to be agreed with representatives from Geosphere Environmental Ltd or the Client's representative, subject to headroom and working area restrictions.
- The proposed exploratory hole locations will be swept with a cable avoidance tool (CAT) and checked for the presence of detectable services.
- If deemed clear of services, the concrete slab will be penetrated with concrete coring equipment, using the 110 V electricity supply from a generator or a transformer converted from 240 V power supply.
- The rig will either be bolted to the surface or vacuum held whilst coring. The core bit will be kept lubricated with a flow of clean water and excess water will be cleaned up with a wet vacuum cleaner.
- If the concrete is in a poor condition and unsuitable for coring, then an electric or hydraulic breaker will be used to penetrate the slab, following the manufactures instructions.
- On completion the core will be extracted, logged and tested for strength.
- Coreholes will be reinstated with concrete on completion.
- All positions will be left tidy upon completion.

METHOD STATEMENT - MACHINE EXCAVATED TRIAL PITTING

- Scan area with cable avoidance tool (CAT), if no services encountered then:-
- Position machine to excavate trial pit.
- Remove surface materials and set on one side. If hard surfacing is present this will be broken out by toothed bucket on the backactor of the excavator or a hydraulically powered 'pecker' attachment. Site operatives will wear ear defenders and eye protection during break out.
- Scan the area with the CAT again. If no services detected then:-
- Proceed carefully with excavation in layers of about 200 mm with the Geosphere Environmental Ltd Consultant maintaining a vigilant watch for any services or obstructions.
- Contaminated spoil and arisings composed of made ground will be stockpiled on one side. Natural uncontaminated spoil will be stockpiled separately.
- Sampling will comprise disturbed samples taken in plastic tubs. Samples shall be labelled with pit number, sample number, and depth. Samples for contamination testing will be taken in suitable containers to preserve the contaminants.
- Excavation will proceed to the required depth with pauses for sampling from the excavator bucket at the instruction of the attending site operative.

- Whilst excavation proceeds the stability of the excavation sidewalls will be assessed. If there is doubt over the stability of the sidewall, such that instability may cause surface settlement which could jeopardise safety, then the excavation will be terminated and the pit backfilled as outlined in the last three paragraphs.

- Trial pits will be excavated and backfilled in a single operation, no pit will be left open and unattended. No person will enter the unsupported excavation for any reason once a depth of 1.2 m is exceeded.

- A note will be made of the trial pits stability and if any groundwater was encountered.

- Any contaminated soil and groundwater will be handled as authorised in the above risk assessments. The attending site operatives will be equipped with full personal protective equipment (PPE) where necessary.

- On completion the pit will be backfilled with arisings, compacted in 300 mm thick layers with the digger bucket.

- Materials will be replaced in the pit in the same order that they were excavated, as far as practical.

- The hole will be backfilled to a domed profile to allow for any further settlement. The topsoil or surfacing materials will be reinstated at the top of the dome in the most tidy and acceptable manner possible.

JCB 801 Mechanical Excavator – Dimensions

- Maximum operating weight: 1.5 Tonnes
- Height over cab (transport position): 2.19 m
- Width over tracks: 1 Metre
- Length (machine in transport position): 3.22 Metres
- Maximum digging reach (ground level): 3.66 Metres
- Maximum digging depth: 2.1 Metres
- Maximum digging height: 3.27 m
- Maximum dumping height: 2.39 m
- Tracks: Rubber
- Offset facility: Yes
- Buckets: 9" 18" & grader
- Attachments available: Hydraulic Hammer

Component	Size (mm)
Sprocket idler centres	1027
Undercarriage overall length	1384
Kingpost clearance	376
Tailswing radius	1028
Overall width of superstructure	980
Height over cab	2318
Ground clearance	158
Track gauge	742
Width over tracks	972
Transport length	3346
Transport height with FOGS guard	2318
Transport height without FOGS guard	2304
Track height	366

METHOD STATEMENT – KANGA OPERATION

- Visual checks to be performed before operation, including oil and fuel checks
- Perform visual checks to attachment and ensure it is locked into position
- Scan area with cat avoidance tool (CAT)
- Position machine to begin operation
- Site operatives to wear ear defenders and eye defenders whilst operating
- Ensure any untrained personnel are not within three metres of the operation area
- Proceed carefully with excavation

- **PERFORMANCE**
- Lift Capacity: 100kg
- Travel Speed: 5.4km/h
- Fuel Capacity: 8.5L
- Operating Weight: 500kg
- Tracked/Wheeled: Tracked
- Drive/Operating System: 5 Hand Levers

- **ENGINE**
- Engine Model: Honda GXV530
- Petrol/Diesel: Petrol
- Power: 11.5kW/16hp

- **HYDRAULICS**
- Gear Pump Displacement: 6.2cc/rev
- Pump Output: 22L/min
- Hydraulic Reservoir Capacity: 51.5L
- System Pressure: 186bar
- Hydraulic Wheel Motors: 2

- **DIMENSIONS**
- Max. Operating Height: 1580mm
- Overall Height: 1210mm
- Overall Length: 1560mm
- Overall Length (c/w bucket): 2070mm
- Overall Track Width: 800mm
- Ground Clearance: 160mm
- Wheel Rim Size: 8 inch
- Bucket Max. Roll Back: 36°
- Bucket Max. Dump Angle: 48°

- **ATTACHMENTS**
- Rotivator
- Grass cutter
- Bucket
- Trencher
- Turf extractor

METHOD STATEMENT - HAND EXCAVATED TRIAL PITS/INSPECTION PITS

- Agree trial pit location with Client's representative on site, with reference to available service drawings (to be provided by the Client).
- Scan area with cable avoidance tool (CAT), if no services encountered then:-
- Erect any temporary fencing/barriers considered necessary.
- Remove surface material and set on one side.
- Scan the area with the CAT again. If no services detected then:-
- Any contaminated spoil and arisings composed of made ground will be stockpiled on one side. Natural uncontaminated spoil will be stockpiled separately.
- Excavation and sampling will be carried out in accordance with the Engineer's site instructions. Samples shall be labelled with pit number, sample number, and depth.
- Whilst excavation proceeds the stability of the excavation sidewalls will be assessed. If there is doubt over the stability of the sidewall, such that instability could jeopardise safety, then temporary shoring will be constructed, or the excavation will be terminated and the pit backfilled.
- Trial pits deeper than 0.6 m requiring access by site personnel will be shored up and inspected prior to entry. Entry should be based on the excavation being classed as a confined space.
- A note will be made of the trial pit stability and if any groundwater was encountered.
- On completion the pit will be backfilled with arisings. Materials will be replaced in the pit in the same order that they were excavated, as far as practical.
- Any contaminated soil/groundwater will be handled as authorised in the risk assessments. The attending site operatives will be equipped with full personal protective equipment (PPE) where necessary.
- Appropriate personal protective equipment shall be worn during site works.

METHOD STATEMENT - WORKING IN CONFINED SPACES

- Clear confined space of all materials that are not required for work or may pose a trip/slip hazard.
- Set up fume extraction equipment and gas alarm before any drilling or 'breakout' commences.
- All site operatives working within the confined space will need to wear the appropriate personal protective equipment (PPE) in addition to dust masks.
- At least one member of personnel on site will be trained in working within confined spaces.
- All Geosphere Environmental Ltd site operatives have been trained in working within confined spaces.

- If during the drilling or excavation within the confined space the gas alarm sounds all personnel will evacuate the confined area as quickly as is safely possible.

- Should any of the site personnel fell unwell during the work within the confined space they should evacuate the area and work within the confined space should be stopped.

17. INSURANCE DETAILS

Geosphere Environmental Ltd has the following insurance cover:

Professional Indemnity Insurance	£5 million cover
Employers Liability Insurance	£10 million cover
Public/Products Liability Insurance	£5 million cover

Employers, Public/Product Insurance Certificate

Glentworth
INSURANCE SERVICES

Unit 16, Middle Bridge Business Park • Bristol Road • Portishead • Bristol • BS20 6PN
Tel: 01275 818553 • Fax: 01275 399781 • Email: portishead@glentworth-insurance.com • Website: www.glentworth-insurance.com

EVIDENCE OF INSURANCE

TO WHOM IT MAY CONCERN **27 February 2015**

Dear Sirs,

OUR CLIENT: GEOSPHERE ENVIRONMENTAL LTD - BRIGHTWELL BARNS, IPSWICH ROAD, BRIGHTWELL, IP10 OBJ

As appointed insurance brokers to Geosphere Environmental Ltd, we are pleased to confirm the existence of the following insurance policies:

The Insured:	Geosphere Environmental Ltd
The Business:	Environmental Consultants
PUBLIC AND PRODUCTS LIABILITY:	
Insurer:	Liberty Syndicates
Policy Number:	TBC
Period of Cover:	04 March 2015 to 03 March 2016 (both days inclusive)
Cover:	Legal Liability for bodily injury, death, illness or disease of third parties or damage to third party property occurring during the Period of Cover and happening in connection with the Business.
Limits of Indemnity:	Public Liability - £5,000,000 any one event Products Liability - £5,000,000 in all for all occurrences during any one Period of Cover
Excess:	£500 each and every claim in respect of Third Party Property Damage
EMPLOYERS LIABILITY:	
Insurer:	Liberty Syndicates
Policy Number:	TBC
Period of Cover:	04 March 2015 to 03 March 2016 (both days inclusive)
Cover:	Legal Liability for bodily injury, death, illness or disease of an employee sustained during the Period of Cover and arising out of his employment by the Insured in the course of the Business.
Limit of Indemnity:	£10,000,000 any one event

Professional Indemnity Insurance Certificate

Glentworth
INSURANCE SERVICES

Unit 16, Middle Bridge Business Park • Bristol Road • Portishead • Bristol • BS20 6PN
Tel: 01275 818553 • Fax: 01275 399781 • Email: portishead@glentworth-insurance.com • Website: www.glentworth-insurance.com

PROFESSIONAL INDEMNITY:

Insurer:	HCC International Insurance Company Plc
Policy Number:	PI13C603195
Period of Cover:	04 March 2015 to 03 March 2016 (both days inclusive)
Cover:	Legal liability in respect of professional negligence &/or breach of professional duty
Limit of Indemnity:	£5,000,000 any one claim and in total including defence costs
Excess:	£1,000 each and every claim
Terms:	Jurisdiction – Worldwide excluding USA/Canada Territorial Limits – Worldwide excluding USA/Canada

All policies include an indemnity to principals' clause. All other terms, conditions, limitations and exceptions are in accordance with the insurers' policy wording.

Yours faithfully,

Mark Baggelaar
Director

geosphere environmental ltd
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CLIENT	Quadrant Construction/London and Quadrant Housing Association
SITE NAME AND ADDRESS	Abbey Road, Barking
PROJECT CONTACT	Terry Boswell
PROJECT VALUE	£60,000
CONTACT TEL NO	0844 06900
CONTACT EMAIL ADDRESS	tboswell@quadrant-construction.co.uk
TYPE OF CONTRACT	Site Investigation, Remediation and Validation Works
CONTRACT START DATE	1/9/2014
CONTRACT END DATE	1/10/2014
BRIEF DESCRIPTION OF CONTRACT	A remediation strategy providing an integrated solution aiming to remove contaminated soils and groundwater for the site. Geosphere Environmental undertook remedial design and the remedial work in-house which comprised the excavation and disposal of contaminated groundwater, validation and an extended groundwater monitoring programme.
FULL DESCRIPTION OF CONTRACT AND ACHEIVEMENTS	As timescale and space was an issue at the site, some remediation was approved in conjunction with further ground investigation to ease pre-commencement conditions which also results in a faster scheme that saved the client large sums of money for demobilisation. The progressive remedial design also prevented the client from zero delays in the project and demobilisation of the piling rig during the groundwork's phase.

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CLIENT	Ipswich Borough Council
SITE NAME AND ADDRESS	Ravenswood
PROJECT CONTACT	Emily Atack
PROJECT VALUE	£70,000
CONTACT TEL NO	01473 43200
CONTACT EMAIL ADDRESS	Emily.atack@ipswich.gov.uk
TYPE OF CONTRACT	Reptile, Habitat, breeding bird & NVC Botanical Survey. Reptile Mitigation. Ground Investigation and Site Investigation.
CONTRACT START DATE	21/2/2014
CONTRACT END DATE	Ongoing
BRIEF DESCRIPTION OF CONTRACT	Geosphere Environmental were commissioned to undertake total consultancy for a sensitive site and development involving various Environmental disciplines.
FULL DESCRIPTION OF CONTRACT AND ACHEIVEMENTS	Geosphere successfully undertook all elements and are currently finalising reptile translocation. Issues overcome included interference from the local population, sourcing and enhancing a suitable receptor site, successfully achieving the targets specified by various parties within the overall build scheme, ie, groundworker, designer, client. Geosphere were also successfully able to alleviate all concerns raised by the Wildlife Trust and Natural England in opposition of the scheme.

CURRICULUM VITAE

Name	Stephen Gilchrist
Position	Senior Geotechnical Consultant
Specialisation(s)	Organisation, management and consultation of geotechnical and geo-environmental investigation.

Key Experience	
Professional Qualification	**University of Brighton** – 2002 to 2006 Geography and Geology BSc (hons / sandwich)
Professional Experience	Project Management / Desk Study Reporting / Contaminated Land Risk Assessment / Geotechnical and Geoenvironmental Reporting / Foundation Engineering / Ground Subsidence Investigations / Drainage (SUDS) / Pavement Design / Contaminated Land Remediation / Intrusive Investigation Site Management / Soil Logging / Slope Stability Assessment and Design / Walkover Surveys / Land Drilling

Career Summary	
Month Year to Month Year	**Geosphere Environmental Ltd – Senior Geotechnical Consultant** April 2014 to Present Responsible for Managing and Undertaking Geotechnical and Geoenvironmental Site Investigation.
Month Year to Month Year	**Richard Jackson Ltd – Geotechnical Engineer** March 2012 to April 2014 Desk Study, Geotechnical and Geoenvironmental Reporting / Intrusive Investigation Site Management / Soil Logging / Slope Stability Assessment and Design / Walkover Surveys. **Projects:** ○ Proposed Fork Rent Depot, Kesgrave Quarry, Ipswich ○ Community Centre and Residential Development, Mark's Gate, Romford ○ Engineered Solution for Slope Stability at Kings Parade, Clacton ○ Proposed Residential Development, Hazel End, Saffron Walden ○ Ground Subsidence Claim, Capital Business Centre, South Croydon
Month Year to Month Year	**Ashdown Site Investigation Ltd – Junior Geotechnical Engineer** January 2008 to January 2009 / May 2010 to December 2011 Intrusive Factual Reporting, Supervision of Intrusive Works, Soil Logging, Geotechnical Laboratory Testing.

Training	○ Fellow of Geological Society of London (FGS) ○ Cone Penetration Techniques (FUGRO) ○ Foundation Awareness (EQUIPE) ○ Walkover Surveys (GEL) ○ Construction Skills Certification Scheme – Site Safety
Project Experiences	
Proposed Fork Rent Depot, Kesgrave Quarry, Ipswich	Intrusive investigation for foundation design and geo-environmental purposes on a former quarry site. ○ Works involved trial pitting, window sampling and ground gas/groundwater monitoring. ○ Limitations to development included Areas of soft Made Ground, shallow groundwater, hazardous ground gases, contaminated land.
Community Centre and Residential Development, Mark's Gate, Romford	Project comprised of two garage sites, community church and allotment, and an area of public open space. ○ Works involved Shell and Auger drilling, window sampling and gas/groundwater monitoring. ○ Limitations to development included low bearing capacity soils at formation depth, low infiltration rate of soils.
Engineered Solution for Slope Stability at Kings Parade, Clacton	Slope stability investigation and assessment on stretch of promenade where retaining walls to slope had been removed and recommendations for drainage not adhered to. ○ Slope failure was modelled based on a number of window sample boreholes along slope, with parameters carried forward so that an engineered solution could be recommended. ○ Limitations to development included saturated soils, steep slope grade, beach houses at slope toe, vegetation strip, soft soils.
Proposed Residential Development, Hazel End, Saffron Walden	Intrusive investigation comprising trial pits for a large number of residential properties together with open spaces. ○ Limitations to development included variable ground conditions, mineral extraction conditions, archaeological survey conditions.
Ground Subsidence Claim, Capital Business Centre, South Croydon	Investigation on significant ground movements on a commercial development for insurance purposes. ○ Works included foundation exposures and window sampling to correlate geological conditions. ○ Limitations included deep Made Ground, insufficient compaction of fill, insufficient foundations design and construction, poor drainage, historical setting (former landfill).

CURRICULUM VITAE

Name	James Dawson
Position	Principal Geo-Environmental/Remediation Consultant
Specialisation(s)	Site Investigation, Remediation and Validation Works.

Key Experience	
Professional Qualification	**University College, London** – BSc (Hons) Geology (1997) Camborne School of Mines (University of Exeter) – DipCSM Industrial Geology (1995)
Professional Experience	Phase I and II Site Investigation reports, due diligence assessments, general client liaison and communication, research and compilation of dQRAs (principally for controlled waters using including RTM/P20), detailed Remediation Method Statements, design, completion and reporting of remediation/validation works. Negotiation of the scope of S.I. and remediation schemes to obtain approval by local Authorities. Assessment of risk and design of systems/site works in accordance with CDM 2007. Completion of risk assessments and method statements for specific site activities. Compilation of Construction Phase Health and Safety Plans for implementation within projects. Liaison with Regulators and other relevant organisations to negotiate and/or obtain relevant permissions/approvals for a range of projects. Compilation-of and application-for Waste Management licencing/exemptions and Environmental Permits via SEPA and the EA for construction sites.
Career Summary	
January 2015 to present	**Geosphere Environmental Ltd – Principal Remediation/Geoenvironmental Consultant** Responsible for delivering and undertaking site investigations, design of remediation strategies through to verification of successful remediation on a wide range of schemes. Assisting the clients throughout the design process of construction on brownfield sites.
January 2013 to January 2015	**Principal Remediation/Geoenvironmental Consultant, agb Environmental Ltd** Working within a small team of geo-environmental consultants and project managers to deliver Phase 1 and 2 site investigation reports, DQRA and RMS reports for sensitive school sites and residential redevelopments. Management of small remediation projects including hydrocarbon impacted brownfield sites.
February 2012 to January 2013	**Various short term contract roles as Senior/Principal Environmental/Remediation Consultant** Production and review of technical reports and communications along with completion of site works for site investigation and remediation schemes within small teams. Projects included delivery of fast turnaround and complex sites including Environmental Permitting applications and liaison with Regulatory bodies.

August 2007 to December 2011	**Principal Remediation Consultant, Soil and Water Remediation Ltd** Design and undertake the investigation, clearance and remediation of a wide variety of contaminated sites, taking into account the various relevant CDM-C (or related) factors. Project experience from standard brownfield sites to marine/aquatic environments and high security sites with site-specific contamination. Production, submission and implementation of a wide range of Environmental Permits/"MTLs" and CPHASPs to enable projects to commence, to enable remediation or remedial measures to occur within waste management legislation.
2003 to 2007	**Environmental Consultant and Senior Consultant, Knight Environmental Limited** Environmental and geo-environmental site investigations, dQRA, remediation and validation reports for a wide range of sites to an ISO 9001 quality assurance system.
2002 to 2003	**Environmental Engineer, Stuart Well Services** Remediation and landfill Project Engineer/Consultant delivering solutions and installations to LNAPL contaminant recovery activities, design and installation of temporary and permanent leachate pumping systems, temporary dewatering schemes.
1998 to 2002	**Environmental Technician and Consultant, Enviratec/Ground Engineering/Enverity** Project management, teamwork, fieldwork, reporting and client liaison for Phase I and II geoenvironmental site investigations, remediation, validation and due diligence projects.
Training	○ CSCS Site Manager Industry Accreditation ○ CDM 2007 Effective CDM Co-ordination ○ Managing Water Pollution of Construction Sites ○ Introduction to the Waste Code of Practice (V2) ○ Confined Space Awareness ○ C4SL Workshop ○ FGeol; application for CSci underway
Project Experience Examples	
Derby	Site manager, project manager and site foreman for remediation scheme of a school playing field June to September 2011. Re-design and implementation of remediation measures while controlling risk to neighbouring sensitive receptors.
Colchester	Assistant site manager, large remediation site in Colchester, providing temporary assistance to a small team of consultants/contractors during waste soil treatment and emplacement. Included initial training for operation of nuclear density gauge testing equipment.
Bury St Edmunds	Design, liaison and completion of innovative remediation for VOC-impacted soil and groundwater overlying a sensitive receptor and for residential development.
Woking	Project management, site management and detailed reporting for investigation of a former landfill for proposed residential redevelopment.
Hull	Design, liaison and implementation of detailed remediation scheme, with environmental permitting requirements for an award-winning brownfield redevelopment of a river crossing scheme.

CURRICULUM VITAE

Name	Lianne Fountain
Position	Assistant Geoenvironmental Consultant
Specialisation(s)	Geoenvironmental Desk Study and Ground Investigation, Organisation and Management of Ground Intrusive Works, Providing recommendations for Soil Remediation, Foundation Design and Drainage.

Key Experience	
Professional Qualification	**University of Portsmouth;** September 2010 to June 2013: BSc (Hons) Geology
Professional Experience	Desk Study Reporting / Contaminated Land Risk Assessment / Geotechnical and Geoenvironmental Reporting / Foundation Engineering / Pavement Design / Contaminated Land Remediation and Validation / Intrusive Investigation Site Management / Soil Logging / Walkover Surveys / Radiology Surveys.
Career Summary	
April 2014 to Present	**Geosphere Environmental – Assistant Geoenvironmental Consultant** Responsible for undertaking Geotechnical and Geoenvironmental Investigation.
Training	○ Foundation Awareness (EQUIPE) ○ An Introduction to Phase 1 and Phase 2 Site Investigations and Contaminated Land (GEL) ○ CSCS operative test
Project Experiences	
Former Allied Bakery, Norwich Road, Ipswich	Intrusive investigation on a Brownfield site (former bakery) for contaminated land purposes. ○ Works involved trial pitting, window sampling and ground gas/groundwater monitoring. ○ Limitations to works included extensive areas of hardstanding, mixed Made Ground and fill, differing ground condition, hazardous ground gases, contaminated land.
Lakewood, Greggs Wood Road, Tunbridge Wells	Intrusive investigation on an existing residential development for pile design and potential remediation. ○ Works involved window sampling and dynamic probing. ○ Limitations to works included hard rock geology, varied topography and public liaison.

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ELAM, Bow, London (First phase of works)	Project site comprised a brownfield site (former garage) proposed for a multi-storey music academy with basement. ○ Project required Client consultation throughout the progress of the initial phase of works. ○ Works involved Shell and Auger drilling, window sampling and gas/groundwater monitoring. ○ Limitation to works included proximity of rail line to site, over consolidated soils, deep contamination within aquifer, location of multiple services, inclusion of basement into proposed development.
East Dulwich Hospital, East Dulwich Grove, London	Radiological surveying of derelict hospital buildings. ○ Works involved using various digital radiological survey equipment to monitor a number of radioactive wavelengths prior to demolition and redevelopment of the site.
Trimley Mushroom Farm, Capel St Martin, Suffolk	Infiltration investigation of the soils underlying the site for use in designing a suitable drainage strategy for the site. ○ Works included trial pitting and undertaking of infiltration tests to current recognised guidance for Environment Agency approval. ○ Information obtained was used in calculating the infiltration rate of the soils for drainage proposals.

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CURRICULUM VITAE

Name	Ian Cowell
Position	Site Engineer
Specialisation(s)	Intrusive works including trial pitting, window sampling, BRE 365 infiltration testing, ground gas and groundwater monitoring. Ecological works including installation of reptile fencing and reptile translocation. Site clearance works including the operation of a Kanga trencher.

Career Summary	
2009 to 2015	Ran my own company working for myself clearing client's gardens of trees, old fencing and sheds, put in soakaways, erected fencing, laid lawns, planted trees and general garden maintenance.
Training	○ CSCS operative test ○ Trailer Towing and Transit Driving ○ In-house training for window sampler rig ○ In-house CAT and Genny training ○ In-house training for gas and PID monitoring.
Project Experiences	
Eltham School, South London for Kier Construction	Operation of window sampler rig over two days completing thirteen 4m holes with SPTs every 1m.
North London Court and Police Station, North London for Kier Construction	Using breaker and hand tools to expose foundation in trial pits for construction purposes.
Western Super Mare, Somerset for CATSurveys	Deep trial pits over 3m deep using 8 tonne excavator to expose contamination at a form gas works.

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CURRICULUM VITAE

Name	Graeme Cheshire
Position	Site Engineer
Specialisation(s)	General fieldwork engineering activities including: trial pitting (hand dig/mechanical excavation, operation of excavation machinery (window sampler rig/Kanga loader and trencher), Site data collection.

Career Summary	
October 2014 to Present	**Geosphere Environmental Ltd – Site Technician** Intrusive works including trial pitting, window sampling, testing, ground gas and groundwater monitoring. Ecological works including installation of reptile fencing and reptile translocation. Site clearance works including the operation of a Kanga trencher.
Training	○ CSCS operative test ○ Shell and Auger rig training with Dando Drilling International Ltd (2 days) ○ Trailer Towing and Transit Driving ○ In-house training for soil logging to BS 5930 ○ In-house CAT and Genny training ○ Manual handling tutor
Project Experiences	
Cells 4B 5A, 5B and 5C, Cambourne, Cambridgeshire	Operation of window sampler rig and second man for cable percussion rig.
Chestunt Grove Academy, London for Kier London	Second man for cable percussion rig for the purpose of geotechnical sampling and in-situ testing.
Oakingdon Road, Coddenham, Suffolk	Operation of window sampler rig, construction of trial pits and monitoring of BRE 365 infiltration tests and operation of mechanical excavator.
North West Haverhill, Essex	Trial pitting by mechanical excavator for environmental purposes including preparation and monitoring of infiltration testing.
River Stour/Orwell, Suffolk	Marie drilling off barge for the cable crossing between Harwich and Felixstowe.

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CURRICULUM VITAE

Name	Stuart Donkin
Position	Site Engineer
Specialisation(s)	Intrusive works including trial pitting, window sampling, BRE 365 infiltration testing, ground gas and groundwater monitoring. Ecological works including installation of reptile fencing and reptile translocation. Site clearance works including the operation of a Kanga trencher.

Career Summary	
2011 to April 2014	**Casa Julia PLC – Drivers Mate** Driver and delivery of stock, stock control and equipment maintenance.
2010 to 2011	**Tesco Supermarket - Driver** Delivery driver.
Training	○ CSCS operative test ○ Rig training with Dando Drilling International Ltd (2 days) ○ Trailer Towing and Transit Driving ○ In-house training for soil logging to BS 5930 ○ In-house CAT and Genny training
Project Experiences	
Cork Street, London for Kier London	Operation of window sampler rig and second man for cable percussion rig.
Ilford Boys School, London for Kier London	Hand excavation of trial pits to expose foundations and operation of window sampler rig.
Oakingdon Road, Coddenham	Operation of window sampler rig, construction of trial pits and monitoring of BRE 365 infiltration tests and operation of mechanical excavator.
Silver Avenue, Hutton	Operation of window sampler rig including in-situ testing for geotechnical purposes.

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CURRICULUM VITAE

Name	**Steve Ivison**
Position	Lead Driller
Specialisation(s)	Land Drilling and Geotechnical Engineering

Key Experience	
Professional Qualification	On site qualification from the British Drilling Association (BDA) January 2002 and Land Drilling NVQ level 2.
Professional Experience	Worked within the construction industry for over 14 years, started as an apprentice Driller and developing the skills required to become a Lead Driller.

Career Summary	
2014 to 2015 2012 to 2013 (Lead Driller) March 2009 to April 2012 (Lead Driller)	**Drift Drilling, Wakefield** ○ Skilled work using a shell and auger drill ○ Extensive experience when drilling all ground conditions ○ Testing soil samples ○ Highly proficient in using 15 inch casing ○ Experience when working to a depth of 70 metres with cable percussion ○ Skilful use of a terrier rig ○ Window sampler ○ Worked as second man on rotary rigs
2013 to 2014	**JB Drilling, Northumberland** ○ Skilled work using a shell and auger drill ○ Extensive experience when drilling all ground conditions ○ Testing soil samples ○ Highly proficient in using 15 inch casing ○ Experience when working to a depth of 70 metres with cable percussion ○ Skilful use of a terrier rig ○ Window sampler ○ Worked as second man on rotary rigs
April 2012	**Henderson and Campbell, Guisborough - Groundworker** ○ All aspects of groundwork ○ Working effectively within a close knit team ○ Working to tight deadlines

January 2000 to February 2009	**Norwst Holst, Leeds – Lead Driller** ○ Extensive use of shell and auger drill ○ Working with mixed ground conditions ○ Soil sample testing ○ Experienced when using 15 inch casing on cable percussion ○ The operation of terrier rig and window sampler ○ Second manning rotary rigs
Training	○ Survival course ○ On site qualification from the British Drilling Association (BDA) January 2002 ○ Land Drilling NVQ level 2 ○ Forklift truck counter balance licence CSCS ○ Skilled workers card

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Schedule 3: The Civil and Structural Engineering Services

Please find Campbell Reith Hill's – Civil and Structural Engineering Services on the following 6 Pages.

Kier Construction Division

Schedule 3 : The Civil & Structural Engineering Services

Clause Ref.	
1.00	**GENERAL**
1.01	~~The civil & structural engineering duties will be required for the tender stage only. The preliminary stages; option appraisal and planning consultation, feasibility study, and project proposals will have been completed by the Employer's directly appointed consultants prior to Kier's involvement with the project. Therefore, the Consultant is to carry out an appraisal and compliance audit of the existing design detailed within the Project Brief prepared by the Employer and identifying areas for innovation and the development of a best value offer.~~
1.02	For the purpose of this agreement the Civil and Structural parts of the Works shall comprise, as a minimum all such services as normally apply under the standard CIRIA guidelines taken in conjunction with the particular requirements of the Employer's Requirements and Contractor's Proposals. The Consultant shall ensure that all matters that may affect the completed building, occupation, and use are incorporated into the design process as the work proceeds.
1.03	Undertake the duties of a designer as defined in the Construction (Design and Management) Regulations 2015. Advise the Contractor on matters or obligations that arise under the CDM Regulations out of the civil and structural engineers' work. Apply the the general principles of prevention (under the CDM Regulations) and pre-constrution information to to eliminate hazards and reduce of control risks. Undertake health and safety risk assessment of the architectural design in specific and the overall design in general, and co-operate fully with the CDM Principal Designer and all other duty holders under the CDM Regulations, supplying information as necessary, supplying information as necessary for the Pre-Construction Health and Safety Plan and/or Health and Safety File, depending on the project stage.
1.04	A Design Responsibilities Matrix forms Schedule 5 of this Agreement. This identifies the primary areas of responsibility but does not limit or reduce the Consultant's responsibility contained within this Schedule 3
1.05	In preparing the design, take due cognisance of the Kier Minimum Standards contained within Schedule 8 and comply with the EDMS Protocol contained within Schedule 8.
1.06	The Consultant is to work with the Lead Consultant to plan, co-ordinate and provide the design solution with assistance from the Contractor's Consultants, Specialist Subcontractors and Suppliers, artists and tradesmen.
1.07	In this document the expression "co-ordinate" or where the context permits "co-ordination" shall include the responsibility for reviewing any ~~BIM model and/or~~ drawings and/or specifications to ascertain conformity with the design concept, profiles and general arrangement only and for integrating conforming work into the overall design, including any interfaces between designs. The Consultant shall, using the standard of care set out in the Agreement, highlight any items or areas of non-conformity on the appropriate ~~BIM model and/or~~ drawings and/or specifications, with overmarked copies of said ~~BIM model and/or~~ drawings and specifications being sent to the author of the same and the Contractor and/or uploaded to the project data management system (EDMS). The adequacy and suitability of the work of Client and Contractor's Consultants, Specialist Subcontractors and Specialist Suppliers shall remain their responsibility.
1.08	Nothing in this Schedule shall be deemed to reduce any liability that the Specialist Subcontractors or/and Specialist Suppliers have for their detailed design and any defects or omissions arising therefrom
1.09	For ease of reference the Services have been divided into phases. Such division is not intended to and shall not limit or affect the Consultant's obligation generally to provide all the Services as and when they may, from time to time, be required necessary or appropriate for the timely carrying out and completion of the Works.
1.10	In carrying out the Services the Consultant shall address all communications, including advice to the Contractor and accept responsibility for ensuring that information is exchanged effectively between the consultants throughout the duration of the Project utilising a system determined and agreed by the Contractor.
1.11	Prepare a structural report at the end of each phase / stage and obtain approval before proceeding.
1.12	Provide Information as necessary for the Employer and/or Contractor to complete third party submissions or applications.

1.13	Assist in the preparation of any Employer and/or Contractor Audit Report, etc.
1.14	Advise the Contractor promptly of any announced or publicised pending changes that the Consultant becomes aware of in any relevant Statutory Requirement which may affect the design or cost of the Works.
1.15	The Consultant will operate under their own ISO 9001 Quality management System or alternatively, the Contractor's quality management system
1.16	The Consultant shall verify that any design, ~~BIM model and/or~~ drawing or technical approvals submitted by any other person including but without limitation any of the Contractor's Consultants, Specialist Subcontractors or Specialist Suppliers acting on behalf of the Contractor, the Employer or the Employer's Agent before or after the date of this Agreement are in accordance with, but not exceeding, the Employer's Requirements and the Contract, and the Consultant shall ensure that all design, ~~BIM model and/or~~ drawings, etc., are co-ordinated and integrated with the design of the overall work. This will apply in respect of:- 1. Checking the information received at the start of the tender or phase of the work; 2. Checking the information received throughout the design development process; and 3. Ensuring the information submitted by the Consultant, for whatever purpose, is co-ordinated and integrated with the design of the overall work.
1.17	Assist the Contractor in any way that may reasonably be required in respect of negotiations with the Employer after the submission of the tender and prior to award of the Contract.
2.00	**RECEIVE & REVIEW**
2.01	Obtain from the Contractor the Employer's Requirements and the requirements of the Contractor, including those for budget and timetable, attending briefings with the Contractor and Employer as appropriate.
2.02	In conjunction with the Contractor's Consultants, prepare an analysis of the Employer's Requirements. Such analysis shall include, but not be limited to: • value engineering opportunities • omissions and/or deviations from Statutory Requirements and relevant industry guidance • discrepancies within Employer's Requirements • project risk areas both financial and programme
2.03	Read and fully digest the relevant sections of the Employer's Requirements. Assist the Lead Designer in his analysis of the requirements of the Employer's Requirements. Carry out all design duties in accordance with and in full knowledge of the Employer's Requirements. Advise the Contractor of any deviation in the design from the Employer's Requirements.
2.04	Advise the Contractor of any aspect of the Employer's Requirements which in the Consultant's opinion should be questioned by the Contractor.
2.05	Advise/give general proposals to the Contractor on how to proceed with the design in order to achieve a successful bid within the bid period set by the Employer.
2.06	Advise the Contractor of any additional design related consultancy that will be required which in the Consultant's opinion will be necessary to deliver the Project requirements.
2.07	Review with the Contractor and Contractor's Consultants all comments and actions arising from any reports submitted and/or audits undertaken at the end of the previous phase/stage and incorporate into the developing design.
2.08	Advise on the need to obtain planning permissions, discharge reserved matters, seek approvals under Building Acts or Regulations and other statutory requirements.
2.09	Review with the Contractor any conditions attached to any outline/prior planning consent(s) and other constraints for the development and ensure that the design incorporates proposals to discharge all conditions.
2.10	Advise on environmental and sustainability issues/impact and prepare any reports required. Any reporting to be an additional service.
2.11	Upon receipt of additional information not previously in your possession, review and advise on the implications to the project
2.12	Review with the other consultants and Contractor any Conditions attached to any outline/prior planning consent(s) and other constraints for the development and ensure that the Design incorporates proposals to discharge all Conditions.
2.13	At the start of each phase / stage obtain the latest Employer's Requirements and advise the Contractor of any further information that in the opinion of the Consultant the Contractor should obtain in respect of any matters that might affect the Contractor's Proposals

2.14	Advise/give general proposals to the contractor on how to proceed with the design in order to achieve a successful bid within the period set

3.00	**INVESTIGATION**
3.01	Obtain the Employer's Requirements and advise the Contractor of any further information that in the opinion of the Consultant the Contractor should obtain in respect of any matters that might affect the Contractor's Proposals. Advise the Contractor of any aspect of the Employer's Requirements which in the Consultant's opinion should be questioned by the Contractor.
3.02	Advise the Contractor in relation to the design and layout of the site(s) having regard to the nature of the development proposed by the Architect and/or the Contractor, in particular, in relation to the provision of: • Underground drainage within the site(s); • the drainage concept of the site generally and in relation to the proposed development of the site(s); • optimum finished levels for the proposed development of the site(s) including buildings and external works; • building foundations and any special design considerations; • retaining structures and any special ground/site considerations.
3.03	With the other appointed consultants, make investigations regarding obstructions in the ground, adjoining properties and LUL tunnels, and site flood risk.
3.04	Carry out an inspection and appraisal of the site(s) and any buildings thereon. Comment on any site conditions, constraints, the technical viability of the Project, discuss the requirements of the design and give general advice on how to proceed. Study all data, reports, investigations and surveys relating to the Project and available to the Consultant through the Contract or in the wider industry / regulatory domain and report accordingly. Advise where clarification of the Employer's Requirements is required.
3.05	Advise the Contractor on the need for further investigations, such as topographical and dimensional surveys, geotechnical or contamination investigations (in accordance with ICRCL Note latest revision), desk studies and the like as may be necessary or appropriate for the site(s) and the proposed development. Organise all such investigations as may be necessary and/or advised by the Consultant and authorised by the Contractor. No additional investigations are to proceed without the written authorisation of the Contractor. As information becomes available and/or the design develops, report to the Contractor upon the effects that such information may have on the Project and advise on any further studies, surveys, etc that may be beneficial to the design process
3.06	Prepare such reports (including specifications) as are reasonably necessary or required by the Contractor arising out of such investigations undertaken or recommended by the Consultant as may be necessary to enable the Consultant to advise the Contractor on the works as may be necessary or recommended by the Consultant to enable the Contractor to undertake the development of the site(s) having regard to the nature of the site(s), the desk studies and all other investigation work carried out by the Consultant.
3.07	Advise and answer queries from the Contractor to enable the Contractor to complete the project, including advice on such measures as may be necessary to ameliorate the condition of the site. Such advice will be limited to what can be reasonably expected to be given by a consultant practising as a Civil and Structural Engineer.
3.08	Provide Assistance to the Lead Consultant on environmental, ecological and sustainability issues / impact, and advise if any BREEAM rating stated in the Employer's Requirements is likely to be achievable within the Contract Sum. Attend workshops and supply information as may be reasonably required and use all reasonable endeavours to see that the design solution is able to achieve the BREEAM rating stated in the Employer's Requirements.

4.00	**PROGRAMME**
4.01	Provide information to assist in the production of, and agreement to, an integrated design programme including participating in design programming workshops to co-ordinate production of information with the Client/Contractor's Consultants and advise on the need and timing of any specialist design input and/or decisions from the Contractor or the Employer.
4.02	Provide such information as may be necessary to comply with the integrated design programme and ensure insofar as is practicable that the programme is adhered to. Provided always that the other Contractor's Consultants should fulfil their own duties to provide such information as required directly to the Contractor. Report on progress against the programme monthly.

4.03	Review, with the Contractor and the Contractor's Consultants, the integrated design programme, prepared previously. Agree any necessary amendments to the programme with the Contractor, to deliver civil & structural information that may be reasonably required for inclusion in the work package information as appropriate to the project from the complete list contained in the Design Deliverables List in Schedule 4. Report on progress monthly.
5.00	**DESIGN DEVELOPMENT**
5.01	Liaise with the Contractor's Consultants to ensure that there is full and proper co-ordination between the Contractor's Consultants in the design and specification of the Works.
5.02	Carry out feasibility studies and option appraisals as necessary to obtain the Employer's and/or Contractor's agreement.
5.03	Attend such meetings with the Client, Contractor or Contractor's Consultants as may be reasonably required.
5.04	Consult with the Stakeholders, End User Groups and others reasonably identified by the Contractor or the Employer. Present proposals/presentation material to the Contarcor in advance of such meetings, and where instructed by the Contractor take into account the results of any consultations in the subsequent development of the design.
5.05	With the Contractor's Consultants, develop design options for the Project. Provide information in sufficient detail for the Contractor to develop a Cost Plan for each option.
5.06	Liaise with the Employer, Contractor and the Contractor's Consultants to select a short list of design options and assist in their non-financial evaluation, including attending meetings to explain the options to the client/contractor and others reasonably identified by the Contractor or the Employer.
5.07	Develop with the Contractor and the Contractor's Consultants the details of the Contractor Proposals. Provide all necessary details, calculations and drawings for submission of Contractor's Proposals, Contract Sum Analysis.
5.08	Provide advice during the design development to ensure a cost effective construction solution, including challenging the Contractor's Consultants, Specialist Subcontractors and Specialist Suppliers designs, highlighting environmental benefits and opportunities to minimise operational and maintenance costs.
5.09	With the Contractor and Contractor's Consultants, develop innovative/best value alternative proposals, alternative design and construction approaches, whilst staying within the parameters of the Employer's Requirements.
5.10	Provide the contractor with technical information to seek quotations from specialist sub-contractors or suppliers in respect of the proposed innovative/best value alternative proposals.
5.11	With the Contractor's Consultants, develop the design for the Project suitable for pricing and in sufficient detail to agree the spatial arrangements, materials and appearance, taking into account amendments instructed and notified in writing by the Contractor, (including notes of any items that will be required but are not currently, fully or properly identified on the drawings, etc) . Report to the Contractor, via the Architect, on the affect of all changes made to the design, including any changes to the GIFA.
5.12	Develop the design of the works so that it conforms to, but does not exceed the Employer's Requirements and Contractor's Proposals. Provide any information that can reasonably be expected from a Civil & Structural Engineer that the Contractor may require to progress the Works
5.13	Ensure the developing design complies with all statutory, authority, industry, or relevant insurance notices, guidelines, requirements or standards. Alternatively, obtain the Contractor's agreement to any non-compliance and prepare a schedule of deviations for submission to the Employer.
5.14	Ensure the specification achieves the requirements of the Employer's Requirements and Construction, FM and Life Cycle criteria and provide the Contractor with sufficient information thereon to ensure that it is likely to be achievable within the Contract Sum.
5.15	Provide assistance to the Architect (or Planning Consultant) in his consultations with the planning authority, building control, fire consultant, environmental authorities, licensing authorities, statutory undertakers and others as appropriate and consider the extent of any requirements that they may have in relation to the Works that will affect the project and advise the Contractor on any revisions to the scheme design to deal with the requirements of any of those authorities. Information shall only be submitted to these parties following approval from the Contractor. Ensure all civil and structural related approvals have been obtained and no outstanding actions or obligations that can be reasonably foreseen remain. Provide a monthly report on the status of such approvals.
5.16	In conjunction with the Contractor, the Contractor's Consultants and the supply chain, review alternative design and construction approaches together with any cost implications and attend value engineering meetings.

5.17	In conjunction with the Contractor's other consultants periodically review the design as it is being developed and report to the Contractor on any matters that in the opinion of the Consultant should be reviewed further and/or amended having regard for the requirements of the Contractor in relation to the Works. The Consultant shall co-ordinate the responses from the Contractor's consultants in as much as they affect the civil and structural works. The obligation upon the Consultant to review the design and advise the Contractor thereon shall continue during the remaining phases of the project.
5.18	Highlight in ~~BIM model and/or~~ on drawings and specifications all unusual, non-standard or bespoke elements using the symbol, to emphasise to subcontractors the elements of the design that require special consideration and/or high levels of quality monitoring. Use symbol to highlight existence of any separate, associated calculations document
5.19	Assist the Contractor in any way that may reasonably be required in respect of negotiations, request for clarification, to explain the proposals and attend presentations to the Employer during and after submissions to the Employer. This may require a review of the design proposals as a result of the submission evaluation.
~~5.20~~	~~Provide information for and participate in AEDET and NEAT reviews.~~
5.21	Prior to submission of the Contractor's Proposals provide a written statement of compliance that the Consultant's designs comply with the Employer's Requirements, all relevant codes and guidelines. This may be supplemented in agreement with the Contractor by a schedule of derogations if necessary.
5.22	Participate in Teambuilding Exercise ~~/ Partnering Workshop.~~
5.23	Provide the Contractor with information to assist the Contractor in determining a realistic programme for the proposed Works and provide all necessary information for inclusion therein.
5.24	Liaise and provide information (~~BIM model and/or~~ drawings, specifications, maintenance strategies, etc) to the FM provider in order to assist the Contractor in obtaining full acceptance by the FM provider of the design solutions to be included in the project. Ensure that the Life Cycle, Hard and Soft Facility Management issues are fully addressed within the design to achieve the best value for money solution
5.25	~~In relation to Fixtures, Fittings & Equipment, ensure that there is full and proper co-ordination between fixed and serviced elements.~~
5.26	If required for the funder's due diligence provide such information as is requested by the funder and or his advisors as agreed with the Client/Contractor. Participate as may be required in the process.
5.27	Comply with the change control procedure within the Construction Contract and/or as required by the Contractor. Advise the Contractor of the effects of the proposed change upon the design of the project and upon design work generally. Advise the Contractor if any design development or change is likely to have a notable affect on the cost of the works compared with the design contained within the tender/Contractor's Proposals, and if known, the consequences of any subsequent change to the Programme. Report to the Contractor the affect on GIFA, via the Architect, of all changes made to the design.
5.28	Advise of all BWIC requirements in connection with the Mechanical & Electrical Consultant's design, modify the design and provide such BWIC details.
5.29	In respect of Reviewable Design Data, provide ~~BIM model and/or~~ drawings and develop as reasonably required to obtain the Employer's approval.
6.00	**WORK PACKAGES**
6.01	Liaise with the Contractor to allow the contractor to develop the scope of work to be sublet to subcontractors and suppliers, as required in the Design Deliverables in Schedule 4. Provide the Contractor with the ~~BIM model and/or~~ general arrangement drawings, interface details, performance specifications and other technical information required to enable him to seek firm quotations for such work and if necessary, sufficient to enable the taking off of quantities and/or for construction.
6.02	Provide civil/structural BIM model and/or drawings and specification information, including specifications in NBS format with named products, with the aim of eliminating any requirement for post-tender Reviewable Design Data, and as may be reasonably required to allow submission of the tender documentation and/or for incorporation into the Project Agreement/Main Contract. Agree with the Contractor on samples and BIM model and/or drawings to be submitted to the Employer and obtain samples where appropriate
6.03	In conjunction with the Contractor Consultants provide general arrangement drawings, interface details, performance specifications and other technical information reasonable necessary to any specialist sub-contractors or suppliers, to enable them to prepare and submit tenders to the Contractor and report to the Contractor on any matters arising.

6.04	Examine ~~BIM model and/or~~ working drawings, details and calculations of Specialist Subcontractors or Specialist Suppliers as identified in Schedule '5, and verify, coordinate and comment on the same against the design, with particular reference to those elements of the design marked with ( ) symbol and generally for tolerances and dimensions, finish, durability, appearance, performance criteria and conformity and in respect of the design and the Contractor's Proposals, Employer's Requirements and Statutory Approvals.
6.05	Where any item is being supplied for fixing, installation and/or integration by others the Consultant shall review and comment on the manner of fixing, installing or integrating such items.
6.06	The Consultant will provide to the Contractor and any relevant Contractor's Consultant throughout the course of the Works BIM model and/or drawings, specifications and other relevant documents as may be amended and revised from time to time.
6.07	Where appropriate, but as a minimum in respect of building components marked with an ( ), carry out pre-delivery off-site inspections of Specialist Subcontractor or Specialist Supplier designed elements of the Works, to ensure that the components being supplied are compliant with and of the quality required by terms of their contract.
6.08	Subject to issue by Kier for comment. Assist the Contractor in the evaluation of quotations received from sub-contractors and Specialist Suppliers.
6.09	Subject to issue by Kier for comment. Examine proposals working drawings and details of any other Consultant and/or Specialist Sub-contractors or Specialist Suppliers and make comment as appropriate, with particular reference to tolerances and dimensions, durability, appearance, performance criteria and conformity with the design and in respect of the Contractor's Proposals and Employer's Requirements.
7.00	**INSPECTIONS, SNAGGING, O&M's**
7.01	After every site visit submit a brief report to the Contractor, raising any design concerns, design co-ordination issues, and omissions or defects requiring attention to ensure the required construction quality is achieved.
7.02	Prior to installation, carry out site inspections of Specialist Subcontractor or Specialist Supplier designed elements of the Works to ensure that the components being supplied are compliant with the Employer's Requirements and Contractor's Proposals and of the quality required. On completion of the associated works, and before the works are concealed, inspect and verify the integrity of the Works together with any interfaces. Report all findings to the Contractor as part of the standard site and client meetings or when required as part of the construction sequence.
7.03	Prior to Practical Completion of the Works or any sections thereof, the Consultant shall issue a letter to the Contractor stating that within the scope of his inspection duties under the Agreement the Works have been carried out and concluded in accordance with the Contract.
7.04	The Consultant shall, prior to Practical Completion of the Works, provide such copies of the record ~~BIM model and/or~~ drawings and other documents as the Contractor may require.
7.05	Immediately prior to Practical Completion, carry out an inspection and assist in the preparation of a schedule of defects (if any). All inspections to be undertaken in liaison with the Independent Certifier, if appointed, the Employer's Agent and the Contractor.
7.06	Review, comment upon any plans, details and specifications relating to the fitting out works of any occupier and, in conjunction with the Contractor's Consultants, advise the Contractor if the integrity of the Works might be compromised or otherwise affected by the carrying out of the proposed fitting out works of the occupier. If required by the Contractor and upon 5 days notice inspect the carrying out and/or completion of the fitting out works of the occupier for the purpose of advising the Contractor whether those fitting out works have compromised the integrity or otherwise affected the Works.
7.07	Subject to issue by Kier of their 3rd Party Consultants for comment. Assist the Contractor in the production and compilation of the operation and maintenance manuals, together with method statements and programmes for such maintenance, as may be specified in the Contract.
7.08	Assist the Contractor in the assessment of any financial claim made by Specialist Subcontractor and / or Specialist Supplier in so far as it relates to information supplied by the Consultant.
7.09	Assist the Contractor in the settlement of any interim or final accounts, by providing such information as may be reasonably required.
7.10	During the defects liability period the Consultant if requested shall provide general structural advice on any remedial work as may be required and produce any details as may be reasonably required.
7.11	Prepare plans for proposed building works for the approval of landlords, freeholders, funders, tenants or others as requested by the Contractor e.g. conveyance drawings, etc.

Schedule 5: Design Responsibility Matrix

Please find Campbell Reith Hill's – Civil and Structural Engineering Design Responsibility Matrix on the following 37 Pages.

SCHEDULE 5 - DESIGN RESPONSIBILITY MATRIX

Project Name Greenwood Place Resource Centre
Tender/Contract Number L4386

Revision Number	Issue Date	Amendments
Original	08/09/2015	
1	09/06/2015	DRM distributed to Primary Consultants - PCKO & Campbell Reith
2	08/02/2016	PCKO & Campbell Reith Comments Received
3	09/02/2016	KIER Amendments Made to DRM. BIM struckthrough and Project Information added
4	24/02/2016	DRM reviewed with PCKO, CRH, SYNERGY. Agreement made on outstanding responsibilities. Hydrotherapy responsibilities added. Schedule renamed to suit Kier's Standard Form of Appointments.
5	24/02/2016	Building Services section agreed with Synergy
6	03/03/2016	Building Services section amended to suit BSRIA BG 6/2014 Design Framework
7	04/04/2016	Amended Verify and Review responsibilities for Civil & Structural Engineer Consultant
8	19/05/2016	Primary Responsibilities of the Hydrotherapy Pool amended to suit Pool Specialists
9	24/05/2016	Amended to CRH comment.

Consultants

Architect:	PCKO
Structural/Civil Engineer :	Campbell Reith
Building Services Consultant:	Synergy
Landscape Architect:	Wynne-Williams
Acoustic Consultant:	Hann Tucker
Fire Engineer	Fusion Fire
Temporary Works Engineer:	Kier Professional Services
Pool Specialists	FT Leisure
BREEAM Assessor:	Scott White and Hookins
Principal Designer:	CPC Services

Level of Consultant input to specialist sub-contractor designed works will be as follows:

Consultant	Sub-Contractor
Prepares design information sufficient to indicate the design intent and the performance specification. Does not prepare detail design or production information for the specialist work.	Provides detail design and production information, including prescriptive specification of products. Constructs work in accordance with that design, using selected components adapted as necessary.

Specialist subcontractors with elements of design responsibility will be as follows:

Sub-Contract Package	Sub-Contract Name
Piling	TBA
Curtain Walling	TBA
Architectural metalwork	TBA
Pool installation	TBA
Lifts	TBA
Mechanical and Electrical	TBA
Security & Access	TBA
Reception Desk	TBA
PV	TBA
Green Walling	TBA
Flat Roofing	TBA

Comments
FT Leisure will undertake both levels of consultancy input ito specialist sub-contractor designed works as defind above.

Project Name:
Greenwood Place Resource Centre

Schedule 5 - Design Responsibility Matrix

Key:

x Primary Responsibility

o Support Function

v / r Check / Verify or Review & Comment On design, fabrication and installation of others

b Performance Spec. by Consultant, Detailed Design by Sub-contractor

Strike through any not applicable duties & Consultants.

Adjust 'x's, 'o's, and 'v's as applicable

S.Eng / C.Eng - is the Structural & Civil Engineer

	SCHEME	Architect	Structural & Civil Engineer	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM / CfSH Assessor	FF&E Consultant	Kier Construction	Kier Professional Services (KPS)	M&E Subcontractor	Hydrotherapy Pool Specialists	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
1.00	**General Duties**															
1.01	Lead Consultant	x	o	o	o	o	o	o	o	o	o	o		o		7
1.02	Prinipal Designer under the CDM regs 2015	o	o	o	o	o	o	o	o	o	o	o	o	o		7
1.03	Chair & minute design team meetings	x	o	o	o	o	o	o	o	o	o	o	o	o		7
1.04	Co-ordinate design inputs from all disciplines	x	o	o	o	o	o	o	o	o	o	o	o	o		7
1.05	Archaeology	o	o											x		7
1.06	Secure by Design 'design integration'	x	o	o	o							o				7
1.07	BREEAM/CfSH etc	o	o	o	o	o	o	x	o	o		o		o		7
1.08	Fire Strategy GA's, compartmentation, fire doors, occupancy levels escape routes, etc.	x	o	o	o		o			o		o				7
1.09	Fire Engineering strategy & report	o	o	o	o		x			o						7
1.10	Catering/Dining	x		o					o			o				7
1.11	Temporary Works	o	o							o	x				S.Engineer responsible for co-ordinating temp works with final design	7
1.12	Check, confirm & control building(s) GIFA	x													To ensure compliance with ER's & Planning	7
1.13	Space Planning & Interior Design	x		o					o							7
1.14	Life Cycle Cost Analysis/Whole Life Costing's	o	o	o	o					o		o		x	Design team to provide supporting information	7
1.15	Signage - statutory, room, way finding, display	x	o	o	o		o					o		o	Support by S.Eng - (bracketry / support)	7
1.16	Signage - external. Building mounted, display	x	o	o								o			Support by S.Eng - (bracketry / support)	7
1.17	**NBS Specification**	x	x	x	x				x			x			Relevant to discipline, Inc. BREEAM requirements	7
1.18	~~CABE/AEDET review~~	~~x~~													~~If stipulated in the ER's only~~	7
1.19	Structural Movements & Structural Tolerances	o	x								o			o		**8**
1.20	Presentation Material Inc. Sample Boards	x	o	o	o				o	o			o			7
1.21	Technical Standards Compliance (BB, HBN, HTM, NoMS, etc.)	x	x	x	x	x	x		x	o		x		x	Relevant to discipline	7
1.22	Derogation Schedule	x	o	o	o	o	o		o	o		o		o		7
1.23	Confirm fixed lump sum fee to be included in tender	x	x	x	x	x	x	x	x				x			7
1.24	Advise Kier of any additional fees to be included in tender	x	x	x	x	x	x	x	x							7
1.25	Identify areas of risk that the tender exercise cant fully encompass	x	x	x	x	x	x		x							7
1.26	Assist Kier in undertaking & realisation of Value Engineering	x	x	x	x											7
1.27	Check & Comment on sub-contract design	x	x	x	x	x	x	x	x						Checking and commenting on the subcontractor design is to be a suitable review of the design / calculations submitted (relevant to discipline).	9
2.00	**Surveys and Reports**															
2.01	Advise on surveys or investigations that are needed	x	x	x	x	x	x	x	x		x	x		x	Relevant to discipline	7
2.02	Confirm adequacy of existing surveys	x	x	x	x	x	x	x	x		x	x		x	Relevant to discipline	7
2.03	Dilapidation surveys (adjacent buildings, boundaries, etc.)									x						7
~~2.04~~	~~Tree Survey & Tree Protection orders (TPO)~~													~~x~~	~~Unless undertaken by Client~~	7

	SCHEME	Architect	Structural & Civil Engineer	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM/CfSH Assessor	FF&E Consultant	Kier Construction	Kier Professional Services (KPS)	M&E Subcontractor	Hydrotherapy Pool Specialists	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
2.05	Measured Surveys (of existing buildings & structures to remain)	o								x					Unless undertaken by Client	7
2.06	Demolition Survey		x							o				o		7
2.07	Demolition Strategy	o	r							o				x	S.Eng to review sub-contract strategy	7
2.08	Topographical surveys									o				x	Unless undertaken by Client	7
2.09	Geotechnical investigation & interpretative report	o	o							o				x	S.Engineer to provide scope	7
2.10	Survey of existing services		o	x						o					Above & below ground	7
2.11	Traffic impact assessment		o							o				x	Unless undertaken by Client	7
2.12	Rights of Way / Rights of Light	o								o				x	Support Function only	7
2.13	Site restrictions/covenants	o	o	o						o				x	Support Function only	7
2.14	Asbestos / contamination	o	o	o						o				x		7
2.15	Environmental impact assessment	o	o	o	o			o						x	Architect to confirm if EIA required	7
2.16	Boundary wall conditions & Ownership of Adjacent Land	o	o							o				x	Party wall surveyor under instruction from Client	7
2.17	Acoustic testing	o	o	o	o	x										7
2.18	Ecological survey	o			o									x		7
2.19	Air quality	o		o										x		7
2.20	Building air leakage detailing	x	o	o		o								o		7
2.21	Building air leakage test	o		o										x		7
2.22	Existing drainage/CCTV		o		o					o				x	Civil Engineer to review survey results	7
2.23	Travel Plan	o	o							o				x		7
~~2.24~~	~~Flood risk assessment~~	~~o~~	~~x~~		~~o~~											7
2.25	Bat Survey and clearnance notice	o			o									x	By Client	7
2.26	Bird Survey and Clerance Notice	o			o									x	By Client	7
2.27	Underground Obstructions and Tunels	o	o	o						o				x		7
2.28	Party Wall Surveys	o	o							o				x	Party wall surveyor under instruction from Client	7
2.29	UXO	o	o							o				x		7
																7
~~3.00~~	~~BIM Roles (Please also refer to the project BIM Execution Plan) PCKO Understand not required for this project~~															
~~3.01~~	~~BIM Manager~~	~~o~~	~~o~~	~~o~~	~~o~~					~~x~~	~~o~~	~~o~~		~~o~~	~~All parties undertaking design should provide a BIM administrator~~	
~~3.02~~	~~Define the BIM requirements for the project~~	~~o~~	~~o~~	~~o~~						~~x~~						
~~3.03~~	~~Produce the project specific BIM Execution Plan~~	~~o~~	~~o~~	~~o~~						~~x~~						
~~3.04~~	~~Work in a 3D Object Orientated CAD System for Building Information Modelling~~	~~x~~	~~x~~	~~x~~	~~x~~				~~x~~			~~x~~		~~x~~	~~To be confirmed~~	
~~3.05~~	~~Support the BIM requirements as defined in the Project BIM Implementation Plan / BIM Execution Plan and referenced to the project BIM geo-reference point~~	~~x~~	~~x~~	~~x~~	~~x~~				~~x~~	~~o~~		~~x~~		~~x~~	~~To be confirmed~~	
~~3.06~~	~~Co-ordinate software training and team file management for your own organisation~~	~~x~~	~~x~~	~~x~~	~~x~~				~~x~~	~~x~~		~~x~~		~~x~~		
~~3.07~~	~~Produce BIM models with the required level of detail, data & accuracy as defined in the BIM Execution Plan~~	~~x~~	~~x~~	~~x~~	~~x~~				~~x~~	~~o~~	~~x~~	~~x~~		~~x~~	~~To be confirmed~~	
~~3.08~~	~~Classify and name all components in the model, such as NBS codes, Uniclass codes, system codes, identity tags and any agreed parameters~~	~~x~~	~~x~~	~~x~~	~~x~~				~~x~~	~~o~~	~~x~~	~~x~~		~~x~~	~~To be confirmed~~	
~~3.09~~	~~Share BIM models for coordination~~	~~x~~	~~x~~	~~x~~	~~x~~				~~x~~	~~o~~	~~x~~	~~x~~		~~x~~	~~To be confirmed~~	
~~3.10~~	~~Export BIM data to Project BIM Collaboration Platform~~	~~o~~	~~o~~	~~o~~	~~o~~					~~x~~	~~x~~	~~o~~		~~o~~	~~To be confirmed~~	
~~3.11~~	~~Clear Error Reports created within the Revit Environment~~	~~x~~	~~x~~	~~x~~	~~x~~				~~x~~	~~o~~	~~x~~	~~x~~		~~x~~		
~~3.12~~	~~Provide periodic reports on the status of BIM development on the project~~									~~x~~						
~~3.13~~	~~Produce & publish combined Navsiworks model for project collaboration and reviews~~									~~x~~						
~~3.14~~	~~Provide 'Model Compare' .NWD files for the design review process~~									~~x~~						
~~3.15~~	~~Lead interactive design reviews using the BIM via Navisworks~~	~~x~~	~~o~~	~~o~~	~~o~~					~~o~~	~~o~~	~~o~~		~~o~~	~~To be confirmed~~	
~~3.16~~	~~Provide periodic clash detection reports to assist the Lead Consultant to co-ordinate the design~~									~~x~~						
~~3.17~~	~~Lead design coordination of the Model and resolve the 'detected' clashes~~	~~x~~	~~o~~	~~o~~	~~o~~					~~o~~	~~o~~	~~o~~		~~o~~	~~To be confirmed~~	
~~3.18~~	~~Use clash detection software in Navisworks to coordinate MEP services~~	~~o~~	~~o~~	~~x~~						~~o~~		~~o~~				
~~3.19~~	~~Make the BIM platform (including the visual highlighter) available for the project~~									~~x~~					~~To be confirmed~~	
~~3.20~~	~~Annotate the model with comments prior to design reviews using the BIM platform RFI system~~	~~x~~	~~x~~	~~x~~	~~x~~				~~x~~	~~x~~		~~x~~		~~x~~	~~To be confirmed~~	

	SCHEME	Architect	Structural & Civil Engineer	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM/CfSH Assessor	FF&E Consultant	Kier Construction	Kier Professional Services (KPS)	M&E Subcontractor	Hydrotherapy Pool Specialists	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
~~3.21~~	~~Define deliverable requirements and strategy to suit BIM based procurement~~									~~x~~					~~To be confirmed~~	
~~3.22~~	~~Produce drawings from the BIM models~~	~~x~~	~~x~~	~~x~~	~~x~~							~~x~~		~~x~~	~~To be confirmed~~	
~~3.23~~	~~Produce builders work models~~	~~o~~	~~o~~	~~o~~						~~o~~		~~x~~		~~o~~	~~To be confirmed~~	
~~3.24~~	~~Incorporate builders work models~~	~~x~~	~~x~~	~~x~~	~~x~~							~~x~~		~~x~~	~~To be confirmed~~	
~~3.25~~	~~Take BIM models for use with final coordination and manufacturing~~											~~x~~		~~x~~	~~To be confirmed~~	
~~3.26~~	~~Incorporate suitable sub-contractor BIM models~~	~~x~~	~~x~~	~~o~~	~~x~~							~~x~~		~~x~~	~~To be confirmed~~	
~~3.27~~	~~Produce design component schedules using the Project BIM Collaboration Platform~~	~~x~~	~~x~~	~~x~~	~~x~~					~~o~~		~~x~~		~~x~~	~~To be confirmed~~	
~~3.28~~	~~Develop BIM data during procurement and construction~~	~~x~~	~~x~~	~~x~~	~~x~~							~~x~~		~~x~~	~~To be confirmed~~	
~~3.29~~	~~Develop O&M BIM data~~	~~x~~	~~x~~	~~x~~	~~x~~					~~o~~		~~x~~		~~x~~	~~To be confirmed~~	
4.00	**Scheme Issues**															
4.01	Integrated Design Programme (IDP)	o	o	o	o	o	o	o	o	x	o	o		o		7
4.02	Work Package Release Schedule Inc. Scopes	o	o	o	o			o	o	x	o	o		o		7
~~4.03~~	~~Masterplan~~	~~x~~	~~o~~	~~o~~	~~o~~					~~o~~					~~N/A~~	
4.04	Site plan	x	o	o	o					o						7
4.05	Site setting out & levels	x	o	o	o					o						7
4.06	Building co-ordinates & levels	x	o		o											7
4.07	Co-ordination of dimensions	x	o	o	o											7
4.08	Recycling & Refuse disposal	x	o	o	o											7
4.09	Medical Waste Disposal	x													Specialist input if required - Architect to lead	7
4.10	Incorporate FM Requirements	x	o	o	o								o		FM advice required from operator	7
4.11	Cleaning Strategy, Access & Maintenance and Replacement	x	o	o	o					o		o				7
4.12	Produce Accommodation Schedule	x	o	o						o		o			Unless undertaken by Client	7
4.13	Room Data Sheets	x		x	o	o			o			o		o		7
4.14	O&Ms - as-built, drawings & information	x	x	x	x	x	x	o	x	o		x		x	Relevant to discipline	7
4.15	Wayfinding Strategy	x	o	o	o					o				o		7
4.16	Security and Access strategy	x		o	o		o			o						7
5.00	**Calculations & Modelling**															
5.01	Thermal modelling & calculations	o	o	x								x			Architect to confirm that U-values modelled can be achieved. M&E Consultant responsible to stage 4. MEPH subcontractor thereafter.	7
5.02	SBEM/SAP - To demonstrate Part L Compliance	o		x								x			Architect to confirm that U-values modelled can be achieved. M&E Consultant responsible to stage 4. MEPH subcontractor thereafter.	7
5.03	Energy performance certification	o		x								x			Architect to confirm that U-values modelled can be achieved. M&E Consultant responsible to stage 4. MEPH subcontractor thereafter.	7
5.04	Building log book CBSE TM31	o	o	x		o	o			o		x			Default to be services consultant unless agreed otherwise	7
5.05	Energy consumption/Carbon Calculations	o		x								o				7
5.06	Sustainability and renewables advice, options and compliance	o	o	x								x			Default to be services consultant unless agreed otherwise	7
5.07	Internal Daylight calculations & compliance	x		o								o				7
5.08	Acoustic Modelling	o	o	o		x		o				o			Architect to identify during tender if specialist required	7
5.09	PPS 25 surface water site discharge calcs.	o	x	o	o							o				8
5.10	Utilities supply capacities, costs & applications for service provisions			x						o		o				7
5.11	Sprinkler risk assessment	o		x			o								Default position Services Consultant unless Fire Engineer engaged	7
6.00	**Approvals (liaison and obtaining agreements) inclusive of re-submissions necessary to secure final approval**															

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6.01	Water Board/Drainage Authority - sewer adoption and connections	o	x	o	o							o			Section 104/106 agreements. Application/inspection fees to be paid by Kier	7
6.02	Environment Agency	o	x	o	o					o		o				7
6.03	Highways - consultation/submissions/approvals	o	x	o	o							o			Section 38/278/247/117 agreements. Application/inspection fees to be paid by Kier	7
6.04	Highways lighting - consultation/submissions/approvals	o	o	x								o			Section 97/98 agreements.	7
~~6.05~~	~~Pre-submission Planning Consultation~~	~~x~~	~~o~~	~~o~~	~~o~~										~~Default Architect unless Planning Consultant engaged. N/A~~	
~~6.06~~	~~Planning approval - outline/detailed~~	~~x~~	~~o~~	~~o~~	~~o~~	~~o~~				~~o~~		~~o~~		~~o~~	~~Default Architect unless Planning Consultant engaged. Planning application fee to be paid by Kier. N/A~~	
6.07	Planning approval - discharge of conditions	x	o	o	o	o				o		o		o	Default Architect unless Planning Consultant engaged. Condition discharge fee to be paid by Kier	7
6.08	SUDS Approval Body (SAB)	o	x	o								o			Submission to LA for approval under the Flood & Water Management Act 2010. Application fee paid by Kier	7
6.09	Building Regulations / Fire officer / Local Acts	x	o	o	o	o	o			o					Building Control plan/inspection fee paid by Kier	7
6.10	Building Regulations, Part M - advise of any deviations to be covered by 'Access Statement'.	x		o	o							o				
6.11	Design in accordance with relevant section of Equality Act	x		o	o					o					Architect to comply with Build. Reg Part M	7
~~6.12~~	~~Listed building consent/English Heritage/English Partnerships/Historic Scotland~~	~~x~~	~~o~~	~~o~~	~~o~~					~~o~~					~~Default Architect unless Planning Consultant engaged. N/A~~	
6.13	Party wall agreements	o	o							o	o			x		7
6.14	Stakeholder Comments / Approvals	x	o	o	o	o	o	o	o	o		o				7
~~6.15~~	~~Network Rail/TFL/LUL Approvals~~	~~o~~	~~x~~	~~o~~	~~o~~					~~o~~	~~o~~				~~N/A~~	
~~6.16~~	~~National Rivers Authority~~	~~o~~	~~x~~	~~o~~	~~o~~					~~o~~						
~~6.17~~	~~Aviation Authority~~	~~x~~	~~o~~	~~o~~	~~o~~					~~o~~						
6.18	~~Sport England / Scotland Consultation~~	~~x~~	~~o~~	~~o~~	~~o~~					~~o~~						
6.19	RDD - attend & present at RDD meetings (Reviewable Design Data)	x	o	o	o				o	o		o				7
6.20	Fully-loaded* 1:50 co-ordinated floor plans and elevations	x	o	o	o				o	o		o				7
7.00	**Hydrotherapy Pool**															
7.01	Pool Profile	x	o	o						o				o		7
7.02	Pool Base Suction Sumps		o							o			x		Size of Sumps to be confirmed by Pool Specialist	7
7.03	Balance Tank Suction Sumps		o							o			x	o	Size of Sumps to be confirmed by Pool Specialist	7
7.04	Pump Pit / Basement Sumps		o							o			x	o	Size of Sumps to be confirmed by Pool Specialist	7
7.05	Backwash Sumps		o							o			x	o	Size of Sumps to be confirmed by Pool Specialist	7
7.06	Balance Tanks		o							o			x	o	Size of Tanks to be confirmed by Pool Specialist	7
7.07	Balance Tank Access	x	x							o			o	o		9
7.08	Transfer Channel	o	o							o			x	o		7
7.09	Pool Access Steps / Ramps	o	o							o			x	o	PCKO to lead design. Pool Specialist to provide support function of compliance and product specifications.	8
7.10	Plantroom Slab		x							o			o	o		7
7.11	Buried Pipework Supports		o							o			x			7
7.12	Pool Sub-Structure		x							o			o	o	Advice from Pool Specialist required	7
7.13	Structural Testing Programme		x							o			o		Advice from Pool Specialist required	7
7.14	Structural Penetrations		x							o			o	o	Advice from Pool Specialist required	7
7.15	Pool Tank Drain/Fill Rates		o	o						o			x	o		7
7.16	Pool Cover Positions	x	o	o						o			o		PCKO to lead design. Pool Specialist to provide support function of compliance and product specifications.	9

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7.17	Pool Cover Support Steelwork	x	o	o						o			o	x	PCKO to lead design. Pool Specialist to provide support function of compliance and product specifications.	7
7.18	Poolpod Fixing Position	o	o	o						o			x	o		7
7.19	Plantroom Equipment Plinths		o	o						o			x			7
7.20	Filter Underdrain Support Concrete		x							o			o			7
7.21	Buried Pipework Trenches	o	x	o						o			o	o	Drainage Only	7
7.22	Backfilling		x							o			o	o		7
7.23	Chemical Store Bund Walls	o								o			x	o		8
7.24	Chemical Store Holes	o								o			x			8
7.25	Chemical Store Layout	o								o			x			8
7.26	Pool 1st Phase Clean									x			o	o		7
7.27	Pool Superchlorintation									o			x			7
7.28	Plant Areas	o	x	x						o			x		Structure Only	8
7.29	Plantroom Height	x	o	x						o			o		Structure Only	7
7.30	Plantroom Access	x	o	o						o			o			7
7.31	Chemical Store Access	x	o	o						o			o			7
7.32	Pump Pit Access/~~Balustrade~~	x	x							o			o			9
7.33	Pool Tank Finishes	o								o			x	o		8
7.34	Transfer for Channel Grille	o								o			x			7
7.35	Pool Inlet Grilles	o								o			x			7
7.36	Pool Outlet Grilles	o								o			x			7
7.37	Pool Access Balustrading	o	o	o						o			x			8
7.38	Plantroom Signage	x								o			o			8
7.39	Pool Depth Signage	x								o			o			9
7.40	Pool Safety Signage	x								o			o			9
7.41	Backwash Drainage System		x	o						o			x		Design intent by FT Leisure. Structural Design by S.Eng	7
7.42	Backwash Attenuation System		x	o						o			o		Design intent by FT Leisure. Structural Design by S.Eng	7
7.43	Plantroom Drainage Gullies/Channel	o	x	o						o			o	o		7
7.44	Pump Pit Drainage Pipework		o	o						o			x		Pool Specialist to clarify which 'drainage'	7
7.45	Trade Effluent Notice		x	o						o			o			7
7.46	Pool Surround Drainage	o	x							o			x		FT Leisure to provide indicative details for S.Eng to finalise and intergrate	7
7.47	Primary Side Heating System			x						o			o			7
7.48	Secondary Side Heating System			o						o			o			7
7.49	MakeUp Water Supply			x						o			x			7
7.50	Operator Wash Basin	x		o						o			o			7
7.51	Bib Taps	x		o						o			o			7
7.52	Drench Showers	x		o						o			o			7
7.53	Plantroom Ventilation	o		x						o			o			7
7.54	Chemical Store Ventilation	o		x						o			o			7
7.55	Chemical Store Firestoppers	x		o						o			o			7
7.56	Heat Loss Calculations			x						o			o			7
7.57	Power Supplies			x						o			o			7
7.58	Plant Area Lighting			x						o			o			7
7.59	Backwash Level Control System			o						o			x			7
7.60	Earth Bonding			x						o			o	o		7
7.61	Temperature Displays	o		x						o			o			7

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7.62	Drowning Detection	o		o						o			x			7
7.63	Panic Alarms	o		o						o			x			7
7.64	Emergency Stops	o		o						o			x			7
~~7.65~~	~~Pool Lights~~	~~o~~		~~*~~						~~o~~			~~o~~			7
7.66	Chemical Delivery	o		o						o			x			7
7.67	CO2 Lease Arrangements	o								o			x			7
7.68	Filtration Training Programme	o								o			o	x		7
8.00	**Miscellaneous**															
8.01	Designer Residual Risk Assessments	x	x	x	x	x	x		x	o		x	x	x		7
8.02	Co-ordination of external levels with drainage scheme & existing topography	o	x		o					o		o		x		7
8.03	Thermographical Surveys	o	o	o										x		7
8.04	Lux Level Testing (General + Emergency)			o								o		x		7
8.05	M&E Noise Testing (Verification of Designed Paeameters)			o		x						o		o		7
8.06	Changing Places Rooms Compliance	x	o	o						o		o		o		7
8.07	Changing Places Rooms Accreditations	x	o	o						o		o		o		7
8.08	Specialist S/C Design Portions - Curtain Walling & Glazed Facades	o	o	o						o				x		7
8.09	Specialist S/C Design Portions - Greenwall	o	o	o	o			o		o				x		7
8.10	Specialist S/C Design Portions - Piling	o	o	o						o	o			x		7
8.11	Specialist S/C Design Portions - Hoists	o	o	o						o		o		x		7
8.12	Specialist S/C Design Portions - Steel Frame Connections	o	o	o						o	o			x		7
8.13	Specialist S/C Design Portions - Lifts	o	o	o			o	o		o		o		x		7
8.14	Specialist S/C Design Portions - PV	o	o	o						o		x		x		7

***** In this context, all rooms are to be 'fully loaded'. Which includes all ICT supplies and hardware, drainage, sinks, water supplies, gas supplies, small power, ventilation and security, furniture, fixtures, equipment, etc.

Project Name:
Greenwood Place Resource Centre

Schedule 5 - Design Responsibility Matrix

Key:

x Primary Responsibility
o Support Function
v / r Check / Verify or Review & Comment On design, fabrication and installation of others
b Performance Spec. by Consultant, Detailed Design by Sub-contractor
Strike through any not applicable duties & Consultants.
Adjust 'x's, 'o's, and 'v's as applicable
S.Eng / C.Eng - is the Structural & Civil Engineer

	SUB-STRUCTURE	Architect	Stuctural & Civil Engineer	Services	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM Assessor	FF&E Consultant	Kier Construction	Kier Professional Services (KPS)	M&E Subcontractor	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
7.00	**Earthworks & Foundations**														
7.01	Cut & fill strategy		x		o					o	o			(Inc. specification & quants for costing)	7
7.02	De-watering		o							o	x				7
7.03	Ground remediation		x							o			o	S.Eng to identify during tender if specialist required	7
7.04	Ground Gas Protection Measures		x										o	S.Eng to identify during tender if specialist required	7
7.05	Piling (layout/loads/specification)		x							o	o				7
7.06	Piling - detailed design		r							o			x		7
7.07	Piling Mat design									o	x		o		7
7.08	Pile caps		x	o											7
7.09	Ground beams - in-situ concrete		x	o											7
7.10	Ground beams - pre-cast concrete		r										x		7
7.11	Strip/Pad foundations, Structural Slabs, etc		x	o											7
7.12	Reinforcement schedules & reinforced concrete detailing		x											For all concrete elements unless agreed otherwise	7
7.13	Soil heave protection measures		x												7
7.14	Impact of tree influence zones		x												7
7.15	Underpinning		x	o							o	o			7
7.16	Lift pits, sumps etc., incl. structural waterproofing	o	x	o									o		7
7.17	Retaining Structures	o	x		o									Inc. reinforcement	7
7.18	RC upstands, walls, kickers, etc.		x										o		7
7.19	Crane Bases		o								x			S.Eng to integrate with permanent foundations where necessary	7
															7
8.00	**Drainage**														
8.01	Below ground FW & SW design inc. gullies	o	x	o											7
8.02	Site wide landscape drainage - inc. land drainage	o	x	o	o						o				7
8.03	Manhole schedule & drainage details		x												7
8.04	Drainage connections & outfalls		x		o									Inc. any approvals & confirmation of discharge rates	7
8.05	Attenuation systems	o	x		o										7
8.06	Pumped drainage solutions/rising mains		o	o	o							x		C.Eng to provide performance specification	7
8.07	Grease traps/special gullies	o	x	o											7
8.08	Petrol interceptors	o	x	o	o										7
															7
9.00	**Miscellaneous**														
9.01	Site wide underground services & co-ordination	o	o	x	o										7
9.02	Services ducts - detailed design	o	o	o								x			7

SUB-STRUCTURE		Architect	Stuctural & Civil Engineer	Services	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM Assessor	FF&E Consultant	Kier Construction	Kier Professional Services (KPS)	M&E Subcontractor	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
9.03	GF slab construction/make up inc. joints	o	x							o	o				7
9.04	Sub-structure brickwork & blockwork - GA's, typical details, cross venting, expansion joints	x	o	o								o		Lintel requirements & movement joints to be provided by S.Eng.	7
9.05	Waterproofing (membranes, DPMs, etc.)	x	o										x	Structural waterproofing i.e. lift pits by specialist required	7
9.06	Waterproofing (additives to concrete -structural waterproof)	o	x												7
9.07	Insulation Requirements	x	o	o											7
9.08	Dead & Superimposed Loads (incl. roof plant, etc.)	o	x	o											7
9.09	Cast-in elements	o	r	o								x	x	S/C to design and set out cast in elements, S.Eng to review and comment.	7
9.10	Temporary works design for substructure	o	r	o						o	v		x	S/C to design and set out cast in elements, S.Eng to review and comment.	7
	Temporary works co-ordination with permanent works for substructure	o	o	o						o	o		x		7

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10.00	**Structural Frame**														
10.01	Confirmation of all frame loadings & deflection requirements	o	x	o									o		7
10.02	Steel frame design - hot & cold rolled	o	x	o									o	S.Eng to verify if this becomes a Sub-contract design	7
10.03	Cladding / sheeting rails	o	x	o						o			o	S.Eng to verify if this becomes a Sub-contract design	7
10.04	Secondary steelwork/supports - inc. windposts, trimming steel etc	o	b / v	o						o			o	Inc external walls	7
10.05	Steelwork connections (hot & cold rolled)	o	r										x	S.Eng to undertake site inspection of steel frame to verify design intent	7
10.06	Support for Plant and other specialist equipment	o	r	o								o	o	Plinth design and plant grillages are an additional service to be agreed.	7
10.07	In-situ reinforced concrete frame	o	x	o								o			7
10.08	Reinforcement schedules & RC detailing	o	x	o								o			7
10.09	Precast frame/stairs - performance spec & design intent	o	x	o								o			7
10.10	Precast frame/stairs - detailed design	o	r	o								o	x	S.Eng to undertake site inspection of PCC frame to assess whether the installation meets the requirements of the design intent	8
10.11	Pre / Post tensioned RC floor slabs - performance & design intent		x	o								o	o		7
10.12	Pre / Post tensioned RC floor slabs - detailed design	o	v	o								o	x	S.Eng to undertake site inspection of PCC frame to assess whether the installation meets the requirements of the design intent	8
~~10.13~~	~~Timber structures - Inc. timber frame, CLT, & glulam - performance spec & design intent~~	~~o~~	~~x~~	~~o~~								~~o~~	~~o~~		7
~~10.14~~	~~Timber structures - Inc. timber frame, CLT, & glulam - detailed design~~	~~o~~	~~v~~	~~o~~								~~o~~	~~x~~	~~S.Eng to undertake site inspection of PCC frame to verify - Incorporate into structural design~~	7
10.15	Pre-cast concrete/metal floors & decking - performance spec & design intent	o	x	o		o	o					o		Inc. composite requirements	7
10.16	Pre-cast concrete/metal floors & decking - detailed design	o	v	o		o	o					o		S.Eng to undertake site inspection of PCC frame to assess whether the installation meets the requirements of the design intent	8
10.17	Stair/landing design - structure	o	x				o							Stairs assumed to be precast concrete with insitu concrete landings.	8
10.18	Stair design - GA, levels, setting out & finishes	x	o												7
10.19	Lift shaft structural design	o	x	o								o	o		7
10.20	Edge protection for temporary handrails, etc.		o							o	o		x		7
10.21	Structural bracing, expansion/movement joints, wall restraints etc	o	x	o						o		o			7
10.22	Structural masonry - inc supports & shelf angles	o	b / r							o			x		7
10.23	Temporary works design for superstructure	o	r							o	v		x	KPS to verify all temporary works design. S Eng. to review and confirm permanent works capacity, etc	7

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10.24	Floor channels, ducts, recesses, etc	o	x	o								o			7
10.25	Lift - performance specification/speed/size, etc	x	o	x								o	o	Relevant to descipline.	7
10.26	Fire protection of superstructure	x	o	o			o					o			7
10.27	Lightning protection - performance spec	x	o	o											7
10.28	Lightning protection - detailed design	o	o	v									x		7
11.00	**External Walls**														
11.01	Building layout & GA's	x	o	o								o			7
11.02	Building Sections & Elevations	x	o	o								o		Inc. confirmation of any critical heights/dims	7
11.03	External walls - make ups, details, interface details & specs.	x	o												7
11.04	External walls - movement & expansion requirements	o	x										o		7
11.05	Cladding, insulation & liner sheet details & spec	x	o										o		7
11.06	External window, curtain walling & door schedules	x	o	o								o			7
11.07	Windows & Curtain walling - performance spec, interface details and design intent	x	o											Inc. shop fronts & screens	7
11.08	Windows & curtain walling - detailed design	v	r	o								o	x	Inc. shop fronts & screens	7
11.09	External Doors	x	o	o		o						o	o		7
11.10	Wind loadings for design	o	x										o		7
11.11	Structural glazing - performance spec, interface details & design intent	x	o	o		o	o			o	o		o		7
11.12	Structural glazing - detailed design	v	r										x	S.Eng to undertake site inspection of Structural glazing to assess whether the installation meets the requirements of the design intent	8
11.13	Rainscreen cladding - performance spec, interface details & design intent	x	o	o		o	o			o	o		o		7
11.14	Rainscreen cladding - detailed design	v	r										x		7
11.15	Metsec/cold rolled studwork Inc. membrane & boarding	x	o										o		7
11.16	Render - specification & details	x	o			o							o	N/A	7
11.17	Waterproofing - DPM/DPC details, etc.	x	o												7
11.18	Lintel schedule	o	x											Inc. internal walls. Architect to specify standard lintel only.	7
11.19	Lintels - specials & angle supports	o	x												7
11.20	Fascia & Soffit spec & details	x	o												7
11.21	Brickwork & blockwork - GA's, typical details etc	x	o											Structural elements to be provided by S.Eng	7
11.22	Fire protection and cavity barriers	x	o	o			o								7
11.23	Solar shading - details & spec	x	o	o				o						Support requirements by S.Eng	7
11.24	Balconies - details & spec	x	o	o										Support requirements by S.Eng	7
11.25	Canopies - details & spec	x	o	o										Support requirements by S.Eng	7
11.26	Louvres & Grilles - details & spec	o	o	x		o	o	o				o		M&E designer to confirm free air requirements	7
11.27	Stone cladding, fixings & support - details & spec	x	o			o							o		7
~~11.28~~	~~Structural stonework~~	~~o~~	~~x~~												7
11.29	Timber boarding	x	o			o	o								7
~~11.30~~	~~Dock levellers~~	~~x~~	~~o~~	~~o~~									~~o~~	~~N/A~~	7
11.31	Roller Shutters	x	o	o									o	Support by S.Eng, interface with fire alarm by M&E designer	7
11.32	Bird deterrence	x											o		7

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12.00	**Roofs and Terraces**														
12.01	Principles (falls, levels, access, etc.)	x	o		o								o		7
12.02	Detailed roof finishes & systems	x	o	o								o	o	Inc. walkways	7
~~12.04~~	~~Rainwater goods, gutters, weirs, etc.~~	~~x~~	~~o~~	~~o~~									~~o~~		7
~~12.05~~	~~Syphonic drainage - performance spec & design intent~~	~~o~~	~~o~~	~~x~~								~~o~~	~~o~~		7
~~12.06~~	~~Syphonic drainage - detailed design~~	~~o~~	~~o~~	~~v~~								~~x~~	~~o~~		7
12.07	SVP & boiler flue setting out	x	o	o								o			7
12.08	Roof make up inc. insulation, vapour barrier & liner sheet requirements	x	o										o		7
12.09	Green roofs - performance spec & interface details	x			o								o		7
12.10	Green roofs - system selection, design & specification	v			o								x		7
12.11	Glazed roof - performance spec & design intent	x	o	o									o		7
12.12	Glazed roof - detailed design	v	v	o									x	S.Eng to undertake site inspection of Structural glazing to assess whether the installation meets the requirements of the design intent	8
12.13	Rooflights - setting out, details & specification	x	o	o								o	o		7
12.14	Parapets, flashings & waterproof detailing	x	o										o		7
12.15	BWIC/upstand detailing for penetrations	x	o	o								o			7
12.16	Fall arrest system	v	o	o								o	x	Architect to confirm indicative layout and roof access	7
~~12.17~~	~~Timber roof truss design~~	~~o~~	~~o~~	~~o~~								~~o~~	~~x~~	~~N/A~~	7
12.18	Balustrades & screens - details & spec	x	o			o							o		7
12.19	Window cleaning strategy	x			o										7
12.20	Window cleaning equipment/cradles, etc. - product & installation	o	o	o	o								x		7
12.21	Fire protection - i.e. fire curtains to roof voids	x	o	o			o								7
12.22	Rainwater Calculations & discharge - using agreed manufacture guidance and RWP resultant locations	x	x	x								o	o	C.Eng to design below ground drainage based on rain water calculations by others.	7
13.00	**Internal Walls, Partitions & Doors**														
13.01	Partition types, thicknesses & interface details	x	o	o		o	o					o		Inc. fire & acoustic requirements. Acoustic specialist reqd	7
13.02	Identify load-bearing & non-load bearing walls	x	o												7
13.03	Fire/compartmentation	x					o							Inc cavity barriers & curtains	7
13.04	Duct/Boxings	x		o					x			o			7
13.05	Head restraint, deflection heads & movement/expansion requirements	o	x			o	o						o	Relevant to discipline	8
13.06	Demountable partitions - specification & details	x	o			o	o						o		7
13.07	Doors & Frames - schedule, specification & elevations	x	o			o	o						o		7
13.08	Brickwork & blockwork - GA's, typical details etc	x	o			o	o						o	Structural elements to be provided by S.Eng	7
13.09	Chasing of walls, setting out, etc	o	o	o								x		S.Eng agreement required when chases are in structural walls	7
13.10	Lintel schedule	o	x											Architect to specify standard lintel only.	7
13.11	Lintels - specials & angle supports	o	x												7
13.12	Sliding/folding (acoustic) partitions - spec & details	x	o			o	o						o	Support by S.Eng	7
13.13	Acoustic requirements & enhancements	x	o			o							o	Architect to specify from acoustic specialist advice As 13.01	7
13.14	Plaster/dry lining specification & details	x				o				o			o		7
13.15	Access panels - specification & details	x		x		o						o		Inc setting out	7
13.16	Skirting's, architraves, window boards and dado's	x													7
13.17	Glazed screens/windows - specification & details	x				o	o						o		7
13.18	Specialist linings - details & spec	x											o		7

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13.19	Ironmongery - schedule & specification	x		o								o	o		7
13.20	Acoustic detailing at Junctions	x	o			o							o		7
13.21	Fire Protection detailing at Junctions	x	o			o							o		7
14.00	**Ceilings**														
14.01	Co-ordinated reflected ceiling plan	x		o		o	o					o		Inc. finishes key	7
14.02	Ceiling - specification & details	x		o		o	o					o		Including Suspension, perimeter and junctions	7
14.03	Bulkheads	x	o	o		o						o			7
14.04	Feature ceilings	x				o									7
14.05	Fire protection & cavity barriers	x		o			o					o			7
14.06	Access panels	x		x		o	o					o			7
14.07	Acoustic panels	x		o		o	o					o			7
															7
15.00	**Floors**														
15.01	Screed/insulation	x	o			o	o		o			o	o		7
15.02	Structural screeds	o	x			o									7
15.03	Raised access floors	x	o	o								o	o		7
~~15.04~~	~~Timber~~	~~x~~	~~o~~											~~Structural design by SE N/A~~	7
~~15.05~~	~~Sports flooring inc. markings~~	~~x~~											~~o~~	~~N/A~~	7
15.06	Co-ordination with services distribution	x		o								o			7
~~15.07~~	~~Granolithic & Terrazzo~~	~~x~~												~~N/A~~	7
~~15.08~~	~~Terrazzo~~	~~x~~												~~N/A~~	7
15.09	Matwells	x	o												7
15.10	Fire protection & cavity barriers	x		o			o					o			7
15.11	slip resitance	x													7
															7
16.00	**Metalwork**														
16.01	Staircases & balustrades - details & spec	x	o												7
16.02	Escape Stairs, Cat Ladders, etc.	x	o	o			o					o			7
16.03	Column protectors	x	o						o						7
16.04	Barriers, step overs, bollards etc.	x	o	o								o			7
16.05	Wall protection rails	x							o						7
16.06	Security Gates	x		o	o		o					o	o	Including Locking strategy, specialist input required	7
															7

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17.00	**Toilets, Bathrooms & Kitchens**														
17.01	IPS/Ducting panels	x		o		o						o	o		7
17.02	Cubicles& vanity units - 1:50 plans, elevations & spec.	x		o								o	o		7
17.03	Kitchen units, sinks & worktops	x		o					o			o		Inc white goods	7
17.04	Commercial kitchens & catering equipment	x		o								o	x		7
17.05	Cold Stores & Freezer Rooms	x		o								o	x		7
17.06	Counters, serveries, etc.	x		o								o			7
17.07	Incorporate OT requirement	x		o								o			7
17.08	Doc m detailing	x		o								o			7
17.09	Elevations and setting out	x		o								o			7
18.00	**Finishes**														
18.01	Finishes Schedule	x													7
18.02	Ceramic floor & wall tiling	x						o	o						7
18.03	Laminate splash backs	x						o	o						7
18.04	Hard finishes	x						o	o						7
18.05	Soft finishes	x						o	o						7
18.06	Specialist finishes	x						o	o						7
18.07	Movement joints and details	x							o				o	Relevant to discipline	7
18.08	Painted / applied finishes	x						o	o			o			7
18.09	Fire protection	x	o				o					o			7
18.10	Acoustic wall/ceiling panelling	x				o		o						Incorporating acoustic requirements from acoustic specialist	7
18.11	Sheet wall finishes	x						o	o						7
18.12	Sensory Provisions	x		o		o							o	Incoporting OT recommendations. Specialist required	7
															7
19.00	**Fixtures, Fittings & Equipment**														
19.01	Fixed & loose furniture & equipment - spec & details	x	o	o								o		Default Architect unless FF&E Consultant employed. Camden to confirm requirements	7
19.02	Joinery items - spec & details	x										o		i.e reception desks, counters	7
19.03	Shelving & racking	x	o									o			7
19.04	Lockers & benches	x	o					o							7
19.05	Whiteboards, blackboards, pin boards, etc.	x	o	o								o			7
19.06	Mirrors	x													7
19.07	Post boxes	x													7
19.08	Machinery & Equipment	x	o	o								o			7
19.09	Blinds & Blackout blinds (inc. powered)	x		o								o			7
19.10	Fire equipment (hand held)	x					x								7
19.11	Miscellaneous Fittings	x													7
~~19.12~~	~~Extract/Fume Cupboards, process & chemical store~~	~~x~~	~~o~~	~~o~~								~~o~~			7
19.13	Hoists, Pull handles etc	x	o	o								o			7
19.14	Sensory Features (water etc)	x		o								o	o	Support function only by specialist	7
19.15	AV strategy	x	o	o								o	o	Support function only by specialist	7
19.16	Music Room fit out Plans and elevations	x		o		o						o	o	Support function only by specialist	7
19.17	Sensory room Fit Out Plans and elevations	x		o		o						o	o	Support function only by specialist	7
19.18	Quiet Room fit out Plans and Elevations	x		o								o	o		7
19.19	Commercial kitchen Plans and Elevations	x		o								o	o		7

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19.20	Demonstration Flat Plans and Elevations	x		o								o	o		7
20.00	**Miscellaneous**														
20.01	BWIC - Plant / Equipment bases & plinths	o	o	x								x		Loads & size by M&E designer, base design by S.Eng Plinth design and plant grillages are an additional service to be agreed.	7
20.02	BWIC - identification, setting out & hole size	o	o	o		o	o			o		x		S.Eng to be consulted on any holes through the structure	7
20.03	Passenger & goods lifts - performance specification	x	o	o									o		7

KIER

Project Name:
Greenwood Place Resource Centre

Schedule 5 - Design Responsibility Matrix

Key:

x	Primary Responsibility
o	Support Function
v / r	Check / Verify or Review & Comment On design, fabrication and installation of others
b	Performance Spec. by Consultant, Detailed Design by Sub-contractor

Strike through any not applicable duties & Consultants.
Adjust 'x's, 'o's, and 'v's as applicable
S.Eng / C.Eng - is the Structural & Civil Engineer

	SERVICES	Architect	Structural & Civil Engineer	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM Assessor	FF&E Consultant	Kier Construction	Kier Profesional Services (KPS)	M&E Subcontractor	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
BSRIA	The following entries clarify the roles of the M&E Consultant, Builder and M&E Partner/Subcontractor in the design development and installation of the M&E services. This template has been prepared on the basis of the M&E Consultant being responsible for the design up to and including RIBA Work Stage 3 (Performance Specification/Drawings), following which the design responsibility will pass to the building services sub-contractor.														
	Preparation & Brief (RIBA Plan of Work 2014 Stage 1)														
	General obligations, external liaison (statutory bodies, utilities)														
	General obligations, external liaison (statutory bodies, utilities)														
1.1.1	Consult local authorities about matters of principle in connection with the services design and provision for each site or option.			x											7
1.1.2	Obtain and review information on the existence and extent of public utilities and record			x											7
	Stakeholder & Client liaison (briefing, handover, surveys)														
1.2.1	Appraise physical data, planning and environmental issues for each site or option.			x											7
~~1.2.2~~	~~Initial review of existing Health & Safety file to identify significant risks that need to be considered (for refurbishment projects or additional construction on an existing site)~~														7
~~1.2.3~~	~~Explain Soft Landings process to the client, end-users and core design team.~~														7
~~1.2.4~~	~~Establish Soft Landings requirements for the project.~~														7
1.2.5	Explain environmental ratings schemes to the client, end-users and core design team			x											7
1.2.6	Establish environmental rating requirement(s) for the project.			x											7
1.2.7	Prepare plan for the initial occupation period and agree with client/occupier and stakeholders, including migration planning if appropriate.			x											7
~~1.2.8~~	~~Obtain information and documents on existing services.~~														7
	~~Pool Specialists~~	~~**FT Leisure**~~													7
~~1.2.9~~	~~Obtain the Asset Information Model, if available, for an existing building being refurbished or extended~~														7
~~1.2.10~~	~~Carry out or commission surveys for a building being refurbished or extended (e.g. desk study, physical survey, intrusive investigation, 3d geometry capture, occupant survey).~~														7
~~1.2.11~~	~~Prepare an 'as-existing' model for a building being refurbished or extended~~														7

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1.2.12	Review design brief in respect of client statement of need.	o	o	x						o					7
Team liaison (builders' work, spatial coordination, energy targeting)															
1.3.1	Identify key issues that cross design discipline boundaries and propose strategies to address them.	x	o	o						o					7
1.3.2	Investigate and advise on potential energy strategy options to comply with any energy-related planning conditions.			v										**Based on TGA Energy Statement approved by planning**	7
~~1.3.3~~	~~Prepare the project protocol for building information modelling including any export requirements to COBie, schedules of software to be used, use cases for the building information models.~~														7
1.3.4	Prepare visualisation model(s) of the proposed building(s) on the site(s) to show relationships with other natural and built features, orientation to the sun and principal occupation zones/interior spaces.			v											7
Selection of plant and specialist designers															
1.4.1	Review potential delivery methods for the project, including off-site manufacture.			x											7
1.4.2	Reflect agreed delivery methods for the project in contractual arrangements.			x											7
Mechanical Design															
															7
Electrical Design															
															7
Public Health Design															
															7
Commissioning															
1.8.1	Advise need for commissioning strategy			x											7
Deliverables – including drawings, specifications, reports															
1.9.1	Provide initial project brief			x											7
1.9.2	Provide initial design programme for the project as a whole.			x											7
1.9.3	Provide assessment of significant risks identified from existing Health and Safety File.			x											7
~~1.9.4~~	~~Provide COBie -UK-2012 tables for Information Exchange 1 (Facility, Floor and Space sheets started).~~														7
PRO-FORMA 2: CONCEPT (RIBA Plan of Work 2014 Stage 2)															
General obligations, external liaison (statutory bodies, utilities)															
2.1.1	Consult local authorities about matters of principle in connection with the services design of the works including requirements over and above statutory requirements.			x											7

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2.1.2	Put known utility supplies or site-based utilities onto a model to support the engineering services philosophy for the project (energy generation, water supply, waste removal)		o	v											7
2.1.3	Advise on the requirements for utilities and services diversions, based on desktop study and provided information			x											7
2.1.4	Advise on regulatory compliance of concept design			x											7
2.1.5	Prepare initial strategy for fire safety (such as compartmentation, location of fire lifts, fire detection and suppression philosophy, consultation with relevant authorities).	o		o			x								7
2.1.6	Establish impact of fire strategy on building services design.			x											7
Client liaison (briefing, handover, surveys)															
2.2.1	Evaluate physical, environmental, functional and regulatory constraints from clients' brief, for potential schemes.			x											7
2.2.2	Visit site(s) and/or example project(s) to assess physical restrictions that might influence the design philosophy or the development of the design.			x											7
2.2.3	Advise the client on the need for arrangements to be made for and define the extent of special investigations or tests (could be intrusive or non-intrusive).			x											7
2.2.4	Review and report on the condition/status of any existing services installations (usually only required for buildings being refurbished/extended).			x										Deane House	7
2.2.5	Review feasibility of renewable technologies.			x											7
2.2.6	Define performance metrics and design targets for the building			x											7
2.2.7	Give initial recommendations to the client in the development of an operating and maintenance strategy			x											7
2.2.8	Establish targets for the post-occupancy review			x											7
Team liaison (builders' work, spatial coordination, energy targeting)															
2.3.1	Undertake the role of lead project designer.	x	o	o						o					7
2.3.2	Discuss potential mechanical, electrical and public health schemes for the preferred solution selected in RIBA Stage 1, with the rest of the design team.	o	o	x						o					7
2.3.3	Advise team members (architect, structural engineer) of significant implications (size, weight, access requirements for installation and replacement) of mechanical, electrical, public health systems including central plant.			x											7
2.3.4	Agree builders' work philosophy (such as the treatment of structural openings) for principal mechanical, electrical and public health systems.		o	x											7
2.3.5	Carry out or commission surveys relating to energy strategy options			x											7
2.3.6	Undertake energy strategy studies for the building fabric and engineering services to support the design – typically generic thermal simulation (and modelling) with simplified boundary conditions to give qualitative feedback.	o		x											7
2.3.7	Undertake generic daylight computer modelling required to support the design and obtain qualitative feedback (state particular requirements for the project).			x											7
2.3.8	Review architect's proposals for compliance with Building Regulations in relation to energy performance.			x											7

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2.3.9	Prepare programme/gantt chart for the design activities and schedule of design deliverables.			x											7
2.3.10	Prepare risk assessments for the design, covering health and safety during construction, operation and end-of-life, and technical risks.			x											7
2.3.11	Contribute to risk assessments for the design covering programme, cost and quality.			x											7
2.3.12	Detailed review of existing health and safety file (for refurbishment projects or additional construction on an existing site).			x										Deane House	7
2.3.13	Team-wide design review to signal end of concept design stage.	o	o	x						o					7
Selection of plant and specialist designers															
2.4.1	Advise client on assessment and selection of specialist designers and contractors.			x											7
2.4.2	Advise on potential for off-site manufacture of building services plant and distribution equipment, including implications for construction strategy, project milestones and logistics.			x											7
2.4.3	Agree initial off-site delivery strategy including programme milestones.			x											7
2.4.4	Establish areas/zones for central plant in line with mechanical, electrical and public health design philosophies			x											7
2.4.5	Consider and define need for provisional sums.			x											7
Selection of plant and specialist designers															
2.5.1	Determine mechanical systems philosophy.			x											7
2.5.2	Determine passive design philosophy.			x											7
2.5.3	Design review.	o	o	x						o					7
Electrical design															
2.6.1	Determine electrical systems philosophy (use of natural light, degree of system integration, redundancy, life-cycle).			x											7
2.6.2	Design review.	o	o	x						o					7
Public Health design															
2.7.1	Determine water supply and waste-handling philosophy (recycling, storage).		o	x											7
2.7.2	Design review.	o	o	x						o					7
Commissioning															
2.8.1	Establish phased handovers, system configuration or plant arrangements to simplify commissioning.			x											7
2.8.2	Prepare strategic commissioning plan.			x											7
Deliverables – including drawings, specifications, reports															

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2.9.1	Provide report on building services issues as part of concept design report, including: o desk study on matters affecting design options o recommendations for renewables o considerations for off-site manufacture o environmental assessments o Part L requirements o building energy model o thermal modelling o noise and acoustic measures o fire and smoke control measures o Adequacy of utilities supplies o Constraints arising from the brief or local authority policy o Research on innovative solutions.			x											7
2.9.2	Provide concept design model including appropriate geometric detail and object information			x											7
2.9.3	Provide concept sketch drawings for preferred preliminary design(s).			x											7
2.9.4	Provide concept schematics for preferred preliminary design(s).			x											7
2.9.5	Provide information for early-stage life-cycle cost and life-cycle assessment studies.			x											7
2.9.6	Provide outline performance specifications for mechanical, electrical, and public health services if required depending on procurement strategy.			x											7
2.9.7	Provide outline cost plan for building services based on floor area/building type/system assumptions.			x											7
2.9.8	Provide high-level metering strategy			x											7
~~2.9.9~~	~~Provide COBie-UK-2012 tables for Information Exchange 2.~~														7
2.9.10	Sign off the concept design report.	o	o	x						o				Usually by Client	7
PRO-FORMA 3A: DEVELOPED DESIGN PART 1 (RIBA STAGE 3)															
General obligations, external liaison (statutory bodies, utilities)															
3a.1.1	Carry out on-going checks for compliance with regulations.			x											7
3a.1.2	Negotiate with public and other utility authorities for the provision of incoming services and agree spatial requirements. Where applicable this will also include liaison with services providers for LZC technologies to review interface issues and ensure design compatibility.			x						o					7
3a.1.3	Consider services design to allow off-site manufacture if appropriate.			x											7
~~3a.1.4~~	~~Identify interfaces between on-site and off-site elements and define packages of work to deliver off-site strategy.~~														7
Client liaison (briefing, handover, surveys)															
3a.2.1	Confirm design criteria, scope and extent of mechanical, electrical and public health services.			v									x	Works based on TGA reports	7
Team liaison (builders' work, spatial coordination, energy targeting)															
3a.3.1	Review architectural and structural designs to identify existing or potential conflicts with indicative plant-room and riser sizes.			x											7

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3a.3.2	Advise on access routes and plant size and weight in relation to future plant removal and replacement			x											7
3a.3.3	Review design risk assessments and update to reflect developing design.			x											7
Selection of plant and specialist designers															
															7
Mechanical design															
3a.5.1	Propose primary design criteria for mechanical systems.			x											7
3a.5.2	Provide preliminary information on specialist mechanical systems, such as performance specification, loads, schedules.			x											7
Electrical design															
3a.6.1	Propose primary design criteria and extent of electrical systems.			x											7
3a.6.2	Provide preliminary information on specialist electrical systems, such as performance specification, loads, schedules.			x											7
Public Health design															
3a.7.1	Propose primary design criteria for public health systems.			x											7
3a.7.2	Establish main below-ground drainage routes and manhole locations.		x	o											7
Commissioning															
															7
Deliverables – including drawings, specifications, reports															
3a.9.1	Provide energy statement for planning submission, based on agreed energy strategy.			v									x	Client to provide. Synergy to verify.	7
3a.9.2	Provide performance specifications and/or main plant equipment schedules for MEP services if required by procurement strategy.			x											7
3a.9.3	Provide updated design risk assessments.			x											7
3a.9.4	Sign off the interim developed design with respect to the primary design criteria.												x	Client to sign off.	7
															7
PRO-FORMA 3B: DEVELOPED DESIGN PART 2 (RIBA STAGE 3)															
General obligations, external liaison (statutory bodies, utilities)															
3b.1.1	Monitor compliance of the developing design with the design philosophies.			x											7
3b.1.2	Monitor compliance of the developing design with the project brief.			x											7
3b.1.3	Review strategy for fire safety (include parameters for fire detection and suppression systems, protection of building services).			v			x							Fire Consultant to provide. Synergy to verify.	7
Client liaison (briefing, handover, surveys)															
3b.2.1	Update recommendations to the client in his development of an operating and maintenance strategy.			x											7
Team liaison (builders' work, spatial coordination, energy targeting)															

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3b.3.1	Review design against Building Regulations compliance in relation to energy performance and (if relevant) EPC criteria.			x											7
3b.3.2	Carry out calculations in relation to any energy-related planning conditions and advise team of implications to overall design.			x											7
3b.3.3	Incorporate frozen primary building geometry in building services design	x		o											7
3b.3.4	Approve and share primary building geometry (General Arrangement drawings or Build ing Information Model)			x											7
3b.3.5	Obtain room data.	x		o											7
3b.3.6	Populate room data with building services information.			x											7
3b.3.7	Review architectural and structural designs to identify existing or potential conflicts with indicative plant sizes.			x											7
3b.3.8	Carry out initial overall spatial co-ordination.			x											7
~~3b.3.9~~	~~Review BIM protocol and determine data fields to be completed for each BIM object~~														7
3b.3.10	Team-wide design review to signal end of developed design stage.	o	o	x						o			o		7
Selection of plant and specialist designers															
3b.4.1	Advise on early engagement with contractors, plant manufacturers and specialists.			x											7
Mechanical design															
3b.5.1	Prepare principal metering strategy			x											7
3b.5.2	Establish indicative plant sizes for mechanical systems and confirm plant room/riser locations/sizes.			x											7
3b.5.3	Undertake dynamic thermal simulation studies in the development of energy strategies for the fabric and engineering services as required to support the design and obtain quantitative feedback – typically 3D modelling.			x										Scope and costs to be defined.	7
~~3b.5.4~~	~~Undertake computational fluid dynamics studies as part of a detailed evaluation for the particular stated aspects of the building services design. (State particular requirements for the project such as air movement in specific areas, smoke clearance, effectiveness of air movement for natural ventilation).~~														7
3b.5.5	Calculate zoned heat gains and losses based on fabric information, using approximate methods.			x											7
3b.5.6	Determine main duct and pipe routes around floors to and from risers.			x											7
3b.5.7	Calculate room loads using approximate methods.			x											7
3b.5.8	Determine approximate duct sizes, pipe sizes, terminal sizes and locations, valve sizes and locations, fan sizes, pump sizes, locations and sizes of ancillary equipment (such as pressurisation units, and attenuators).			x											7
3b.5.9	Design review	o	o	x						o				Sufficient for spatial allocation and detailed schematic design	7
Electrical design															
3b.6.1	Determine principal plant locations/sizes.			x											7
3b.6.2	Prepare principal metering strategy			x											7

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3b.6.3	Establish indicative plant sizes for electrical systems and confirm plant room and riser locations/sizes.			x											7
3b.6.4	Undertake daylight computer modelling required to support the design and obtain quantitative feedback (State particular requirements for the project).			x											7
3b.6.5	Calculate the maximum demand for small power and lighting using approximate methods.			x											7
~~3b.6.6~~	~~Calculate the maximum demand for high voltage supply using approximate methods.~~														7
3b.6.7	Determine main distribution routes and circuits around floors to and from risers and main switchgear, and approximate sizes of containment and switchgear.			x											7
3b.6.8	Design review	o	o	x						o					7
Public Health design															
3b.7.1	Prepare principal metering strategy			x											7
3b.7.2	Establish indicative plant sizes for public health systems and confirm plant room and riser locations/sizes.			x											7
3b.7.3	Calculate maximum demand for water supply and waste removal using approximate methods.			x											7
3b.7.4	Calculate approximate system capacities for hot and cold water central plant (tanks, cylinders, and pumps).			x											7
3b.7.5	Determine main pipe and drain routes around floors to and from risers.			x											7
3b.7.6	Confirm main below-ground drainage routes and manhole locations.		x	o											7
3b.7.7	Design review	o	o	x						o					7
Commissioning															
3b.8.1	Carry out commissioning review of developed design.			x											7
3b.8.2	Update the commissioning plan.			x											7
Deliverables – including drawings, specifications, reports															
3b.9.1	Provide an initial schedule of cast-in/formed builders' work openings that are structurally significant.			x											7
~~3b.9.2~~	~~Provide COBie-UK-2012 tables for Information Exchange 3.~~														7
3b.9.3	Provide programme information on design and construction issues.			x											7
3b.9.4	Provide a refined cost plan for building services.			x											7
3b.9.5	Provide a report on building services issues as part of the developed design report			x											7
~~3b.9.6~~	~~Provide developed design model.~~														7
3b.9.7	Provide developed design drawings.			x											7
3b.9.8	Provide developed schematics.			x											7

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3b.9.9	Sign off the developed design report.												x	Sign off by Client	7
PRO-FORMA 4A: TECHNICAL DESIGN PART 1 (RIBA STAGE 4) Some activities in Stage 4 may continue after the start of the project's construction stage															7
General obligations, external liaison (statutory bodies, utilities)															7
4a.1.1	Carry out on-going checks for compliance with regulations.			x											7
4a.1.2	Advise on impact of any changes from scheme used to calculate the Building Emissions Rate for Building Regulations energy compliance and (if relevant) EPC.			x											7
4a.1.3	Provide full and formal information for building control.			x										Accreditation issue	7
4a.1.4	Obtain final quotations for incoming services based on final agreed building loads.			x											7
4a.1.5	Seek utility company comments on the spatial requirements and builders' work associated with the provision of incoming services.			x											7
Client liaison (briefing, handover, surveys)															7
4a.2.1	Advise on an appropriate method of procuring maintenance expertise.			x											7
4a.2.2	Define the scope and content of operating and maintenance manuals appropriate for the project.			x											7
4a.2.3	Review the design against operational design targets, involving the future building manager(s).			x											7
4a.2.4	Define the requirement for record drawings.			x											7
4a.2.5	Specify form of delivery and method of production of record drawings.			x											7
4a.2.6	Define what level of documentation, commissioning results and other information must be available prior to practical completion and handover. (Take into account possible implications of phased handover and partial possession.)			x											7
Team liaison (builders' work, spatial coordination, energy targeting)															7
4a.3.1	Provide builders' work information related to building services			x											7
4a.3.2	Undertake checks in relation to Building Regulations energy performance compliance and (if relevant) EPC criteria.			x											7
4a.3.3	Review proposals from others in relation to Building Regulations energy performance compliance and (if relevant) EPC criteria.			x											7
4a.3.4	Make submissions to obtain Building Regulations approval in relation to energy performance			x											7
4a.3.5	Project-wide design review to signal end of technical design stage.	o	o	x						o					7
4a.3.6	Confirm builders' work information for specified equipment or materials, or where alternatives to those provisionally or pre-selected are agreed.			x											7
4a.3.7	Design weatherproofing details for all services passing through external elements of the building.	x		o											7
4a.3.8	Detail all acoustic stopping for services penetrating builders' work elements.			o										Acoustic Consultant	7

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4a.3.9	Carry out spatial co-ordination associated with major spaces: plantrooms, risers, depths of ceiling and floor voids. (Feasible for contractor/ sub-contractor pricing and installation without major re-routing).			x											7
4a.3.10	Carry out services co-ordination associated with major spaces: plantrooms, risers, ceiling and floor voids. (Feasible for contractor/sub-contractor pricing and installation without major re-routing).			x											7
4a.3.11	Consider requirements for cable pulling (routes, an d anchor points).			x											7
4a.3.12	Review design risk assessments incorporating specialist design input.			x											7
Selection of plant and specialist designers															7
4a.4.1	Identify client requirements which will necessitate design input from a specialist designer, sub-contractor or supplier, and the timing of their appointment.			x											7
4a.4.2	Advise of significant allowances or constraints incorporated in the main design that may affect the specialist design.			x											7
4a.4.3	Obtain indicative quotations for plant not requiring specialist design.			x											7
4a.4.4	Review that all plant and equipment incorporated into the works can be safely maintained in compliance with current legislation.			x											7
Mechanical design															7
4a.5.1	Determine parameters of flues to incorporate the requirements of the plant manufacturer, building control, environmental health officer and current legislation such as the Clean Air Act.			x											7
4a.5.2	Finalise detailed design calculations for all services being included in the detailed design in accordance with recognised national standards.			x											7
4a.5.3	Determine detailed flue, duct and pipe sizes and routes.			x											7
4a.5.4	Design review.	o	o	x						o					7
Electrical design															7
4a.6.1	Determine approximate cable sizes, switchgear locations, control panel locations, user equipment sizes and locations, sensor locations for small power, lighting, high voltage systems, and metering.			x											7
4a.6.2	Determine approximate cable sizes, sen sor locations, control panel locations for control, fire safety and security systems.			x											7
4a.6.3	Design automatic controls systems as required to meet with the operational, functional and spatial requirements of the specification.									x					7
4a.6.4	Determine control strategy for lighting.			x											7
4a.6.5	Determine detailed sizing of cables for all electrical supply systems.			x											7
4a.6.6	Design fixing, connection, earthing and bonding details as required for final installation of lightning protection systems.			x											7
4a.6.7	Design review.	o	o	x						o					7
Public Health design															7
4a.7.1	Design review.	o	o	x						o					7
Commissioning															7

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4a.8.1	Review all designs to ensure that systems are commissionable.			x											7
4a.8.2	Identify and incorporate into system designs the essential components and features necessary to enable the proper preparation and commissioning of building services.			x											7
4a.8.3	Review the commissioning plan.			x											7
4a.8.4	Update the commissioning plan.			x											7
Deliverables – including drawings, specifications, reports															7
4a.9.1	Provide a report on building services issues as part of the technical design report.			x											7
4a.9.2	Provide risk assessments of the design.			x											7
4a.9.3	Provide information for detailed whole-life cost studies			x										Based on CIBSE Guide	7
4a.9.4	Provide information to the Environmental Assessment Method Assessor to allow credits to be checked and awarded			x											7
4a.9.5	Provide revised commissioning plan.			x											7
4a.9.6	Provide updated health and safety plan information.			x											7
~~4a.9.7~~	~~Provide calculations and/or software files as evidence of detailed design model and/or drawings.~~														7
4a.9.8	Provide schedules to cross-reference cables to containment systems.			x											7
~~4a.9.9~~	~~Provide technical design model relevant to the first part of Stage 4.~~														7
4a.9.10	Provide technical design drawings.			x											7
4a.9.11	Provide builders' work information.			x											7
4a.9.12	Produce materials and workmanship specifications.			x											7
4a.9.13	Produce equipment schedules.			x											7
4a.9.14	Provide design stage information towards log book.			x											7
4a.9.15	Provide mechanical, electrical and public health information necessary to obtain statutory approvals.			x											7
4a.9.16	Provide detailed specifications for mechanical, electrical, public health services, if relevant.			x											7
4a.9.17	Provide final commissioning specification.			x											7
4a.9.18	Sign off detailed specifications.												x	Sign off by Client	7
PRO-FORMA 4B : TECHNICAL DESIGN PART 2 (RIBA STAGE 4)															7
General obligations, external liaison (stat bodies, utilities)															7
															7
Client liaison (briefing, handover, and surveys)															7

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															7
Team liaison (builders' work, spatial coordination, energy targeting)															7
4b.3.1	Check the provision for and adequacy of the builders' work information.			x											7
4b.3.2	Select and detail sleeves, inserts, frames, and fixing anchors, and any other items required to be cast or built into the structures by others, including coordination of positions to such extent and accuracy to allow structural construction to proceed.			o						o			x		7
4b.3.3	Detail and co-ordinate all access platforms, stairs, rails and protection elements required for future maintenance and operation of plant/equipment.	x		v											7
4b.3.4	Carry out final detailed location and dimensioning of 2nd fix equipment based on architectural information.	x		o						o					7
4b.3.5	Specify initial location of test points			x											7
4b.3.6	Specify location of access panels.	x		o									v		7
4b.3.7	Project-wide design review to signal end of production information stage.	o	o	x						o					7
Selection of plant and specialist designers															7
4b.4.1	Check plant and system sizing once full co-ordination of the works has been undertaken.			x											7
Mechanical design															7
4b.5.1	Carry out detailed design of pipework gradients for builders' work and coordination, including domestic and waste drainage and condensate runs.			v								x			7
4b.5.2	Make allowance for anchors, guides and provision for movement of services and systems due to thermal expansion and contraction and building movement.			v								x			7
4b.5.3	Modify distribution systems and equipment capacities as may be required as a result of final detailed spatial co-ordination.			v								x			7
4b.5.4	Check fan and pump system resistances based on the final equipment selectionand co-ordinated installation drawings.			v								x			7
4b.5.5	Design all necessary temporary facilities for flushing, and commissioning.			v								x			7
4b.5.6	Size, select and determine final locations of commissioning sets based on the final equipment selection and co-ordinated installation drawings.			v								x			7
4b.5.7	Carry out final sizing of sections of ductwork between terminal units and diffusers to ensure the specified acoustic criteria and duct velocities.			v								x			7
4b.5.8	Carry out final detailing and confirm the location and sizes of duct connections to external louvres.			v								x		If not in accordance with the design	7
4b.5.9	Design review.			v								x		If not in accordance with the design	7
Electrical design															7
4b.6.1	Modify distribution systems and equipment capacities as may be required as a result of final detailed spatial co-ordination.			o											7
4b.6.2	Verify spatial requirements for cable pulling and installation.											x		Final connection detail	7
4b.6.3	Design review.	o	o	x						o					7

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Public Health design															**7**
4b.7.1	Determine detailed routing of pipework and drainage to/from risers.											x			**7**
4b.7.2	Modify distribution systems and equipment capacities as may be required as a result of final detailed spatial co-ordination.			v								x			**7**
4b.7.3	Carry out final detailed co-ordination of above and below ground drainage with superstructure and substructure.		o	x											**7**
4b.7.4	Design review.	o	o	x								o			**7**
Commissioning															**7**
4b.8.1	Determine witnessing and commissioning requirements for off-site manufactured elements.			x											**7**
Deliverables – including drawings, specifications, and reports															**7**
4b.9.1	Contribute to draft construction programme for the project.			o								x			**7**
4b.9.2	Provide updated design risk assessments.			x											**7**
~~4b.9.3~~	~~Provide revised technical design model to show resolution of all clashes between architecture, structure and all services.~~			~~x~~											**7**
4b.9.4	Provide co-ordinated working drawings.											x			**7**
4b.9.5	Provide final co-ordinated reflected ceiling plans based on latest architectural information for all components.	o		o								x			**7**
PRO-FORMA 4C : TECHNICAL DESIGN PART 3 (RIBA STAGE 4)															**7**
General obligations, external liaison (stat bodies, utilities)															**7**
4c.1.1	Obtain final quotations for incoming services based on final agreed building loads.			x											**7**
Client liaison (briefing, handover, and surveys)															**7**
~~4c.2.1~~	~~Prepare method statement (prior to commencement of works) for the maintenance of existing services.~~														**7**
Team liaison (builders' work, spatial coordination, energy targeting)															**7**
4c.3.1	Confirm builders' work information for specified equipment or materials, or where alternatives to those provisionally or pre-selected are agreed.											x			**7**
4c.3.2	Detail all fire stopping and sleeving systems.											x			**7**
4c.3.3	Detail all acoustic stopping for services penetrating builders' work elements.									x					**7**
4c.3.4	Carry out final detailed spatial co-ordination between all trade contractors.			o						o		x			**7**
4c.3.5	Carry out final detailed spatial co-ordination between the building services and the structure/architecture.											x			**7**
4c.3.6	Modify the final detailed spatial co-ordination for approved alternative equipment or materials.											x			**7**
4c.3.7	Prepare detailed construction programme for installation and remaining design activities.											x			**7**
Selection of plant and specialist designers															**7**

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4c.4.1	Select plant, equipment, components and material to meet the specified performance. Where these differ from provisional selections ensure they are fully compatible with all the other system parameters, components and design requirements.			v								x			7
4c.4.2	Advise whether the alternative complies with the selection criteria.											x			7
4c.4.3	Advise whether the alternative suggested is acceptable.			x											7
4c.4.4	Re-evaluate all parts of the services design which may be affected by acceptance of alternative plant, equipment, and components.											x			7
4c.4.5	Re-evaluate all parts of the building design which may be affected by acceptance of alternative plant, equipment, components.											x			7
4c.4.6	Amend the design to incorporate agreed alternative plant, equipment, or components.			v								x			7
4c.4.7	Agree final equipment selections and manufacturers prior to confirming agreed final fixed costs with the client.											x			7
4c.4.8	Monitor the specialist design input for compliance with the design intent.											x			7
4c.4.9	Evaluate the impact of the specialist design on those parts of the overall design that are provisional.											x		CDP Elements	7
4c.4.10	Amend and complete the design as appropriate.			x											7
4c.4.11	Monitor the ongoing progress of the procurement, manufacture, installation and commissioning of all plant items.											x		CDP Elements or where not compliant to Specification	7
4c.4.12	Review that all plant and equipment incorporated into the works can be safely maintained in compliance with current legislation.			o						o		x			7
Mechanical design															7
4c.5.1	Carry out detailed design of anchors, guides and other provision for movement of services and systems due to thermal expansion and contraction and building movement.			x											7
4c.5.2	Check fan and pump system resistances based on the final equipment selectionand co-ordinated working drawings.			v						x					7
4c.5.3	Check system water capacities and quantities of chemical additives based on the final equipment selection and co-ordinated installation drawings.									x					7
4c.5.4	Carry out final detailing of drain and vent points.			x						x					7
4c.5.5	Carry out final selection of all terminal devices.			x											7
4c.5.6	Carry out final selection of pressurisation units and expansion vessels based on the final equipment selection and co-ordinated working drawings.											x			7
4c.5.7	Detailed design and sizing of refrigerant pipework between items of equipment provided under the contract works based on the final equipment selection and co-ordinated installation drawings.			v								x			7
4c.5.8	Select and confirm location of control dampers and control valves to achieve the specified function and to suit the characteristics of items served and final system configurations based on the final equipment selection and co-ordinated installation drawings.			v								x			7
4c.5.9	Carry out final selection of control valves to suit pipework and authority of controls based on final installation drawings.														7
4c.5.10	Carry out final selection of all anti-vibration mountings.														7

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4c.5.11	Design review.	o		x						o		o			7
Electrical design															7
4c.6.1	Verify cable sizes based on the co-ordinated working drawings, selected equipment and cable lengths including those for specialist systems such as fire alarm, datacomms, CCTV, and access control.			v								x			7
4c.6.2	Check control panel cable entry and exits are possible in the final location and that safe operating and maintenance clearances are provided.											x			7
4c.6.3	Check compatibility of the plant and equipment with the controls systems.											x			7
4c.6.4	Carry out design and incorporation of all interfaces (including relays or other devices or modifications to hardware or software).											x			7
4c.6.5	Check software engineering and programming is completed so that systems function in the prescribed manner.											x			7
4c.6.6	Incorporate final information for electrical systems into the design via schedules or BIM objects, including control addresses for lighting and fire alarm systems, BMS points											x			7
4c.6.7	Design review.	o		x						o		o			7
Public Health design															7
4c.7.1	Design review.	o		x						o		o			7
Commissioning															7
4c.8.1	Review proposals and method statements from prospective commissioning specialist(s).											o			7

	SERVICES	Architect	Structural & Civil Engineer	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM Assessor	FF&E Consultant	Kier Construction	Kier Profesional Services (KPS)	M&E Subcontractor	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
4c.8.2	Appoint an independent specialist commissioning contractor responsible for testing and commissioning.									x					7
Deliverables – including drawings, specifications, and reports															7
4c.9.1	Provide updated health and safety plan information.											x			7
4c.9.2	Provide detailed cost plan.											x			7
4c.9.3	Provide final construction programme.											x			7
4c.9.4	Provide detailed commissioning programme.											x			7
4c.9.5	Provide final co-ordinated reflected ceiling plans based on latest architectural information for all components.	o		o						o		x			7
4c.9.6	Provide updated technical design mode l with revised or new design details.			v								x		CDP Elements	7
4c.9.7	Provide report on the specialist designers' proposals within the main contract.											x		CDP Elements	7
4c.9.8	Provide a report in consideration of any alternative plant, equipment, and component selections.			v								x			7
4c.9.9	Provide calculations and/or software files in support of specialist design proposals.											x		CDP Elements	7
PRO-FORMA 5: CONSTRUCTION (RIBA STAGE 5).															7
General obligations, external liaison (statutory bodies, and utilities)															7
5.1.1	Notify the necessary statutory bodies (building control, fire officer, and environmental health) in respect of all tests and demonstrations required.			o						x		o			7
5.1.2	Carry out airtightness test of completed building envelope.	o		o						x		o			7
5.1.3	Seek full statutory approval of the works and arrange all necessary attendance,and documentation.			o						x		o			7
Client liaison (briefing, handover, surveys)															7
5.2.1	Oversee the instruction of the client's staff (FM team and end-users as appropriate) in the use, operation and maintenance of the installations.			o						o		x			7
5.2.2	Instruct the client's staff (FM team and end-users as appropriate) in the use, operation and maintenance of the installations in advance of handover			o						o		x			7
5.2.3	Examine and comment on the contents of the operating and maintenance information in order to ensure compliance with the specified requirements.			x						o		o			7
5.2.4	Modify and update operating details to reflect commissioning results.			v								x			7
5.2.5	Modify the record drawings as the works progress, so that all alterations from the installation drawings are recorded.			v								x			7
5.2.6	Inspect draft record drawings at agreed intervals and comment on their content with respect to the size and positions of installed systems and plant.			x						o		o			7
~~5.2.7~~	~~Establish central and visible 'home base' for aftercare team as defined by Soft Landings.~~														7
5.2.8	Arrange for all appropriate maintenance contracts to be in place for start immediately after hand-over.			o								x			7
5.2.9	Provide recommendations for the commencement and carrying out of operation and maintenance during and after the defects liability period.			o								x			7

	SERVICES	Architect	Structural & Civil Engineer	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM Assessor	FF&E Consultant	Kier Construction	Kier Profesional Services (KPS)	M&E Subcontractor	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
Team liaison (builders' work, spatial coordination, energy targeting)															**7**
5.3.1	Finalise location of test points.			**v**								**x**			**7**
5.3.2	Prepare accredited as-constructed energy consumption information for Building Regulations and (if relevant) the actual Energy Performance Certificate.			**x**								**o**			**7**
Selection of plant and specialist designers															**7**
5.4.1	Review sub-contractors' or specialists' information against detailed design drawings and co-ordinated working drawings or against building information model(s) (if relevant).			**x**								**o**			**7**
5.4.2	Incorporate changes arising from sub-contractors' or specialists' information in detailed design drawings and co-ordinated working drawings or against building information model(s) (if relevant).			**v**						**o**		**x**			**7**
Mechanical design															**7**
															7
Electrical design															**7**
															7
Public Health design															**7**
															7
Commissioning															**7**
5.8.1	Comment on the adequacy of systems for commissioning as detailed on specialists' drawings and manufacturers' shop drawings prior to actual manufacture at works.			**x**								**o**			**7**
5.8.2	Attend commissioning meetings as necessary.	**o**		**o**						**o**		**x**			**7**
5.8.3	Arrange and chair commissioning meetings as necessary.			**o**						**x**		**o**		Independent Commissioning Manager	**7**
5.8.4	Monitor the progress of commissioning and testing of all systems and plant, including assessment of whether installations meet the original (or amended) design intent.			**o**						**x**		**o**			**7**
5.8.5	Conduct mock-up performance tests											**x**			**7**
5.8.6	Conduct pre-commissioning works (verification of installation works and static tests)											**x**			**7**
5.8.7	Commission all systems to agreed method, logic and programme, and in accordance with the commissioning specification. Record the results.											**x**			**7**
5.8.8	Attend witness testing and commissioning of off-site manufactured assemblies at manufacturers' premises			**o**						**o**		**x**			**7**
5.8.9	Demonstrate that the overall and complete systems perform correctly in the required manner and as intended by the specification.											**x**			**7**
5.8.10	Record all plant settings from commissioning.											**x**			**7**
5.8.11	Accept completed systems.			**x**						**o**		**o**			**7**
Deliverables – including drawings, specifications, reports															**7**
5.9.1	Provide final installation details, including dimensions, of electrical switchgear to ensure that cable entry is acceptable in the selected location and that safe operating and maintenance clearances are provided.			**v**								**x**			**7**

	SERVICES	Architect	Structural & Civil Engineer	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM Assessor	FF&E Consultant	Kier Construction	Kier Profesional Services (KPS)	M&E Subcontractor	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
5.9.2	Provide final installation details, including dimensions, of automatic control panels to suit the detailed requirements of the agreed supplier of the controls equipment.			v								x			7
5.9.3	Provide detailed BMS point schedules, wiring schematics, control panel labelling details and equipment schedules for the complete works.			v								x			7
5.9.4	Provide detailed electrical wiring diagrams of all equipment supplied showing all interconnections between equipment to enable all necessary wiring to be undertaken.			v								x			7
5.9.5	Provide installation model													???	7
5.9.6	Provide installation drawings.			v								x			7
5.9.7	Provide builders' work details.			v								x			7
5.9.8	Provide manufacturers' drawings.			v								x			7
5.9.9	Provide a final commissioning report detailing the results of the commissioning and commenting on the performance of systems signed by a competent person.			o								x			7
5.9.10	Provide schedule of activities/works required for handover.			v						o		x			7
5.9.11	Provide all necessary calculations, drawings, information and logs for the Health and Safety File.			v								x			7
5.9.12	Provide a schedule of all spare parts required for the works including recommendations of any others not stated in the specification.			v								x			7
5.9.13	Provide a schedule of all tools required for the works including recommendations of any others not stated in the specification.			v								x			7
5.9.14	Provide specialist author for production of operating and maintenance manuals.			v						o		x			7
~~5.9.15~~	~~Provide as-built model~~														7
5.9.16	Provide record drawings.			v								x			7
5.9.17	Provide log book(s) in accordance with the requirements of the specification and the Building Regulations.			v								x		Fire alarm & Emergency lighting	7
5.9.18	Provide planned preventative maintenance schedules			v								x			7
5.9.19	Provide operation and maintenance information in accordance with the specified requirements.			v								x			7
5.9.20	Provide technical guide for the facilities management team.			v								x			7
5.9.21	Provide recorded water, gas and electricity meter readings on completion of the works									x					7
5.9.22	Provide Building Users' Guide, including instructions on controls, energy-saving and water-saving features.			v								x		AS TM31	7
5.9.23	Provide pre-handover defects schedule.			o						v		x			7
PRO-FORMA 6: HANDOVER AND CLOSE OUT (RIBA STAGE 6)															7
General obligations, external liaison (statutory bodies, and utilities)															7
															7

	SERVICES	Architect	Structural & Civil Engineer	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM Assessor	FF&E Consultant	Kier Construction	Kier Profesional Services (KPS)	M&E Subcontractor	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
Client liaison (briefing, handover, and surveys)															**7**
6.2.1	On site attendance by aftercare team during first eight weeks of occupation													?? Soft Landings	**7**
6.2.2	Hold meetings/workshops with end-users/occupiers during the first eight weeks of occupation													??	**7**
6.2.3	Hold regular meetings with user representatives during Year 1 of occupation.													??	**7**
6.2.4	Review building performance against energy targets during Year 1 of occupation													??	**7**
6.2.5	Hold end-of-year reviews of the general and environmental performance of the building.													??	**7**
6.2.6	Visit site to train and/or transfer information about the use of the building services to the facilities management team and the building occupiers.													??	**7**
Team liaison (builders' work, spatial coordination, energy targeting)															**7**
6.3.1	Review project health and safety performance.			**o**						**x**		**o**			**7**
6.3.2	Organise lessons learned workshop for the project with design team, main contractor, significant specialist contractors and FM team.									**x**					**7**
Selection of plant and specialist designers															**7**
															7
Mechanical design															**7**
															7
Electrical design															**7**
															7
Public Health design															**7**
															7
Commissioning															**7**
6.8.1	Carry out seasonal commissioning from practical completion including environmental testing and monitoring.			**v**								**x**			**7**
6.8.2	Attend seasonal commissioning activities carried out by others.			**x**						**o**					**7**
Deliverables – including drawings, specifications, reports															**7**
6.9.1	Provide a reviewed and updated list of defects identified during post completion audit.	**o**		**o**						**x**		**o**			**7**
~~6.9.2~~	~~Provide COBie-UK-2012 tables for Information Exchange 6.~~														**7**
~~6.9.3~~	~~Provide written reviews of energy use and system performance (as defined in the Soft Landings framework).~~														**7**
6.9.4	Provide outturn cost analysis.									**x**		**o**			**7**
~~6.9.5~~	~~Provide updated as-built model incorporating defect rectification and any changes resulting from Year 1 aftercare.~~														**7**
6.9.6	Provide updated record drawings incorporating defect rectification and any changes resulting from Year 1 aftercare.			**v**						**o**		**x**			**7**
6.9.7	Provide lessons learned report.									**x**					**7**
PRO-FORMA 7: IN USE (RIBA STAGE 7)															**7**

	SERVICES	Architect	Structural & Civil Engineer	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM Assessor	FF&E Consultant	Kier Construction	Kier Profesional Services (KPS)	M&E Subcontractor	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
General obligations, external liaison (statutory bodies, and utilities)															**7**
															7
Client liaison (briefing, handover, and surveys)															**7**
7.2.1	Carry out Post Occupancy Evaluation.			**x**				**o**		**o**					**7**
~~7.2.2~~	~~Hold regular meetings with user representatives during Years 2 to 3 of occupation.~~														**7**
Team liaison (builders' work, spatial coordination, energy targeting)															**7**
															7
Selection of plant and specialist designers															**7**
															7
Mechanical design															**7**
															7
Electrical design															**7**
															7
Public Health design															**7**
															7
Commissioning															**7**
															7
Deliverables – including drawings, specifications, reports															**7**
~~7.9.1~~	~~Provide written reviews of energy use and system performance (as defined in the Soft Landings framework).~~														**7**
~~7.9.2~~	~~Provide updated as-built model incorporating any changes resulting from Years 2 and 3 aftercare.~~														**7**
~~7.9.3~~	~~Provide updated record drawings incorporating any changes resulting from Years 2 and 3 aftercare.~~														**7**

Project Name:
Greenwood Place Resource Centre

Schedule 5 - Design Responsibility Matrix

Key:

x Primary Responsibility
o Support Function
v / r Check / Verify or Review & Comment On design, fabrication and installation of others
b Performance Spec. by Consultant, Detailed Design by Sub-contractor
Strike through any not applicable duties & Consultants.
Adjust 'x's, 'o's, and 'v's as applicable
S.Eng / C.Eng - is the Structural & Civil Engineer

	EXTERNAL WORKS	Architect	Structural & Civil Engineering	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM Assessor	FF&E Consultant	Kier Construction	Kier Professional Services (KPS)	M&E Subcontractor	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
29.00	**Landscaping (Hard & Soft)**														
29.01	Soft landscaping and planting	o	o		x										7
29.02	External works layouts/levels - paths, parking, roads etc	o	o		x										7
~~29.03~~	~~Vehicle tracking/turning analysis~~		~~x~~		~~o~~										7
29.04	Landscape features	o	o		x										7
29.05	Irrigation & water points	o	o	o	x							o			7
29.06	Planters	o	o		x										7
~~29.07~~	~~Sports surfacing and pitches (performance and extent)~~	~~o~~	~~o~~		~~x~~							~~o~~			7
~~29.08~~	~~Sports surfacing and pitches (construction make up & drainage)~~	~~o~~	~~o~~		~~v~~								~~x~~		7
~~29.09~~	~~Lagoons, ponds, lakes, swales~~	~~o~~	~~x~~												7
29.10	Hard surfacing - material selection & setting out	o	o		x										7
29.11	Hard surfacing - construction make ups & details	o	x		x										7
29.12	Crossovers, bellmouths & site access - GA & setting out	o	x		o										7
29.13	Crossovers, bellmouths & site access - construction make ups and material selection	o	x												7
29.14	Road markings, hatchings & symbols	o	o		x										7
29.15	Fire tender access provision	x	o				o								7
29.16	Bollards & crash barriers	x	o												7
29.17	Fencing & gates (layout, extent & details)	o	o	o	x							o			7
29.18	Recycling & bin stores	x	o												7
~~29.19~~	~~Control barriers~~	~~x~~		~~o~~											7
~~29.20~~	~~Segregation barriers~~	~~x~~	~~o~~	~~o~~											7
29.21	Cycle stores/racks	x	o	o				o				o			7
29.22	Steps, Ramps & Parapets incl. balustrades	x	o												7
29.23	Street furniture	o	o	o	x										7
29.24	Sheds and greenhouses	x	o									o			7
~~29.25~~	~~Play & sports equipment~~	~~x~~	~~o~~												7
29.26	Habitat creation	o			x			o						Incorporate ecolist requirements	7
~~29.27~~	~~Assessment of green playing field loss/gain~~	~~o~~			~~x~~									~~Architect to identify at tender stage if specialist required~~	7
															7
30.00	**External Services**														
30.01	Service diversions/lowering	o		x	o										7
30.02	Incoming underground services & utilities	o	o	x	o							o			7

EXTERNAL WORKS		Architect	Structural & Civil Engineering	Services Consultant	Landscape Architect	Acoustic Consultant	Fire Engineer	BREEAM Assessor	FF&E Consultant	Kier Construction	Kier Professional Services (KPS)	M&E Subcontractor	Other Subcontractor / Specialist Consultant	Consultant Comments	Revision
30.03	External & highway lighting - performance requirements	o	o	x											7
30.04	External & highway lighting - detailed design	o	o	x								o			7
30.05	Co-ordination of underground services	o	o	x	o							x			7
30.06	Utility sub-stations/housings - provision, size, capacity	o	o	x											7
30.07	Utility sub-stations/housings - location & enclosure design	x	o	o										Structural elements by S.Eng	7
30.08	CCTV	o	o	x	o							o			7
30.09	Fire Hydrants - requirements/location	o	o	o			x					o		Technical design by M&E designer	7
30.10	Below ground FW & SW design inc. gullies	o	x	o											7
~~30.11~~	~~Attenuation of pitch drainage~~		~~x~~		~~o~~										7
31.00	**Miscellaneous**														
~~31.01~~	~~Bridges~~	~~o~~	~~x~~		~~o~~										7
31.02	Retaining walls	o	x												7
~~31.03~~	~~Marina Works~~	~~o~~	~~x~~		~~o~~										7
~~31.04~~	~~Railway Works~~	~~o~~	~~x~~		~~o~~										7
~~31.05~~	~~Flagpoles~~	~~x~~			~~o~~									~~N/A~~	7
31.06	Traffic, building & way finding signage	x		o											7
31.07	Part M requirements	x	o	o	o							o			7
31.08	OT requirements	x	o	o	o							o			7
31.08	Stopping up Highways	o	x	o	o							o		support only, civils/transport to lead. Additional Service	8
															7

Ground Investigation Specification

Please find Campbell Reith Hill's – Ground Investigation Specification on the following 87 Pages.

CampbellReith
consulting engineers

Confidential

Greenwood Place

Ground Investigation Specification

For

Kier Construction London

Project No:

12291

December 2015

Campbell Reith Hill LLP
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

Tel: 020 7340 1700
Fax: 020 7340 1777
www.campbellreith.com

THE GREENWOOD CENTRE

GROUND INVESTIGATION SPECIFICATION

Project Specification Revision Record

Date	Clause Revisions	Prepared By	Checked By
21/12/15	Draft for comment	JHC	AF

INDEX:

Invitation to Tender

12291 Date: December 2015

Dear Sirs

THE GREENWOOD CENTRE

Having expressed an interest in submitting a Fixed-Price Tender for the site investigation to the above project, we have pleasure in enclosing, on behalf of Kier Construction London, one set of tender documents together with a copy of the Instructions to Tenderers for your consideration.

Your attention is drawn to the following:

1. Pre-selection has been undertaken and the number of tenders invited is three.

2. Information as to the site, the main construction works and the Employer's Requirements are detailed in the tender documents in Schedules 1 to 5.

3. The successful tenderer will be in full charge of the supervision and direction of the investigation, and he will be responsible for advising ourselves of any changes which, in his opinion, are necessary to ensure the satisfactory performance and completion of the investigation.

4. Tenderers must accept responsibility for the proper performance of the investigation.

5. Unless noted otherwise in Schedule 1, the Employer has appointed ourselves to act as the Investigation Supervisor for the investigation contract.

6. Having regard to the constraints imposed by the Employer and our knowledge of the site we have prepared a suggested layout for the investigation as indicated on the attached drawing. The tenderers will be responsible for advising us of any shortcomings of which they might reasonably be aware in these proposals when submitting their tender.

7. Tenders will be assessed on their technical merits as well as price. Accordingly, the Employer gives no guarantee that the lowest tender or any tender will be accepted.

8. To be considered, tenders must be submitted without qualifications in accordance with the attached Instructions to Tenderers, and must be received at the address specified on or before **14/01/16**

   If, after reviewing the documentation, you are unable to submit a tender we will be grateful if you would advise the undersigned by telephone or email at the earliest opportunity.

Yours faithfully
for and on behalf of CAMPBELL REITH HILL LLP

Encls

THE GREENWOOD CENTRE
Site Investigation Contract

Instructions to Tenders

1. The Employer has endeavoured to provide (but without responsibility) desk study information as he has available to assist tenderers. Tenderers remain responsible for collecting any further information required and for evaluating all relevant information necessary to ensure the proper performance of the investigation.

2. The successful tenderer is required to indemnify the Employer against any damage caused by his activities to underground or above ground services, infrastructure or Japanese knotweed.

3. The following specification is based on the UK Specification for Ground Investigation, 2nd Edition, published by Thomas Telford Ltd 2012. Tenderers should note the contents and requirements of Schedules 1 to 5 and they must prepare, complete and submit with their tender Schedules 6 to 8 inclusive, as they will all form part of the Contract.

4. In preparing and completing Schedules 6 to 8 the Tenderer must take account of and comply with the requirements of Schedules 1 to 5. Any tenders which do not contain all the information required or are divergent from the requirements of Schedules 1 to 5 may be rejected. To assist tenderers we provide the following notes for guidance in completing these schedules.

5. **Schedule 6: List of Activities**

   This should contain the following:-

   a) An indication of the minimum period for mobilisation from placement of order together with an estimate of the earliest start date.

   b) A detailed program indicating time periods required for the various phases of investigation including site works, monitoring periods/dates, production of testing schedules, laboratory testing draft and final report production.

   c) Details of areas of land required for investigation and for storage of investigation equipment.

   d) Proposals for accessing any confined/enclosed areas of land for investigation purposes.

   e) A description of any particular investigative procedures or equipment proposed which warrant further mention due to particular merits.

6. **Schedule 7: Information Required**

   The tenderer is to list any information concerning the investigation which he requires the Employer to provide and he must state when each item of information will be required.

7. **Schedule 8: List of Premises and Subcontractors**

   The Employer needs to know the office where the Contract will be administered from together with the address of any subcontractors (including laboratories) to be used.

   The tenderer shall also provide confirmation of professional accreditation and quality assurance schemes in which the tenderer and subcontractors participate.

8. Schedules 6 to 8 should be completed and may include additional documents, provided these are clearly incorporated in, and physically attached to, the form provided.

9. **Bill of Quantities**

The Tenderers are required to complete the attached Bill of Quantities for the Investigation. This Bill of Quantities is based upon that included in the UK Specification for Ground Investigation published by Thomas Telford Ltd in 2012 and will be used by the Engineer to ascertain and determine by admeasurement the value of all payments to the Contractor.

In preparing the Bill of Quantities, tenderers should comply with the following:-

a) The Bill of Quantities must be prepared in accordance with the Preamble provided in the Specification.

b) All quantities (including those of sampling and testing) must be a true and accurate estimate of the anticipated final quantities and the rates must reflect the actual costs for each particular element of the investigation.

c) The Bill of Quantities is to be prepared on the basis of the investigation outlined on the attached CampbellReith drawing(s) together with the requirements of Schedules 1 to 5. Where the tenderer is of the opinion that there are other works required in addition to those described in the Schedules a supplementary Bill of Quantities is to be prepared and included in the tender for the items which the specialist feels should be carried out as a result of his review.

d) The Bill of Quantities should include an item which identifies the rate for further technical advice following completion of the investigation.

e) The Bill of Quantities should include a general contingency items equal to 10% of the Tender Sum which will only be expended in whole or in part on the instruction of the Engineer.

10. ~~Tenderers must be prepared to enter into a Contract based on the Conditions of Contract provided after the Form of Tender.~~ The successful tenderer should indicate his willingness to enter into a collateral warranty, in the form of warranty published by the Construction Industry Council (appended) on up to two occasions, together with his fee for so doing.

~~11.~~ The following completed documents must be submitted with the tender:

~~Form of Tender (and Appendix)~~
~~Form of Agreement~~
List of Activities (Schedule 6)
Information Required (Schedule 7)
List of Premises and Subcontractors (Schedule 8)
~~Form of Warranty~~
Bill of Quantities

12. All works must be carried out in accordance with the appended Pre-Tender Designer's Risk Assessment. CDM Regulations apply and the successful tenderer will be required to act as Principal Contractor where noted in Schedule 1.

13. Unless stated elsewhere, tenderers are expected to have visited site during the preparation of their tender. No additional costs to the client will be considered as a result of the tenderer not having inspected the site.

~~14. Tenders must be submitted by e-mail **"SI Tender (12291.)"** to joshchastney@campbellreith.com and must be received on or before 14/01/16.~~

CONTENTS

~~CONDITIONS OF CONTRACT~~

~~The Terms and Conditions of appointment shall be the ICC Infrastructure Conditions of Contract - Ground Investigation Version, August 2011. The following amendments, omissions and additions apply:~~

FORM OF TENDER

To **Kier Construction London**
c/o CampbellReith
SI Tender (12291)
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

Dear Sirs / Madam

THE GREENWOOD CENTRE

Having examined the Drawings, Conditions of Contract, Specification and Schedules 1 to 5 and having completed the Bill of Quantities for the construction of the above-mentioned investigations and Schedules 6 to 8, we offer to undertake and complete the whole of the said investigations in conformity with the said Drawings, Conditions of Contract, Specification, Schedules and Bill of Quantities for such sum as may be ascertained in accordance with the said Conditions of Contract.

We warrant that all skill and care was taken in designing the Investigation and acknowledge that the Bill of Quantities includes everything that could have reasonably been foreseen for the satisfactory completion of the Investigation.

We undertake to complete and deliver the whole of the investigations comprised in the Contract with reasonable diligence within the times stated in the Contract.

Unless and until a formal agreement is prepared and executed this Tender together with your written acceptance thereof, shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest or any tender you mayreceive.

Yours sincerely

Signature……

Address……

Date……

FORM OF TENDER (APPENDIX)

(NOTE: Relevant Clause numbers are shown in brackets)

Appendix – Part 1 (to be completed prior to the invitation to tender)

1.	Name of the Employer	Kier Construction London
	Address:	2 Langston Road Loughton Essex IG10 3SD
2.	Name of the Engineer	Campbell Reith Hill LLP
	Address:	Friars Bridge Court 41-45 Blackfriars Road London SE1 8NZ
3.	Defects Correction Period	
4.	Number and type of copies of Drawings to be provided	Figures Figure 1: Site location plan Figure 2: Existing site layout Figures 3a and 3b: Proposed development plans Figure 4: Exploratory Hole location plan
5.	Form of Agreement	Not Required
	If required	
6.	Performance Bond	Not required
	Amount of Bond (if required) to be	10% of Tender Total
7.	Minimum amount of third party insurance (persons and property) for each and every occurrence	£5,000,000
8.	The liability of the Contractor under his Professional Indemnity shall be	£2,000,000
9.	Commencement Date (Date of instruction)	(Week 0)
10.	Time for completion calculated from the Commencement Date	
	Sections of the Investigation	
	Section	
	A - Completion of site works.	Week 4
	B - Release of preliminary information (draft report) in accordance with Specification Schedule S1.21.12	Week 6

C - The Remainder of the Investigation (Final Report) Week 7

11. Liquidated damages for delay

	per week	limit of liability
Section		
Completion of site works.		
Release of preliminary information in accordance with Specification Schedule S1.8.21.		
The Remainder of the investigation		

12. Method of measurement adopted in preparation of Bills of Quantities — "Site Investigation in Construction, UK Specification for Ground Investigation, 2nd Edition (2012)"

13. Rate of retention (recommended not to exceed 5%) — 0%

14. Limit of retention (% of Tender Total) (Recommended not to exceed 3%) — 0%

15. Bank whose Base Lending Rate is to be used — Bank of England

16. Name of the Principal Designer — Kier Construction London (TBC)
Address:

17. Period for Approval — Testing Schedule: 1 week
Draft Report: 1 week
Final Report: 1 week

18. Maximum sum for the Contractor to make changes without an instruction — £100

19. The arbitration procedure to be used is — a) The Institution of Civil Engineers' Arbitration Procedure (1997)

FORM OF AGREEMENT

THIS AGREEMENT made the_____day of_____20____.

BETWEEN

of

in the County of (hereinafter called "the Employer")

and

of

in the County of (hereinafter called "the Contractor")

WHEREAS the Employer is desirous that certain Investigations should be carried out in connection with

_____

_____

and has accepted a Tender by the Contractor for the carrying out of the Investigation.

NOW THIS AGREEMENT WITNESSETH as follows

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement, namely

   a) the said Tender and the written acceptance thereof
   b) the Drawings
   c) the Conditions of Contract
   d) Schedules 1 to 8
   e) the Specification
   f) the priced Bill of Quantities
   g) the Form of Warranty

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned the Contractor hereby covenants with the Employer to carry out the Investigation in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay to the Contractor in consideration of the carrying out of the Investigation the Contract Price at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed the day and year first above written.

SIGNED on behalf of the said ..... Ltd/plc (the Employer)

Signature ..... Signature .....

Position ..... Position .....

In the presence of ..... In the presence of .....

SIGNED on behalf of the said ..... Ltd/plc (the Contractor)

Signature ..... Signature .....

Position ..... Position .....

In the presence of ..... In the presence of .....

or

SIGNED (and SEALED*) AS A DEED by the said .....

..... Ltd/plc (the Employer)

In the presence of .....

SIGNED (and SEALED*) AS A DEED by the said .....

..... Ltd/plc (the Contractor)

In the presence of .....

* Delete as appropriate

SCHEDULES 1 - 8

Specification

The Specification shall be the *UK Specification for ground investigation,* 2nd Edition published by ICE Publishing, with the information, amendments and additions as described in the Schedules.

Schedule 1. Information and site-specific requirements
Schedule 2. Exploratory holes
Schedule 3. Investigation Supervisor's facilities
Schedule 4. Specification amendments
Schedule 5. Specification additions

Schedule 1: Information and site-specific requirements

S1.1 Name of Contract

The Greenwood Centre

S1.2 Investigation Supervisor

CampbellReith

S1.3 Description of Site

The site location is presented in Figure 1. The site is located at Greenwood Place, London, NW5, in the London Borough of Camden (NGR 528840E, 185400N), approximately 200m north-west of Kentish Town Station.

The site is bound to the north-west by Deane House, to the east by a road named Greenwood Place and to the west by Murphy's Yard.

The Greenwood Centre is composed of several connected structures forming a single one-storey complex which were historically a day centre and a hostel. Headroom in the northern section of the site is restricted by a low height ceiling of circa 2.7m. If ceiling tiles are removed this can be increased to 3.1m.

S1.4 Main works proposed and purpose of this contract

The proposed site redevelopment is shown in Figure 3a. It is proposed to demolish the existing buildings and construct a new community centre with a single storey basement beneath the north west part of the building. Available plans indicate the finished floor level for most of the basement to be around 32.70m OD. Locally a pool and associated balance tank are to be constructed in the basement and these features are indicated to have a finished floor level the region of 31.43m OD.

S1.5 Scope of Investigation

The investigation should comprise the following:

- Full time supervision of the site works.
- Health and Safety Documentation in accordance with CDM 2015.
- 3 cable percussive boreholes to 15-25m.
- 4 Foundation inspection pits.
- 4 in-situ CBR tests by TRL probe.
- Geotechnical sampling and laboratory testing.
- Geo-environmental sampling and laboratory testing.
- Production of a Factual Report.

It should be noted that the investigation is proposed to be undertaken prior to demolition of existing buildings. Consequently it is noted that a de-mountable cable percussive rig will be required. Partial demolition of

structures can be arranged by the client if deemed required for health and safety purposes or deemed to provide an economical saving to the cost of the ground investigation. It should be noted that a suspended floor slab is suspected in the northern site section in the location of BH1 and potentially in the location of FIP1. The Contractor is to ensure that a floor slab risk assessment and mitigation measures are in place before setting up equipment. Liaison with the principal contractor (Kier) will be required and any enabling works should be agreed directly.

S1.6 Geology and Ground Conditions

The following general assessment of the geology of the site and ground conditions has been inferred from available information and historical site investigation. No assurance is given to its accuracy.

An area of 'Worked Ground' is shown on geological mapping on the western corner of the site, which would suggest it has a minimum thickness of 5m. It is also likely that Made Ground will be present overlying the London Clay in the remainder of the site, although this is likely to be of a lesser thickness than the 'Worked Ground' as it is not shown on geological mapping.

Strata	Depth to Base (m bgl)	Description
Made Ground / Worked Ground	Unknown	Man-made granular and cohesive soils of unknown thickness, associated with historical development of the site.
Alluvium	Unknown	A former tributary of the River Fleet is anticipated to be present beneath the site. It is therefore possible that Alluvial deposits may be present on site overlying the London Clay.
London Clay	50m bgl	Firm brown clay, becoming stiff to very stiff blue silty clay with depth.

S1.7 Schedule of Drawing(s) and Documents

Figures
Figure 1: Site location plan.
Figure 2: Existing site layout.
Figures 3a: Proposed development plan.
Figure 4: Exploratory Hole location plan.

Reports
AEDsrm-11167-300415-LQS-F3: CampbellReith Preliminary LQS.
Type II Asbestos Surveys.

S1.8 General requirements (Specification Section 3) Particular restrictions / relaxations

The Contractor should note there are amendments and additions to the Standard Clauses - refer to Schedules 4 and 5.

S1.8.1 Quality Management System (Clause 3.3)

Accreditation to BS EN ISO 9001 is required.

S1.8.2 Professional Attendance (Clause 3.5.2)

The Contractor shall provide suitably qualified personnel, with not less than 5 years relevant experience to supervise the works and undertake the tasks detailed in Specification.

The Contractor is to provide competent staff to undertake all site operations detailed in S1.5 and Schedule 2. The Contractor is to provide all names, contact numbers and relevant certification for all site personnel listed within this report.

All site staff provided by the Contractor will be required to hold a valid CSCS Card.

S1.8.3 Provision of ground practitioners and other personnel (Clauses 3.6.1 and 3.6.2)

S1.8.4 Hazardous ground, land affected by contamination and notifiable and invasive weeds (Clauses 3.7.1 and 3.22)

A Preliminary Land Quality Statement has been prepared for the site and the Contractor is required to appraise the matter in relation to the safe completion of site investigation works.

Type II asbestos surveys are available for the site. The Contractor should consider asbestos in soils or structures as a presumed risk. The Contractor shall review the information provided at tender stage and make provision for any additional assessments needed to appraise the associated risks in order to safely control the works.

S1.8.5 Additional information on services not shown on Contract drawings (Clause 3.7.2)

The Contractor should satisfy themselves that they have all necessary information in order to mitigate Health & Safety risk associated with underground services and utilities and if not, notify the Investigation Supervisor of what measures shall be required to do so.

The Contractor shall take full responsibility for the location, avoidance and protection of all underground and over ground services.

S1.8.6 Known suspected mine workings, mineral extractions, etc. (Clause 3.7.3)

S1.8.7 Protected species (Clause 3.7.4)

S1.8.8 Archaeological remains (Clause 3.7.5)

S1.8.9 Security of site (Clause 3.11)

The site is a disused building not accessible to the Public. Security guards are currently present at the site 24 hours a day.

S1.8.10 Traffic management measures (Clause 3.12)

S1.8.11 Restricted working hours (Clause 3.13)

Working site hours will be restricted to 08:00 to 18:00 hours Monday to Friday inclusive. This is subject to confirmation.

S1.8.12 Trainee site operatives (Clause 3.14.1)

Not permitted.

S1.8.13 Contamination avoidance and/or aquifer protection measures required (Clauses 3.15.2 and 3.15.3)

S1.8.14 Maximum period for boring, pitting or trenching through hard material, hard stratum or obstruction (Clauses 2.8, 4.3 and 6.4)

One hour upon which time the Investigation Supervisor is to be advised of progress.

S1.8.15 Reinstatement requirements (Clause 3.16)

Backfilling of boreholes with bentonite is required where no installation is present.

S1.8.16 Hygiene facilities required (Clauses 2.20 and 3.16.1)

The contractor may use welfare facilities within the existing building, this is to be confirmed.

S1.8.17 Unavoidable damage to be reinstated by Contractor (Clause 3.16.1)

S1.8.18 Accuracy of exploratory hole locations (Clauses 3.19 and 3.20)

The as built positions of all exploratory holes shall be related to the National Grid system to an accuracy of 0.50m.

The elevation of the ground at each exploratory hole shall be related to Ordnance Datum to the nearest 0.05m.

S1.8.19 Photography requirements (Clause 3.25)

Photographs are required. Photographs shall be supplied within the digital copy of the report.

S1.8.20 Approvals

S1.8.21 Meetings

An Engineer from CampbellReith may meet the contractor on site during works. This is subject to confirmation.

Due to access restrictions it is recommended that the contractor visits site prior to mobilising site equipment. Tender visits are outlined in Item 13 of the Site Investigation Contract.

S1.9 Percussion boring (Specification Section 4) Particular restrictions / relaxations

S1.9.1 Permitted methods and restrictions (Clauses 4.1 to 4.4)

Due to access restrictions it is anticipated that a de-mountable cable percussive rig will be the most appropriate method of borehole construction. Cable percussive boreholes shall take into account the restricted head room at site.

Some locations will be undertaken on a suspended floor slab. This floor slab is of concrete construction and suspected to be raised above ground level by 0.60 - 1.0m (variable). The Contractor is to ensure that a floor slab risk assessment and mitigation measures are in place before setting up equipment.

It should be noted that ventilation equipment may be required.

S1.9.2 Backfilling (Clause 4.5)

Exploratory holes shall backfilled with bentonite or lean mix concrete where installs are not required.

All working areas shall be returned to their original condition and the reinstatement is to be such that the risk of subsequent trip hazard forming is avoided.

S1.9.3 Dynamic sampling (Clause 4.6)

Dynamic sampling is to comprise windowless sampling undertaken using a track mounted rig capable of undertaking SPTs. SPTs shall be taken at 1.0m intervals.

S1.10 Rotary drilling (Specification Section 5) Particular restrictions / relaxations

Not required.

S1.11 Pitting and trenching (Specification Section 6) Particular restrictions / relaxations

It should be noted that historical concrete slabs may be present within borehole positions. The contractor shall provide breaking apparatus to penetrate concrete slabs to enable borehole and foundation inspection pit construction, if deemed safe to do so. The Contractor is to ensure that a floor slab risk assessment and mitigation measures are in place before setting up equipment.

S1.11.1 Detection of buried services and inspection pits (Clauses 3.8.3 and 6.1)

The Contractor shall complete a specialist service scan of each proposed exploratory location to confirm it is free of detectable services. Where a service is detected or suspected in the vicinity of the location the proposed exploratory location this shall be relocated a safe distance from the service.

Where services are suspected, known or found to be in close proximity to the proposed exploratory hole, the Investigation Supervisor should relocate the hole to be clear of the services. The revised location should take into account statutory/required safe distances from services. If the location of the exploratory hole cannot be moved, further inspection pits are to be excavated to confirm the services location and ensure that they will be unaffected by the investigation. This may need the approval of the utility company.

The use of inspection pits should, wherever possible, prove the positive presence of services rather than their absence. In some cases, inspection pits may need to be excavated beyond 1.20m bgl in order to be appropriate. This may include areas where land has been raised since services installation or to locate services at greater depth (e.g. foul sewer and high-voltage electricity cables). As a general reference, please consult and adhere to:

Health & Safety Executive (HSE) Publication 47, Avoiding Danger from Underground Services, 2005.

S1.11.2 Restrictions on plant or pitting / trenching methods (Clauses 6.2 and 6.3)

S1.11.3 Entry of personnel (Clause 6.5)

S1.11.4 Alternative pit and trench dimensions (Clause 6.7)

S1.11.5 Abstracted groundwater from land affected by contamination (Clause 6.9.2)

S1.11.6 Backfilling (Clause 6.10)

S1.11.7 Photographic requirements (Clause 6.12)

Photographs are required of all positions within the Factual Report - sufficient photographs to show the condition of the site prior to the start of the works and upon completion must be taken. All starter pit locations and any services, obstructions and foundations are to be photographed as per good practice described in BS EN ISO 5930:A2 2015.

S1.11.8 Artificial lighting (Clause 6.12.2)

Artificial lighting shall be provided as required to obtain suitable photographs.

S1.11.9 Provision of pitting equipment and crew for Investigation Supervisor's use (Clause 6.13)

S1.11.10 Foundation Inspection Pits

Foundation inspection pits shall reveal the full depth, width and geometry of the foundation and shall allow sampling and description of the bearing stratum. Such excavations shall have a minimum base area of $1.5m^2$.

The depth (related to Ordnance Datum), width and any stepping of the foundation shall be recorded with a description of the construction materials. Records shall include cross sections and sketches of excavation faces. Photographs are required. Foundation inspection pits are not to be backfilled until they have been inspected by an engineer from CampbellReith.

S1.12 Sampling and monitoring during intrusive investigation (Specification Section 7) Particular restrictions / relaxations

S1.12.1 Address for delivery of selected geotechnical samples (Clause 7.6.1)

This clause also refers to samples taken for contamination testing.

S1.12.2 Retention and disposal of geotechnical samples (Clause 7.6.2)

This clause also refers to samples taken for contamination testing.

S1.12.3 Frequency of sampling for geotechnical purposes (Clause 7.6.3 - 7.6.11)

- The minimum frequency of sampling is described in Cl 7.6.4. The frequency of sampling and in situ testing is dependent on the ground conditions and shall be such that each and every soil stratum including all near surface strata, is sampled, defined and identified. It is to be ensured that samples are typical of the zone from which they have been taken. Sampling is to be sufficient to permit the determination of desiccation in the upper 4m and to allow the design, where required, of working platforms.
- In addition to the frequency stipulated in Cl 7.6.4, bulk disturbed samples shall be taken over the depth of SPTs in granular soils and fill.
- In cohesive soils open tube samples and SPTs are to be alternated at the frequency described above, unless noted otherwise in Schedule 2.
- In pits, trenches and dynamic sampler holes window/windowless samples holes small disturbed samples shall be taken of the topsoil, at each change in soil type or consistency and between successive bulk disturbed samples. Where achievable, bulk samples shall be taken at 1m intervals with at least one large bulk disturbed samples of each soil type.

S1.12.4 Open-tube and piston sample diameters (Clause 7.6.5)

UT100 samples are required at a spacing based on S1.12.3. However, subject to the agreement with the Investigation Supervisor, it may be permissible to adopt U100 sampling on the following basis for a given exploratory hole:

1. In the event of a UT100 refusing or failing, the hole is to be cleaned out and a U100 undertaken and a UT100 attempted at the next scheduled depth for an open tube sample based on S1.12.3 above.
2. If undertaking item 1 above results in two successive failures or refusals to UT100 sampling, the hole is to be cleaned out and a U100 undertaken. From then on U100 samples are to be undertaken for the remainder of the hole at the scheduled depths for open tube samples based on S1.12.3 above.

Refusal or failure UT100 sampling is defined as (i) damage to the cutting shoe which is considered by the supervising geotechnical engineer to result in sample disturbance (ii) the failure to recover a sample of sufficient length to facilitate the testing of a 100mm diameter sample for undrained shear strength in triaxial apparatus or (iii) recovery of a sample which is considered, by the supervising engineer, to be disturbed.

S1.12.5 Retention of cutting shoe samples (Clause 7.6.5)

S1.12.6 Delft and Mostap sampling (Clause 7.6.12)

S1.12.7 Groundwater level measurements during exploratory hole construction (Clause 7.7)

Strikes and rises in groundwater to be noted during exploratory hole construction on corresponding exploratory hole log.

S1.12.8 Special geotechnical sampling (Clause 7.8)

S1.12.9 Address for delivery of selected samples (Clause 7.9.2)

S1.12.10 Retention and disposal of contamination / WAC samples (Clause 7.9.3)

S1.12.11 Frequency of sampling for contamination testing (Clause 7.9.4)

- Soil samples shall be recovered from each exploratory hole at a minimum as follows:
- 0 - 0.15m in topsoil or surface layer;
- At 0.25m into each soil layer beneath. This depth is to be revised to a central position when the soil layer is less than 0.40m deep; and,
- In Made Ground at minimum 1.00m intervals.
- The extent of sampling shall ensure that samples are recovered for each soil type, including undisturbed soils, Made Ground, and any horizon exhibiting visual or olfactory signs of contamination. Particular care shall be taken to ensure that each different type of Made Ground are sampled.
- Where suspected Asbestos Containing Materials (ACM) are encountered within the soils, an additional sample of the bulk ACM shall be collected together with a soil sample from the corresponding position. Where ACM is to be sampled, this should be undertaken under appropriate risk assessed methodologies utilising PPE, RPE and any other mitigation as deemed necessary by the Contractor or their specialist sub-consultants. Samples should be – as a minimum – double bagged and labelled 'May Contain Asbestos' and delivered by an appropriately licenced courier to a specialist laboratory.

S1.12.12 Sampling method (Clause 7.9.5)

Where insufficient sample volumes are available to provide the soil samples described under S1.12.11, the Contractor shall notify the Engineer and request alternative instructions.

S1.12.13 Headspace testing (Clause 7.9.8)

S1.12.14 Sample Containers and Deviating Samples (Clause 7.9.6)

The Contractor shall ensure that the sample container, preservation, storage/holding and transit arrangements are sufficient to prevent any sample for contamination becoming a 'deviating sample' (Refer to UKAS "Guidance on Deviating Samples").

In advance of works the Contractor shall be required to confirm with the laboratory the specific arrangements for site based filtration of water and preservation of the sample in light of the range of determinants proposed by the Consultant for works and shall be required to provide sufficient sample containers for this purpose. The Contractor shall then comply with these requirements in full.

The Contractor shall notify the Consultant if any expedited sample scheduling is required to prevent the holding time of any determinant proposed by the Consultant at tender stage being exceeded.

As a minimum all environmental soil samples shall comprise an 825 ml plastic tub, 250 ml glass jar (wide neck) and 2 no. 60 ml glass jar (clear vial with PTFE seal). Additional samples shall be obtained where required to comply with the laboratory.

As a minimum all environmental water samples shall comprise an 100 ml plastic bottle, 40 ml vial, 500 ml plastic bottle and 1000ml glass bottle (dark). Additional samples shall be obtained where required to comply with the laboratory.

S1.13 Probing and cone penetration testing (Specification Section 8) Particular restrictions / relaxations

Not required.

S1.14 Geophysical testing (Specification Section 9) Particular restrictions/relaxations

Not required.

S1.15 In situ testing (Specification Section 10) Particular restrictions/relaxations

S1.15.1 Tests in accordance with British Standards (Clause 10.3)

At CBR locations the test is to be carried out using a TRL probe and is to commence below any existing hard standing or 300mm bgl (whichever is deeper) and is to extend to 1.00m bgl. Where specified in Schedule 2, a hand dug pit is to extend over the tested zone and materials are to be sampled and logged as described is S1.12.3.

S1.15.2 Hand penetrometer and hand vane for shear strength (Clause 10.4.1)

Hand shear vane and/or hand penetrometer testing is required in situ or on block samples in all cohesive strata to 2m depth.

S1.15.3 Self-boring pressuremeter and high-pressure dilatometer testing and reporting (Clause 10.5.1)

S1.15.4 Driven or push-in pressuremeter testing and reporting requirements (Clause 10.5.2)

S1.15.5 Menard pressuremeter tests (Clause 10.5.3)

S1.15.6 Soil infiltration test (Clause 10.6)

S1.15.7 Special in situ testing and reporting requirements (Clause 10.7)

S1.15.8 Interface probes (Clause 10.8)

S1.15.9 Contamination screening tests (Clause 10.9)

S1.15.10 Metal detection (Clause 10.10)

The CampbellReith preliminary LQS report has stated that the risk of encountering UXOs is considered to be **Low**.

Notwithstanding the above information, UXO hazards should be included as part of the health and safety briefing and tool box talks during the works, such that if any suspicious articles are found, they can be quickly identified and treated appropriately by specialist inspection.

S1.16 Instrumentation (Specification Section 11) Particular restrictions/relaxations

S1.16.1 Protective covers for installations (Clause 11.2)

Flush cover and rubber bung to be used unless noted otherwise in Schedule 2.

S1.16.2 Protective fencing (Clause 11.3)

S1.16.3 Standpipe and standpipe piezometer installations (Clauses 11.4.1 and 11.4.2)

S1.16.4 Other piezometer installations (Clause 11.4.3)

S1.16.5 Development of standpipes and standpipe piezometers (Clause 11.4.5)

Well development is required to ensure the well is suitable for subsequent sampling and for in situ permeability tests. It is required to settle down the filter pack, break down any remoulded soil on the BH wall

surface formed during installation. Reference should be made to BS ISO 14686 (2003) for appropriate methods depending on strata.

S1.16.6 Ground gas standpipes (Clause 11.5)

Ground gas monitoring standpipes are to be incorporated into standpipes as per described in S1.16.3. Construction details are provided within Schedule 2.

S1.16.7 Inclinometer installations (Clause 11.6)

S1.16.8 Slip indicators (Clause 11.7)

S1.16.9 Extensometers and settlement gauges (Clause 11.8)

S1.16.10 Settlement monuments (Clause 11.9)

S1.16.11 Removal of installations (Clause 11.10)

S1.16.12 Other instrumentation (Clause 11.11)

S1.17 Installation monitoring and sampling (Specification Section 12) Particular restrictions/relaxations

S1.17.1 Groundwater level readings in installations (Clause 12.2)

The Contractor should note there are amendments to the Clause to which this Schedule relates - refer to Schedule 4.

S1.17.2 Groundwater sampling from installations (Clause 12.3.1)

The Contractor shall obtain post fieldwork water samples from installations during monitoring. (3 no.) return visits shall be made to site for monitoring. Refer also to S1.17.7.

S1.17.3 Purging/micro-purging (Clause 12.3.2)

Purging of all installations where groundwater sampling is required to continue until conductivity, pH, temperature, dissolved oxygen and redox potential have stabilised.

S1.17.4 Ground gas monitoring (Clause 12.4)

The Contractor should note there are amendments to the Clause to which this Schedule relates - refer to Schedule 4.

The Contractor monitor post fieldwork installations. (3 no.) return visits shall be made to site for monitoring. Samples containers shall be compliant with S1.17.7.

S1.17.5 Sampling from ground gas installations (Clause 12.5)

If concentrations of CH_4 exceed 1.0% vol., concentrations of CO_2 exceed 5.0% vol, concentrations of Volatile Organic Compounds (VOCs) exceed 20ppm or concentrations of oxygen are less than 10% vol, collect gas samples using either tedlar bags, or negative pressure gas canisters.

S1.17.6 Other monitoring (Clause 12.8)

S1.17.7 Sampling and testing of surface water bodies (Clause 12.9)

S1.18 Daily records (Specification Section 13) Particular restrictions/relaxations

S1.18.1 Information for daily records (Clause 13.1)

The Contractor should submit a copy of the previous days works in the form of a printed sheet or Driller's log no later than noon the following day.

S1.18.2 Special in situ tests and instrumentation records (Clause 13.4)

S1.19 Geotechnical laboratory testing (Specification Section 14) Particular restrictions / relaxations

S1.19.1 Investigation Supervisor or Contractor to schedule testing (Clause 14.1.1)

Investigation Supervisor to schedule geotechnical, contamination and waste testing.

S1.19.2 Tests required (Clause 14.1.2)

- Refer to Section K of the Bill of Quantities.
- The Contractor shall inform the Investigation Supervisor at tender stage if testing procedures are to vary from those specified.

S1.19.3 Specifications for tests not covered by BS 1377 and options under BS 1377 (Clauses 14.2.1 and 14.4)

S1.19.4 UKAS accreditation to be adopted (Clause 14.3)

UKAS accreditation is required for all geotechnical tests.

S1.19.5 Rock testing requirements (Clause 14.5)

S1.19.6 Chemical testing for aggressive ground / groundwater for concrete (Clause 14.6) (Test Suites A-D are overleaf)

- The quantity of anticipated testing is given in the Bill of Quantities.
- The test methods must comply with Suite B/D.

S1.19.7 Laboratory testing on site (Clause 14.7)

S1.19.8 Special laboratory testing (Clause 14.8)

SCHEDULE 1.19.6 (Derived from BRE Special Digest SD1)

CHEMICAL TESTS ON POTENTIALLY AGGRESSIVE GROUND/GROUNDWATER

SUITE B Greenfield site (pyrite present)			
Sample type	**Determinand**	**Recommended test methods**	**Test method specified**
Soil	pH in 2.5:1 water/soil extract	BR 279 Electrometric	Any of the recommended
		BS 1377 Part 3, Method 9	
	SO_4 in 2:1 water/soil extract	BR 279 Gravimetric method, cation exchange or ion chromatography	
		BS 1377 Part 3 Method 5.3 + 5.5	
		TRL: 447 Test 1	
	Acid soluble SO_4	BR 279 Gravimetric method	
		BS 1377 Part 3, Method 5.2 + 5.5	
		TRL 447 Test 2	
	Total sulphur	BR 279 Ignition in oxygen	
		TRL 447 Test 4A	
		TRL 447 Test 4B	
Groundwater	pH	BR 279 Electrometric	
		BS 1377 Part 3, Method 9	
	SO_4	BR 279 Gravimetric method, cation exchange or ion chromatography	
		BS 1377 Part 3 Method 5.4 + 5.5	
		Commercial lab in-house procedure – determination of sulphur by ICP-AES[1]	

[1] ICP-AES: inductively coupled plasma atomic emission spectroscopy.

SCHEDULE 1.19.6 (Derived from BRE Special Digest SD1) continued

CHEMICAL TESTS ON POTENTIALLY AGGRESSIVE GROUND/GROUNDWATER

SUITE D Brownfield site (pyrite present)			
Sample type	**Determinand**	**Recommended test methods**	**Test method specified**
Soil	pH in 2.5:1 water/soil extract	BR 279 Electrometric	Any of the recommended
		BS 1377 Part 3, Method 9	
	SO_4 in 2:1 water/soil extract	BR 279 Gravimetric method, cation exchange or ion chromatography	
		BS 1377 Part 3 Method 5.3 + 5.5	
		TRL: 447 Test 1	
	Acid soluble SO_4	BR 279 Gravimetric method	
		BS 1377 Part 3, Method 5.2 + 5.5	
		TRL 447 Test 2	
	Total sulphur	BR 279 Ignition in oxygen	
		TRL 447 Test 4A	
		TRL 447 test 4B	
	Mg (only required if water soluble SO_4 > 3000 mg/l)	BR 279 AAS[1] method	
		Commercial lab in-house procedure – varianet of BR 279 using ISP-AES[2]	
	NO_3 in 2:1 water/soil extract (only required if pH < 5.5)	BR 279	
	C1 in 2:1 water/soil extract (only required if pH < 5.5)	BR 279	
		BS 1377 Part 3, Method 7.2	
Groundwater	pH	BR 279 Electrometric	
		BS 1377 Part 3, Method 9	
	SO_4	BR 279 Gravimetric method, cation exchange or ion chromatography	
		BS 1377 Part 3 Method 5.4 + 5.5	
		Commercial lab in-house procedure – determination of sulphur by ICP-AES[2]	
	Mg (only required if water soluble SO_4 ≥ 3000 mg/l)	BR 279 AAS method[1]	
		Commercial lab in-house procedure – Mg in solution by ICP-AES[2]	
	NO_3 (only required if pH < 5.5)	BR 279	
	C1 (only required if pH < 5.5)	BR 279	
		BS 1377 Part 3, Method 7.2	

[1] AAS: atomic absorption spectrometry.
[2] ICP-AES: inductively coupled plasma atomic emission spectroscopy.

S1.20 Geoenvironmental laboratory testing (Specification Section 15) Particular restrictions / relaxations

S1.20.1 Investigation Supervisor or Contractor to schedule testing (Clause 15.1)

Investigation Supervisor to schedule all testing.

S1.20.2 Accreditation Required (Clause 15.2)

The Contractor should note CampbellReith have made an amendment to the Clause to which this Schedule relates. The Contractor should refer to Schedule 4 for these requirements.

The Contractor shall notify the Investigation Supervisor where any accreditation cannot be achieved or when any sample deviates prior to reporting (refer to UKAS 'Guidance on Deviating Samples').

S1.20.3 Chemical testing for contamination (Clause 15.3)

The chemical analytical laboratory shall be Specific. The Contractor shall refer to following tables indicating the contamination test suites for soil, water and gas which may be required as part of the works. All analytical tests are required on a 10 day turnaround.

The Contractor shall notify the Investigation Supervisor where any Limit of Detection (LOD) cannot be achieved. The Contractor shall state in his tender return where any test method inserted in Schedule 1.20.3 cannot be achieved.

pH tests on soils and groundwater and sulphate tests on groundwater are to comply with methods prescribed S1.19.6

SCHEDULE 1.20.3

PRIMARY SOIL ANALYSIS SUITES (CONTRACTOR TO COMPLETE METHOD AND LAB)

		LOD
s1.1	As, Cd, Cr, Cu, Ni, Pb, Hg, Se, Zn	1mg/kg
	Cyanide (total)	1mg/kg
	pH	Unit 0.1%
	TPH screen (C6-C40)	10mg/kg
	PAH (16 speciated)	0.01mg/kg
	Phenol (total)	0.01mg/kg

		LOD
s1.2	Phenol (total)	0.01mg/kg
s1.3	Asbestos in Soil using stereo microscopy	Detected
s1.4	Total Organic Carbon	%
s1.5	Sulphate (total)	50 mg/kg

		LOD
s1.6	As, Cd, Cr, Ni, Pb, Hg, Se, Cu, Zn,	1mg/kg
	Moisture Content	0.1 %
	PAHs USEPA 16	0.01mg/kg
	EPH Banded (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, >C21)	0.01mg/kg
	Sulphate (total)	50 mg/kg
	Sulphide	15 mg/kg
	Phenols Monohydric (Total of Phenol+Cresol+Xylenol)	0.025mg/kg
	Cyanide (total)	1mg/kg
	pH	pH

		LOD
s1.7	TPH – CWG (C5-40) Aliphatic/Aromatic Split (with CWG banding) Ali C5-6,>6-8,>8-10,>10-12,>12-16,>16-35,>35-44 Aro - >C6-7,>7-8,>8-10,>C10-12,>12-16,>16-21,>21-35, >35-44	0.1mg/kg

		LOD	Method / Lab
s1.8	(As S1.3 above) Asbestos in Soil using stereo microscopy	Detected	Asbestos in Soil using stereo microscopy
s1.9	Identification of Asbestos in a Bulk material by PLM (e.g. identification of asbestos in a product such as a cement).	Present / Absent	HSG 248
s1.10	Gravimetric Quantification of Bulk Asbestos Products and Fibre Bundles in soils by PLM/PCOM	0.1%	HSG 248/HSG 264
s1.11	Detailed Gravimetric Quantification and Free Fibre Dispersion and Collection by PLM/COM	0.001%	HSG 248/HSG 264/HSE Report NO. 83/19964

		LOD
s1.12	Soil Leachate Preparation (specific determinants specified as water)	NA
s1.13	Fraction Organic Carbon (for NC/99/11)	Fraction

OTHER SOIL ANALYSIS

		LOD
	CLEA Metals (specify after CLR 8)	
	Barium	1mg/kg
	Beryllium	1mg/kg
	Vanadium	1mg/kg
	Water Soluble Boron	1mg/kg
	Hexavalent Chromium	0.3mg/kg
	Zinc	1mg/kg
	CLEA Inorganic Chemicals (specify after CLR 8)	
	Cyanide (Free)	1mg/kg
	Nitrate (soluble) as NO3	1mg/kg
	Nitrite (soluble) as NO2	0.01 mg/kg
	Water Soluble Sulphate as SO4 2:1 Extract	0.003g/l
	Sulphate (Total)	50mg/kg
	Non CLEA Inorganic Chemicals	
	Ammoniacal Nitrogen – as N	0.3mg/kg
	Fluoride	0.25mg/kg
	Nitrite	0.3mg/kg
	Phosphate	1mg/kg
	Sulphur (Elemental)	50mg/kg
	Sulphur (Total)	0.01%
	Thiocyanate	1mg/kg
	Non CLEA Miscellaneous	
	Leachate Prep – TCLP	NA
	Loss on ignition	0.10%
	Calorific Value	MJ/kg
	CLEA Organic chemicals	
	PAH (16 speciated) (Modified EPA 8100)	0.001mg/kg
	Benzo(K)fluoranthene	0.001mg/kg
	TPH – Risk Based Evaluation Package (C6-C40)	10mg/kg
	TPH – CWG (C5-35)	0.1mg/kg
	TPH – UK CWG (EC5 – EC70) for EA report P5-08/TR3	0.1mg/kg
	BTEX by GC-MS (	0.001mg/kg
	Phenols (speciated)	10mg/kg
	TLC (mineral oils, aromatics, NSO resins)	10mg/kg
	PCBs (7 congeners)	0.001mg/kg
	PCBs (total aroclors)	0.001mg/kg
	Acetone	0.001mg/kg
	CLEA Semi Volatile Organic Compounds (SVOCs)	
	SVOCs target list (Modified US EPA 8270)	0.1mg/kg
	SVOC scan (up to 10 peaks, >80% fit)	1mg/kg
	CLEA Volatile Organic Compounds (VOCs)	
	VOCs target list only (Modified US EPA 8260)	0.1mg/kg
	CLEA Organics	
	Glycol Suite: Monoethylene glycol, propylene glycol, diethylene glycol, triethyleneglycol	0.1mg/kg
	Alcohol suite: methanol, ethanol, i-oropanol, methyl acetate, n-propanol, ethyl acetate, i-propyl acetate, n-butanol, n-propyl acetate, n-oentanol, n-butyl acetate, n-hexanol, n-heptanol (both 1mg/kg)	0.1mg/kg
	Pesticides – Combined suite	0.001mg/kg
	Pesticides – Organochlorine suite	0.001mg/kg
	Pesticides – Organophosphorous suite	0.001mg/kg
	Total Organic Carbon (TOC)	0.01%

	Atrazine and simazine	0.01mg/kg
	Dioxins and furans	0.001mg/kg
	Organolead compounds	0.01mg/kg
	Organotin compounds	0.01mg/kg

DC - Distillation/colourmetric. IC - Ion Chromatography

PRIMARY WATER ANALYSIS SUITES (CONTRACTOR TO COMPLETE METHOD AND LAB)

		LOD
w1.1	As, Cd, Cr, Cu, Ni, Zn, Pb, Hg, B, Se, hex Cr	0.001mg/l
	Total cyanide, free cyanide, thiocyanate	1.0ug/l
	PAH (total), TPH (total), phenol (total)	0.1ug/l
	Sol sulphate, sulphide, free sulphur	0.1mg/l
	pH	0.01 units

		LOD
w1.2	PAH (total)	1mg/l
w1.3	PAH (total of USEPA 16)	0.01mg/l
w1.4	PAH (16 speciated) (Modified EPA 8100)	0.01ug/l
w1.5	TPH – CWG (C5-35) based on TNRCC method 1006	0.01mg/l
w1.6	Petrol Range Organics/BTEX/MTBE	0.01mg/l
w1.7	BTEX by GC-MS (Modified US EPA 8150)	0.001mg/1
w1.8	SVOCs target list (one extraction only) (Modified US EPA 8270)	0.001mg/l
w1.9	SVOC scan (up to 10 peaks, >80% fit)	0.01mg/l
w1.10	VOCs target list only (Modified US EPA 8260)	0.001mg/l
w1.11	VOCs target list plus TICs (top 10 peaks to 0.01mg/1 only) (Modified US EPA 8260)	0.001mg/l
w1.12	Phenols (total) by HPLC	0.01mg/l
w1.13	Phenols (speciated)	0.01mg/l

OTHER WATER ANALYSIS

		LOD
	Glycol Suite:	
	Monoethylene glycol, propylene glycol, diethylene glycol, triethylene glycol	1mg/l
	Alcohol suite	
	Methanol, ethanol, i-opropanol, methyl acetate, n-propanol, ethyl acetate, i-propyl acetate, n-butanol, n-propyl acetate, n-pentanol, n-butyle acetate, n-hexanol, n-heptanol.	1mg/l
	PCBs (7 congeners)	0.01µg/l
	PCBs (total aroclors)	0.001mg/l
	Pesticides - Combined suite	0.01µg/l
	Pesticides - Organochlorine suite	0.01µg/l
	Pesticides - Organophosphorous suite	0.01µg/l
	Total Organic Carbon (TOC)	1mg/l
	Tributyl-tin/triphenyl-tin/dibutyl tin	0.05ug/l
	Atrazine and simazine	0.01mg
	Inorganics	
	Ammoniacal Nitrogen	0.2mg/l
	BOD	1mg/l
	COD	10mg/l
	Chloride	1mg/l
	Complex Cyanide	0.05 mg/l

	Easily Lib Cyanide	0.05 mg/l
	Dissolved Oxygen	0.1mg/l
	Electrical Conductivity	0.01 mS/cm
	Nitrate	0.3mg/l
	Nitrite	0.05mg/l
	pH	0.01 units
	Sulphide	0.05mg/l
	Magnesium	0.001mg

PRIMARY GAS ANALYSIS SUITES (CONTRACTOR TO COMPLETE METHOD AND LAB)

		LOD
g1.1	Bulk Gas - Methane (0.05%), Carbon Dioxide (0.05%), Oxygen (0.5%), Nitrogen (0.5%), Hydrogen (0.5%), Carbon Monoxide (1ppm), Hydrogen Sulphide (1ppm)	0.05%
g1.2	C1-C7 (Methane, Ethane, Ethene, Butane, Propane, Pentane, Hexane, Heptane)	1ppm
g1.3	VOCs inc BTEX.	10ppm

S1.20.4 Waste characterisation (Clause 15.4)

The Contractor should note an addition to Clause 3.26 - refer to Schedule 5.

The Contractor shall be responsible for the disposal and waste classification of soils from the site investigation in line with Environment Agency requirements and shall make appropriate provision for this at tender stage.

S1.20.5 Waste Acceptance Criteria testing (Clause 15.5) (Test Suites H - J are overleaf)

All analytical tests for waste are required on a 10 day turnaround. The Contractor shall notify the Investigation Supervisor where any Limit of Detection (LOD) cannot be achieved.

WAC Leachate	LOD (mg/kg)
Eluates for compliance using BS EN 12457 - 3 at L/S 10/kg (2 batch)	
As	0.5
Ba	20
Cd	0.04
Cr	0.5
Cu	2
Hg	0.01
Mo	0.5
Ni	0.4
Pb	0.5
Sb	0.06
Se	0.1
Zn	4
Cl	800
F	10
SO_4	1000 [1]
Total dissolved Solids (TDS) [2]	4000
Phenol Index	1
Dissolved organic Carbon at own pH or pH7.5-8.0 [3]	500

[1] This limit value for sulphate may be increased by 6,000, provided that the value of Co from a percolation test does not exceed 1,500 mg/l at L/S=0.1 l/kg. It will be necessary to use a percolation test to determine the limit value at L/S – 0.1 l/k.
[2] The values for TDS can be used instead of the values for Cl and SO4.
[3] DOC at pH 7.5-8.0 and L/S 10 can be determined on eluate derived from a modified version of the pH dependence test, prEN 14429, if the limit value at own pH (BS EN 12457 eluate) is not met.

		LOD
Full WAC Soil Suite	TOC, LOI, BTEX, PCBs, Mineral Oil C10-C40 Acid Neutralisation Capacity, PAHs-total (17 GC-MS)	1% or mg/kg
Inert WAC Soil Suite	TOC,BTEX, PCBs, Mineral Oil C10-C40, PAHs-total (17 GC-MS) 1% or mg/kg	1% or mg/kg
Hazardous WAC Soil Suite	TOC, LOI	1%

S1.20.6 Laboratory testing (Clause 15.6)

S1.20.7 Special laboratory testing (Clause 15.7)

S1.21 Reporting (Specification Section 16) Particular restrictions / relaxations

S1.21.1 Form of exploratory hole logs (Clauses 16.1 and 16.2.1)

Preliminary logs, Chain of Custody forms and blank test schedules shall be submitted to the Investigation Supervisor within 48hrs of exploratory hole completion.

S1.21.2 Information on exploratory hole logs (Clause 16.2.2)

- As required by Cl16.2.2 and additionally:
  - (i) The results of any in situ tests associated with the location.
  - (ii) Any visual or olfactory evidence of contamination and reference to/detail of any suspected asbestos containing materials (matrix and proportion).
  - (iii) In all granular soils (including Made Ground) the state of density shall be classified in accordance with BS EN ISO 14688-2.
  - (iv) In addition to natural fine soils, the consistency term shall be given for any Made Ground that would behave as a fine soil.
  - (v) For trial pits the ease/difficulty of excavation shall be recorded.
  - (vi) For cores or excavations into rock the FI shall be recorded.
  - (vii) The % recovery is to be recorded for dynamic sampling techniques.

S1.21.3 Variations to final digital data supply requirements (Clause 16.5.1)

AGS data is required in full incorporating both the main phase of fieldwork and all subsequent gas and water monitoring visits and iterative phases of chemical analysis. The data shall be checked by the Contractor prior to issue and be accompanied by the error log.

S1.21.4 Preliminary digital data (Clause 16.5.3)

Preliminary AGS digital data is to be issued as part of the draft report as follows:

Exploratory Hole records and laboratory soils data (geotechnical, contamination and waste) upon completion of all scheduled testing and data from any completed monitoring. Files must include legend codes and all other relevant exploratory hole log data. Multiple files may be provided for gas and groundwater results provided they are uniquely identified.

S1.21.5 Type(s) of report required (Clause 16.6)

A factual site investigation report as described in Schedule S1.21.8 is required.

S1.21.6 Electronic report requirements (Clause 16.6.3)

- PDF versions of the report shall make use of bookmarks in accordance with the guidance notes to Cl16.6.3.
- For draft and final reports, drawings are to be additionally provided in DWG or DXF formats and must include: north arrow, scale, a key and title indicating the subject of the drawings.
- Draft and final reports are to include AGS data as detailed in S1.21.3 and S1.21.4, although in the case of the latter updated to be consistent with the final report and to include the completed monitoring programme.
- In addition the draft and final reports are to include the following information in relation to contamination and waste testing:
  i) 'CrossTab' collated Microsoft Excel electronic copy of results;
  iii) Laboratory formatted data and MCERTS supporting data.
- Chemical analysis spread sheets shall be provided in:
  1. Excel spread sheet format that shall follow a consistent order and format for rows and columns to allow direct referencing across a given row/column for either a single determinant across all exploratory samples or vice versa.
  2. Separate sheets shall be provided for the analysis results for soil, water, leachate and gas.
  3. Each of the spread sheet fields shall be populated free of hidden data, spaces, or other insertions (other than explained symbols) that inhibit interpretation of data.
  4. The detection limit applicable to each chemical analysis, agreed at appointment, shall remain consistent throughout the works.
  5. The units of expression shall be consistent (e.g micrograms or milligrams) and shall remain consistent throughout the works for a given medium and parameter.
- Sample data shall be submitted to the Engineer electronically as soon as the complete data (eg. Schedule requested) becomes available and within 12 working days of receiving the applicable testing schedule from the Engineer

S1.21.7 Format and contents of Desk Study Report (Clause 16.7)

S1.21.8 Contents of Ground Investigation Report (or specified part thereof) (Clause 16.8)

- A factual report as described Cl 16.8.1, Cl16.8.2 and Cl 16.8.3 is required, with the following additions:
  Cl 16.8.1 items (c) and (h): key sheets are to be additionally provided
  Cl 16.8.1 Item (c): Chain of Custody records are to be additionally provided for all contamination and waste samples.
  Cl 16.8.1 Item (d): Calibration certificates are to be additionally provided where calibration is required by the testing standard adopted.
- In addition the contractor is to provide a section of the report detailing any known limitations to the in situ, ex situ or monitoring test results provided.

S1.21.9 Contents of Geotechnical Design Report (or specified part therefore) Clause 16.9)

S1.21.11 Times for supply of electronic information (Clause 16.10.1)

- Preliminary AGS data is required as given in S1.21.4 and AGS data is required upon issue of the draft and final reports. Drawings to be additionally provided in DWG or DXF formats at the time of issue of draft and final reports.

S1.21.12 Electronic information transmission media (Clause 16.10.2)

- Preliminary data to be issued via e-mail.
- Draft and Final reports and associated data to be issued via e-mail and on CD or DVD ROM.

S1.21.12 Report approval (Clause 16.11)

- One electronic copy of the report is required for draft issue. This is the 'Preliminary Information' referred to in the Appendix to the Form of Tender.
- One electronic copy of the report is required for final issue. This must be a signed copy.
- The period of approval will be that given in the Appendix to the Form of Tender.

S1.21.13 Contents of an Interpretative Phase 2 Report for Contamination

Where specified in S1.21.5 the Contractor shall prepare a Phase 2 contamination interpretive report in accordance with DEFRA and the Environment Agency's 'Model Procedures for the Management of Land Contamination', CLR11 and BS 10175.

This shall include a risk assessment of land potentially affected by contamination, or ground stability and slope stability reports, incorporate a Conceptual Model, Generic Quantitative Risk Assessment, Recommendations (for further investigation and remediation) and Conclusions. The report should be adequate to satisfy any contamination related planning conditions based on the results obtained.

The Contractor shall review the prescribed scope of investigation at the tender stage and advise the Consultant if this requires modification in order to allow a comprehensive report to be prepared which satisfies these technical guidance documents.

Schedule 2: Exploratory Holes

S2.1 Hole number

S2.2 Type

S2.3 Scheduled depth

S2.4 National grid reference

S2.5 Approximate ground level

S2.6 Remarks

Hole number	Type	Scheduled depth (m)	Standpipe installation details	Sampling and in situ testing	Remarks
BH1	Cable Percussive Borehole	25	Ground water / gas installation depth to be confirmed by investigation supervisor during site works	As per in S1.12	SPTs, UT100s, geotechnical and geo-environmental samples
BH2		25			
BH3		15			
FIP1	Foundation Inspection Pit	To base of foundation as per S1.11.10	N/A	As per S.1.12	Hand shear vanes, geotechnical and geo-environmental samples.
FIP2					
FIP3					
FIP4					
CBR1	TRL probe	1.2	N/A	As per S1.12, S1.15.1 and S1.15.2	Hand dug pit required over depth of test to retrieve geotechnical and geo-environmental samples.
CBR2					
CBR3					
CBR4					

Schedule 3: Investigation Supervisor's Facilities

S3.1 Accommodation – not required

S3.2 Furnishings – not required

S3.3 Services – not required

S3.4 Equipment – not required

S3.5 Transport – not required

S3.6 Personal Protective Equipment for Investigation Supervisor – not required

Schedule 4: Specification amendments

The following clauses are amended			
Section number	**Clause number**	**Delete the following**	**Substitute the following**
2	2.3	Delete second sentence.	Replace with 'They shall be competent to undertake the work required which shall include site reconnaissance, supervision of trial pitting, boring and drilling, logging soils to BS5930:2015, making observations of potential contamination, sampling appropriately and liaison with site owners / occupiers'.
3	3.9	... at least one working days' notice...	...at least two working days' notice.....
12.4	12.4.1	Add	1. The following parameters shall be monitored and recorded on each visit to the site. Items iv to viii shall proceed in the order stated and the gas tap shall be closed between the flow and gas concentration stages. i) Weather conditions on the day of and 24 hours prior to the visit. ii) Air temperature. iii) Barometric Pressure on day of visit and preceding 3 days. iv) Downhole temperature. v) Downhole pressure and equilibrium flow rate. vi) Timed initial, peak and steady state equilibrium concentrations (% vol) of CH_4, CO_2 and O_2 (ppm) concentrations of Volatile Organic Compounds (VOCs) and flow rates up to 3 minutes. If equilibrium is not achieved after 3 minutes the rate and direction of concentration change shall be recorded. vii) **If** concentrations of CH_4 exceed 1.0% vol., concentrations of CO_2 exceed 5.0% vol, concentrations of Volatile Organic Compounds (VOCs) exceed 20ppm or concentrations of oxygen are less than 10% vol, collect gas samples for laboratory analysis then fully purge borehole with nitrogen, close valve and remeasure 60 minutes after purging. viii) **If** post purge concentrations of CH_4 exceed 1.0% vol., concentrations of CO_2 exceed 5.0% vol, concentrations of Volatile Organic Compounds (VOCs) exceed 20ppm or concentrations of oxygen are less than 10% vol, collect a second set of gas samples for laboratory analysis. Engineer approval shall be obtained prior to commencement of any laboratory analysis.

			2. Monitoring on-site shall generally be undertaken using portable handheld equipment. The performance specification and accuracy of the equipment employed shall be stated in the final report. 3. Any damage to the monitoring installation or incidents of open gas taps upon arrival shall be recorded. 4. The name of the person monitoring shall be stated and wherever possible the same person should be used on each monitoring visit to maximise consistency. It is desirable monitoring visits are coordinated so as to include 'worst case' events comprising periods of rapidly falling barometric pressure.
12.2	12.2	Add	On each occasion of groundwater monitoring, sample collection shall be accompanied by records of: 1. Groundwater levels in standpipes; 2. Thickness and depth of any hydrocarbon free product (LNAPL or DNAPL); 3. Description of water condition including water colour, odour, turbidity and any hydrocarbon free product.
15.2	15.2	Add	1. Where additional testing outside the original scope of works is required, the analytical methods shall be agreed between the Engineer and Contractor. 2. Only laboratories and analytical methods accredited to and compliant with the 'MCERTS all Performance Standard for Laboratories Undertaking Chemical Testing of Soil' shall be used. Laboratories shall be BS EN ISO/IEC 17025:2000 accredited. 3. All analytical data presented shall be reported in accordance with the MCERTS Standard.

SCHEDULE 5: SPECIFICATION ADDITIONS

The following clauses are amended		
Section number	**Clause number**	**Clause wording**
3	3.15.1	Additional sentence: *'The Contractor shall take every reasonable precaution to ensure the safety of all persons entitled to be on the site and shall keep the site and site operations in an orderly state. He shall provide and maintain at his own expense all lights, guards, fencing and warning signs as may be required. Fencing shall be suitably robust. The Contractor shall reinstate surfaces/services in such a manner as to ensure that the Employer is safeguarded from any public liability associated with damage on accident.*
3	3.26	Additional sentence: 'The Contractor shall be fully responsible for the proper classification and disposal of all waste arisings that require removal from the site as part of the site investigation/and reinstatement works. The soil results produced as part of the works can be used, as appropriate, in this regard. Soils classification shall be in accordance with EA guidance document 'Framework for the Classification of Contaminated Soils or Hazardous Waste' Version 1, 2004; WM2 (as amended) and all subsequent best practice guidance amendments for waste.
3	3.28 (New Clause)	**CDM** The current site investigation is considered to be notifiable under the Construction (Design and Management) Regulations 2015. A Designers Risk Assessment is appended to this specification. The Contractor is required to act as Principal Contractor. The Principal Designer is thought to be Kier Construction London; this will be confirmed at a later date. The contractor shall produce appropriate Construction Phase Plans as per the requirements of CDM 2015.
3	3.29 (New Clause)	**Sub Contracting** Sub-contracting of any part of the works is not permitted unless the proposed sub-contractors are included in the tender or the written approval of the Engineer is obtained. All sub-contractors should have in place appropriate written quality control and quality assurance procedures. Evidence of UKAS accreditation for the specified testing and testing laboratory shall be provided to the Engineer in the tender.
3	3.31 (New Clause)	**Asbestos** It should be presumed that there is potential for asbestos containing materials to occur in the ground and structures at any site. Health and safety provisions shall be made by the Contractor to consider such an eventuality and to ensure the safety of workers. Particular care is to be taken during the site works to establish if bulk asbestos is present on the site. If asbestos is encountered which is either 'notifiable' or requires additional Health and Safety controls, all work of a disruptive nature is to cease and appropriate measures are to be agreed with the Engineer and the provisions of the Health and Safety Executive to render the asbestos safe in these circumstances. Work to be carried out in accordance with Control of Asbestos Regulations 2012.

SCHEDULE 6: LIST OF ACTIVITIES

(To be completed by tenderer)

SCHEDULE 7: INFORMATION REQUIRED

(To be completed by tenderer)

SCHEDULE 8: LIST OF PREMISES AND SUBCONTRACTORS

(To be completed by tenderer)

BILL OF QUANTITIES FOR GROUND INVESTIGATION

Preamble

1. In this Bill of Quantities the sub-headings and item descriptions identify the work covered by the respective items. The exact nature and extent of the work to be performed shall be ascertained by reference to the Conditions of Contract, the Specification and the Schedules and Appendices to the Specification, as appropriate. The rates and prices entered in the Bill of Quantities shall be deemed to be the full inclusive value of the work covered by the several items, including the following unless stated otherwise:

   a) Contract management and superintendence, labour and all costs in connection therewith
   b) The supply of materials, goods, storage, facilities and services and all costs in connection therewith, including wastage and delivery to site
   c) Plant and all costs in connection therewith
   d) Fixing, erecting and installing or placing of materials and goods in position
   e) All temporary works
   f) All general obligations, requirements, liabilities and risks involved in the execution of the investigation as set forth or implied in the documents on which the tender is based
   g) Establishment charges, overheads and profit
   h) Bringing plant and sampling, in situ testing and monitoring equipment to the site of each exploratory hole, erecting, dismantling and removing on completion
   i) On completion, removal of all equipment and services from site and disposal of arisings.

2. Unless identified as Not required, all items in section A of the Bill of Quantities (general items, provisional services and additional items), and also all items in subsequent sections against which quantities are entered shall be priced.

3. If lump-sum items are not required by the Contractor, this shall be stated against the rate item in the Bill of Quantities and £0.00 entered in the amount. Where rates are not priced they shall have £0.00 placed against them and £0.00 entered in the amount.

4. When full- or part-time professional attendance on site is required in accordance with Clause 3.5.2, this shall normally be paid for under Item A7 of the Bill of Quantities.

   Unless otherwise detailed in Schedule S1.8.2, the on-site professional attendance services provided by the technical staff shall comprise the technical supervision of site activities, site liaison, logistics, logging, in situ testing and sampling, photography and the preparation of daily records and preliminary logs (except where any of the above activities are carried out by site operatives and boring/drilling operatives).

   When individuals are not carrying out their specific duties or are otherwise away from site, then daily rates will not apply and these costs will be deemed to be covered under general items.

5. The rate entered under Item A3 shall include the provision of any additional PPE, ground surface protection measures, additional welfare and hygiene facilities and plant and equipment decontamination facilities required as a direct result of the contamination or hazard(s) detailed in Schedule S1.84 and/or S1.8.6.

6. The item for photographs shall allow for the standing time of associated plant and supply of negatives, enprints and bound volume or electronic equivalents.

7. Rates for moving plant and equipment to the site of each exploratory hole shall allow for the formation of access routes and working areas and making good avoidable damage to access routes and working areas on completion as required by the Contract.

8. The rates for moving rotary drilling plant to the site of each hole shall include for setting up over a previously formed borehole, including for any additional costs arising from pulling casings left in the ground or providing temporary casings.

9. Payment for forming exploratory holes shall be based on:

   a) full thickness of strata investigated and described in accordance with the Specification
   b) depths measures from ground level
   c) depth measured from original ground level where an inspection pit has been excavated
   d) that part of a drillhole below the bottom of a borehole where a drill hole has been ordered to continue from the bottom of a borehole
   e) core recovery of a least 90% in any core run, unless the Investigation Supervisor is satisfied it cannot be achieved
   f) volume calculated as measured length times measured depth times specified width for trial and observation trenches.

10. Rates for forming exploratory holes shall allow for:

   a) temporary casing installation, where necessary, and removal
   b) dealing with surface water
   c) backfilling with arisings
   d) taking information and supply of daily record for works carried by site operatives
   e) additional site supervision of non-qualified operatives.

11. Rates for aquifer protection measures shall allow for the measures detailed in Schedule S1.8.13.

12. Standing time shall be measured as the duration of time for which plant, equipment and personnel are standing on the instruction of the Investigation Supervisor or in accordance with the Specification.

    Standing time shall be paid for interruption of the formation of exploratory holes to record groundwater entry in accordance with clause 7.7. The rates for standing time shall include for:

   a) plant equipment and personnel
   b) consequential costs
   c) changes in the programme of working
   d) recording information and preparing daily record

13. The rates for daily provision of dynamic sampling and probing, hand augering and pitting and trenching crews and equipment at locations as directed by the Investigation Supervisor shall allow for compliance with the requirements of the Contract, including preparation of records (unless the Investigation supervisor takes responsibility for the logging and preparation of records).

    The rates for dynamic sampling Items B15-B17 and B19 shall include for the provision of liners.

14. The rates for sampling shall allow for the standing time of associated plant. The rates for sampling shall also include for the costs of the sample containers and transport and storage of the samples up to the specified time limits.

    The rate for taking a U100 or UT100 sample does not include for recovery of a sample from the cutting shoe.

    The rates for each of Items E14.1-E15.3 shall include for all necessary containers and collected samples for an individual determination of the specified contamination or WAC suite.

15. The rates for insitu testing shall allow for the standing time of associated plant and for interpretation and presentation of the results on preliminary logs/exploratory hole logs or on separate agreed report forms using the same dates of presentation as the exploratory hole to which they refer.

    In the case of the self-boring pressuremeter, high-pressure dilatometer or Menard pressuremeter, the rates shall also allow for the mutual standing of the respective boring/drilling plant and specialist testing equipment and crews during the combined process.

Where in situ testing is paid for on an hourly basis, the time measured shall be the actual time taken to carry out the test in accordance with the Investigation Supervisor's instruction and/or the Specification but excluding the time taken to erect and dismantle test equipment where this is itemised separately.

The rate for carrying out an SPT (whether using a split spoon or solid cone) does not include for recovery of an associated sample.

16. The rates for cone penetration tests Items F15 and F21 shall allow for provision of daily records and for interpretation and presentation of the results on agreed report forms/exploratory hole logs in accordance with BS 1377 and Schedules 1.13.3 or 1.13.4.

For the seismic cone, the recorded and presented data shall include the specified CPT data recorded between seismic test depths.

The rates for dynamic probing shall allow for undertaking and reporting torque measurements at the prescribed vertical intervals.

17. The rates for installation of instruments shall allow for:

a) clearing and keeping the hole free of unwanted materials
b) all costs associated with equipment, installation, specified seals, surround and backfill materials excluding backfill below the instrument
c) proving correct functioning
d) delays due to installations, including the setting time for grout
e) recording information and preparing daily record and additional reports.

18. The rates for monitoring and sampling of installations during the fieldwork period shall allow for:

a) purging and dealing with disposal of recovered water
b) all costs associated with consumables and provision of data recording equipment to site
c) proving correct calibration and recalibration
d) recording information, preparing, updating and submitting additional reports successively and at the completion of monitoring, including notification of any unexpected readings and/or variation in readings
e) delays due to interruptions of other site activities.

The rates for monitoring and sampling of installations during the post-fieldwork period shall allow for:

a) items (a) – (d) above
b) all costs associated with remobilising the appropriate (number and experience) staff to site and all travelling and accommodation expenses.

The rates for recording of water level, ground gas or other monitoring measurements shall allow for notices of re-entry to the Investigation Supervisor, owners or occupiers affected by the location or access route.

19. The rates for laboratory testing shall include for:

a) the supply of a copy of the preliminary test results to the Investigation Supervisor
b) notification of unavailable test samples, failed tests and/or deviating samples (eg. samples not correctly preserved)
c) the cost of determining a parameter (eg. moisture content or density) where that parameter forms part of the information to be reported for the specified test (eg. undrained shear strength, consolidation test or unconfined compressive strength)
d) the disposal of samples in accordance with the relevant regulations.

20. The provisional sum, Item A6, for the off-site disposal of contaminated waste shall include for temporary storage and for organising the transport and disposal by a suitably licenced waste disposal contractor. Payment shall be made only against receipted invoices.

    The costs of laboratory testing to determine the nature of the waste shall be covered by laboratory testing rates for tests actually completed and to an agreed schedule. Those sums shall be offset against the provisional sum Item A6.

21. Appendix A to the Bill of Quantities (Rates for Ground Practitioners and other Personnel) shall be priced. The rates given will be used by the Investigation Supervisor to make an initial estimate of costs, where applicable, of employing the Contractor's staff in accordance with Clauses 3.5.2, 3.6.1 and/or 3.6.2 of the Specification.

22. Items for the supply of the master and copies of the Desk Study Report, Ground Investigation Report and/or Geotechnical Design Report shall include the printing and supply of the specified number of draft and final copies (Specification Clause 16.11 and Schedule S1.21.13). All other duties in compiling, preparing and checking the draft and final reports shall normally be paid for either under Item A7 of the Bill of Quantities or using the rates given under Appendix A.

23. **Units of measurement**

    The following abbreviations shall be used for the units of measurements

    Millimetres: mm
    Metre: m
    Kilometre: km
    Square millimetres: mm^2
    Square metre: m^2
    Cubic metre: m^3
    Square metre per day: m^2/day
    Linear metre: lin.m
    Kilogramme: kg
    Tonne: t
    Sum: sum
    Number: nr
    Hour: h
    Week: wk
    Vehicle week: v.wk
    Item: item
    Day: day
    Specimen day: sp.day
    Person day: p.day

Preamble amendments and additions shall be entered below, using sequential numbers to those above.

The following clauses are amended or added to the Preamble.

Bill of Quantities

The following pages constitute the Bill of Quantities.

Bill of Quantities

Bill A: General Items, provisional services and additional items

Number	Item Description	Unit	Quantity	Rate	Amount £
A	**General items, provisional services and additional items**				
A1	Offices and stores for the Contractor	sum	R/O		
A2	Establish on site all plant, equipment and services for a Green Category site.	sum	1		
A3	Extra over Item A2 for a Yellow Category site	sum	1		
A4	Maintain on site all site safety equipment for a Yellow Category site	week	1		
A5	Decontamination of equipment during and at end of intrusive investigation for a Yellow Category site.	sum	1		
A6	Appropriate storage, transport and off-site disposal of contaminated arisings and any PPE equipment, excluding laboratory testing.	provisional sum	1		
A7	Provide professional attendance in accordance with Clause 3.5.2	sum	1		
A8	Establish the location and elevation of the ground at each exploratory hole	sum	1		
A9	Preparation of Health and Safety documentation and Safety Risk Assessment	sum	1		
A21a	Electronic copy of Ground Investigation Report (or specified part thereof)	sum	1		
A25	Digital data in AGS transfer format	sum	1		
	Contract specific additional bill items				
A30	Specialist Buried Services Search	sum	1		
A31	Principal Contractor	sum	1		
A32	Meetings	nr	R/O		
A33	Coring / breaking out of concrete at exploratory hole locations (coring required at CBR locations). Note presence of suspended floor slabs.	sum	1		

Total section A carried to summary

Bill B: Percussion boring

Number	Item Description	Unit	Quantity	Rate	Amount £
B	**Percussion boring (de-mountable rig)**				
B1	Move boring plant and equipment to the site of each exploratory hole and set up	nr	3		
B4	Advance borehole between existing ground level and 10m depth	m	30		
B5	As Item B4 but between 10m and 20m depth	m	25		
B6	As Item B4 but between 20m and 30m depth	m	10		
B7	As Item B4 but between 30m and 40m depth	m	R/O		
B9	Advance borehole through hard stratum or obstruction	h	3		
B11	Backfill borehole with cement/bentonite grout where no installation required.	m	R/O		
B12	Standing time for borehole plant, equipment and crew	h	R/O		
	Contract specific additional bill items				

Total section B carried to summary

Bill C: Rotary Drilling
Not required

Bill D: Pitting and trenching

Number	Item Description	Unit	Quantity	Rate	Amount £
D	**Pits and Trenches**				
	Inspection pits				
D1a	Excavate inspection pit by hand to an appropriate depth (minimum 1.20m bgl)	nr	3		
	Observation pits and trenches				
D14	Move equipment to the site of each hand dug observation pit or trench of not greater than 4.5m depth	nr	4		
D17	Excavate hand dug observation pit between existing ground level and 3.0m depth	m	8		
D18	As Item D17 but between 3.0 and 4.5m depth	m	R/O		
D28	Standing time for excavation plant, equipment and crew for hand dug observation pit or trench	h	R/O		
	General				
D37	Bring pump to the position of each exploratory pit or trench	nr	4		
D38	Pump water from pit or trench	h	7.5		
D39	Extra over Item D38 for temporary storage, treatment and disposal of contaminated water	Provisional sum	1		
D40	Leave open observation pit or trench	m²/day	R/O		
	Contract specific additional bill items				

Total section D carried to summary

Bill E: Sampling and monitoring during intrusive investigation

Number	Item Description	Unit	Quantity	Rate	Amount £
E	**Sampling and monitoring during intrusive investigation**				
	Samples for geotechnical purposes				
E1	Small disturbed sample	nr	77		
E2	Bulk disturbed sample	nr	24		
E3	Large bulk disturbed sample	nr	R/O		
E4.1a	Open-tube sample using thick-walled (OS-TK/W) sampler (including U100)	nr	R/O		
E4.2a	Open-tube sample using thin-walled (OS-T/W) sampler (including UT100)	nr	30		
E6	Groundwater sample	nr	7		
E7	Ground gas sample	nr	R/O		
E8	Cut, prepare and protect core sub-sample	nr	R/O		
	Containers for contamination assessment and WAC testing				
E14.1	Provision of containers and collection of samples for soil contamination suites (S1.20.3)	nr	42		
E14.2	Provision of containers and collection of samples for water contamination suites (S1.20.3)	nr	7		
E14.3	Provision of containers and collection of samples for gas contamination suites (S1.20.3)	nr	4		
E15.1	Provision of containers and collection of samples for WAC suites (S1.20.5)	nr	R/O		
	Contract specific additional bill items				

Total section E carried to summary

Bill F: Probing and cone penetration testing
Not required

Bill G: Geophysical testing
Not required

Bill H: In situ testing

Number	Item Description	Unit	Quantity	Rate	Amount £
H	**In situ testing**				
H1	Standard penetration test in borehole	nr	32		
H4	California Bearing Ratio test by TRL probe.	nr	4		
H5	Excavate and log soils at TRL probe location to 1.2m bgl maximum.	nr	4		
H8	Hand vane test (set of 3 readings)	nr	6		
	Miscellaneous site testing				
H84	Reading of free product level in borehole using an interface probe	nr	R/O		
H85	Provide contamination screening test kits per sample	nr	R/O		
H86	Carry out headspace testing by FID/PID	nr	3		
	Contract specific additional bill items				

Total section H carried to summary

Bill I: Instrumentation

Number	Item Description	Unit	Quantity	Rate	Amount £
I	**Instrumentation**				
	Standpipes and piezometers				
I1	Backfill exploratory hole with cement/bentonite grout below standpipe or standpipe piezometer	m	35		
I2	Provide and install standpipe (19mm)	m	R/O		
I7	Provide and install ground gas monitoring standpipe (50mm)	m	30		
I9	Provide and install headworks for ground gas monitoring standpipe, standpipe or standpipe piezometer	nr	3		
I10	Provide and install protective cover (flush)	nr	3		
I15	Standpipe and piezometer development				
I15.1	Supply equipment and personnel to carry out development by surging	nr	3		
I15.2	Develop standpipe or piezometer by surging	h	9		
I15.9	Disposal of development water, not including chemical testing	Provisional sum	1		
	Contract specific additional bill items				

Total section I carried to summary

Bill J: Installation monitoring and sampling

Number	Item Description	Unit	Quantity	Rate	Amount £
J	**Installation monitoring and sampling** (during fieldwork period)				
J1	Reading of water level in standpipe or standpipe piezometer during fieldwork period	nr	R/O		
J8	Reading of free product level in standpipe using an interface probe during fieldwork period	nr	R/O		
	Installation monitoring and sampling (post fieldwork period)				
J9	Return visit to site following completion of fieldwork to take readings in, or recover samples from, installations	nr	3		
J10	Extra over Item J9 for reading of water level in standpipe or standpipe piezometer during return visit	nr	3		
J11	Extra over Item J9 for ground gas measurement in ground gas monitoring standpipe during return visit	nr	3		
J17	Extra over Item J9 for reading of free product level in standpipe using an interface probe during return visit to site	nr	3		
	Contract specific additional bill items				

Total section J carried to summary

Bill K: Geotechnical laboratory testing

Number	Item Description	Unit	Quantity	Rate	Amount £
K	**Geotechnical laboratory testing**				
K1	Classification				
K1.1	Moisture content	nr	24		
K1.2	Liquid limit, plastic limit and plasticity index	nr	12		
K1.8	Particle density by gas jar or pycnometer	nr	R/O		
K1.9	Particle size distribution by wet sieving	nr	6		
K1.11	Sedimentation by pipette	nr	6		
K2	Chemical and electrochemical				
K2.1	Organic matter content	nr	6		
K2.2	Mass loss on ignition	nr	R/O		
K2.3	Sulphate content of acid extract from soil	nr	6		
K2.4	Sulphate content of water extract from soil	nr	12		
K2.5	Sulphate content of groundwater	nr	3		
K2.8	Water soluble chloride content	nr	R/O		
K2.9	Acid soluble chloride content	nr	R/O		
K2.10	Total sulphur content	nr	6		
K2.12	pH value	nr	12		
K3	Compaction related				
K3.1	Dry density/moisture content relationship using 2.5kg rammer	nr	R/O		
K3.4	Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould	nr	R/O		
K3.9	California Bearing Ratio on re-compacted disturbed sample	nr	R/O		
K3.10	Extra over Item K3.9 for soaking	day	R/O		
K4	Compressibility, permeability and durability				
K4.1	One-dimensional consolidation properties, test period 5 days	nr	R/O		

Number	Item Description	Unit	Quantity	Rate	Amount £
K4.2	Extra over Item K4.1 for test period in excess of 5 days	day	R/O		
K4.3	Measurements of swelling pressure, test period 2 days	nr	R/O		
K4.11	Frost heave of soil	nr	R/O		
K6	Shear strength (total stress)				
K6.12	Residual shear strength using the small ring shear apparatus at three normal pressures, test duration not exceeding 4 days	nr	R/O		
K6.13	Extra over Item K6.12 for test duration in excess of 4 days	day	R/O		
K6.16	Undrained strength of a single 100mm diameter specimen in triaxial compression without the measurement of pore pressure	nr	30		
K7	Shear strength (effective stress)				
K7.3	Consolidated drained triaxial compression test with measurement of volume change (set of three 38mm specimens), test duration not exceeding 4 days per specimen	nr	R/O		
K7.4	As Item K7.3 but single-stage or multi-stage test using 100mm diameter specimen, test duration not exceeding 4 days	nr	R/O		
K7.5	Extra over Items K7.1 and K7.3 for test duration in excess of 4 days per specimen	sp. Day	R/O		
K7.6	Extra over Items K7.2 and K7.4 for test duration in excess of 4 days	day	R/O		
	Contract specific additional bill items				
K10.1	Mg in 2:1 water soil extract	nr	3		
K10.2	NO_3 in 2:1 water soil extract	nr	3		
K10.3	Cl in 2:1 water soil extract	nr	R/O		
K10.4	Ammonium ions in Soil (BR279)	nr	3		
K10.5	Groundwater pH	nr	R/O		
K10.6	Soluble Mg in groundwater	nr	R/O		
K10.7	Groundwater NO_3	nr	R/O		

Number	Item Description	Unit	Quantity	Rate	Amount £
K10.8	Groundwater Cl	nr	R/O		

Total section K carried to summary

Bill of Quantities Section L: Geoenvironmental laboratory testing – Notes for Guidance

Number	Item Description (these are given as summary reminders – the Contractor shall refer to Schedule 1.20.3 for full details)	Unit	Quantity	Rate	Amount £
Soil	Suite s1.1 – basic suite	nr	21		
	Suite s1.2 - phenol	nr	R/O		
	Suite s1.3 – asbestos in soil (screening)	nr	R/O		
	Suite s1.4 - TOC	nr	R/O		
	Suite s1.5 - sulphate	nr	R/O		
	Suite s1.6 - general suite with waste classification parameters	nr	R/O		
	Suite s1.7 TPHCWG	nr	R/O		
	Suite s1.8 – screen for ACM in soil (stereo microsc.)	nr	15		
	Suite s1.9 – Asbestos ID in bulk materials (PLM)	nr	R/O		
	Suite s1.10 - Asbestos quant. in soil (PLM)	nr	R/O		
	Suite s1.11 - Asbestos detailed quant. in soil (PCOM)	nr	7		
	Suite s1.12 – soil leachate preparation (for leachate analysis as water)	nr	R/O		
	Suite S1.13 – Fraction Organic Carbon	nr	4		
	PCBs total arochlors	nr	R/O		
	VOCs target list US EPA	nr	7		
Water	Suite w1.1 – general suite	nr	3		
	w1.2 - PAH (total)	nr	R/O		
	w1.3 - PAH (total of USEPA 16)	nr	R/O		
	w1.4 - PAH (16 speciated) (Modified EPA 8100)	nr	R/O		
	w1.5 - TPH – CWG (C5-35) based on TNRCC method 1006	nr	3		
	w1.6 - Petrol Range Organics/BTEX/MTBE	nr	R/O		
	w1.7 - BTEX by GC-MS (Modified US EPA 8150)	nr	R/O		
	w1.8 - SVOCs target list (one extraction only) (Modified US EPA 8270)	nr	R/O		
	w1.9 - SVOC scan (up to 10 peaks, >80% fit)	nr	R/O		
	w1.10 - VOCs target list only (Modified US EPA 8260)	nr	3		
	w1.11 - VOCs target list plus TICs (top 10 peaks to 0.01mg/1 only) (Modified US EPA 8260)	nr	R/O		
	w1.12 - Phenols (total) by HPLC	nr	R/O		
	w1.13 - Phenols (speciated)	nr	R/O		
Gas	Suite g1.1 – bulk gases	nr	R/O		
	Suite g1.2 – C1-C7	nr	4		
	Suite g1.3 – VOCs incl. BTEX	nr	4		
Waste	WAC Leachate	nr	R/O		
	Full WAC Soil Suite	nr	R/O		
	Inert WAC Soil Suite	nr	R/O		

	Hazardous WAC Soil Suite	nr	R/O		
	Contract specific additional bill items				

Total section L carried to summary

SUMMARY OF BILL OF QUANTITIES

		£
A.	General items, provisional services and additional items	
B.	Percussion boring	
C.	Rotary drilling	
D.	Pitting and trenching	
E.	Sampling and monitoring during intrusive investigation	
F.	Probing and cone penetration testing	
G	Geophysical testing	
H.	In situ testing	
I.	Instrumentation	
J.	Installation monitoring and sampling	
K.	Geotechnical laboratory testing	
L.	Geoenvironmental laboratory testing	
	Total Tender	
	Of which £_____is for interpretative report	
	Contingency sum to be expended only on the direction of the Engineer – 10% Total Tender	
	TOTAL	

	Fee for entering into collateral warranty in the form appended.	

Appendix A. Rates for Geotechnical and Other Personnel

Rates shall be entered for the various grades of staff listed, who will be employed by agreement with the Engineer for advisory work for the Engineer on site on the conduct of the investigation, in accordance with Specification Clause 3.13 and Schedule 1 or subsequent to the preparation of the Site Investigation Report. This excludes the superintendence and technical direction required under the Conditions of Contract and the requirements of Clauses 3.12, 4.4.2, 5.3.6, 5.4.2, 6.5 and 7.11 which must be covered by the rates and prices entered in the main Bill of Quantities (see clause 1 of the preamble to the Bill of Quantities), and the preparation of the report which must be covered by the items in Section A of the Bill of Quantities.

Item	Item Description	Unit	Rate £
1	Technician	h	
2	Incorporated Engineer	h	
3	Graduate Engineer/Geologist/Environmental Scientist	h	
4	Graduate Engineer/Geologist/Environmental Contractor with at least 3 years of relevant experience since graduation	h	
5	Chartered Engineer/Geologist/Environmental Contractor with at least 5 years of relevant experience	h	
6	Principal chartered Engineer/Geologist/ Environmental Contractor with at least 10 years of relevant experience	h	
	Expenses incurred by staff on site visits or who are resident by agreement with the Engineer	h	
7	Fare per kilometre from Contractor's premises and return for Items 1, 2 and 3	km*	
8	As above but for Items 4, 5 and 6	km*	
9	All other expenses incurred in conjunction with a site visit where a return journey is made on the same day for Items 1, 2 and 3	visit	
10	As above but for Items 4, 5 and 6	visit	
11	All other expenses incurred in connection with visit where an overnight stay is necessary for Items 1, 2, and 3	night	
12	As above but for Items 4, 5 and 6.	night	

* Where considered more appropriate, 'mile' may be used.

FORM OF WARRANTY

For use where a collateral warranty is to be given by a consultant to a funder of a commercial or industrial development

Please note that the Standard Form has been amended at Clauses 10.1 and 10.2 to accord with CampbellReith policy.

THIS AGREEMENT

is made the ..... day of .....20.....

Between

1 Insert name of Consultant

1. ..... [1]

whose address/registered office is at

.....

.....

(the 'Consultant') and

2 Insert name of Consultant's Client

2. ..... [2]

whose address/registered office is at

.....

.....

(the 'Client') and

3 Insert name of Funder

3. ..... [3]

whose address/registered office is at

.....

.....

(the 'Funder').

Whereas

A. The Funder and the Client have entered into an agreement ('the Finance Agreement') for the provision of finance in connection with the carrying out of

4. Insert description of ..... [4]

works

5. Insert address of Development

..... [5]

(the 'Development').

6. Insert date of Appointment

B. By a contract dated ..... [6] (the 'Appointment'),

which shall include any variation thereto, the Client has appointed the Consultant

7. Insert discipline

as ..... [7]

in connection with the Development.

8. Delete as appropriate

C. The Client has entered/may enter [8] into a contract

9. If Building Contract signed, insert date; if not, delete word 'dated'

[dated ..... [9]] (the 'Building Contract')

10. Insert name of contractor of 'a contractor to be selected'

with ..... [10]

(the 'Contractor') for the construction of the Development.

Now it is hereby agreed

11. Insert figure

In consideration of the payment of £ ..... [11] by the Funder to the Consultant, receipt of which the Consultant hereby acknowledges:

1. The Consultant warrants to the Funder that it has exercised and will continue to exercise reasonable skill care and diligence in the performance of its services to the Client under the Appointment.

2. In the event of any breach of this Agreement giving rise to losses recoverable by the Funder as a result of such breach (the 'Funder's losses'):

   (a) Without prejudice to any other exclusion or limitation of liability, damages, loss, expense or costs the Consultant's liability for any claim or claims under this Agreement shall be limited to that proportion of the Funder's losses as it would be just and equitable to require the Consultant to pay having regard to the extent of the Consultant's responsibility for the same and on the assumptions that:

      (i) all other consultants and advisers, contractors and subcontractors involved in the Development have provided contractual undertakings on terms no less onerous than those set out in clause 1 to the Funder in respect of the carrying out of their obligations in connection with the Development; and

      (ii) there are no exclusions of or limitations of liability nor joint insurance or

co-insurance provisions between the Funder and any other party referred to in this clause 2 and any such other party who is responsible to any extent for the Funder's losses is contractually liable to the Funder for the same; and

(iii) all the parties referred to in this clause 2 have paid to the Funder such sum as it would be just and equitable for them to pay having regard to the extent of their responsibility for the Funder's losses.

(b) The Consultant shall be entitled in any action or proceedings by the Funder to rely on any limitation or exclusion in the Appointment and to raise the equivalent rights in defence of liability as it would have against the Client under the Appointment.

(c) The obligations of the Consultant under or pursuant to this Agreement shall not be released or diminished by the appointment of any person by the Funder to carry out any independent enquiry into any relevant matter.

12 Ensure clause is consistent with any deleterious clause in Appointment; delete if Consultant is a QS or planning supervisor

3. [12] The Consultant has exercised and will continue to exercise reasonable skill and care to see that, unless authorised by the Client in writing or, where such authorisation is given orally, confirmed by the Consultant to the Client in writing, materials specified by it for use in the Development are in accordance with the guidelines contained in the edition of the publication *Good Practice in Selection of Construction Materials* (Ove Arup & Partners) current at the date of its specification.

4. The Funder has no authority to issue any direction or instruction to the Consultant in relation to the performance of the Consultant's services under the Appointment unless and until the Funder has given notice under clause 6 or 7.

5. The Consultant acknowledges that the Client has paid all fees and expenses properly due and owing to the Consultant under the Appointment up to the date of this Agreement. The Funder has no liability to the Consultant in respect of fees and expenses under the Appointment unless and until the Funder has given notice under clause 6 or 7.

6. The Consultant agrees that, in the event of the termination of the Finance Agreement by the Funder before completion of the services under the Appointment, the Consultant will, if so required by notice in writing given by the Funder and subject to clause 8, accept the instructions of the Funder or its appointee to the exclusion of the Client in respect of the Development upon the terms and conditions of the Appointment. The Client acknowledges that the Consultant shall be entitled to rely on a notice given to the Consultant by the Funder under this clause as conclusive evidence for the purposes of this Agreement of the termination of the Finance Agreement by the Funder; and further acknowledges that such acceptance of the instructions of the Funder to the exclusion of the Client shall not constitute any breach of the Consultant's obligations to the Client under the Appointment.

7. The Consultant further agrees that it will not without first giving the Funder not less than twenty one days' notice in writing exercise any right it may have to terminate the Appointment or to treat the same as having been repudiated by the Client or to discontinue the performance of any services to be performed by the Consultant pursuant thereto. Such right to terminate the Appointment with the Client or treat the same as having been repudiated or discontinue performance shall cease if, within such period of notice and subject to clause 8, the Funder shall give notice in writing to the Consultant requiring the Consultant to accept the instructions of the

Funder or its appointee to the exclusion of the Client in respect of the Development upon the terms and conditions of the Appointment.

8. It shall be a condition of any notice given by the Funder under clause 6 or 7 that the Funder or its appointee accepts liability for payment of the fees and expenses payable to the Consultant under the Appointment and for performance of the Client's obligations including payment of any fees and expenses outstanding at the date of such notice. Upon the issue of any notice by the Funder under clause 6 or 7, the Appointment shall continue in full force and effect as if no right of termination on the part of the Consultant, nor any right of the Consultant to treat the Appointment as having been repudiated by the Client, nor to discontinue the performance of any services, had arisen and the Consultant shall be liable to the Funder and its appointee under the Appointment in place of its liability to the Client. If any notice given by the Funder under clause 6 or 7 requires the Consultant to accept the instructions of the Funder's appointee, the Funder shall be liable to the Consultant as guarantor for the payment of all sums from time to time due to the Consultant from the Funder's appointee.

13 Delete clause if Consultant does not retain copyright/amend as appropriate according to the terms of Appointment

9. [13] The copyright in all drawings, reports, models, specifications, bills of quantities, calculations and such other documents and information prepared by or on behalf of the Consultant pursuant to the Appointment (the 'Documents') shall remain vested in the Consultant. Subject (save in the case of the documents for the health and safety file) to the Consultant having received payment of any fees properly due and owing as at the date of exercise of the licence, the Funder and its appointee shall have a licence to copy and use the Documents and to reproduce the designs and content of them for any purpose related to the Development including, but without limitation, the construction, completion, maintenance, letting, promotion, advertisement, reinstatement, refurbishment and repair of the Development. Such licence shall enable the Funder and its appointee to copy and use the Documents for the extension of the Development but such use shall not include a licence to reproduce the designs contained in them for any extension of the Development. The Consultant shall not be liable for any use by the Funder or its appointee of any of the Documents for any purpose other than that for which the same were prepared by or on behalf of the Consultant.

14 Insert amount

15 Insert amount; if there is no such limit, delete words in brackets

16 Insert period

10. The Consultant shall maintain professional indemnity insurance in an amount each year of not less than £..... [14] in respect of each and every occurrence or series of occurrences arising out of one event [but limited to £..... [15] in the aggregate for claims arising out of or in connection with pollution or contamination or asbestos and/or date recognition] for a period of ..... [16] years from the date of practical completion of the Development under the Building Contract and provided that such insurance is available at commercially reasonable rates. The Consultant shall inform the Funder if such insurance ceases to be available at commercially reasonable rates in order that the Consultant and the Funder can discuss the means of best protecting their respective positions. The Consultant shall, on reasonable request by the Funder, provide documentary evidence that such insurance is being maintained.

10.1 The Consultant's liability for any claim or series of claims arising out of the same occurrence or series of occurrences shall not exceed the sum of **£n[1] million** provided that the total liability in respect of all such claims arising out of or in connection with pollution, contamination or toxic mould shall not exceed in aggregate the sum of £n[n] million. Liability in connection with asbestos is

??1

excluded.

10.2 Such liability as determined by the aggregate or balance thereof under 10.1 shall be further limited to the lesser of (i) the direct costs reasonably incurred by the Client in cleaning up the site or any part thereof or (ii) the amount, if any, recoverable under the Consultant's professional indemnity insurance policy.

(Clauses 10.1 and 10.2 are additional clauses required to be added to accord with Campbell Reith policy)

17 Delete clause if the law of Scotland applies

11. [17] The Funder may assign by way of absolute legal assignment only the benefit of this Agreement to a third party who is also providing finance or re-finance in connection with the carrying out of the Development. Any such assignment shall only be effective if written notice thereof is given to the Consultant. No further or other assignment of this Agreement shall be permitted.

18 Delete clause if the law of England and Wales applies

11S. [18] The Funder may assign or transfer the rights under this Agreement without the consent of the Consultant to another person who is also providing finance or re-finance in connection with the carrying out of the Development. Any such assignation shall only be effective if written notice thereof is given to the Consultant in accordance with clause 12. No further or other assignation or transfer of this Agreement shall be permitted.

12. Any notice to be given by the Consultant shall be deemed to be duly given if it is delivered by hand or sent by recorded (signed for) or special delivery to the Funder at the above mentioned address, its registered office or principal place of business for the time being; and any notice given by the Funder shall be deemed to be duly given if it is delivered by hand or sent by recorded (signed for) or special delivery to the Consultant at the above mentioned address, its registered office or principal place of business for the time being. Any such notices, if sent by recorded (signed for) or special delivery, shall be deemed to have been received forty eight hours after being posted (subject to proof to the contrary).

19 Insert period

13. No action or proceedings for any breach of this Agreement shall be commenced against the Consultant after the expiry of ..... [19] years from the date of practical completion of the relevant part of the Development under the Building Contract or, in the event that practical completion is not achieved, the date that the Consultant finishes its services under the Appointment.

20 Delete clause if the law of Scotland applies

14. [20] Nothing in this Agreement confers or purports to confer on any third party any benefit or any right to enforce any term of this Agreement pursuant to the Contracts (Rights of Third Parties) Act 1999.

FOR USE WHERE THE APPLICABLE LAW IS THAT OF ENGLAND AND WALES

15. This Agreement is subject to the law of England and Wales and the parties hereto submit to the jurisdiction of the courts of England and Wales.

Where the Agreement is to be executed under hand and not as a deed

As witness the hands of the parties hereto

Signed by or on behalf of the Consultant

21 Name and signature of person signing on behalf of Consultant .....[21]

Signed by or on behalf of the Client

22 Name and signature of person signing on behalf of Consultant .....[22]

Signed by or on behalf of the Funder

23 Name and signature of person signing on behalf of Funder .....[23]

Where the Agreement is to be executed as a deed

In witness whereof the parties have executed this Agreement as a deed the day and year first before written

[WHERE THE CONSULTANT IS A SOLE PRACTITIONER OR PARTNERSHIP]

Signed as a deed by the Consultant

24 Name and signature of sole practitioner or first partner .....[24]

25 Name and signature of witness in the presence of .....[25]

26 Address of witness of .....[26]

27 Name and signature of additional partner and by .....[27]

in the presence of .....[25]

of .....[26]

and by .....[27]

in the presence of .....[25]

of .....[26]

[*WHERE THE CONSULTANT IS A LIMITED LIABILITY PARTNERSHIP OR COMPANY]*

Executed as a deed by the Consultant

28 Name and signature of member or director

by .....[28]

29 Name and signature of member or director or company secretary

and .....[29]

[WHERE THE CLIENT IS AN INDIVIDUAL OR PARTNERSHIP]

Signed as a deed by the Client

30 Name and signature of individual or first partners

.....[30]

25 Name and signature of witness

in the presence of .....[25]

26 Address of witness

of .....[26]

27 Name and signature of additional partner

and by .....[27]

in the presence of .....[25]

of .....[26]

and by .....[27]

in the presence of .....[25]

of .....[26]

[*WHERE THE CLIENT IS A LIMITED LIABILITY PARTNERSHIP OR COMPANY]*

Executed as a deed by the Consultant

by .....[28]

and .....[29]

[*WHERE THE FUNDER IS A LIMITED LIABILITY PARTNERSHIP OR COMPANY]*

Executed as a deed by the Consultant

by .....
[28]

and .....
[29]

For use where a collateral warranty is to be given by a consultant to a purchaser or tenant of the whole or part of a building project in a commercial or industrial development

Please note that the Standard Form has been amended at Clauses 7.1 and 7.2 to accord with CampbellReith policy.

THIS AGREEMENT

is made the ..... day of .....20.....

Between

1 Insert name of Consultant

1. ..... [1]

whose address/registered office is at

.....

.....

(the 'Consultant') and

2 Insert name of Purchaser/Tenant

2. ..... [2]

whose address/registered office is at

.....

.....

3Delete as appropriate throughout Agreement

(the 'Purchaser'/'Tenant' [3]).

Whereas

4. Insert name of Consultant's Client

A. The Purchaser/Tenant and..... [4]

5. Delete as appropriate

(the 'Client') have entered into an agreement to purchase/an agreement to lease/ a lease of [5]

6. Insert description of Premises

..... [6]

7. Delete if Premises form the whole of Development

(the 'Premises') [being a part of [7]].

8. Insert address of Development

..... [8]

9. Delete if Premises form part only of Development

(the 'Development'). [The Premises are also referred to in this Agreement as the 'Development'. [9]]

10. Insert date of Appointment

B. By a contract dated ..... [10] (the 'Appointment'),

which shall include any variation thereto, the Client has appointed the Consultant

11. Insert discipline

as ..... [11]

in connection with the Development.

12. Delete as appropriate

C. The Client has entered/may enter [12] into a contract

13. If Building Contract signed, insert date; if not, delete word 'dated'

[dated ..... [13]] (the 'Building Contract')

14. Insert name of contractor of 'a contractor to be selected'

with ..... [14]

(the 'Contractor') for the construction of the Development.

Now it is hereby agreed

15. Insert figure

In consideration of the payment of £ ..... [15] by the Purchaser/Tenant to the Consultant, receipt of which the Consultant hereby acknowledges:

1. The Consultant warrants to the Purchaser/Tenant that it has exercised [and will continue to exercise [16]] reasonable skill care and diligence in the performance of its services to the Client under the Appointment.

16. Delete if services completed

2. In the event of any breach of this Agreement:

   (a) Subject to sub-clauses (b) and (c), the Consultant shall be liable for the

reasonable costs of repair, renewal and/or reinstatement of any part or parts of the Development to the extent that the Purchaser/Tenant reasonably incurs such costs and/or the Purchaser/Tenant is or becomes liable either directly or by way of financial contribution for such costs. The Consultant shall not be liable for other losses incurred by the Purchaser/Tenant:

(b) Without prejudice to any other exclusion or limitation of liability, damages, loss, expense or costs the Consultant's liability for such costs of the repair, renewal and/or reinstatement in question shall be further limited to that proportion thereof as it would be just and equitable to require the Consultant to pay having regard to the extent of the Consultant's responsibility for the same and on the assumptions that:

(i) all other consultants and advisers, contractors and subcontractors involved in the Development have provided contractual undertakings on terms no less onerous than those set out in clause 1 to the Purchaser/Tenant in respect of the carrying out of their obligations in connection with the Development; and

(ii) there are no exclusions of or limitations of liability nor joint insurance or co-insurance provisions between the Purchaser/Tenant and any other party referred to in this clause 2 and any such other party who is responsible to any extent for such costs is contractually liable to the Purchaser/Tenant for the same; and

(iii) all the parties referred to in this clause 2 have paid to the Purchaser/Tenant such proportion of such costs which it would be just and equitable for them to pay having regard to the extent of their responsibility for the same.

(c) The Consultant shall be entitled in any action or proceedings by the Purchaser/Tenant to rely on any limitation or exclusion in the Appointment and to raise the equivalent rights in defence of liability as it would have against the Client under the Appointment.

(d) The obligations of the Consultant under or pursuant to this Agreement shall not be released or diminished by the appointment of any person by the Purchaser/Tenant to carry out any independent enquiry into any relevant matter.

17 Ensure clause is consistent with any deleterious clause in Appointment; delete if Consultant is a QS or planning supervisor

3. [17] The Consultant has exercised [and will continue to exercise [18]] reasonable skill and care to see that, unless authorised by the Client in writing or, where such authorisation is given orally, confirmed by the Consultant to the Client in writing, materials specified by it for use in the Development are in accordance with the guidelines contained in the edition of the publication *Good Practice in Selection of Construction Materials* (Ove Arup & Partners) current at the date of its specification.

18 Delete if services completed

19 Delete clause if not appropriate

4. [19] The Consultant acknowledges that the Client has paid all fees and expenses properly due and owing to the Consultant under the Appointment up to the date of this Agreement.

5. The Purchaser/Tenant shall have no authority to issue any direction or instruction to the Consultant in relation to the Appointment.

20 Delete clause if Consultant does not retain copyright/amend as appropriate according to the Terms of Appointment

6. [20] The copyright in all drawings, reports, models, specifications, bills of quantities, calculations and such other documents and information prepared by or on behalf of the Consultant pursuant to the Appointment (the 'Documents') shall remain vested in the Consultant. Subject (save in the case of the documents for the health and safety file) to the Consultant having received payment of any fees properly due and owing as at the date of exercise of the licence, the Purchaser/Tenant and its appointee shall have a licence to copy and use the Documents and to reproduce the designs and content of them for any purpose related to the Premises including, but without limitation, the construction, completion, maintenance, letting, promotion, advertisement, reinstatement, refurbishment and repair of the Premises. Such licence shall enable the Purchaser/Tenant and its appointee to copy and use the Documents for the extension of the Premises but such use shall not include a licence to reproduce the designs contained in them for any extension of the Premises. The Consultant shall not be liable for any use by the Purchaser/Tenant or its appointee of any of the Documents for any purpose other than that for which the same were prepared by or on behalf of the Consultant.

21 Insert amount

22 Insert amount; if there is no such limit, delete words in brackets

23 Insert period

7. The Consultant shall maintain professional indemnity insurance in an amount each year of not less than £..... [21] in respect of each and every occurrence or series of occurrences arising out of one event [but limited to £..... [22] in the aggregate for claims arising out of or in connection with pollution or contamination and/or asbestos and/or date recognition] for a period of ..... [23] years from the date of practical completion of the Premises under the Building Contract and provided that such insurance is available at commercially reasonable rates. The Consultant shall inform the Purchaser/Tenant if such insurance ceases to be available at commercially reasonable rates in order that the Consultant and the Purchaser/Tenant can discuss the means of best protecting their respective positions. The Consultant shall, on reasonable request by the Purchaser/Tenant, provide documentary evidence that such insurance is being maintained.

7.1 The Consultant's liability for any claim or series of claims arising out of the same occurrence or series of occurrences shall not exceed the sum of **£n[2] million** provided that the total liability in respect of all such claims arising out of or in connection with pollution, contamination or toxic mould shall not exceed in aggregate the sum of £n[n] million. Liability in connection with asbestos is excluded.

7.2 Such liability as determined by the aggregate or balance thereof under 10.1 shall be further limited to the lesser of (i) the direct costs reasonably incurred by the Client in cleaning up the site or any part thereof or (ii) the amount, if any, recoverable under the Consultant's professional indemnity insurance policy.

(Clauses 7.1 and 7.2 are additional clauses required to be added to accord with Campbell Reith policy)

24 Delete clause if the law of Scotland applies

8. [24] The Purchaser/Tenant may assign by way of absolute legal assignment only the benefit of this Agreement to a third party who also takes an assignment of the Purchaser's/Tenant's interest in the Premises (the 'First Assignee'). The First Assignee may assign by way of absolute legal assignment only the benefit of this Agreement to a third party who also takes an assignment of the First Assignee's interest in the Premises. Any such assignment shall only be effective if written notice thereof is given to the Consultant. No further or other assignment of this

??2

Agreement shall be permitted.

25 Delete clause if the law of England and Wales applies

8S. [25] The Purchaser/Tenant may assign or transfer the rights under this Agreement without the consent of the Consultant to another person (the 'First Assignee') who also takes an assignation of the Purchaser's/Tenant's whole interest in the Premises. The First Assignee may assign or transfer the rights under this Agreement without the consent of the Consultant to another person taking an assignation of the First Assignee's whole interest in the Premises. Any such assignation shall only be effective if written notice thereof is given to the Consultant in accordance with clause 9. No further or other assignation or transfer of this Agreement shall be permitted.

9. Any notice to be given by the Consultant shall be deemed to be duly given if it is delivered by hand or sent by recorded (signed for) or special delivery to the Purchaser/Tenant at the above mentioned address, its registered office or principal place of business for the time being; and any notice given by the Purchaser/Tenant shall be deemed to be duly given if it is delivered by hand or sent by recorded (signed for) or special delivery to the Consultant at the above mentioned address, its registered office or principal place of business for the time being. Any such notices, if sent by recorded (signed for) or special delivery, shall be deemed to have been received forty eight hours after being posted (subject to proof to the contrary).

26 Insert period

10. No action or proceedings for any breach of this Agreement shall be commenced against the Consultant after the expiry of ..... [26] years from the date of practical completion of the relevant part of the Premises under the Building Contract or, in the event that practical completion is not achieved, the date that the Consultant finishes its services under the Appointment.

27 Delete clause if the law of Scotland applies

11. [27] Nothing in this Agreement confers or purports to confer on any third party any benefit or any right to enforce any term of this Agreement pursuant to the Contracts (Rights of Third Parties) Act 1999.

FOR USE WHERE THE APPLICABLE LAW IS THAT OF ENGLAND AND WALES

12. This Agreement is subject to the law of England and Wales and the parties hereto submit to the jurisdiction of the courts of England and Wales.

Where the Agreement is to be executed under hand and not as a deed

As witness the hands of the parties hereto

Signed by or on behalf of the Consultant

28 Name and signature of person signing on behalf of Consultant

..... [28]

Signed by or on behalf of the Purchaser/Tenant

29 Name and signature of person signing on behalf of Purchaser/Tenant

..... [29]

Where the Agreement is to be executed as a deed

In witness whereof the parties have executed this Agreement as a deed the day and year first before written

[WHERE THE CONSULTANT IS A SOLE PRACTITIONER OR PARTNERSHIP]

Signed as a deed by the Consultant

30 Name and signature of sole practitioner or first partner ..... [30]

31 Name and signature of witness in the presence of ..... [31]

32 Address of witness of ..... [32]

33 Name and signature of additional partner and by ..... [33]

in the presence of ..... [31]

of ..... [32]

and by ..... [33]

in the presence of ..... [31]

of ..... [32]

[*WHERE THE CONSULTANT IS A LIMITED LIABILITY PARTNERSHIP OR COMPANY]*

Executed as a deed by the Consultant

34 Name and signature of member or director by ..... [34]

35 Name and signature of member or director or company secretary and ..... [35]

[WHERE THE PURCHASER/TENANT IS AN INDIVIDUAL OR PARTNERSHIP]

Signed as a deed by the Purchaser/Tenant

36 Name and signature of individual or first partners ..... [36]

31 Name and signature of witness

in the presence of[31] .....

32 Address of witness

of[32] .....

33 Name and signature of additional partner

and by[33] .....

in the presence of[31] .....

of[32] .....

and by[33] .....

in the presence of[31] .....

of[32] .....

and by[33] .....

in the presence of[31] .....

of[32] .....

[*WHERE THE PURCHASER/TENANT IS A LIMITED LIABILITY PARTNERSHIP OR COMPANY]*

Executed as a deed by the Purchaser/Tenant

by[34] .....

and[35] .....

DRAWINGS

DESIGNER'S RISK ASSESSMENT

DESK STUDY INFORMATION

REVISION HISTORY RECORD SHEET

Version No	Amendments Made	Date Approved
1	Update of CRH standard specification to NBS format	1985
2	General revision incorporating more extensive requirements for establishing the presence of contaminants and to better define near surface soils	1992
3	Reformatted SI specification in accordance with 'Recommendations for the procurement of ground investigation' by CIRIA 1986	1992
4	Instructions to tenderers and contract year amended	1994
5	General revisions, update and reformatting	1998
6	Revised to incorporate Thomas Telford Specification for Ground Investigation with revisions	Sept 2005
7	General revisions and update	Oct 2005
8	General revisions and update	Nov 2006
9	Amendments to require AGS data 3.1 format data and complete ground gas measurement in accord with CIRIA C659. Also instructions to tenderers emphasise responsibility for services is with the contractor.	Jan 2007
9.1	Accommodate the role of CDM coordinator Clarify analysis for asbestos in soils TPH testing that relates to GAC	August 2007
9.2	Update to Schedule 4: Appendix 4, Ref 1.1	July 2008
9.3	Update to Schedule 4 with (1.1B) **Waste Suites**	January 2009
10	Updated to MS word format	August 2009
10.1	Updated with minor amendments to chemical suites and notes on asbestos	May 2010
10.2	Change BS 10175: 2001 to BS 10175: 2011	April 2011
11	Comprehensive review to provide an update for ICE UK Specification for Ground Investigation SISG 2012. Particular additional controls also added for Asbestos in Soils.	May 2011
12	General revisions and update	March 2014

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T: +971 4 453 4735
E: uae@campbellreith.com

Signed Appointments

Please find agreed and signed appointments with the Engineering Consultants involved within the scheme.

Executed as a Deed by the Consultant

namely **Campbell Reith Hill LLP**

(A) acting by a Director and the Company Secretary / two ~~Directors~~ **of the company** Members LLP

A.K.FORBES and M.J. LAWSON

(print name of signatory) *(print name of signatory)*

Signature ~~Director~~ Member

Signature ~~Company Secretary/~~ Member Director

(B) by affixing hereto the common seal **of the company / other body corporate**

Signature Director

Signature Company Secretary/ Director

[Common seal of company]

(C) by attested signature of a single Director **of the company**

Signature Director

In the presence of

Witness' signature _____ (Print name) _____

Witness' address _____

(D) by attested signature **of the individual**

Signature Director

In the presence of

Witness' signature _____ (Print name) _____

Witness' address _____

Execution as a Deed

Executed as a Deed by the Contractor

Namely **Kier Construction Limited, trading as Kier Construction - London**

(***Contractor a company or other body corporate***)

Signed as a deed by ANDREW ELLIS
As attorney for Kier Construction Limited trading as Kier Construction - London

Signature
As attorney for Kier Construction Limited trading as Kier Construction - London

In the presence of *Witness' signature*

Witness' name LORETTA PRINCE

Witness' address 2 Langston Road, Loughton, Essex, IG10 3SD

AND

Signed as a deed by C. A. C. FINLAY
As attorney for Kier Construction Limited trading as Kier Construction - London

Signature
As attorney for Kier Construction Limited trading as Kier Construction - London

In the presence of *Witness' signature*

Witness' name LORETTA PRINCE

Witness' address 2 Langston Road, Loughton, Essex, IG10 3SD

7 days notice; or

8.1.2 if the Consultant becomes Insolvent (as defined within the Contract).

8.2 If any of the Services are excluded from this Appointment or this Appointment is terminated the Consultant shall be entitled to such fair and reasonable proportion of the Fee having regard to the work completed at the time of suspension or termination but shall not be entitled to any claims in respect of loss of profit. Whether or not termination or suspension results from a breach by the Consultant, the Consultant shall not be entitled to any further payment whatsoever.

9 ENTIRE AGREEMENT

The Contractor and the Consultant respectively acknowledge that this Appointment forms the entire agreement between them to the exclusion of any antecedent statement or representation.

10 OTHER TERMS

The terms of this Appointment are amended and/or supplemented by way of the obligations and/or requirements as set out in Schedule Three.

11 GOVERNING LAW

This Appointment shall be governed by and interpreted in accordance with English law and the parties irrevocably submit to the jurisdiction of the English courts.

12 CONTRACTS (RIGHTS OF THIRD PARTIES) ACT 1999

A person who is not a party to this Appointment has no right under the Contracts (Rights of Third Parties) Act 1999 to enforce any of its terms but this does not affect any right or remedy of a third party which exists or is available apart from that Act.

The parties have signified their agreement to this Appointment by executing it as a Deed.

Execution as a Deed

Executed as a Deed by the Contractor

Namely **Kier Construction Limited, trading as Kier Construction - London**

(***Contractor a company or other body corporate***)

Signed as a deed by G J Bickerdike
As attorney for Kier Construction Limited trading as Kier Construction - London

Signature
As attorney for Kier Construction Limited trading as Kier Construction - London

In the presence of

Witness' signature P S Rowden

Witness' name P. S. ROWDEN

Witness' address 2 Langston Road, Loughton, Essex, IG10 3SD

AND

Signed as a deed by Richard Bysouth
As attorney for Kier Construction Limited trading as Kier Construction - London

Signature
As attorney for Kier Construction Limited trading as Kier Construction - London

In the presence of

Witness' signature P S Rowden

Witness' name P. S. ROWDEN.

Witness' address 2 Langston Road, Loughton, Essex, IG10 3SD

Notes on execution as a Deed for the Consultant

1. The form provides four methods of execution, (A) to (D), for use as appropriate. The full name of the Consultant (whether an individual, a company or other body) should be inserted where indicated at the commencement of the relevant form. This applies irrespective of the method used.

2. For public and private companies incorporated and registered under the Companies Acts, the three principal methods of execution as a deed are:

   (A) through signature by a Director and the Company Secretary or by two Directors;

   (B) by affixing the company's common seal in the presence of a Director and the Company Secretary or of two Directors or other duly authorised officers; or

   (C) signature by a single Director in the presence of a witness who attests the signature.

   Methods (A) and (C) are available to public and private companies whether or not they have a common seal. (Method (C) was introduced by section 44(2)(b) of the Companies Act 2006.) Methods (A) and (C) are not available under companies legislation to local authorities or to certain other bodies corporate, e.g. bodies incorporated by letters patent or private Act of Parliament that are not registered under companies legislation and such bodies may only use method (B).

3. Where method (A) is being used, delete the inappropriate words and insert in the spaces indicated the names of the two Directors, or of the Director and the Company Secretary, who are to sign.

4. If method (B) (affixing the common seal) is adopted in cases where either or both the authorised officers attesting its affixation are not themselves a Director or the Company Secretary, their respective office(s) should be substituted for the reference(s) to Director and/or to Company Secretary/ Director. (In the case of execution by bodies that are not companies, the reference to "Company" under the second signature should be deleted where appropriate.)

5. Method (C) (execution by a single Director) has been introduced primarily, but not exclusively, for 'single officer' companies. The Director should sign where indicated in the presence of a witness who should then sign and set out his name and address.

6. Where the Contractor or Consultant is an individual, he should use method (D) and sign where indicated in the presence of a witness who should then sign and set out his name and address.

Executed as a Deed by the Consultant

namely **Geosphere Environmental Limited**

(A) acting by a Director and the Company Secretary / two Directors **of the company**

TOM POWLING and PAUL DAVIES
(print name of signatory) *(print name of signatory)*

Signature Director Signature Company Secretary/ Director

(B) by affixing hereto the common seal **of the company / other body corporate**

Signature Director

Signature Company Secretary/ Director

[Common seal of company]

(C) by attested signature of a single Director **of the company**

Signature Director

In the presence of

Witness' signature _____ (Print name) _____

Witness' address _____

(D) by attested signature **of the individual**

Signature Director

In the presence of

Witness' signature _____ (Print name) _____

Witness' address _____