VAUSE CONSTRUCTION Ltd

CONSTRUCTION PHASE HEALTH & SAFETY PLAN

Kingswood Rd
Prestwich
Manchester
M45 0AR

Vause Construction Ltd
Unit 9
Meadow Business Park
Meadow Lane
Bolton
BL2 6PT

HEALTH & SAFETY PLAN

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HEALTH & SAFETY PLAN

1. INTRODUCTION

1.1 Appointments & Responsibilities

Wilby Ltd Ltd are appointed as CDM Co-ordinator for Vause Construction Ltd, Vause Construction Ltd have been appointed as Principal Contractor in compliance with the Construction (Design & Management) Regulations 2007.

Acting as the CDM Co-ordinator Wilby Ltd will ensure:

- the competency of any designers and principle contractor
- the co-ordination, input and management of the Health & Safety file
- the development of the Health & Safety Plan
- the development of the Health & Safety File including its handover to the client on completion

1.2 Plan Development

This Construction Phase Health and Safety Plan identifies hazards and assesses the risk of the various activities and components of the design and construction of the scheme to the workers and people affected by the works, with a view to alleviation or reduction of those at risk.

This Plan has been prepared in good faith, using the information available at its time of preparation

All **foreseeable** significant risks and other relevant Health & Safety issues will be contained within the Plan.
Information will be obtained from designers and any subcontractors in order to produce a comprehensive management document.

The Plan will be updated continually based on the information available and remains a live document until completion of the project.

1.3 Introduction Statement

- This Health & Safety Plan is intended to form part of the contract management documentation for all construction work which is to be undertaken on behalf of Vause Construction Ltd. for contracts which are likely to exceed 30 days or 500 person days in duration.

- The precautions outlined in this Health & Safety Plan will use the best practicable means for securing the health and safety of persons employed on the contract as well as other persons who may become affected by it.

- Vause Construction Ltd. will ensure through this Health and Safety Plan that all construction work undertaken on its behalf is conducted in accordance with

current health and safety legislation, existing codes of practice and best working practice of the construction industry.

- In order to achieve high standards of health and safety on all construction work Vause Construction Ltd. will monitor the performance of its contractors through its Safety Advisor.

- Vause Construction Ltd. will evaluate the results from its monitoring programme and will use this information to update its list of preferred contractors.

- Vause Construction Ltd. will remain responsible for ensuring that all work is executed in accordance with the construction phase of the Health and Safety Plan.

- The following Health & Safety Plan details the various health and safety arrangements which are required by Vause Construction Ltd during the progress of all construction work on Vause Construction Ltd property/land or their clients or suppliers property/land.

- Vause Construction Ltd. will provide detailed risk assessments and method statements in respect of all work carried out during the construction phase of this project for approval by the client or his representative. Method statements requested by the client will be produced in the course of the works.

- Vause Construction Ltd. will initiate regular meeting between all interested parties on site to ensure the transfer of information regarding design changes and potential hazards arising, including regular consultation with the work force inclusive of any subcontractors

- All operatives will be subject to a site Health & Safety induction with relevant Tool Box Talks being given on a weekly basis. A register of tool box talks will be maintained.

- All Statutory Notices, “Basic Health & Safety Rules” and site specific rules shall be displayed in the site accommodation.

- Emergency procedures (including fire) will be included in the site induction and displayed in the site accommodation along with details of emergency services contact numbers and details of the nearest Accident and Emergency unit.

- Vause Ltd will supply the information requested for inclusion in the Health & Safety File at the practical completion of the works.

- Vause Ltd will carry out weekly “Management Health & Safety Audits of the site and copies of the audit report will be made available.

1.4 Health & Safety Executive Notification

A copy of the Form F10 is enclosed in this section.

Health and Safety Executive

Notification of Construction Project

This is an Initial Notification

Site Address:
Kingswood Road
Prestwich
Manchester
M45 0AR

Multiple Site Locations:
No

Geographical Area:
Greater Manchester

Local Authority:
Bury Metropolitan Borough Council

Type of Project:
Demolition/Dismantling - Other

Time Allowed by Client:
2 weeks

Start Date:
01/12/2014

Duration:
6 weeks

No of people on site:
10

No of contractors on site:
3

Project Description:
The project involves the demolition and site clearance of the site adjacent Kingswood Road, the demolition of existing buildings and structures, the preparation of the ground to an agreed formation level, and removing all obstructions to a depth of three (3) metres. The site areas for the future residential properties are to receive a suitable piling mat for future works by others.

Please note that demolitions of existing buildings have been previously undertaken and this F10 Notification relates to the current works including ground remediation and preparation works to facilitate a future residential development.

Client:
Prospect (GB) Limited / John Pearson
Unit 5 Meridian Business Village
Hansby Drive
Hunts Cross
Liverpool
L24 9LG
0151 4485720
john.pearson@prospectgb.com

CDM Coordinator:
Wilby Limited / Mark Weeks
Gordon House
Charles Street
Halifax
HX1 1NA
01422 358525
mark.weeks@wilbyltd.co.uk

Designer:
MPSL Planning & Design Ltd / David Golden
Commercial House
14 West Point Enterprise Park
Clarence Avenue
Trafford Park
Manchester
M17 1QS
01617 721999
dgolden@mpsldesignltd.co.uk

Designer:
Sutciffe Consulting / Billy Baldwin
18 – 20 Harrington Street
Liverpool
L2 9QA
0151 726 2000
William.baldwin@sutcliffe.co.uk

Principal Contractor:
Vause Construction Ltd / Graham Vause
Unit 5 Meadow Business Park
Meadow Lane
Bolton
BL2 6PT
England
01204 361117

Name:	John Pearson
Declaration Signed:	Yes
Declaration Selected:	As client for this project, I hereby declare that I am aware of my duties under the Construction (Design and Management) Regulations 2007 (S.I. 2007/320).
Role:	Construction Director
Declaration Signature:	***pp*** 
Date:	02/04/2014

2. HEALTH & SAFETY STANDARDS

The principle objective is to ensure that adequate actions and precautions are taken to prevent harm being caused to those carrying out the construction work and others who may be affected including the general public and visitors.

All operations undertaken and controlled by Vause Construction Ltd will be undertaken by competent and experienced managers and operatives.

The work involved will be subject to agreed working procedures, risk assessments and method statements. It will be planned and executed in accordance with both statutory legislation and Vause Construction Ltd company standards.

The Health & Safety standards relating to all operations, both in any design and build, will be constantly monitored by management.

The Managing Director will ensure that advice and assistance on all Health & Safety issues is available. Regular inspections will be carried out by an independent inspection company to ensure compliance to standards, including the updating of the Plan.

3. VAUSE CONSTRUCTION LTD HEALTH & SAFETY ORGANOGRAM

4.1 NATURE OF THE PROJECT

4.1 Site Location

Kingswood Rd, Prestwich, Manchester, M45 0AR.

4.2 Scope of Work

The demolition and site clearance of the site adjacent Kingswood Road, the demolition of existing buildings and structures, the preparation of the ground to an agreed formation level, and removing all obstructions to a depth of 3m.

The site areas for the future residential properties are to receive a suitable piling mat for future works by others
Demolitions of existing buildings have been previously undertaken in a previous visit. The current works are to undertake the ground remediation and preparation works to facilitate a future residential development.

4.3 Timescale for Completion of Work

Commencement date for construction operations:	Dec 2014.
Current operations:-	
Duration of Contract:	6 Weeks.
Completion Date:	Feb 2015

Indicative work programme

Attached construction programme is in Appendix B

Generally, re establishment of site the facilities and the removal of timber trusses during Dec 2014, for a period of 6 weeks.
Estimated date of completion: Feb 2015

4.4 Client

Vause Construction Ltd
Unit 5, Meridan Business Village
Hansby Drive
Liverpool
L24 9LG
Contact: John M Pearson Tel: 0151 448 5720
E:john.pearson@prospectgb.com

4.5 Architectual Designer

MPSL Planning and Design Ltd
Commercial House
14 West Point, Enterprise Park
Clarence Avenue, Trafford Park
Manchester
M17 1QS
Contact: David Golden. Tel: 0161 772 1999

Mob:-07718 910060
E: dgolden@mpsldesignltd.co.uk

4.6 Structural / Civil Engineer **Sutcliffe Consulting**
18 – 20 Harrington Street
Liverpool
L2 9QA
Contact: Billy Baldwin Tel: 051 726 2000
Mob: 07968 514671
E: William.baldwin@sutcliffe.co.uk

4.7 CDM Co-ordinator **Wilby Ltd**
Gordon House
Charles Steet
Halifax
HX1 1NA
Contact: Mark Weeks Tel: 01422 357367
Mob: 07908 499976
E: mark.weeks@wilbyltd.co.uk

4.8 Principal Contractor **Vause Construction Ltd**
Unit 5
Meadow Business Park
Meadow Lane
Bolton
BL2 6PT
Contact: Graham Vause. Tel 01204 361117
Mob:07836 366794
E:
Site Manger TBA. Mob.
E:

5. EXISTING ENVIRONMENT

5.1 Previous Use of Land

No existing Health & safety File has been made available for the project.

The site which is located on Kingswood Road Road was previously occupied by a computer company, ISoft, the site has been purchased by Vause Construction for a residential development.

As the development area was vacanted after the demolition for some 4 weeks. A visual survey is required to be undertaken before any ground works commence to ascertain if any hazardous materials have been tipped / left on the site in the interim period.

- Needles
- Sharps, etc

Vause Construction is responsible for inspecting the sites, and becoming familiar with means of access, including conditions that may affect their contracted works. Vause Construction will be responsible for all necessary survey investigations and enquiries to ensure their works can be completed safely.

Due to the building structures being previously demolished, there are no demolition works left on the site. However there still could be a possibility of hazardous substances having been previously fly tipped on the site in the interim period.

5.2 Surrounding Land Use

The site is surrounded by metal railings which limits public access and will remain insitu for the duration of the works..

The area surrounding the site is bounded by and comprises of the following;

- _ North – Supermarket and car park.
- _ East – Post Office sorting office.
- _ West – Vegetation, football ground with open space of rough grass land.
- _ South – Kingswood Road and residential dwellings.

5.3 Site Investigation

A Ground Investigation report has been commissioned by the Client and is provided in Appendix E of this document.

We will be vigilant as the ground works progress to ensure that any buried asbestos or other deleterious materials affecting the work are identified. Vause Construction operate to the requirements of the Health and Safety at Work Act 1974, and Control of Asbestos at Work Regulations 2012.

If any ACMs are found during the contract in areas of work then all tasks in the vicinity will be stopped, the area will then be made safe and secure. Prospect will be contacted to agree the most appropriate course of action

5.4 Existing Utility Service Information

A Final Utility Connections Report has been produced by Utilities Connections Management Limited, dated Oct 2014.
A copy of the report is available in Appendix A
This report has been produced as a desktop study using the statutory records received from each relevant body. Vause Construction will review the report for the services in and around their working area.

The report confirms that the following services have been located on the Kingswood Rd
Low Voltage Electricity Infrastructure
Low Pressure Gas Mains
Water Infrastructure
Underground and Overground Telecomms apparatus
Underground Virgin Media apparatus

Vause Construction are to identify and protect all existing services. Vause Construction will use location equipment to trace all underground plant; hand dig trial holes to confirm the precise location of plant. Once services have been identified Vause Construction will mark the location of any concealed services before carrying out the works by using suitable paint or markers on the ground surface.

Vause Construction will ensure that services are adequately protected to prevent damage to services; and will not interfere with their operation without the consent of the appropriate service authorities/statutory undertakers.

Contact Names for Utilities

UTILITY	NAME	TELEPHONE NUMBER
Gas	**National Grid**	**0800 111 999**
Water	**United Utilities**	**01925 237000**
Electricity	**Electricty Northwest**	**0800 195 4141**
Telecom	**Openreach**	**0800 9173993**

Cable TV	**Virgin Media**	**0845 4541111**
Foul Sewer	**United Utilities**	**0904 4756448**

5.5 Proposed & New Service Information

Records of the new laid down services and proposed service layouts will be provided by the utility companies.

Drawings will require updating to show the final as laid information.

UTILITY	DRAWING NO.	DATE OF UPDATE	SIGNED
Gas			
Water			
Electricity			
Telecom			
Cable TV			
Foul Sewer			
Storm Water			

6. DESIGN

There is NO design works as part of this contract.

7. HAZARD & RISK IDENTIFICATION & ASSESSMENT

7.1 Register of General Risk Assessments / Method Statements

The following Hazards & Risks have been identified and require Risk Assessments to be completed. All Assessments to be filed in the site office including any COSHH and Manual Handling information.

Operation	Risk Assessment To Be Provided By	Date Received	Date Accepted	Accepted By
Site Security				
Protection of Public				
Ground worker				
Piling Mat				
Road Cleaner				

8. DESIGN & CONSTRUCTION MODIFICATIONS

Health & Safety information on construction and design modifications and their implications to health and safety must be noted in the following table:

Modifications	H & S Implications	Action taken	Approved By	Date

9. CONTRACTORS

9.1 Appointment of Contractors

Any sub contractors appointed will be deemed competent in accordance with the Vause Construction Procedure for the Assessment of Contractors.
Vause Construction will provided all contractors with the relative Health & Safety information in order for them to gauge resources and assess Hazard / Risks not designed out.
The contractors will provide all necessary Health & Safety information to Vause Construction and will co-operate with site management and to ensure the maintenance of Health & Safety standards.

9.2 Approved Contractors

The following is a list of approved contractors involved in working on the project:-

Contractor	Trade	Date of Assessment

10. SITE WIDE ELEMENTS

10.1 Site Management & Supervision Cover

Contracts Manager:- **Graham Vause**

Site Manager:- **TBA**

Site Administration:- **Vause Construction Ltd, Bolton office.**

10.2 Vause Construction "Supplied" Plant & Plant Operatives (e.g. teleporters, cranes)

Plant Item: **Supplied by:** **Operator:**

Size/Type/Capacity:
No of:

Plant Item: **Supplied by:** **Operator:**

Size/Type/Capacity:
No of:

10.3 First Aid Provision on Site

4 Day Trained First Aider(s) :

Graham Vause…….

Site Manager TBA…….

Appointed Person(s) …….

…….

…….

…….

10.4 Protection of General Public /. Security and Delivery Arrangements

Suitable security will be incorporated into the project to ensure the safety of the site personnel and members of the public and to prevent unauthorised entry and reduce vandalism.

Vause Construction will be in sole possession of the site from commencement of the construction until Practical Completion of their works and will make allowances for suitable security syste

Adequate / appropriate sigms.

- Snage is to be erected around the site for the duration of the works.
- Protection of the surrounding public footpath, highways and residents gardens will be needed during construction.
- All reasonable measures will be taken to ensure that no unauthorised persons enter the work areas. Only people who are explicitly authorised by the site management will be allowed access to the site.
- All people attending the site will have the relevant site rules explained to them and undertake the safety induction as detailed elsewhere within this document.
- Barriers and means of separation and / or permits-to-work will be used to keep all sub- contractor works away from hazards created by others and other people away from hazards created by the works.
- Requirements of HS (G) 151 "Protecting the public will be implemented and observed
- The site manager will inspect the boundaries on a daily basis as a minimum

Details of General Site Protection

The existing metal railings which are provided to all boundaries of the site are deemed sufficient to provide an effective barrier.

- The entrance gates to the site will be secure, kept locked at all times when not in use, and of the similar height as the hoarding.
- The effectiveness of the site perimeter including arrangements for maintaining the perimeter particularly where there is evidence that person can breach the fencing will be inspected daily.
- Adequate lighting is to be made available during the hours of darkness, should suitable illumination not already be present.

- Any licences that might be required for any hoardings, scaffold, or skips that encroach into the adopted highway will be attained.

- Vause Construction Limited will ensure the site is safe and unauthorised access is prevented whist the works are occurring, and at the end of each working day

Signs will be erected on the entrance to the site and where necessary.

- Mandatory health and safety sign
- Contractors vehicles this way, showing way to compound and site areas
- Company Notice board with out of hours contact numbers Site Transport and related traffic management.
- Delivery of materials, plant and equipment will be scheduled to minimise disruption to nearby schools, residents and businesses
- Routes for emergency services are to be maintained and kept clear at all times and all means of escape to be maintained.
- All roads around Kingswood Road will be kept open and clear of mud at all times.
- No materials will be stored other than within the designated stores areas indicated on the site plan
- All traffic management routes used by sub-contractors must be adhered to, and kept clean and clear of obstructions.
- When accepting deliveries a trained banksman from the relevant subcontractors will be used to supervise the movement of these vehicles.

10.5 Access & Egress

Access and egress to the site is via the entrances on Kingswood Road as indicated on drawing in Appendix D

10.6 Traffic, Delivery, Pedestrian Routes & Car Parking Facilities

As per the Traffic Management Plan which will be located in the site office and will be updated as the project develops. The initial plan is shown in Appendix D

We will ensure that a traffic management plan will be imposed that will not put pedestrians and others at risk during the site activities.

The area surrounding the site is largely residential and has good pedestrian facilities with lit roads and footways to both sides of the roads. The roads are subject to a 20 mph speed limit and a number of the roads include speed reduction measures such as humps and priority chicanes.

However, the basic principles will be adopted and applied to the site

- Delivery of materials and equipment will need to be assessed and reviewed and agreed with the supplies to minimise disruption. Deliveries will NOT take place during start and finish of the school day to minimise traffic distruption.

- Any alternative pedestrian routes which will be required during the currency of the works will be clearly signed to ensure the segregation of site operatives and public from site operations.

- When parking vehicles consideration should always be given to emergency access routes to the surrounding properties and under no circumstances should these routes be blocked.

- When carrying out any activity that could affect members of the public or the public highway we will ensure that the deliveries and any waste removal are strictly controlled accordingly, including the need for licenses etc:
  - placing a skip on a public road
  - erecting any kind of temporary scaffolding/fencing/hoarding
  - vehicles delivering materials that need to cross a footway to reach the site
  - excavating any part of a public road or pavement

We will be manage and record the following:

- Traffic management plan as part of H&S Plan prepared, implemented, updated and enforced;
- Pedestrians separated from movements e.g. at site entrance/exit and during plant slewing and loading;
- Reversing minimised and controlled by a non reversing policy and use of trained banksmen
- Training card or equivalent held by drivers or operators and a verification system in place;
- High visibility clothing provided to, and worn by, all persons as risk

10.7 <u>Details of Compound & Welfare Facilities</u>

Compound as per Traffic Management Plan which will be located in the office and updated as required by the progress of the works.

1. Canteen
2. Toilets / drying room
3. Site Office / Meeting Room
4. Container Storage

Welfare facilities will be line with the requirements of Schedule 2 of the CDM Regulations and totally suitable for the number of operatives on site.

10.8 Details of Temporary Facilities

The temporary facilities include the provision for site personnel when the site welfare facilities will not be available. This is generally at the commencement and completion of the project and will be sufficient for the needs of the project at that time and in line with Schedule 2 of the CDM Regulations.

11. SITE RULES

1. Vause Construction control the management of Health & Safety on site. All instructions issued by the Site Manager will be observed by those employed directly or indirectly.

2. Head protection will be worn by all those in the construction area and any other areas designated by Site Management or for specific operations and any location where risk of head injury exists.

3. Safety footwear will be worn by all those in the build area and any other areas designated by Site Management for specific operations and any location where risk of foot injury exists.

4. Hi-Vis Vests will be worn by all those persons working in the construction areas and other designated area.

5. Authorised Visitors entering the build area must report to the Site Manager and sign the register.

6. All operatives must report to the Site Office and log in on arrival to the Site.

7. All cars must be parked in designated areas.

8. All operatives will receive a site induction before being allowed to work on the site for the first time.

9. When other articles of P.P.E. are assessed as being required, then it shall be worn.

10. The public, especially children, must not be allowed in the build areas unless supervised and accompanied by a Vause Construction representative and the visit is pre-planned and authorised.

11. Smoking in designated areas.

12. No alcohol or non-prescriptive drugs are permitted on Site.

13. Site speed limit is 5 m.p.h.

15. Do not use any plant or machinery or adjust scaffolding unless you are competent and authorised to do so.

16. Clean up your work place prior to moving on to other work places and in any event at the end of each working day.

17. All approved ladders when in use must be secured.

18. All persons have a duty to report any accident, injury or dangerous occurrence, damage to plant or equipment and any other safety related problem to the Site Manager.

19. 110V power will be used on site unless alternative arrangements accompanied by Risk Assessments are authorised in writing by Site Management.

20. There will be no Site Burning of any material.

21. Do not enter into any excavation unless authorised to do so.

22 Mobile phones to be used **only** in designated areas

The above rules and any relevant site specific control measures drawn from risk assessments will be brought to the attention of the workforce during the Site Induction.

12. FIRE PREVENTION & EMERGENCY EVACUATION

12.1 Fire Prevention

Vause Construction Limited have reviewed the latest guidance from the HSE "Fire Safety in Construction" (HSG168) and will manage any significant fire risks to new build works on the project.

A fire management procedure will be developed as the project develops. This will include a fire risk assessment and fire plan for the project.

All LPG cylinders and other flammable materials will be properly stored. LPG will be stored outside buildings in well-ventilated and secure areas, any flammable materials such as solvents and adhesives will be stored in lockable steel containers.

Vause Construction Limited will ensure that suitable fire extinguishers are on hand and that sparks or heat cannot set fire to surrounding materials. After the work has finished, suitable arrangements to check the worksite to make sure that there are no smouldering materials will be implemented under a permit to work.

The site will be kept clean and tidy any rubbish being cleared away promptly and regularly, and avoid unnecessary stockpiling of combustible materials.

Vause Construction Limited will prevent personal injury, death and damage to the works or other property from fire. Compliance with the Joint Code of Practice 'Fire Prevention on Construction Sites' published by the construction confederation and the Fire Prevention Association (The 'Joint Fire Code') is expected.

BURNNG ON SITE is not permitted.

SMOKING ON SITE is to be prevented except in designated areas that are carefully controlled, equipped with the firefighting equipment and receptacles for the safe disposal of smoker's materials and inspected to guard against the risk of fire.

Adequate and suitable fire extinguishers are to be provided within all site facilities, compound areas and working areas as follows.

This equipment is to be checked and inspected annually and a records maintained.

Location	Type of Extinguisher Wall or Floor Mounted
Office	2 x Water 1 x Dry Powder 1 x Foam
	None

Toilet & Washroom	
Canteen	1 x Dry Powder 1 x Water
Drying Room	(Included in Canteen)
Compound / Silo	1 x Dry Powder Wall Mounted
Working Areas	Fire Stations as operation demand

12.2 EMERGENCY EVACUATION

The purposes of an emergency procedure plans is to ensure that everyone on site reaches a place of safety. An emergency plan should:

- be available before construction starts;
- be up to date and appropriate for the circumstances concerned; make clear who does what during a fire

1. In the event of fire which cannot be extinguished safely using the available fire fighting equipment **call the Fire Brigade**.

2. To call the Fire Brigade by telephone dial 999 and ask for the fire service. Answer all the questions asked by the operator precisely, especially the address and location of the site and the location of the main entrance. Report back all instructions and do not leave the telephone until the operator instructs you to do so.

3. The Site Manager or his appointee will position themselves at the main entrance to await the arrival of the fire engine and direct it to the scene of the fire.

4. If gas cylinders are in or near the outbreak of the fire, the officer in charge of the fire crew must immediately be informed. Similarly, if there are quantities of Hilti cartridges stored or other flammable / explosive items or substances, their location must be identified.

5. Immediately, an outbreak of fire has been identified the Site Manager or his appointee must check to ensure that all personnel working in the vicinity are evacuated to the Assembly Area. This is designated in the Site Safety Plan and displayed in the welfare facilities along with the Procedure and Action Notice.

6. After the situation has stabilised the Construction Director must be immediately informed.

7. An Incident Report must be produced by the Site Manager into the cause of the incident and any injuries sustained. A schedule of material damage must also be produced.

8. If felt necessary by Construction Director and / or the Fire Authority an enquiry will be held to determine the final cause and to discuss improved prevention techniques.

Emergency Evacuation

The assembly point is as shown should it be necessary to evacuate the site in the case of an emergency fire. This must be identified with a sign indicating Assembly Point.

The assembly point is highlighted in the site induction procedure and shown on the Traffic Management plan in the office.

12.3 Local Information for Emergency Services

Hospital

Address: North Manchester General Hospital ……..
Delaunays Rd
Crumpsall
Manchester
M8 5RB
Tel No: 01617954567…….…..

Police

Address: Prestwich Police Station
Fairfax Rd, Prestwich
Manchester
M25 1AS
Tel No: 0161 856 8229…….……..

Fire Service

Address: Whitefield Fire Station
Bury New Rd
Manchester
M45 7SY
Tel No: 0161 609 0502

IN AN EMERGENCY USE THE 999 CALL

13. SITE INDUCTION TRAINING

The following personnel have received and understood the Health & Safety Induction provided by the Site Manager or his appointed representative in accordance with Vause Construction Health & Safety requirements.

Site Kingswood, Prestwich, Manchester

Date	Name & Signature of Recipient	Recipient's Company	Name & Signature of Trainer

14. STATUTORY INSPECTORS

14.1 The following persons are appointed to carry out the required Statutory and Policy Inspections on site:

Scaffold Inspector(s)

Name:		**Name:**	
Company:		**Company:**	
Tel. No:		**Tel. No:**	
Fax No:		**Fax No:**	

General Frequency

On completion of each section prior to first use. After bad weather. Within every 7 days.

Excavation Inspector(s)

Name:		**Name:**	
Company:		**Company:**	
Tel. No:		**Tel. No:**	
Fax No:		**Fax No:**	

General Frequency

Prior to commencement of daily operations.

14. STATUTORY INSPECTORS (cont'd)

Plant Inspector(s)

General Frequency

Within every 7 days.

Name:		**Name:**	
Company:		**Company:**	
Tel. No:		**Tel. No:**	
Fax No:		**Fax No:**	

Lifting Equipment Inspector(s)

General Frequency

Name:		**Name:**	
Company:		**Company:**	
Tel. No:		**Tel. No:**	
Fax No:		**Fax No:**	

Traffic Management Inspector(s)

General Frequency

Name:		**Name:**	
Company:		**Company:**	
Tel. No:		**Tel. No:**	
Fax No:		**Fax No:**	

15. PLANT OPERATORS

15.1 Operatives of Plant must be adequately trained, competent and authorised.

Certificate of Training Achievements and Driving Licence must be provided to the Site Manager for inspection and inclusion on the list of approved operators prior to any machine being operated. A copy of both the certificate and licence should be maintained on site.

List of Approved Plant Operators

Name	Company	Plant	CTA No.	Confirmation that Plant Op. Holds Current Driving Licence YES / NO

16. PLANT

16.1 Listed is the plant operating or which has operated on the site. The list includes forklift trucks, telescopic handlers, excavators, cranes, rollers, dumpers etc.

The necessary documentation must be included and filed in this section.

List of Plant on Site

Type & Machine No.	Hire Company or Company Ownership	Documentation Provided & Inspected	Date

17. WASTE MANAGEMENT

17.1 Classification of Materials to be Removed

Sample SWMP located in Appendicx C. This plan will be refined when a waste management company has been appointed to the site

17.2 Waste Removal Contractors Details

Name of Contractor Date

Operators Licence Details

Location of Transit Station or Waste Disposal Point

Name of Persons who Visited & Verified Disposal Point

TBC

18. ENVIRONMENTAL CONSIDERATIONS

There are no TPOs in place.

19. MANAGING & MONITORING

19.1 Health & Safety Plan – Design, Planning & Handover

The following is a Record of the Completion Acceptance and Handover of the contents contained within the Health & Safety Plan between CDMC and the Principal Contractor.

Record of Completion & Acceptance of Health & Safety Plan from Planning to Construction

	Name	Position in Company	Date	Comments
Design Element / Stage 1 Plan signed off as complete prior to issue to P.C. and other Contractors				
Construction Phase completed and signed off by as sufficiently developed to allow works to commence	**Graham Vause**	**Managing Director**		

NO PLAN IS CONSIDERED ADEQUATE TO ALLOW CONSTRUCTION TO COMMENCE UNLESS THIS RECORD IS FULLY COMPLETED

19.2 Distribution List.
Managing Director, Commercial Managerr, H&S Consultant, Site Manager, Buyer, Head Office, H&S File.

19.3 Health & Safety Plan – Construction

The following is a Record of the Updates and Inspections of the Health & Safety Plan during the Construction Stage.

Update & Inspection of Health & Safety Plan

Date of Update or Inspection	General Comments & Action Required	Inspected By		
		Name	Position	Signature

19.4 Health & Safety Input & Monitoring

Vause Construction external Health & Safety advisor will advise, inspect, audit and monitor in accordance with the Companies Policy and Procedures.

19.5 Distribution

The following personnel have received a copy of the Health & Safety Plan:

Name	Position	Date Received	Comments

19.6 Health & Safety File Requirements

Under Regulation 22(1) of the CDM Regulations 2007, Vause Construction Ltd as Principal Contractor, has a statutory duty to promptly provide to Wilby Ltd as CDM Coordinator information for inclusion within the Health & Safety File.

Vause Construction will provide::

1 No Hard copy
1 No electronic copy

The required information is too provided prior to practical completion of the project.

This will include;

- A brief description of the work carried out.
- Residual hazards and how they have been dealt with (e.g. surveys or other information concerning asbestos, contaminated land, water bearing strata, buried services, etc.)
- Key structural principles incorporated into the design of the structure (e.g. bracing, sources of substantial stored energy – including pre or post tensioned members and safe working loads for floors and roofs, particularly where these may preclude placing scaffolding or heavy machinery there.)
- Any hazards associated with the materials used (e.g. hazardous substances, lead paint, special coatings which should not be burnt off.)
- Information regarding the removal or dismantling of installed plant and equipment (e.g. lifting arrangements.)
- Health and Safety Information about equipment provided for cleaning or maintaining the structure.
- The nature, location and marking of significant services, including underg round services, gas supply equipment, firefighting services, etc.
- Information and as built drawings of the structure, its plant and equipment e.g. the means of safe access to and from the services voids and risers, fire doors and safe fire compartments.

Before the Practical Completion Certificate is issued, Vause Construction Limited must ensure that all such information has been supplied by themselves and their sub-contractors, to the satisfaction of the CDM Co-ordinator.

APPENDIX A

- **Utility Infrastructure Report**

OUTLINE UTILITY INFRASTRUCTURE REPORT

Kingswood Road, Prestwich

For

Prospect GB

Prepared By
Utility Connection (UK) Limited

October 2014

CONTENTS

1.0 INTRODUCTION

1.1 General Comments

Utility Connections service is the provision of an outline utility infrastructure report.

The report contains information received from utility and other companies (including information received from electricity, gas, oil, water mains and sewers and telecommunications companies) on the whereabouts of any apparatus they maintain within or in the immediate vicinity of the site boundary relating to the land area as detailed in Section 2.1.

Utility Connections has reviewed the information currently provided from utility companies and other providers.

The utility searches spreadsheet (Section 2.2) provides the details of the utility companies and other providers who have been contacted and asked to provide details on the whereabouts of any apparatus they own or maintain within or in the immediate vicinity of the site.

The companies highlighted in **red** have confirmed they have apparatus in or near the vicinity of the development (not necessarily within the development plot) and the "as laid" drawings they have provided are contained in Section 9.

The companies highlighted in **blue** have confirmed they have no existing apparatus in the vicinity or near to the development area.

Where companies are highlighted in **green,** there is a comment "waiting" and we have at this time not received confirmation from that company as to whether or not that company has any affected apparatus in the development area. As soon as any further information is received an update letter will be issued for the completeness of the report.

Comment is made within the report in regard to any potential diversionary elements that may need to be considered. Based on the information relating to existing networks provided by the utility companies, Utility Connections have looked at the availability of the normal utility infrastructure and provided budget estimates for the infrastructure necessary to service the development (terminating at the site entrance), i.e. water, electricity, gas and Openreach / BT (telecommunications). Comment regarding any potential network reinforcements that may need to be considered is made where appropriate.

Utility Connections have carried out high level load profiling for the site area based on potential use as defined in Section 1.2 of this report. Consideration for energy demands from sustainable or renewable sources has not been made in the load calculations. The load profiling used by Utility Connections for water, electricity and gas has been based on typical lighting, power, gas heating and water consumption requirements for this type of development only.

It should be noted that utility networks are of a dynamic nature and any future developments in the area, as well as the one reviewed in this report, can substantially change the estimated availability of the existing networks which could affect any reinforcement requirements and subsequent costs.

Drainage and sewers have not been considered within the scope of Utility connections works.

This report does not include comment with regard property or land information.

While Utility Connections takes all due care in the preparation of its reports the primary information on the whereabouts of any existing apparatus in the vicinity of the development site has been sourced wholly from third party sources, and therefore this report can only be as complete and accurate as those sources. The information is provided in good faith but is offered without warranty.

Utility Connections shall not be liable for any shortcoming by reason of the inaccuracy or omission in the source information, or of the total or partial absence of source information.

Reference should be made to HSE document HSG47 "Avoiding Danger from Underground Services" before undertaking any excavation works on the development site.

For further information please contact:

Utility Connections (UK) Limited
Clifton House
Ashville Point
Clifton Lane
Cheshire
WA7 3FW

Project Manager: Mark Jackson

Tel: 0844 499 6404
Fax: 01928 898599

e-mail:mark.jackson@utilityconnections.co.uk

www.utilityconnections.co.uk

1.2 Description of Project

The proposed development will consist of 24 new build residential gas heated dwellings.

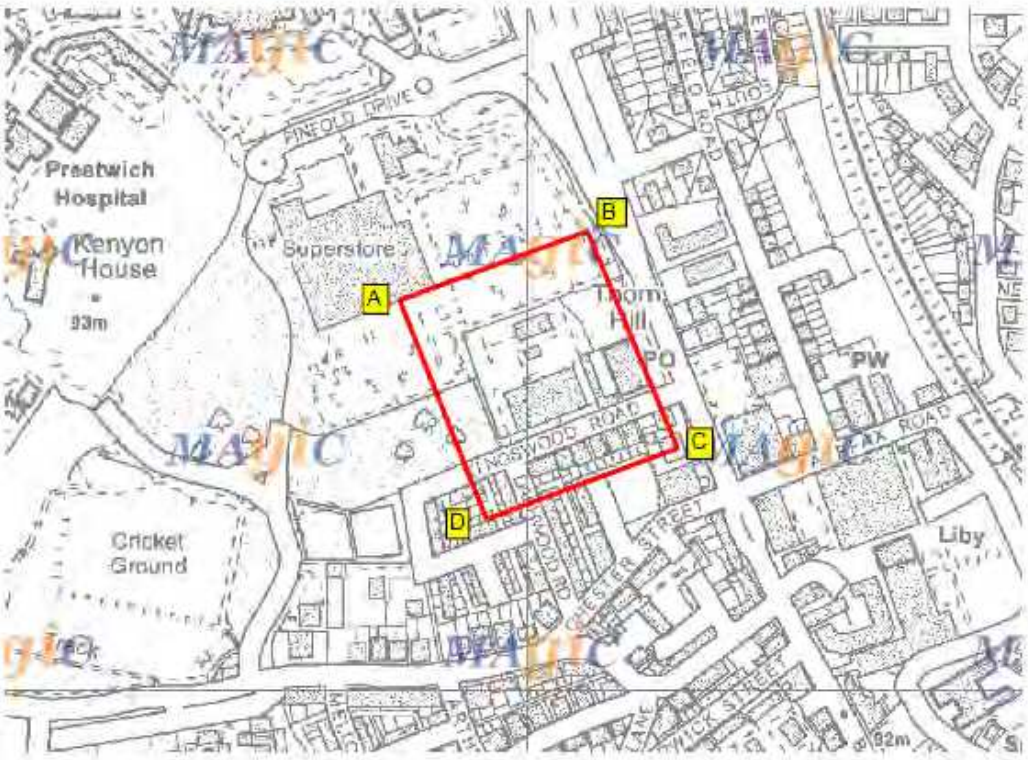
The proposed development site is located Kingswood Road, Prestwich, Manchester, M25 3AB.

Figure 1.2 Proposed Development Plan

2.0 AREA INFORMATION

2.1 Area under Consideration for Utility Searches

Kingswood Road
Prestwich
Manchester
M25 0AD



Point	Eastings	Northings
A	380907	404286
B	381042	404335
C	381106	404178
D	380968	404127

2.2 Utility Searches Results Schedule

The following table provides the details of the utility companies and other providers who have been contacted and asked to provide details on the whereabouts of any apparatus they own or maintain within or in the immediate vicinity of the site.

United Utilities - Water	Water	Yes
United Utilities - Water Sewerage	Water Sewerage	Yes
Electricity North West	Electricity	Yes
National Grid - Gas	Gas	Yes
BT	Telecoms	Yes
Cable & Wireless (respond for Thus)	Telecoms	No
Abovenet UK	Telecoms	No
Airwave Solutions Ltd	Telecoms	No
All pipelines via Linesearch	Oil/Fuel	No
Easynet Telecom Ltd	Telecoms	No
Energetics	Multi Utility	No
Envoy Asset Management Ltd	Gas	No
ES Pipelines	Gas	No
Fulcrum	Gas	No
Gamma Telecom Limited	Telecoms	No
Gas Transportation Co.	Gas	No
Hutchison 3G UK Limited	Telecoms	No
National Grid - Electricity	Electricity	No
Network Rail	Telecoms	No
O2 UK Limited	Telecoms	No
Orange Personal Communication Services Ltd	N/A	No
SSE Pipelines Ltd	Gas/Telecoms	No
T Mobile	Telecoms	No
Thus Plc (cable and wireless respond)	Telecoms	No
Trafficmaster Plc	Telecoms	No
Verizon Business	Telecoms	No
Vodafone Group	Telecoms	No
Vtesse Networks	Telecoms	No
Colt Networks C/O McNicholas Construction Services	Telecoms	Awaiting
Fibernet UK Ltd	Telecoms	Awaiting
Fibrespan Limited	Telecoms	Awaiting
Global Crossing PEC UK Ltd	Telecoms	Awaiting
Global Crossing UK Ltd	Telecoms	Awaiting
Kingston Communications	Telecoms	Awaiting
Level 3 Communications (Allcom)	Telecoms	Awaiting
Spectruminteractive	Telecoms	Awaiting
Telewest Broadband	Telecoms	Awaiting
Teliasonera (Telent)	Telecoms	Awaiting
Virgin Media	Telecoms	Awaiting
KPN Intrntl C/O McNicholas Construction Services	Telecoms	Awaiting
Tata Communic C/O McNicholas Construction Services	Telecoms	Awaiting

3.0 Utility Profile for Development

Table 3.1 below shows the capacities that are likely to be required to service the development, based on the need to provide a reasonable level of flexibility into the utility infrastructure provision, based on the plan as shown in Figure 1.2.

Table 3.1 – Anticipated Utility Profile for the Development

Units	Water L/S	Electricity kVA	Gas SCMH
24	0.252	48	22

4.0 WATER

4.1 Water – Reinforcement & Diversion Considerations

United Utilities Water records show that they have existing asset located within the surrounding area of the development, see figure 4.1.

Records indicate a 6" diameter water main within Bury New Road, located to the east of the proposed development.

A 3" diameter water main is shown located within Kingswood Road, which is located to the south of the proposed development.

No water mains are shown located within the development boundaries.

No diversion costs are anticipated as the water main within Kingswood Road is located in carriageway.

Figure 4.1 United Utilities Water Asset Plan

4.2 Water - New Infrastructure

United Utilities Water has confirmed that the development can be supplied from the existing water network, based on the Utility Profile as shown in Section 3, see figure 4.2.

The development can be supplied from the existing 3″ diameter water main located in Kingswood Road.

No reinforcement works are required to the existing water network in order to accommodate the development.

The development can be supplied by gravity.

An estimated cost for the new connections (24 units) and infrastructure charges associated to the units is £26,400.

Figure 4.2 United Utilities Point of Connection

Please Note: - As utility networks are of a dynamic nature the exact location of points of connection, and associated costs to connect onto United Utilities Water network, can only be determined once a formal application is made, and exact water demands have been calculated based on end user requirements.

5.0 ELECTRICITY

5.1 Electricity - Diversionary Considerations

Electricity North West Ltd (ENWL) asset records show that they own existing high and low voltage networks located within the title boundary and the surrounding areas of the proposed development. Please see Figure 5.1.

Low voltage cables are shown located within both footpaths of Bury New Road.

An underground 6.6kV high voltage cable is shown entering the site at the northern boundary from Bury New Road.

This 6.6kV high voltage cable terminates at an onsite substation which supplies power to the existing building.

ENWL has confirmed that the onsite substation can be decommissioned and removed from site.

The 6.6kV high voltage cables will be terminated at Bury New Road, as shown in Figure 5.1.1.

An estimated cost for this work is £10,000 if not already undertaken.

No diversionary works are anticipated to the existing low voltage network.

Figure 5.1 ENWL Asset Plan

Figure 5.1.1 Substation Decommission

5.2 Electricity - New Infrastructure

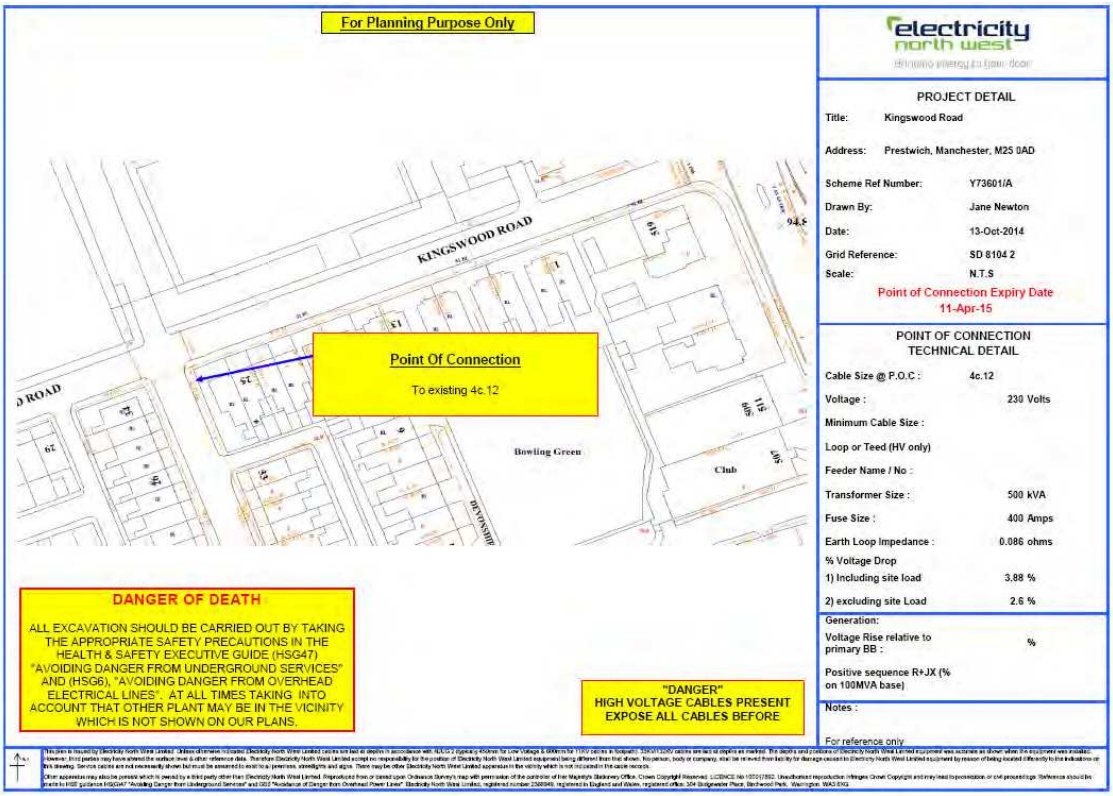
Electricity North West Ltd (ENWL) has confirmed that the development can be supplied from the existing electricity network, based on the Utility Profile as shown in Section 3.

The development can be supplied at low voltage from the existing low voltage network located adjacent to house number 27 Kingswood Road.

An estimated budget cost for the new low voltage main to be installed from 27 Kingswood Road, onsite low voltage infrastructure and 24 plot connections will be £36,800.

Figure 5.2 shows the existing low voltage network that the point of connection (POC) will be taken from.

Figure 5.2 ENWL Low Voltage Point of Connection



Please Note: - As utility networks are of a dynamic nature the exact location of points of connection, and associated costs to connect onto ENWL network, can only be determined once a formal application is made, and exact electricity demands have been calculated based on end user requirements.

6.0 GAS

6.1 Gas - Diversionary Considerations

National Grid asset records show existing low pressure networks located in the surrounding area of the proposed development. Please see Figure 6.1.

A 125mm diameter gas main is shown located in the carriageway of Kingswood Road.

A 4" diameter gas main is shown as supplying the site via Kingswood Road.

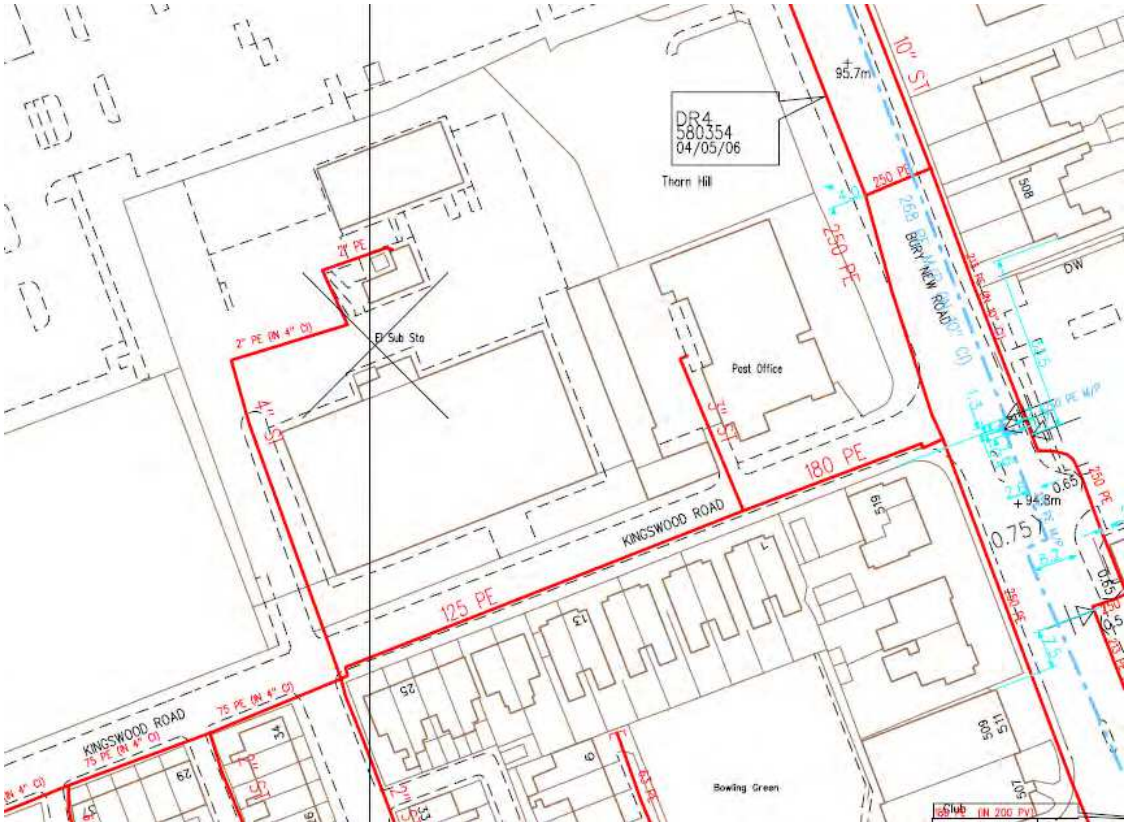
This 4" diameter gas main will require terminating/disconnecting at the location of the of the 125mm diameter gas main in Kingswood Road.

An estimated cost for this work is £4,000.

Please note that the existing onsite gas meter will have to be removed prior to this disconnection work being undertaken.

No diversion costs are anticipated.

Figure 6.1 National Grid Gas Network Asset Plan



6.2 Gas - New Infrastructure

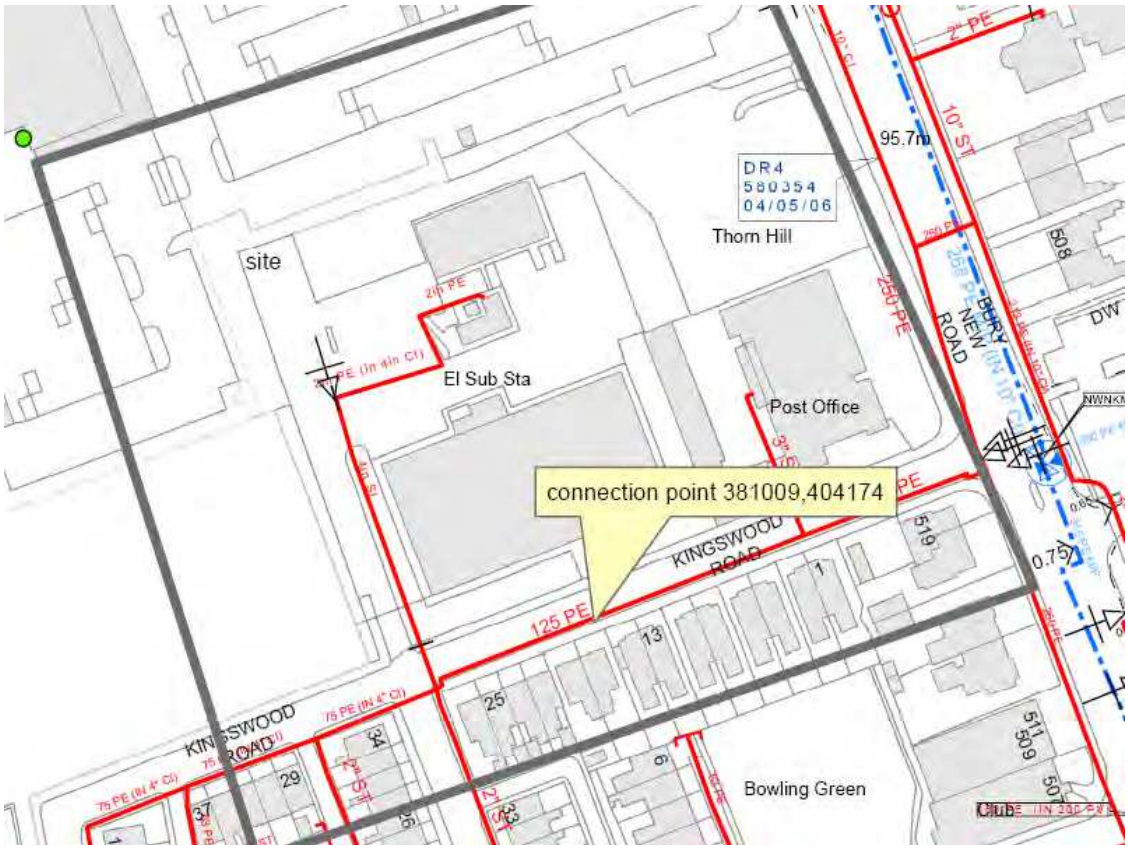
National Grid has confirmed that the development can be supplied from the low pressure gas network located in Kingswood Road, based on the Utility Profile as shown in Section 3.

No offsite reinforcements are required to the existing low pressure gas network in order to supply the development.

Figure 6.2 shows the National Grid point of connection from the 125mm diameter low pressure gas main, located in Kingswood Road.

An estimated budget cost for the new low pressure main to be installed from Kingswood Road and 24 plot connections is £12,000.

Figure 6.2 National Grid Low Pressure Point of Connection



Please Note: - As utility networks are of a dynamic nature the exact location of points of connection, and associated costs to connect onto National Grid gas networks, can only be determined once a formal application is made, and exact water demands have been calculated based on end user requirements.

7.0 TELECOMMUNICATIONS

7.1 BT Openreach - Diversionary Considerations

BT Openreach asset records indicate overhead and underground apparatus (ducting and chambers) located in the footpaths of Kingswood Road, as shown in Figure 7.1.

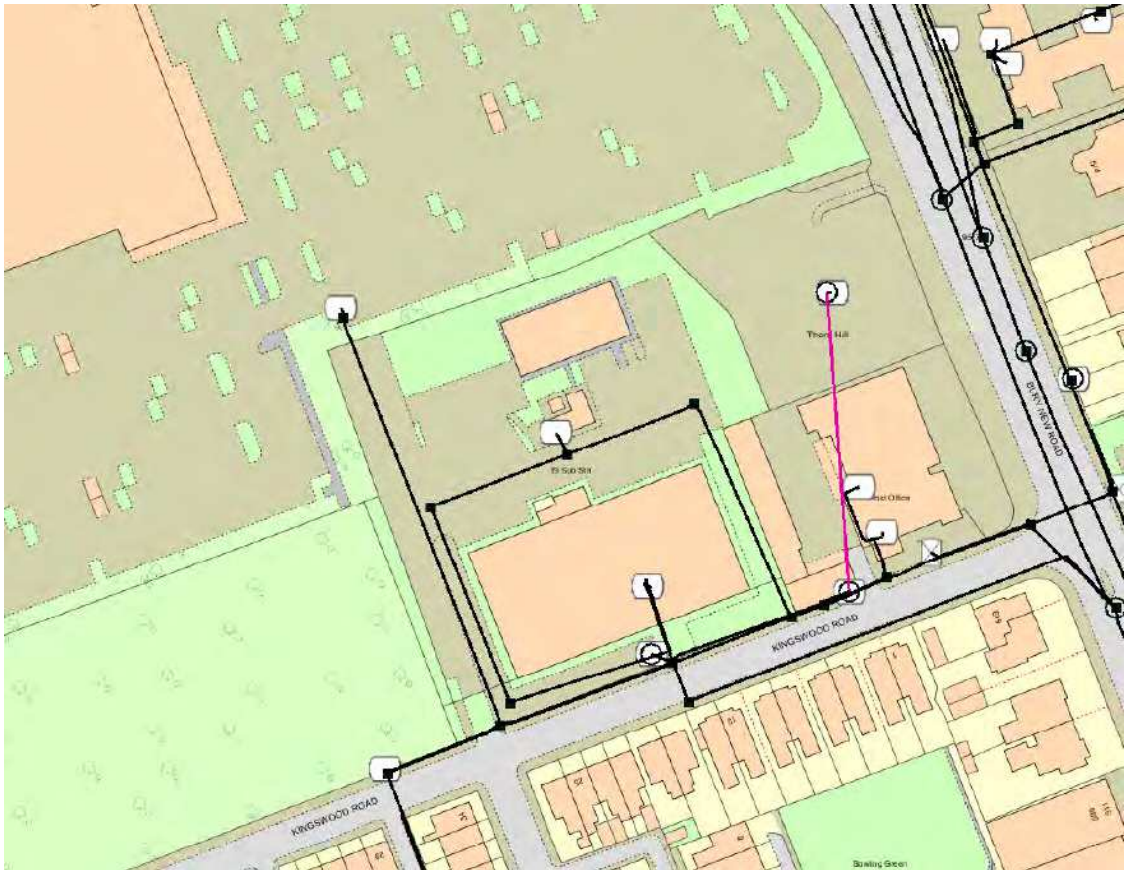
Underground BT network may require diverting based on the current development layout at the location of the proposed site entrance off Kingswood Road.

An overhead pole is shown located within the northern footpath of Kingswood Road. This pole supplies the existing residential houses to the south and will require diverting.

An estimated budget cost for this diversionary/lowering work at the proposed development entrance and relocation of the pole and associated lines is £38,000.

Please note that the above estimate is based on a copper network, if optical fibre is presents costs could significantly increase.

Figure 7.1 B.T Openreach Asset Plan



7.2 Telecommunications - New Infrastructure

BT Openreach will provide a duct design and all materials (e.g. duct and joint box components) needed for the construction and installation of the Openreach network on your new development free of charge. BT Openreach does not provide the building materials (e.g. Bricks, sand, cement, etc) associated with the construction of the chambers.

However a duct design will not be provided by BT Openreach until such time as a planning authorizing number has been provided by the planning authorities for the development, a latest site layout plan provided and projected start date known.

At such time when planning consent, latest site layout plans and projected site start dates are provided a duct design will then be produced, at no cost, by BT Openreach.

Openreach expect these works to be carried out by others rather than BT Openreach themselves. BT Openreach will normally construct all chambers and lay all necessary ducts off site.

8 UTILITY ASSET INFORMATION

IMPORTANT NOTE

The information provided is for guidance purposes only and is based upon existing utility records. No guarantee is provided by the utilities as to their accuracy. Please be aware that in some cases service connections into individual buildings are not always shown on records, and that other un-recorded and third party assets could exist in this area.

It is the responsibility of those undertaking excavation works to satisfy themselves that it is safe to do so, and that the appropriate safety precautions in accordance with the Health and Safety Executive guidance note HS(G)47, "Avoiding Danger from Underground Services" are understood and adhered to.

APPENDIX B

- **Construction Programme**

APPENDIX C

- **Sample of a Site Waste Management Plan (SWMP)**

-SAMPLE --Site Waste Management Plan (SWMP)

AUTHOR: E.J. Aldred, Aldred Associates (for Vause Construction Ltd.)

1. PROJECT TITLE: Kingswood Rd,

2. LOCATION: Kingswood Rd, Prestwich, Manchester M45 0AR

3. NATURE OF PROJECT:

Partial demolition and refiguring plus extension to augment facilities at Sikh temple.
Asbestos survey has been carried out and no asbestos or ACMs were found.
Contract period should be assumed as 40 weeks (starting in September 2012).
Access to site is limited via Deane Road with deliveries and vehicle movement carefully controlled.

4. PROJECT AIM

At The Mandir Temple we are committed to implement the project environmental plan and the SWMP so that it is effective, accurate and economical and ensure that the procedures put into place are working and are maintained.

5. MANAGEMENT

The Contracts Manager is the SWMP co-ordinator of the project and as such is responsible for ensuring the instruction of workers, implementation and overseeing of the SWMP. The CDM Co-ordinator will monitor the effectiveness and accuracy during the routine site visits. Independent audits will also be completed by our safety consultancy via site inspections. Copies of these reports will be held on file at our Head Office for monitoring.

Position	Name	Contact Details

-SAMPLE --Site Waste Management Plan (SWMP)

Client	SSSS Mandir Temple	The Secretary
Construction Director	Graham Vause	07836 366794
Contracts Manager	Graham Vause	07836 366794
Site Manager	Brian Todd	07884 869012
H&S Advisor	Eddie Aldred	07967 628656
Document Controller	Brian Todd	Site Office

6. DISTRIBUTION

The Contract Manager shall distribute copies of this plan to the CDM Co-ordinator, Client, Site Manager and each Subcontractor where relevant/applicable. This will be undertaken every time the plan is updated.

7. INSTRUCTION and TRAINING

The Contract Manager will provide on-site briefing via induction of appropriate separation, handling, recycling, reuse and return methods to be used by all parties and at appropriate stages of the project where applicable. Toolbox talks will be carried out regularly on waste issues and all subcontractors will be expected to attend. This will ensure that everyone feels they are included and that their participation is meaningful.

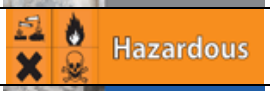
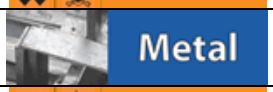
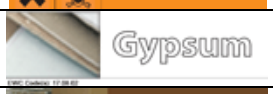
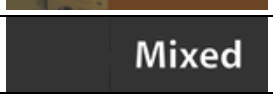
8. WASTE MANAGEMENT ON SITE

Surplus or waste materials arise from either the materials imported to site or from those generated on site. Imported materials are those, which are brought to the project for inclusion into the permanent works. Generated materials are those, which exist on the project such as topsoil, sub-soil, trees and materials from demolition works etc.
However, there are other considerations to waste management such as waste reduction, segregation of waste, disposal of waste, financial impacts of waste disposal and recording, monitoring, education and reviewing. This plan outlines the procedures that have been put in to place and demonstrate how they benefit the environment, how we can measure the effects and how these procedures and practices are sustainable.

PRIORITISING WASTES REQUIRING WASTE MANAGEMENT ENABLING WORKS

-SAMPLE --Site Waste Management Plan (SWMP)

(including DEMOLITION): Waste Type, Category and Origin

Waste Types eg bricks	Waste Category	European Waste Codes EWC	Colour Codes	Origin of Waste Demolition of existing buildings & walls.
Concrete	**Inert**	**17 01 06**		Site Strip & Demolition
Tarmac	**Inert**	**17 03 01**		N/A
Brick/Block	**Inert**	**17 01 06**		Site Strip & Demolition
Timber	**Active/bio**	**17 02 01**		Demolition Works
Subsoils	**Inert**	**17 05 04**		N/A
Subsoils	**Hazard**	**17 05 03**		N/A
Metals	**Active/Bio**	**17 04 07**		Site Strip & Demolition
Asbestos	**Hazardous**	**17 06 05**		N/A
Plasterboard	**Active/Bio**	**17 08 02**		Demolition Works
Packaging		**15 01 01 see note 1** **15 01 02 see note 2** **15 01 03 see note 3**		Construction
Mixed		**17 09 04**		Construction & Demolition

NOTE 1 15 01 01 is the EWC code for paper & cardboard packaging

NOTE 2 15 01 02 is the EWC code for plastic packaging

NOTE 3 15 01 03 is the EWC code for wooden packaging

9. WAYS OF MINIMISING WASTE

At The Mandir Temple we have, from a very early stage, looked at how we can minimise the waste produced, thereby reducing the amount of waste to be removed from the project. Trade Contractors, Design Team and Suppliers are all being encouraged to look at ways to minimize the amount of waste produced at the work face.

Current Actions Table

-SAMPLE --Site Waste Management Plan (SWMP)

Action	Responsibility	Date Action Commenced	How notified
Plasterboard sheets are made to standard sizes to suit the wall heights and to reduce the amount of off cuts/waste.	Design Team		Meetings
The wash down point for the concrete wagons is in a suitable location so that the washed out aggregates formed part of the fill.	Principal Contractor		Construction Phase Health & Safety Plan
Substructure - when the bases are being poured that we had other bases excavated Manager so that any surplus concrete could be utilised as blinding.	Construction Manager Principal Contractor		CPHSP
Materials, which arrive on pallets, are unloaded and the pallets are stored neatly and removed from site once the numbers are sufficient to make collection economical.	Site Foreman Principal Contractor		CPHSP
Apply all identified environmental risk & actions identified in the CPHSP	Operatives Site Manager Trade contractors		Method statements Risk Assessments CPHSP

All of the above act to reduce the amount of waste and surplus materials, which traditionally would be skipped and sent to landfill. We are continually identifying waste minimisation actions and these will be updated in the above table.

10. SEGREGATION

A specific area shall be laid out and labelled to facilitate the separation of materials for potential recycling, salvage, reuse and return. Recycling and waste bins are to be kept clean and clearly marked in order to avoid contamination of materials. The labelling systems shall be the Waste Awareness Colour Coding Scheme. If the skips are clearly identified the bulk of the workforce will deposit the correct materials into the correct skip. Skips for segregation of waste identified currently are:

- Wood
- Metal
- Brick/rubble
- Canteen waste

As works progress and other trades come to site other skips will be placed to enable certain waste to be removed from site. This is likely to include:

- Plasterboard
- Paper and cardboard (bagged up)

11. MANAGEMENT

Waste materials fall into three categories for management, these are:

- Re-use
- Recycle
- Landfill

Re-used

If surplus materials can be used in the permanent works they are classified as materials, which have been ***re-used***. If they are surplus to requirements and need to be removed from site and they can be removed and used in their present form, they can be removed from site for ***reuse***.

Recycling

If the surplus material cannot be re-used in its present form but could be used in a different form, it is sent for ***recycling*** such as 50x50 timber to make chipboard.

Landfill

If either of the above cannot be satisfied then the only option left is to send the surplus materials to ***landfill***. At The Mandir Temple **landfill is always a last resort.**

-SAMPLE --Site Waste Management Plan (SWMP)

WASTE MANAGEMENT CYCLE

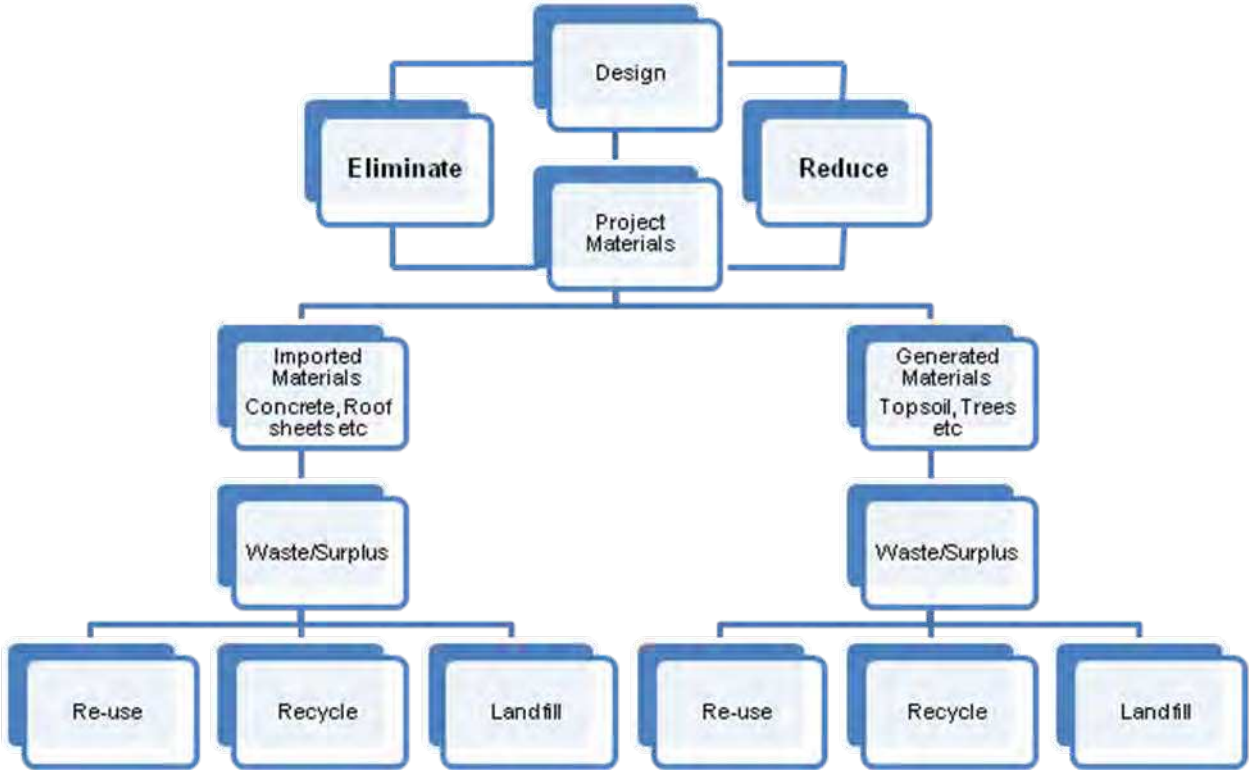


TABLE FOR WASTE TYPES & WASTE MANAGEMENT PACKAGES

Waste Types	Waste Stream
Enabling Works (including Demolition)	
Concrete	Re-use onsite
Tarmac	Re-use on site
Bricks/blocks	Re-use onsite
Timber	Recycle
Subsoils	Re-use onsite/recycle
Metals	Scrap Value
Asbestos	No usage/Landfill
Plasterboard	Return/recycle/Landfill
Construction Works	
Plasterboard	Return/recycle
Bricks/blocks	Recycle
Timber	Recycle
Cardboard	Recycle
Mortar	No usage/dry to skip
Metals	Recycle
Paints	Recycle
Soils	Use/sell

-SAMPLE --Site Waste Management Plan (SWMP)

The skips need to be monitored to ensure that contamination of segregated skips does not occur. Therefore we will advise regularly on how the waste management system is working and point out that an uncontaminated skip for recycling costs typically £75 but should it get contaminated then it has to go direct to landfill at a cost of typically £99 per skip and this price is continually increasing.

We will continually review the type of surplus materials being produced and where we can change the site set up to maximise on re-use or recycling and **the use of landfill will be the last resort.**

The plan will be communicated to the whole project team (including the client) at the regularly held progress meetings. Business wide updates including the KPIs will be communicated and discussed at IMS and Management meetings

The plan will also be analysed by the MD to produce KPIs and will be responsible for transferring and advising any best practice and solutions throughout the company. Our prequalification process identifies compliant waste management companies with records maintained on file.

SITE WASTE MANAGEMENT PLAN (SWMP) IMPLEMENTATION CHECKLIST

Checks – please tick √ yes or no	Yes	No
Have terms and commercial rates been agreed with contractor(s)?	√	
For offsite or disposal are all the waste destination details verified?	√	
Has a waste segregation / collection area been prepared?	√	
Has the waste area been adequately sign posted?	√	
Has the SWMP document control / filing system been set up (site safety pack)?	√	
Have all necessary staff and contractors had the SWMP transmitted?	√	
Have all the SWMP training / induction procedures for staff been met?	√	
Have all the SWMP training / induction procedures for contractor/s been met?	√	
Has the SWMP been approved by the Contracts Manager?	√	
Comments / Further Actions:		
Include Waste Management Plan within Tender Documentation/ CPHSP		

-SAMPLE --Site Waste Management Plan (SWMP)

RELEVANT SIGNATURES

Contracts Manager: Date:

Site Manager: Date:

Appendix D

- Drawing, Compound, access, egress, storage and parking areas

Revision		Date
A	GENERAL SURVEY CLUTTER CLEARED FROM PLAN	13 08 14
B	UPDATED TO SUIT CLIENTS REQUEST AS PLANNING APPROVAL	26 08 14
C	EXISTING LAND DRAIN SHOWN AND EASEMENT HATCHED, PLOTS 2-5 ADJUSTED TO EAST AND PLOT 6 HANDED TO AVOID EASEMENT ZONE REQUESTED BY UNITED UTILITIES.	19 09 14
D	CLIENT CHANGED TO TITLE AND REVISED AS INSTRUCTED.	08 11 14
E	NOTES TO ILLUSTRATE ILLUMINATED ENTRANCES ADDED FOR LIFETIME HOMES	27 11 14

LEGEND

PATIO AREAS AND ACCESS PATHS TO BE GREY 900 X 600MM PRESSED CONCRETE PAVING FLAGS

COMPOSTER — 330 LITRE COMPOSTER

LOCKABLE SHED — 6FT X 5 FT SECURED BY DESIGN SHED

LOCKABLE CYCLE STORE NOM 2000X 1000MM

BINS — NUMBER REQUIRED FROM BBC

ROTARY DRYER — 6M LONG WASHING LINE

WATER BUTT — 200 LITRE WAYTER BUTT LINKED TO RWP WITH STAND

RED BLOCK PAVED MARGIN — RED BLOCK PAVED MARGIN

RED BLOCK PAVED MARGIN — TARMAC FINISH, ROADS, FOOTPATHS , DRIVEWAYS, PARKING SPACES

1800MM HIGH CLOSE BOARDED FENCE

LOCKABLE GATE — 1800MM HIGH CLOSE BOARDED GATE WITH FENCE

LOCKABLE GATE, LOCKABLE GATE — BRICKWORK WALL AND PIERS. STEEL RAILINGS & GATES

AREA SCHEDULE

2no. Type A - 154.84sqm = 1666sqft
3no. Type B - 141.03sqm = 1518sqft
1no. Type C - 120.52sqm = 1297sqft
16no.Type D - 113.81sqm = 1225sqft
2no. Type E - 113.81sqm = 1225sqft

24 TOTAL PROPERTIES

NB. In line with the Properties Description Act areas shown are approximate and may vary when structure / construction is finalised. They may be subject to change in detail design. Areas exclude recessed balcony spaces, terraces, external balconies where applicable and Garages. A 25mm finishes zone has been allowed for on all walls. Areas calculated by developer.

coda

Coda Studios Ltd
70-71 Cornish Place, Cornish Street,
Sheffield, S6 3AF
tel: 0114 2796003
e:information@codastudios.co.uk

PROSPECT (GB) LTD	Client
Kingswood Road	Job
SITE PLAN	Title

DRAWN	CHECKED	DATE	SCALE A3 ISSUE:	SCALE A1 ISSUE:
PN		July 2014	1:500	1:250

REVISION	DRAWING STATUS	DRAWING NUMBER
E	Building Regs	2163_112

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The Contractor must verify all dimensions on site before making shop drawings or commencing work of any kind. No dimensions to be scaled from this drawing. Architect to be notified of any discrepancies in dimensions immediately.

Appendix E

- Ground Investigation Report

Prospect GB

Ground Investigation Report

for

Land at Kingswood Road,

Prestwich, Manchester

October 2014

REPORT NO: 14PRS011/GI

- *Desk Studies and Site Walkovers*
- *Intrusive Contaminated Land Investigations*
- *Geotechnical Appraisals and Ground Investigations*
- *Landfill Gas Assessments and Remedial Design*
- *Remediation Design and Implementation*
- *Remediation Project Management and Supervision*
- *Site Abnormal Assessments (Foundations and Contaminated Land)*
- *Ecological Surveys (Bats, Badgers, Newts, Japanese Knotweed etc)*

GEOTECHNICAL - CONTAMINATED LAND - ECOLOGY - FLOOD RISK

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DOCUMENT ISSUE RECORD

Contract No:	14PRS011/GI
Client:	Prospect GB
Contract:	Land at Kingswood Road, Prestwich
Document:	Ground Investigation Report

Prepared by:		S Millar
Checked by:		B Lewis
Authorised by:		M Fawcett
Date:		October 2014

REVISION RECORD

Revision	Date	Description	Prepared by
0	Oct 2014	Draft for comment	SM

CONTENTS

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1 EXECUTIVE SUMMARY

1. Site Location

The purpose of the work was to review an existing reports and carry out an additional confirmatory site investigation to provide up to date contamination risk and geotechnical information for the proposed construction of residential dwellings and associated infrastructure.

2. Site Description

Site was visited by an Engineer on the 24th September 2014. The site is accessed off Kingswood Road and consists of two commercial buildings with a substation, with backup generators and above ground bunded fuel tank. There was red diesel noted within the bund and what appeared to be damage to the filling point. The rest of the site comprises hard standing of concrete, tarmac and landscaped areas along the boundaries.

The site boundaries consist of metal palisade fencing, concrete post and wire mesh, with frequent trees and other vegetation.

At the time of our walkover and ground investigation, asbestos removal and demolition work had begun on the site.

3. Proposed Development

The proposed development is of the construction of new residential dwellings, gardens and associated infrastructure.

4. Site History

On Site

The site is shown as undeveloped until the late 1960's, the land was associated with a residential dwelling to the east, Thorn Hill which later became part of the Prestwich Hospital. The building was demolished during the 1990's.

A commercial building was constructed later 1960's with electricity substation, it is know that at closure in 2014 that it was a computer company (iSoft). There was a building in the northwest corner, shown until the 1990's when it was demolished and replaced by a long rectangular building to the north of the substation (centrally located).

The entire site was being demolished in October 2014.

Surrounding Area

In 1909 Prestwich Hospital was located to the northwest of site, with some encroachment on to the site. The hospital was demolished circa 1995, parts of the site (immediately north) were converted into a supermarket 70m N. The rest consist of rough grass land and small commercial units.

Kingswood Road appears by 1909 with the residential dwellings to the south (still present). Thorn Hill residential dwelling is present from the mid 1850's and is present until late 1990's. The site currently consists of hardstanding and vegetation with a gated entrance.

The Post Office sorting office is adjacent east and first present in the mid 1960's and is still present.

The football ground adjacent west was present from circa 1950's and was still present in the late 1990's. It is

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currently overgrown and waste ground.

5. Published Geology

- **Drift – Glaciofluvial Deposits –** Sand and Gravel
- **Solid – Worsley Delf Rock -** Sandstone

6. Hydrogeology and Hydrology

- The drift deposits are classed as an Secondary A Aquifer within the Glaciofluvial Deposits (Moderate Permeability).
- The bedrock deposits of the Worsley Delf Rock Sandstone are classed as a Secondary A Aquifer (Moderate Permeability).
- The site does not lie within a Groundwater Source Protection Zone as outlined by the Environment Agency.
- The nearest surface water feature is a river 441m N.
- There are no current water abstractions within 1000m of site.

7. Summary of Environmental Data

Possible Contamination Sources;

- **Current Land Use**
- **Former Hospital on site**
- **Peat on site**

In this qualitative risk assessment, a **Low-Low/Moderate** risk implies that remedial action is likely to be necessary.

8. Scope of Investigation- Betts

The fieldwork was carried out on the 29th September 2014 and comprised of the following;

- Four (4 No) machine excavated trial holes between 0.60mbgl (TP106) and 2.50mbgl (TP105).
- Chemical analysis (Metals, PAH's) of four (4 No) samples.
- Chemical analysis (TPH's) of six (6 No) samples
- Analysis of four (4 No) samples for asbestos screening.

9. Ground Conditions Encountered A summary of main ground conditions; made ground overlying sands and gravels overlying firm-stiff clay

10. Contamination Encountered

Significantly elevated PAHs were encountered above guidance levels therefore remediation is required

11. Remedial Actions

600mm clean cover system within garden areas
Removal and validation of existing above ground tank

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12. Off-Site Disposal of Surplus Soil

It is recommended that the results of the contamination testing (including the history of the site) be presented to the proposed landfills, to obtain their acceptance of the information to date and to determine the actual WAC limits used by them, (see Appendix J for further guidance). Segregation of made ground and natural should be possible given the chemical analysis and very different visual identification.

13. Specialist Ground Gas Measures -

No specialist ground gas measures are required according to Geo Assist Reports

BRE211 (2007) Radon: Guidance on protective measures for new buildings that 1-3% of the properties are affected by Radon and therefore no radon protection measures are necessary.

14. Foundations

Strip/trench foundations may be suitable upon the site with the following allowable bearing capacities;

- Firm to stiff CLAY strata with an allowable bearing pressure of 100kN/m^2
- Firm locally soft locally stiff CLAY strata with an allowable bearing pressure 75kN/m^2 (within vicinity of TP1,TP3,TP4,TP8,WS5)
- Possible weathered cobbly LIMESTONE with an allowable bearing pressure of 150kN/m^2
- Medium Strong LIMESTONE with an allowable bearing pressure of 250kN/m^2

Localised deepening of foundations and/or piled foundations are likely to be required in the vicinity of trees, former pond and location of former diner. A detailed foundation assessment plans should be undertaken.
Foundations should be excavated wholly on one stratum. Should proposed foundations span different strata, trenching and stepping of foundations and/or nominal reinforcement will be required. A foundation zoning plan should be undertaken when proposed levels are made available.
Calculations on the allowable bearing capacity indicate settlements of less than 25mm for a square pad using the above allowable bearing capacity.

Consideration to existing services and diversion are required to assess foundation type. Additional trenching is recommended to delineate the former pond.

15. Concrete Design

It is considered for concrete design purposes that brownfield site and mobile groundwater conditions are applicable and the results indicate a Design Sulphate Class of DS-1, ACEC class of AC-1 and Design Chemical Class of DC-1 as defined by BS8500-1:2006.

16. Heave / Shrinkage Potential

The plasticity limit/moisture content of clay strata encountered and tested were classed as LOW plasticity, tree heave protection should be designed accordingly following discussion with NHBC.

17. Ground Floor Construction

Suspended floor construction e.g. either in situ RC slabs or block and beam flooring is recommended as per NHBC guidance.

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2 SITE DESCRIPTION

2.1 Introduction

This investigation was carried out on the instruction of Prospect GB. The purpose of the work was to review an existing reports (referenced fully in Section 3) and carry out an additional confirmatory site investigation to provide up to date contamination risk and geotechnical information for the proposed construction of residential dwellings and associated infrastructure.

Proposed Site Layout at Kingswood Road for Prospect GB – DWG No 13009,(0-)10J – 25th Oct 2013

2.2 Site Location

The site is located north of Kingswood Road, Prestwich, Manchester (nearest postcode M45 0AR). The coordinates on National Grid are 381000, 404230. The proposed site area is approximately 0.68 hectares in total. See Site Location Plan in Appendix A.

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2.3 Site Description

2.3.1 On Site

Site was visited by an Engineer on the 24th September 2014. The site is accessed off Kingswood Road and consists of two commercial buildings with a substation, with backup generators and above ground bunded fuel tank. There was red diesel noted within the bund and what appeared to be damage to the filling point. The rest of the site comprises hard standing of concrete, tarmac and landscaped areas along the boundaries.

The site boundaries consist of metal palisade fencing, concrete post and wire mesh, with frequent trees and other vegetation.

At the time of our walkover and ground investigation, asbestos removal and demolition work had begun on the site and access to, and in the immediate vicinity of, the existing buildings was restricted.

2.3.2 Surrounding Area

The area surrounding the site comprises of the following;

- **North –** Supermarket and car park.
- **East –** Post Office sorting office.
- **West –** Vegetation, football ground with open space of rough grass land.
- **South –** Kingswood Road and residential dwellings.

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3 ENVIRONMENTAL SETTING AND DATA

3.1 Previously Undertaken Investigation

Prospect GB provided Betts Geo Environmental three (3 No) previous reports these reports should be reviewed in full in conjunction with this report:

- Phase 1 Desk Study, Preliminary Risk Assessment Kingswood Road, Prestwich, Manchester, M45 0AR, undertaken March 2014 by LKC Consult Ltd – (Ref CL-602-LKC 14 1009-01, Version 0). This comprised a review of historic maps and environmental data to form an initial site conceptual model

- Ground Investigation – Geotechnical Report (Factual) Land off Kingswood Road, Prestwich, Manchester – Undertaken in July 2014 by GeoAssist Ltd – (Ref 5633/KRP-G). This comprised Factual data The report is factual only and comprises the Ground Investigation data for five (5 No) window sample boreholes, three (3 No) machine excavated trial holes undertaken on 26/6/14 and 30/6/14;

- Phase II Contaminated Land Risk Assessment Land off Kingswood Road, Prestwich, Manchester – Undertaken in July 2014 by GeoAssist Ltd, (Ref 5633/KRP-CLRA v1.00). The comprised additional chemical testing and assessment using factual data from the report above plus chemical testing and assessment.

- Ground Gas Risk Assessment, (Ref 5633/KRP-GRA v1.00). Land off Kingswood Road, Prestwich, Manchester – Undertaken in October 2014 by GeoAssist Ltd. Results from ground gas monitoring undertaken in the previously undertaken boreholes and summary.

Full copies of the Geo Assist reports have been included within Appendix E The sketch below shows the exploratory hole locations of the Geo Assist investigations.

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Where necessary the above reports have been used throughout this report and reference accordingly. The following Site History Summary and other Environmental Data has been taken from the LKC Consult Ltd (Ref CL-602-LKC 14 1009-01, Version 0) and Geo Assist Ltd Reports (Ref. 5633).

Whilst Betts Geo Environmental Ltd cannot be held liable for the third party, client furnished, results/data, it is suggested that it is reasonable to assume that the data provided in these reports have been undertaken with suitable care and due diligence by suitably experience consultants. As such the data is regarded as being of an appropriate standard to utilise within this report.

3.2 Summary of Site History

3.2.1 On Site

The site is shown as undeveloped until the late 1960's, the land was associated with a residential dwelling to the east, Thorn Hill which later became part of the Prestwich Hospital. The building was demolished during the 1990's.

A commercial building was constructed later 1960's with electricity substation, it is know that at closure in 2014 that it was a computer company (iSoft). There was a building in the northwest corner, shown until the 1990's when it was demolished and replaced by a long rectangular building to the north of the substation (centrally located).

The entire site was being demolished in October 2014.

3.2.2 Surrounding Area

In 1909 Prestwich Hospital was located to the northwest of site, with some encroachment on to the site. The hospital was demolished circa 1995, parts of the site (immediately north) were converted into a supermarket 70m N. The rest consist of rough grass land and small commercial units.

Kingswood Road appears by 1909 with the residential dwellings to the south (still present). Thorn Hill residential dwelling is present from the mid 1850's and is present until late 1990's. The site currently consists of hardstanding and vegetation with a gated entrance.

The Post Office sorting office is adjacent east and first present in the mid 1960's and is still present.

The football ground adjacent west was present from circa 1950's and was still present in the late 1990's. It is currently overgrown and waste ground.

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4 ENVIRONMENTAL DATA

The following section details both geological and environmental data available for the site and the surrounding area and was referenced from the LKC Consult Ltd (Ref CL-602-LKC 14 1009-01, Version 0) and Geo Assist Ltd (Ref 5633/KRP-G) reports (full references in Section 3).

4.1 Geology

Geology	Drift	Solid
Sheet 096 Southwest Lancashire 1:10,560	**Glaciofluvial Deposits –** Sand and Gravel	**Worsley Delf Rock -** Sandstone

4.2 Mining, Extraction and Mineral Extraction

4.2.1 Natural Cavities and Extraction

There are no recorded natural cavities or mineral extraction within 500m of site.

4.2.2 Coal Mining and Brine Extraction

The site lies within former coal mining area, the seam is 480m deep and last worked in 1970. The property is unlikely to be in the zone of influence of any present underground coal workings. There are no known mine entrances within 20m of site.

4.3 Authorisations, Incidents and Registers.

The following subsections detail authorisations, incidents and registers associated with the site and surrounding area.

4.3.1 Discharge Consents

There are no known Discharge Consents within 250m of site.

4.3.2 Local Authority Pollution Prevention and Controls

There is one (1 No) Local Authority Pollution Prevention and Controls within 250m of site, this is detailed below;

7	**Local Authority Pollution Prevention and Controls** Name: Tesco Stores Location: Bury New Road, Prestwich BURY, Lancashire, M25 9EL Authority: Bury Metropolitan Borough Council, Environmental Health Department Permit Reference: Lappc0516 Dated: Not Supplied Process Type: Local Authority Pollution Prevention and Control Description: PG1/14 Petrol filling station Status: **Authorised** Positional Accuracy: Manually positioned to the address or location	413NW (NW)	143	2	380914 404398

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4.3.3 Pollution Incidents to Controlled Waters

There are no Pollution Incidents to Controlled Waters within 250m of site.

4.3.4 Contemporary Trade Directory

There is one (1 No) Contemporary Trade Directory entry within 100m of site and is associated with the petrol filling station, full details are below:

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
29	**Contemporary Trade Directory Entries** Name: Aleef Garages Location: Bury New Rd, Prestwich, Manchester, Lancashire, M25 3AJ Classification: Petrol Filling Stations Status: Active Positional Accuracy: Manually positioned within the geographical locality	A13SE (E)	43	-	381096 404198

4.4 Landfill and Other Waste Sites

There are no Landfill or any other Waste Sites within 500m of the subject site.

4.5 Hydrology & Hydrogeology

- The drift deposits are classed as an Secondary A Aquifer within the Glaciofluvial Deposits (Moderate Permeability).
- The bedrock deposits of the Worsley Delf Rock Sandstone are classed as a Secondary A Aquifer (Moderate Permeability).
- The site does not lie within a Groundwater Source Protection Zone as outlined by the Environment Agency.
- The nearest surface water feature is a river 441m N.
- There are no current water abstractions within 1000m of site.

4.6 Radon

The property is in a lower probability area, as less than 1% of homes are above the action level. Therefore no Radon protective measures are necessary in the construction of new dwellings or extensions.

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5 SUMMARY OF ENVIRONMENTAL SENSITIVITY

The following section is a review of the environmentally sensitivity of the site as discussed in Sections 2-4 and from GeoAssist Ltd – Land off Kingswood Road, Prestwich, Manchester – Phase II Contaminated Land Risk Assessment, (Ref 5633/KRP-CLRA v1.00). Significant potential risks are discussed in the following subsections and will then be evaluated as part of the Site Conceptual Model in Section 5.

Sources are defined as where pollution comes from, pathways are a route in which the pollution travels and receptors are anything affected by a pollutant. Further details on Source-Pathway-Receptor methodology can be found in Appendix F.

The table below focuses on significant site specific sources, pathways and receptors. More 'generic' pathways and receptors (such as site end uses) will be covered as part of the full Site Conceptual Model in Section 5.

5.1 Sources

Source	Dist/Dir	Details	Significant Risk
Current Land Use – Computer Software Company	On Site	Former buildings on site (currently being demolished Oct 2014).Possible determinants include fuel oils, heavy metals, asbestos, PAH's and TPH. An independent asbestos survey was undertaken but was not made available.	**Yes**
Current Land Use – Electricity Substation, Backup Generator and Above Ground Bunded Fuel Tank	On Site	PCBs, TPH's and PAH's highly likely within and around the vicinity. Above ground tank shown recent movement and red diesel within the bunded area. Possible migration around site, ground investigation and testing post demolition to determine the extent of contamination.	**Yes**
Peat	On Site NE	Peat noted within WS3 from previous investigation 2.00-2.50m. Further ground investigation post demolition to delineate.	**Possible**
Former Hospital	0m N/NW	Site demolished circa 20 years ago, potential for made ground gas generation, limited due to redevelopment of land to north as a supermarket.	**Unlikely**
Post Office Sorting Office	0m E	Low risk of ground gas or contamination from building due to extensive hard standing.	**Unlikely**
Coal Mining	480m Below Site	Given depth and last worked in 1970, unlikely to impact upon the site.	**No**

5.2 Pathway/Receptor

Source	Distance/ Direction	Details	Significant Risk
Superficial/Bedrock Deposits	On Site	Possible contamination pathway/receptor due to above ground tank and bund. Ground investigation and testing to delineate and determine risk to underlying secondary A aquifer.	**Yes**

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6 INITIAL CONCEPTUAL SITE MODEL

For details on how the conceptual model is evaluated please refer to Appendix F.

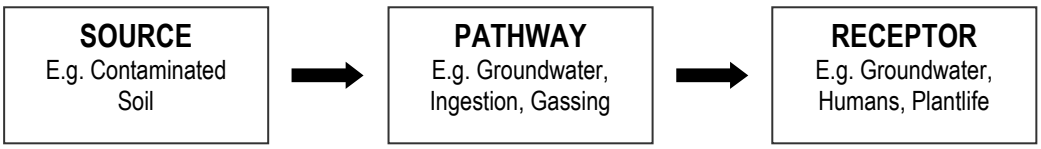
This section of the report aims to identify land which could potentially be affected by contamination, such that it could affect the value or re-use of the land, or such that mitigation would be required for certain proposed end uses of the land.

Potential contamination sources and environmentally sensitive receptors have been discussed in Section 4. Potentially significant risks are evaluated as part of the subsequent sub-sections.

6.1 Source-Pathway-Receptor Linkages

The risk assessment uses a 'Source-Pathway-Receptor' methodology for assessing whether a source of contamination could potentially lead to harmful consequences. This means that there needs to be a pollutant linkage from source to receptor for harm to be caused, this linkage consisting of: a source of pollution; a pathway for the pollutant to move along; a receptor that is affected by the pollutant.

The current potential risks to site arising from various source-pathway-receptor linkages are assessed below. A risk may be considered significant if all three of the stages are present and therefore providing a pollution linkage. The various sources, pathways and receptors are considered separately. The assessment is based on the future use, which is understood to be predominantly residential with garden areas and hard standing.



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Type of Contamination	Potential Sources	Potential Pathway	Potential Receptors	Pollution Linkage	Comment	Estimated Level of Risk
Ground Gas	Potential Made Ground on Site Peat TPH's from Above Ground Fuel Tank	Inhalation of Vapours	Construction/ Maintenance Workers	**Potentially Active**	PPE will reduce the risk significantly.	**Low/ Moderate**
		Vapours Penetrating Unprotected Buildings	Future Site Users	**Potentially Active**	Potential ground gas risk from above ground fuel tank and possibly from the peat in the north east corner - protection measures anticipated, ground investigation and delineation to confirm.	**Moderate**
Near Surface Contaminants Within Soils	Former/Existing Buildings On Site Possible Made Ground Above Ground Fuel Tank Electricity Substation/ Backup Generator	Ingestion, Inhalation, Dermal Contact	Current Site Users	**Potentially Active**	Localised potential for Made Ground located in the elevated area and in the vicinity of current/former buildings. Ground Investigation to confirm. PPE to minimise risk.	**Low/ Moderate**
			Construction Workers	**Potentially Active**	Localised potential for Made Ground within the site. Ground Investigation to confirm. PPE to minimise risk.	**Low**
			Future Site Users	**Potentially Active**	Possible localised Made Ground. Future site users at risk within proposed garden areas, SI required to confirm.	**Moderate**
			Adjacent Land Users	**Potentially Active**	Contamination anticipated within vicinity of above ground fuel tank/electricity substation. Post demolition delineation and testing to determine extent.	**Moderate**
		Direct Contact	Structures	**Potentially Active**	Significant contamination is not anticipated on site with exception of above ground fuel tank; however ground investigation is required to confirm this.	**Low/ Moderate**
		Absorption in Root Zone	Plants	**Potentially Active**	Possible phytotoxic contamination; however ground investigation is required to confirm this.	**Low**
Mobile Contaminants, Leachables e.g. From Pollution Sources Adjacent to Site	Former/Existing Buildings On Site Possible Made Ground Above Ground Fuel Tank Electricity Substation/ Backup Generator	Leaching into Groundwater	Groundwater	**Potentially Active**	Granular superficial deposits, potential pathway and receptor for TPH contamination from above ground fuel tank. Site investigation and delineation post demolition to confirm.	**Moderate**
		Off Site Migration in Groundwater	Abstractions	**Potentially Active**	No groundwater extraction within 1000m of site. Doesn't lie within a groundwater source protection zone.	**Low/ Moderate**
			Controlled Waters	**Potentially Active**	Nearest surface water feature is 441m north.	**Low**
Organic and Inorganic Contaminants Within Soils/ Groundwater	Possible Made Ground Above Ground Fuel Tank Electricity Substation/ Backup Generator	Potable Water Supply Pipes	Utilities Workers	**Potentially Active**	Possible significant contamination within vicinity of former above ground fuel tank. Post demolition ground investigation, testing and delineation. Liaise with United Utilities once water pipes route is determined.	**Moderate**

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6.2 Summary

In this qualitative risk assessment, a **Low/Moderate** risk implies that remedial action is likely to be necessary.

6.3 Geotechnical Risk

It should be highlighted that the following geotechnical constraints exist at the site and should also be considered when undertaking the ground investigation to allow foundation design:

18. Existing trees along boundary, roots and possible deepening of foundations if clay is encountered
19. Potential obstructions and unknown depth of Made Ground in vicinity of former buildings and deepening of foundations
20. Services across site, known and unknown.

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7 FIELDWORK

7.1 Betts Fieldwork Objectives

The objectives of the intrusive ground investigation will be to:

- Clarify the 'Initial Contamination Conceptual Model'.
- Clarify the Initial Risk Assessment.
- Confirm and clarify previously undertaken investigation findings
- Benchmark the contamination status of the site.
- Provide data for the design of any remedial works that may be required.
- Provide geotechnical information to be used for the design and specification of foundations and substructure requirements.

7.2 Betts Fieldwork Scope

The fieldwork was carried out on the 29th September 2014 and comprised of the following;

- Four (4 No) machine excavated trial holes between 0.60mbgl (TP106) and 2.50mbgl (TP105).
- Chemical analysis (Metals, PAH's) of four (4 No) samples.
- Chemical analysis (TPH's) of six (6 No) samples
- Analysis of four (4 No) samples for asbestos screening.

The exploratory hole positions were selected and set out by Betts Geo Environmental Ltd (BGE) as shown on the Exploratory Hole Location Plan in Appendix B.

Prior to any intrusive works, each location was checked for services using a cable avoidance tool (CAT) and review of statutory service plans.

7.3 Site Restrictions and Constraints

There was limited access across the site due to multiple services across the site and ongoing asbestos removal/demolition works

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8 GROUND CONDITIONS

8.1 General

The exploratory holes were logged by an Engineer in general accordance with the recommendations of BS5930:1999+A2:2010 Detailed descriptions, together with relevant comments, are given in the exploratory hole logs included in Appendix C. Ground conditions were very variable and as such the full logs should be consulted in conjunction with this summary.

8.2 Previous Ground Conditions Summary – GeoAssist Ltd July 2014

Strata	Depth of Strata (m) below ground level	
	Top	Base
Made Ground Generally granular and cohesive	Ground Level	0.60 to 3.50
Superficial Natural Deposits Very loose to loose silty Sand PEAT present in WS3	0.60 to 3.50	3.30 to 4.60
Superficial Natural Deposits Medium to high strength sandy silty Clay	3.30 to 1.60	>6.00
Bedrock	Not proven	

8.3 Ground Conditions Summary- Betts

Strata	General Description	Thickness m		No of Holes Located
		Top	Base	
MADE GROUND	Tarmac.	0.00	0.20 (TP105)	TP101,TP102,TP105,TP106
MADE GROUND (2)	Yellowish brown and grey fine to coarse SAND. (Laminated).	0.10	0.30	TP101
MADE GROUND (3)	Greyish brown and light brown (mixed) of varying fine to coarse SAND and fine to coarse GRAVEL. (Layered).	0.20	0.50	TP105
MADE GROUND (4)	Light brown silty gravelly fine to coarse SAND. Gravel is coarse of sandstone.	0.10 (TP106)	1.60 (TP102)	TP102,TP106
MADE GROUND (5)	Dark brown/orangish brown with black silty pocket fine SAND. Occasionally clayey. Occasionally ashy. Occasional brick.	0.30 (TP101)	2.00 (TP105)	TP101,TP105,TP106 (base not encountered due to yellow electricity tape)
MADE GROUND (6)	Dark orangish brown/orangish brown cobbly silty SAND & GRAVEL. Cobbles of brick.	0.50	1.00	TP105
POSSIBLE MADE GROUND	Dark brown and light brown silty fine SAND. (Possibly reworked).	2.00	Base Not Encountered (2.50m)	TP105
SAND	Medium dense light brown and greyish silty fine SAND. Occasional clay pocket.	1.20	Base Not Encountered (2.20m)	TP101
SAND (2)	Medium dense dark brown/brown silty fine SAND.	1.60	Base Not Encountered (1.95m)	TP102

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8.4 Visual and Olfactory Contamination

There was olfactory and visual contamination around the above ground fuel tank centrally located, the extent of the contamination is yet to be determined due to red diesel located within the bund (which would need removing prior to investigation in the immediate vicinity) and ongoing demolition works/live services.

8.5 Groundwater - Fieldwork

All exploratory holes were recorded as dry during the fieldwork with the exception of the following;

Exploratory Hole	Depth (mbgl)	Strata	Remark
TP102	0.70	MADE GROUND	Water from drain, stopped after 30 seconds.

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9 LABORATORY TESTING

9.1 General

An assessment of potential determinands associated with the former uses has been undertaken.

Determinands originating from the former site uses may include metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH) and asbestos. No significant determinands associated with former or current surrounding land uses are anticipated. A general suite of testing should detect most potential contaminants. Additional TPH and organic testing was undertaken in vicinity of above ground fuel tank.

9.2 Scheduled Chemical Testing: Soils GeoAssist Ltd July 2014

Chemical Test	No. of Samples	Comment/Method
pH Values	8	Determination of pH (using Cyberscan pH meter).
Sulphate - Soluble 2:1 Extract	8	Dionex.
Arsenic, Cadmium, Chromium VI, Chromium III, Total Chromium, Lead, Mercury, Selenium, Copper, Nickel, Complex and Free Cyanide and Zinc.	8	Soil samples were analysed in accordance with UKAS/MCERTS standards Inductively coupled plasma atomic emission spectroscopy (ICP-OES)
Speciated Polycyclic Aromatic Hydrocarbons (PAH),	8	Determination of Polycyclic Aromatic Hydrocarbons by GC-MS. End/end extraction using DCM on as received sample. In house method modified USEPA 8270. Include coronene if required.
TPH CWG	2	TPH CWG (Aliphatics C5-6,>6-8,>8-10,>10-12,>12-16,>16-21,>2-35) (aromatics >C5-7,>7-8,>8-10,>10-12,>12-16,>16-21,>21-35) C5-8 fractions by Headspace GC-MS (003S). C8-35 fractions on as received sample extracted with hexane/acetone, aliphatic/aromatic splits run by GC-FID (005S), banded as listed above.
GRO/BTEX/MTBE by GC-FID (C5-10; C10-C12)	2	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12).
Organic Matter	8	Determination of Organic Matter by combustion.
Asbestos Screen	3	Visual Screening for Fibres.
PCB	1	EC7 Enogeners (28,52,101,118,138,153,180).

9.3 Scheduled Chemical Testing: Soils Betts Geoenvironmental Ltd Sept 2014

Soil was sent to a UKAS accredited laboratory, and were generally analysed in accordance with ISO 17025 and/or MCERTS accreditation. The results are summarised in tabular and/or graphical form in Appendix D.

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Chemical Test	No. of Samples	Comment/Method
pH Values	4	Determination of pH (using Cyberscan pH meter).
Sulphate - Soluble 2:1 Extract	4	Dionex.
Arsenic, Cadmium, Chromium VI, Chromium III, Total Chromium, Lead, Mercury, Selenium, Copper, Nickel, Complex and Free Cyanide and Zinc.	4	Soil samples were analysed in accordance with UKAS/MCERTS standards Inductively coupled plasma atomic emission spectroscopy (ICP-OES)
Speciated Polycyclic Aromatic Hydrocarbons (PAH),	4	Determination of Polycyclic Aromatic Hydrocarbons by GC-MS. End/end extraction using DCM on as received sample. In house method modified USEPA 8270. Include coronene if required.
TPH CWG	6	TPH CWG (Aliphatics C5-6,>6-8,>8-10,>10-12,>12-16,>16-21,>2-35) (aromatics >C5-7,>7-8,>8-10,>10-12,>12-16,>16-21,>21-35) C5-8 fractions by Headspace GC-MS (003S). C8-35 fractions on as received sample extracted with hexane/acetone, aliphatic/aromatic splits run by GC-FID (005S), banded as listed above.
GRO/BTEX/MTBE by GC-FID (C5-10; C10-C12)	6	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12).
Organic Matter	6	Determination of Organic Matter by combustion.
Asbestos Screen	4	Visual Screening for Fibres.
PCB	1	EC7 Enogeners (28,52,101,118,138,153,180).

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10 CONTAMINATION ASSESSMENT

10.1 General

Contaminants of concern recorded at concentrations above relevant screening values are summarised below. For ease of description, the identification of contaminant sources and possible re-use of material, Made Ground, Natural Strata and Groundwater will be dealt with in separate sub-headings in this section of the report where required.

Our assessment is based on the following assumptions:

- The proposed site end use in of a high risk rating (residential housing with gardens). For analysis purposes, 'residential with home grown produce' is deemed most appropriate end use.
- Underlying aquifer is a Secondary A Aquifer with Glaciofluvial deposits (moderate permeability) above.
- It is deemed that some statistical analysis is appropriate. Where sample data numbers are low and/or targeted, each determinant result is however reviewed further as an individual result as opposed to an average across the site.
- Site history has indicated a **Low/Moderate** risk of contamination.
- Statistical analysis of the chemical test results has been undertaken in general accordance with Environment Agency 2009 SGV Guidance and LQM/CIEH GAC's using the combined assessment criterion given by CLEA (Note: all SSVs for EA derivation are for a SOM of 6%, in line with Environment Agency Report SC050021/SR4 – this figure is deemed representative as an average value for a sandy loam soil). LQM/CIEH 2009 GAC's are used to the nearest SOM percentage deemed appropriate.
- No free product was noted within the exploratory holes.
- Following the withdrawal of CLR 7-10 Guidance documents by the Environment Agency, statistical analysis has been undertaken in accordance with the CIEH/CL:AIRE 'Guidance on Comparing Soil Contamination Data with a Critical Concentration' (May 2008). As such, the use of the mean value test alone is not considered.

A full risk assessment is detailed within Section 10 of this report.

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10.2 Soils Contamination Summary – GeoAssist Ltd July 2014

10.2.1 Contamination Summary

All determinants for TPH's, PAH's and Metals fall below the residential home grown produce guidance levels within the Topsoil, Made Ground and Natural, with exception of one sample, which is detailed below;

Determinant	Location	Depth (mbgl)	Concentration (mg/kg)	SGV v SOM (mg/kg)
Benzo(a)pyrene	WS1	0.90	2.70	0.83 (1% SOM, no organic content testing undertaken)

10.2.2 Asbestos

No asbestos was detected within the three samples screened for asbestos (WS2 0.90m, WS3 0.90m, TP3, 0.90m).

10.2.3 PCB's

No elevated PCB's were encountered within the 1 sample taken adjacent to the substation

10.3 Soils Contamination Summary- Betts

10.3.1 Metals

All determinants for Metals fell below the residential home grown produce guidance levels within the Made Ground and Natural Strata.

10.3.2 PAH's

All determinants for PAH's fell below the residential home grown produce guidance levels within the Natural Strata with the exception of the following within the Made Ground:

Determinant	Location	Depth (mbgl)	Concentration (mg/kg)	SGV v SOM (mg/kg)
Benzo(a)anthracene	TP105	1.50	49.1	5.90 (6% SOM)
Benzo(a)pyrene	TP101	0.40	3.28	1.00 (6% SOM)
	TP105	1.50	34.7	
Benzo(b)fluoranthene	TP105	1.50	41.6	7.00 (6% SOM)
Chrysene			64.9	9.30 (6% SOM)
Dibenzo(ah)anthracene			2.98	0.90 (6% SOM)
Indeno(123-cd)pyrene			11.7	4.20 (6% SOM)

10.3.3 TPH's

Determinants for TPH's fell below the residential home grown produce guidance levels within the Made Ground and Natural Strata.

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10.3.4 Asbestos

No asbestos was detected within any of the samples screened for asbestos.

10.3.5 PCB's

No elevated PCB's were encountered within the 1 sample taken adjacent to the substation

10.4 Groundwater

No groundwater was encountered on site, therefore no groundwater testing was undertaken.

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11 ENVIRONMENTAL RISK ASSESSMENT

11.1 General

This section assesses likely risks to the identified receptors, arising from potential contamination sources. It provides a final qualitative assessment of the risks involved, indicating whether (where appropriate) any immediate action is required to mitigate certain risks.

In assessing the risk qualitatively, it is appropriate to use the methods outlined in the CIRIA document C552, "Contaminated Land Risk Assessment a Guide to Good Practice". It uses a classification of risk based on the magnitude of the potential consequence or severity of risk occurring, compared with the magnitude of the probability or likelihood of the risk occurring. These are indicated on the attached tables in Appendix H.

11.2 Assessment of Contamination Analytical Results

There were significantly elevated PAH levels for several determinants that exceeded the guidance of 'Residential with Homegrown Produce' (ATrisk 2009); therefore additional risk assessment is required.

There are granular superficial deposits recorded (Secondary A Aquifer, moderate permeability) and the bedrock is classed a Secondary A Aquifer (moderate permeability). Therefore the site's environmental setting is considered to be a moderate to high environmental sensitivity. With respect to human health, the proposed end use (residential use with home-grown produce) is of high sensitivity. Transient risks to construction workers can be addressed by the adoption of appropriate health and safety measures (see Section 14.2).

Significant levels of PAH's in TP105 was encountered with elevated levels of Benzo(a)pyrene 33 times above guidance values for residential with homegrown produce. The US^{95} mean value for the elevated levels are significantly above guidance values, but due to the small number of samples (4 No) there is not enough data to determine whether this is statistically significant. Further testing, delineation may determine whether it is site wide or a localised hotspot, however given the ash content within made ground across site, elevated levels are likely to be encountered site wide.

Double ratio plots determine TP105 as coal ash and TP101 as coal and combustion soots. This is shown below:

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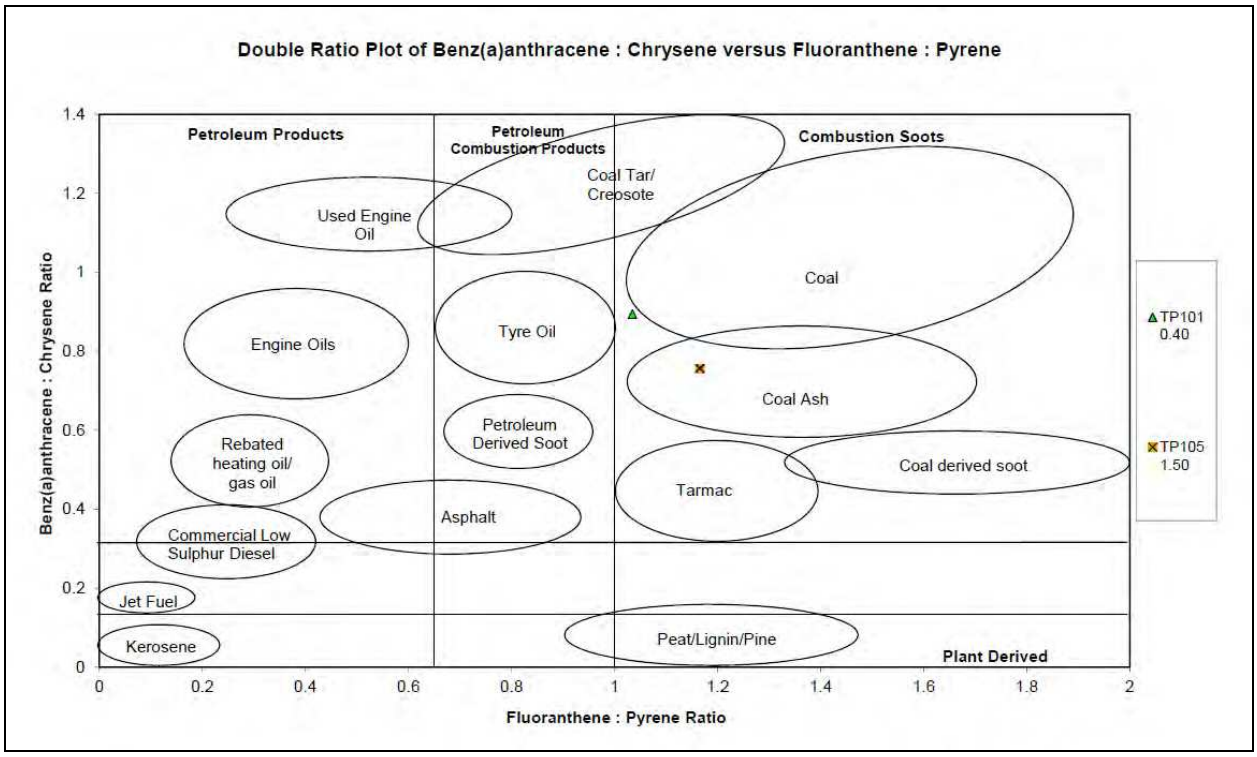

By their nature, PAHs are insoluble and low mobility within soils, therefore the risk of significant migration to the underlying aquifer or off-site receptors is deemed low. Residual human health risk will require mitigation via remediation options. See Section 14 for remediation details.

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12 GROUND GAS ASSESSMENT - ONGOING

12.1 Ground Gas Requirements – Radon

According to the LKC Desk Study Report, between 1-3 of homes are above the action level. Therefore no Radon protective measures are necessary in the construction of new dwellings or extensions.

12.2 Ground Gas Assessment

It is understood that GeoAssist Ltd undertook ground gas monitoring as part of their report referenced (Ref 5633/KRP-GRA v1.00). 6 No ground gas monitoring visits were undertaken over a 3 month period with varying barometric pressures.

12.2.1 Summary of Results

A results summary table from the report is shown below:

Date - Time	BH	CH4 (%)	CO2 (%)	O2 (%)	H2S (ppm)	CO (ppm)	LEL (%)	aP (mb)	Flw (l/h)	H2O (m)	Notes
11/07/2014	WS3	0.1	3.6	17.2	0	0	3.2	1006	0.0	2.80	
11/07/2014	WS5	0.2	0.4	19.7	0	0	4.3	1005	0.0	1.90	
31/07/2014	WS3	0.0	3.3	17.7	0	0	0.0	998	0.1	2.90	
31/07/2014	WS5	0.0	0.0	20.2	0	0	0.0	998	0.5	2.70	
14/08/2014	WS3	0.0	0.1	20.4	0	0	0.0	996	0.0	3.35	
14/08/2014	WS5	0.0	0.0	20.1	0	0	0.0	995	1.4	2.90	
26/08/2014	WS3	0.0	0.0	21.0	0	0	0.0	998	0.0	3.70	
26/08/2014	WS5	0.0	0.0	20.8	0	0	0.0	997	-0.3	2.95	
12/09/2014	WS3	0.0	0.3	20.3	0	0	0.0	1014	0.0	3.95	
12/09/2014	WS5	0.0	0.7	19.6	0	0	0.0	1014	0.0	2.95	
29/09/2014	WS3	0.0	0.9	19.6	0	0	0.0	1008	0.0	4.30	
29/09/2014	WS5	0.0	0.6	19.8	0	0	0.0	1008	0.0	3.00	

NM = Not Measured

12.2.2 Gas Recommendations as summarised by Geo Assist

Soil	Depth (m)	GSV Methane	GSV Carbon Dioxide	Risk Category C665
Made Ground	1.20 to 3.50m thick	0.003	0.008	Very Low Risk CS1 NHBC Green
Peat	0.50m Thick	0.001	0.003	Very Low Risk CS1 NHBC Green
Combined Worst Case Gas Regime		0.003	0.050	Very Low Risk CS1 NHBC Green

Evidence presented elsewhere within this report indicates that the ground gas on this site presents a Very Low Risk to end user receptors and no special precautions are necessary for the construction of new dwellings on this site.

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13 REVISED CONCEPTUAL SITE MODEL

13.1 General

The Initial Conceptual Site Model has been amended in light of data obtained during the ground investigation, most notably the absence of any contaminated soil in relation to the screening criteria for the proposed end use.

13.2 Final Conceptual Site Model

This section reassesses likely risks to the identified receptors, arising from potential contamination sources. It provides a final qualitative assessment of the risks involved, indicating whether (where appropriate) any immediate action is required to mitigate certain risks. It also discusses (where appropriate) what longer term measures or remedial works may be required in the future if the site were to be developed. It is considered that the site has not been assessed by the Local Authority as a contaminated site under the terms of the Environmental Protection Act 1990 Part IIa.

Target (Receptor)	Potential Source-Pathway Linkage	Remedial Action Required (where appropriate)	Est. Degree of Risk to Target Following Remedial Action Where Necessary
Site End Users	Inhalation of soil gases, odours or dust.	none anticipated.	Low
Site End Users	Ingestion of, and skin contact with, contaminated soil.	600mm clean cover system with no dig layer (geotextile in base). Removal and remediation of existing above ground tank Post demo ground investigation including asbestos screening	Low
Site End Users	Ingestion of contaminants in vegetables etc. or in soils adhering to vegetables, etc	600mm clean cover system with no dig layer (geotextile in base). Removal and remediation of existing above ground tank Post demo ground investigation including asbestos screening	Low
Construction/ Maintenance Workers.	Inhalation of soil gases, odours or dust.	PPE Removal and remediation of existing above ground tank	Low **
Construction/ Maintenance Workers.	Ingestion of, and skin contact with, contaminated soil	PPE	Low **
Plants	Adverse effects on growth caused by presence of contaminants in soil	600mm clean cover system with no dig layer. Removal and remediation of existing above ground tank	Low
Buildings and Structures	Flow of ground gas into buildings. Asphyxiation, toxicity, explosion and fire hazards	None anticipated	Low

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Foundations	Sulphate attack of foundations	Foundations to be designed as per section 15	Low
Water Supplies	Hydrocarbons penetrating plastic water supply pipes.	United Utilities pipeline risk assessment required.	Low
Groundwater	Migration of soluble contaminants into groundwater on or off site	No remedial action required.	Low
Surface Water	Migration of soluble contaminants and/or direct run-off of contaminants	No remedial action required.	Low

** assumes basic PPE is used

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14 OUTLINE STRATEGY FOR RISK REDUCTION/REMEDIATION STRATEGY

14.1 General

The following section details any recommendations and to reduce risk on site and recommended remedial actions (as per the previous sections of this report). For clarity, the section is split into sub-sections as per the conceptual site model (Section 13).

14.2 Construction/Maintenance Workers

Though no significant contamination was encountered on site, the following recommendations should be adhered to during site works:

- Site workers should wear gloves, boots and overalls and wash their hands before eating, drinking and smoking. Excessive dust generation should be avoided.
- It is recommended that during all excavations adequate ventilation should be maintained. If man entry is required, gas monitoring should be carried out as a precaution.
- If areas of suspected contamination are found then a suitably qualified person should undertake appropriate sampling, testing and further risk assessment.
- Asbestos was not encountered on site, vigilance should be adhered and any suspected asbestos should be notified and a suitably qualified person to inspect.

14.3 Site-End Users

Elevated levels of contamination of PAH's exceeded the soil guidance values for Residential with Homegrown Produce within TP101 0.40m, TP105 1.50m and WS1 0.90m.

A minimum thickness of 600mm of debris-free soil within garden areas with a no dig layer/geotextile.

Site vigilance will need to be maintained during site works should any unforeseen evidence of contamination. Assistance should be sought from a suitable qualified engineer should any differences in strata/evidence of contamination be encountered.

It is likely that imported soils will be required on site, however, any imported soils should be tested for contamination to ensure that they are suitable for the proposed use, and it is generally advisable to test a minimum of three samples, or one sample per 150m^3 so that a representative mean value can be calculated. The size of proposed garden and topsoil volume should be calculated and a representative ratio of samples per garden taken.

14.4 Piped Drinking Water Supplies

The use of Protect-a-Line is potential anticipated, until further testing and delineation of any contamination

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from the above ground fuel tank; further liaison with the water provider is required upon further investigation.

14.6 Off-Site Disposal of Surplus Soil

It is recommended that the results of the contamination testing (including the history of the site) be presented to the proposed landfills, to obtain their acceptance of the information to date and to determine the actual WAC limits used by them, (see Appendix J for further guidance).

Segregation of made ground and natural should be possible given the chemical analysis and very different visual identification.

14.7 Additional Works

Supervised removal of the existing above ground tank and chemical testing of the resultant void to assess risk to the underlying aquifer

Additional ground investigation will be required post demolition to assess the ground conditions beneath the building. Asbestos screening will also be required to confirm asbestos has been adequately removed from site, it would be prudent to undertaken additional soil sampling to assess the levels of PAHs below the buildings to confirm suitability of the proposed remediation options.

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15 GEOTECHNICAL ASSESSMENT

15.1 Introduction

It is understood that the proposed development will consist of construction of residential properties with associated rear gardens, associated infrastructure, public open space and new highway.

15.2 Site Preparation and Excavation

All excavations should be planned and due consideration should be given to providing temporary support or suitable battering. Excavations should be regularly inspected by a competent person to ensure continued safety. Further advice on the safety of excavations is given *in Health and Safety in Construction.* Shallow (<1.20mbgl) excavations for service trenches could be complicated by collapsing sands, silts/clays, care should be taken.

15.3 Control of Groundwater

No significant groundwater was encountered during the fieldwork. It is likely that provision of pumping/shuttering will be necessary during excavation of foundation trenches during wet weather, close to existing ditches and to deeper excavations for sewers etc. It is good practice to have such equipment on standby in case of seasonal / abnormal weather conditions.

15.4 Foundations

Strip/trench foundations may be suitable upon the site with the following allowable bearing capacities;

- Loose to medium dense SAND strata with an allowable bearing pressure of 75kN/m^2
- Firm to stiff CLAY strata with an allowable bearing pressure of 100kN/m^2 (encountered by GeoAssist) between 3.30-6.00mbgl.

Localised deepening of foundations and/or piled foundations are likely to be required in the former buildings and services. A detailed foundation assessment plans should be undertaken.

It is likely that a vibro solution may be possible on the sand strata encountered, a vibro contractor should be consulted to review this option. Removal of peat and replacement with granular fill will be required

Foundations should be excavated wholly on one stratum. Should proposed foundations span different strata, trenching and stepping of foundations and/or nominal reinforcement will be required. A foundation zoning plan should be undertaken when proposed levels are made available.

Calculations on the allowable bearing capacity indicate settlements of less than 25mm for a square pad using the above allowable bearing capacity.

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15.5 Ground Floor Construction

Suspended floor construction e.g. either in-situ RC slabs or block and beam flooring is recommended as per NHBC guidance.

15.6 Soakaways

Due to close proximity to existing services and restriction in site area, soakaways are not considered a suitable surface water drainage option.

15.7 Heave / Shrinkage Potential

The following results were assessed as part of the Geo Assist report.

Exploratory Position ID	Depth (m)	% <425um	% Plasticity Index	Modified Plasticity Index %	NHBC Modified Plasticity Level
WS1	4.50	74	12	8.9	LOW
WS2	4.80	70	10	7	LOW
WS3	3.50	79	12	9.5	LOW
WS4	4.80	61	14	8.5	LOW
WS5	2.50	69	9	6.2	LOW

Low plasticity is evident at depth; foundation design for tree heave protection could be designed accordingly following discussion with the NHBC.

15.8 Highway

According to the criteria of Highways Agency HD 25/95 Volume 7 Section 2 Part 2 HD 25/94, a CBR value of >5% on the Made Ground and 3-5% on the firm to stiff clay is expected, however confirming in-situ CBR's should be undertaken. Placement of geotextiles within the areas of roads / parking could also be designed to minimise the subgrade thickness.

15.9 Protection of Buried Concrete

It is considered for concrete design purposes that brownfield and mobile groundwater conditions are applicable, the results are summarised below:

Concrete Classification	
Design Sulphate Class	DS-1
ACEC Class	AC-1
Design Chemical Class	DC-1

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16 REFERENCES

16.1 *Undertaken March 2014 by LKC Consult Ltd – Kingswood Road, Prestwich, Manchester, M45 0AR, Phase 1 Desk Study, Preliminary Risk Assessment (Ref CL-602-LKC 14 1009-01, Version 0).*

16.2 *Undertaken in July 2014 by GeoAssist Ltd – Land off Kingswood Road, Prestwich, Manchester – Ground Investigation - Geotechnical, (Ref 5633/KRP-G).*

16.3 *Undertaken in July 2014 by GeoAssist Ltd – Land off Kingswood Road, Prestwich, Manchester – Phase II Contaminated Land Risk Assessment, (Ref 5633/KRP-CLRA v1.00).*

16.4 *BS 5930:1999+A2 Code of Practice for Site Investigation.*

16.5 *BS1377: 1990 Methods of Test for Soils for Civil Engineering Purposes.*

16.6 Assessment of risks to human health from land contamination: an overview of the development of guideline values and related research. EA, 2002

16.7 *Contaminated Land Risk Assessment; A Guide to Good Practice; CIRIA C552: 2001.*

16.8 *Health and Safety in Construction, HSG150, HSE, 1996.*

16.9 *Hazardous Waste: Interpretation of the Definition and Classification of Hazardous Waste, Environment Agency, WM2 Version 1.0, June 2003.*

16.10 *DoE (1991), The Building Regulations Approved Document C, Site Preparation and Resistance to Moisture, HMSO*

16.11 *Baker W (1987), Investigation Strategy - lecture at City of Birmingham Development Department Symposium on Methane Generating Sites, 9 December 1987, Industrial Research Laboratories, Birmingham*

16.12 *NHBC Standards, Chapter 4.2, 2003 Building Near Trees*

16.13 *Highways Agency HD 25/95 volume 7 section 2 Part 2 HD 25/94*

16.14 *Water Regulations Advisory Scheme (2002) The selection of materials for water supply pipes to be laid in contaminated land*

16.15 *Anon (1997) Dutch in Policy Retreat on Contaminated Land ENDS (Environmental Data Services), 269, 46*

16.16 *Water Regulations Advisory Scheme (2002) The selection of materials for water supply pipes to be laid in contaminated land*

16.17 *Piling In Layered Ground: Risks to Groundwater and Archaeology Science Report SC020074/SR Environment Agency October 2006*

16.18 *Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention National Groundwater & Contaminated Land Centre report NC/99/73 F J Westcott, C M B Lean & M L Cunningham May 2001*

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16.19 *'Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present', Report Edition No.04 March 2007 NHBC – designed for use with low rise residential properties*

16.20 *CIRIA C665 'Assessing risks posed by hazardous ground gases for buildings' 2007 - for high rise residential / flats*

16.21 *BS8485:2007 'Code of practice for the characterization and remediation from ground gas in affected developments'*

16.22 *BRE 414 'Protective measures for housing on gas-contaminated land' Roger Johnson, Parkman Environment 2001*

16.23 *BS 8500- 1:2006 'Concrete – Complementary British Standard to BS EN 206-1 – Part 1: Method of specifying and guidance for the specifier' November 2006*

16.24 *'Planning Policy 23:Planning and Pollution Control' Office of the Deputy Prime Minister 2004*

16.25 *CLR11 'Model Procedures for the Management of Land Contamination' DEFRA 2004*

16.26 *BRE 465 'Cover Systems for Land Regeneration' 2004*

16.27 *'The UK Approach for Evaluating the Human Health Risks from Petroleum Hydrocarbons in Soils, Environment Agency Science Report P5-080/TR3', Environment Agency (May 2005)*

16.28 *TOX12- Contaminants in Soil: Collation of Toxicological Data and Intake Values for Humans. Dioxins, Furans and Dioxin-like PCBs' Environment Agency 2003*

16.29 *The LQM/CIEH GAC for Human Health Risk Assessment 2009 second edition*

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APPENDIX A

(i) Site Location Plan

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BETTS ASSOCIATES
GEO ENVIRONMENTAL

APPENDIX B

(i) Betts Exploratory Hole Location Plan

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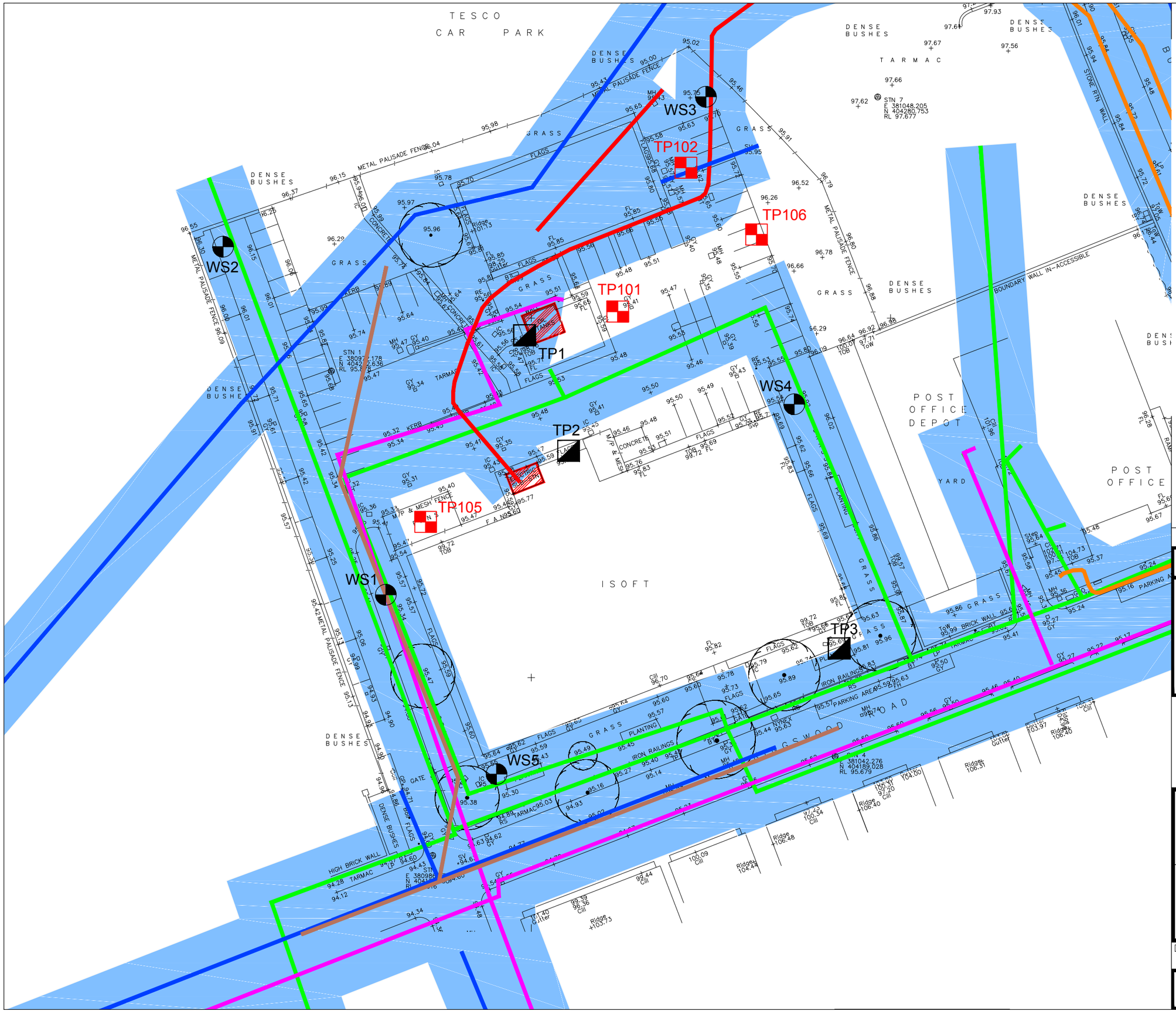

NOTES

DO NOT SCALE

THIS DRAWING SHOWS THE INDICATIVE LOCATION KNOWN SERVICES WHICH ARE PRESENT ON SITE. THE LOCATION OF PREVIOUSLY UNDERTAKEN GROUND INVESTIGATION WORKS AND THE EXPLORATORY HOLES UNDERTAKEN BY BETTS GEO ENVIRONMENTAL IN 2014.

- TP1 — PREVIOUSLY UNDERTAKEN TRIAL PIT (GeoAssist)
- WS1 — PREVIOUSLY UNDERTAKEN WINDOW SAMPLE (GeoAssist)
- TP101 — LOCATION AND REFERENCE OF TRIAL PIT (BETTS GEO ENVIRONMENTAL)
- GAS MAIN
- SURFACE WATER SEWER
- FOUL WATER SEWER
- BRITISH TELECOM
- LOW VOLTAGE CABLE
- HIGH VOLTAGE CABLE
- 5m EASEMENT OF SERVICES

REV	DATE	BY	DESCRIPTION	CHK

DRAWING STATUS: DRAFT

BETTS ASSOCIATES
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Unit 6, Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire CH5 2LY
Tel: 01244 288178 Fax: 01244 288516 enquiries@betts-associates.co.uk

PROSPECT GB

PROJECT: KINGSWOOD ROAD PRESTWICH

TITLE: EXPLORATORY HOLE LOCATION PLAN

DATE:	SCALE @ SIZE:	DRAWN:	CHECKED:
25/09/14	1:500 @ A3	PH	BL

PROJECT No:	DRAWING No:	REV:
14PRS011	001	-

APPENDIX C

(i) Betts Exploratory Hole Logs

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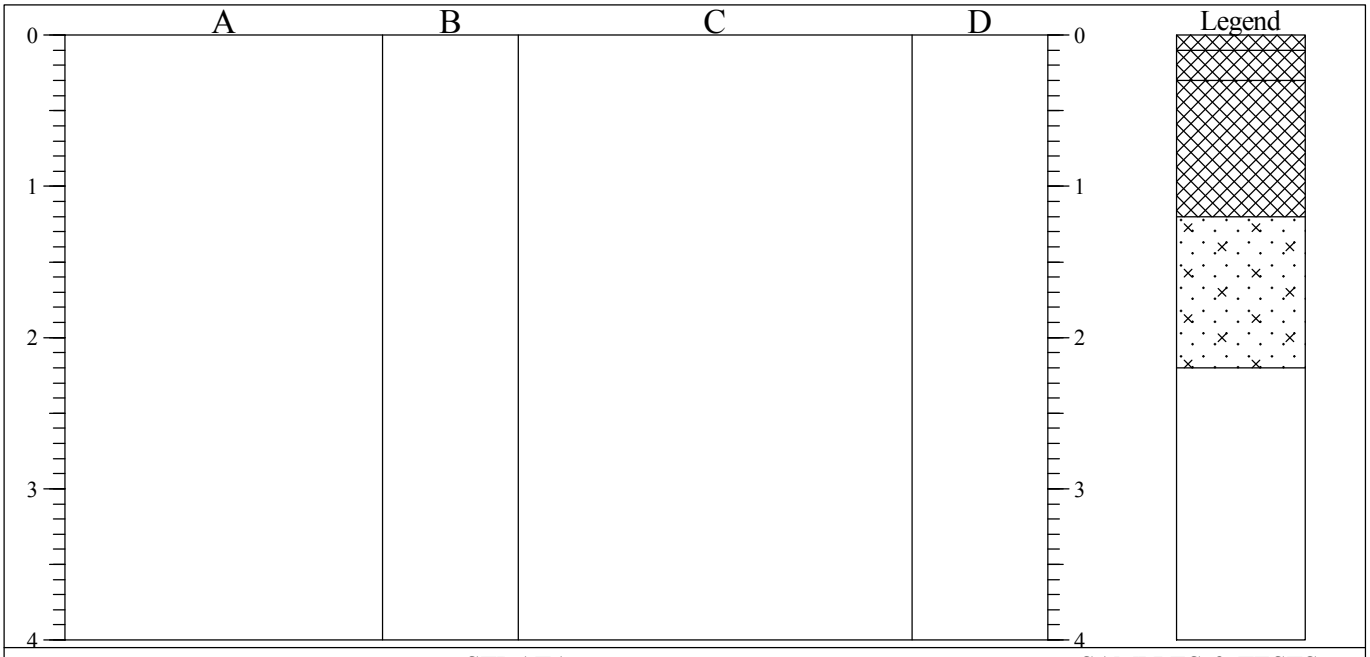
Betts Geoenvironmental Ltd
Old Marsh Farm Barns, Unit 6-7, Welsh Road
Flintshire, CH5 2LY
Telephone: 01244 288 179

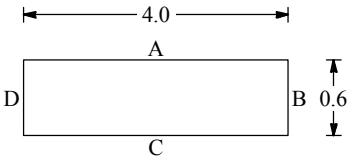
TRIAL PIT LOG

Project				TRIAL PIT No
Kingswood Road, Prestwich, Manchester				**TP101**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
14PRS011	29-09-14			
Contractor				Sheet
BETTS GEOENVIRONMENTAL LTD				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.10		MADE GROUND: Tarmac.			
0.10-0.30		MADE GROUND: Yellowish brown and grey fine to coarse SAND (in laminations).			
0.30-1.20		MADE GROUND: Dark brown/orangish brown with occasional black pocket silty fine SAND. Occasional clay pocket.	0.40	ES	
			1.00	ES	
1.20-2.20		Medium dense light brown and greyish brown silty fine SAND. Occasional clay pocket.			
			1.50	ES	

Shoring/Support:
Stability: Stable.



GENERAL REMARKS

Dry.

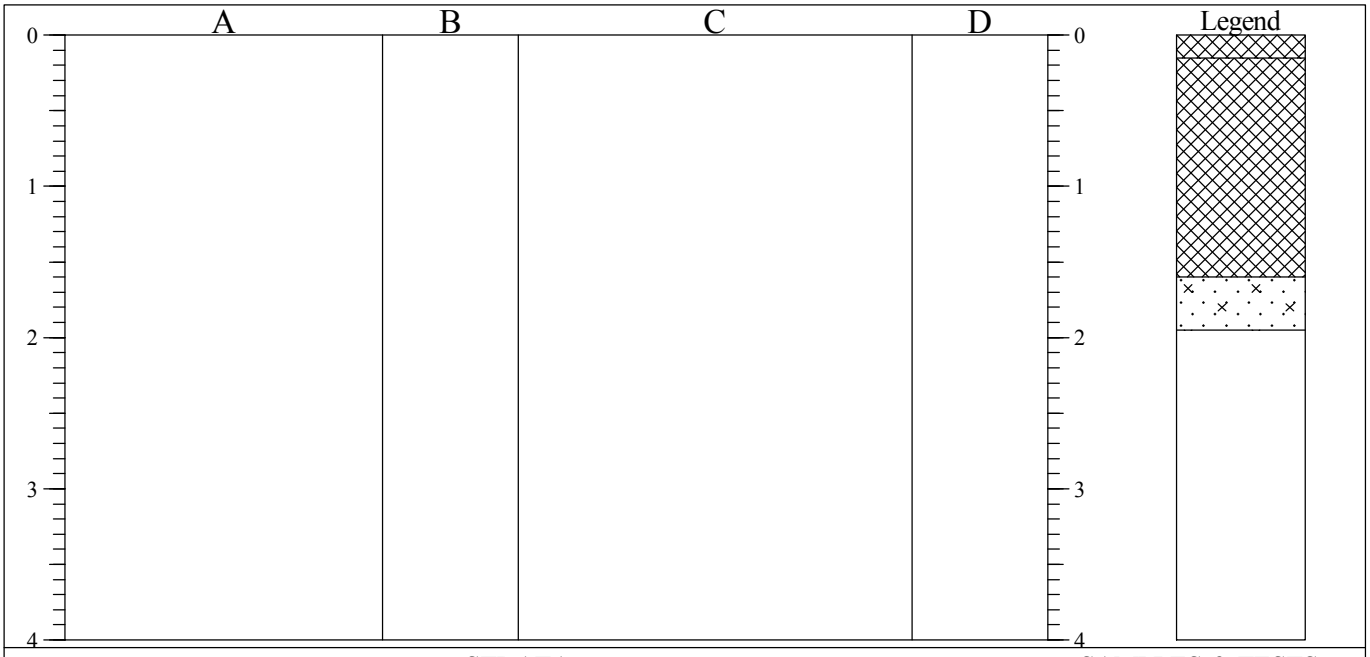
All dimensions in metres Scale 1:50	Client Prospect GB	Method/ Plant Used JCB 3CX	Logged By SM

AGS3 UK TP 14PRS011 - KINGSWOOD ROAD, PRESTWICH.GPJ GINT STD AGS 3_1.GDT 29/9/14

Betts Geoenvironmental Ltd
Old Marsh Farm Barns, Unit 6-7, Welsh Road
Flintshire, CH5 2LY
Telephone: 01244 288 179

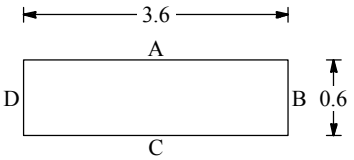
TRIAL PIT LOG

Project				TRIAL PIT No
Kingswood Road, Prestwich, Manchester				**TP102**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
14PRS011	29-09-14			
Contractor				Sheet
BETTS GEOENVIRONMENTAL LTD				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.15		MADE GROUND: Tarmac.			
0.15-1.60		MADE GROUND: Light brown silty gravelly fine to coarse SAND. Gravel is coarse of sandstone. 0.65 Blue plastic water pipe. 0.70 Surface water drain.			
1.60-1.95		Medium dense dark brown/brown silty fine SAND.			
			1.90	ES	

Shoring/Support:
Stability: Stable.



GENERAL REMARKS

The surface water drain was blocked and released water into hole, terminating hole at 1.95m.
The blue plastic water pipe was hit, burst and isolated on site.

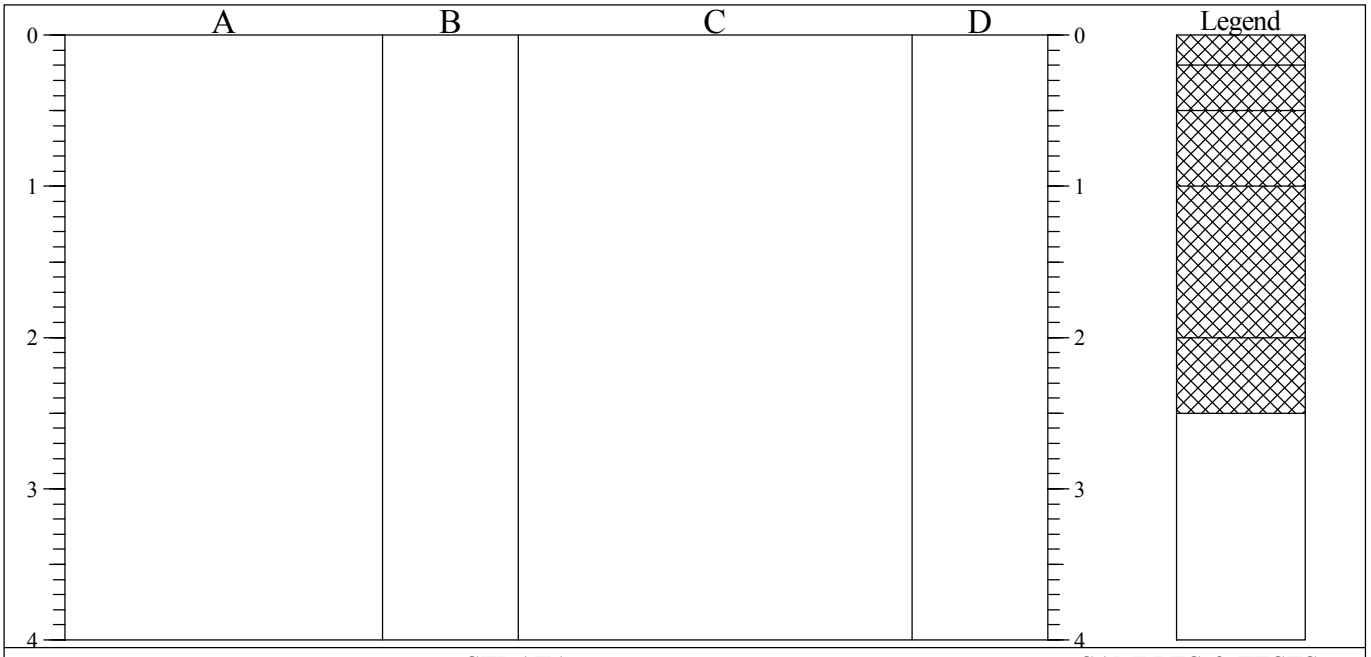
All dimensions in metres Scale 1:50	Client Prospect GB	Method/ Plant Used JCB 3CX	Logged By SM

AGS3 UK TP 14PRS011 - KINGSWOOD ROAD, PRESTWICH.GPJ GINT STD AGS 3_1.GDT 29/9/14

Betts Geoenvironmental Ltd
Old Marsh Farm Barns, Unit 6-7, Welsh Road
Flintshire, CH5 2LY
Telephone: 01244 288 179

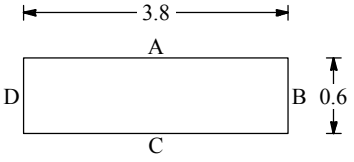
TRIAL PIT LOG

Project				TRIAL PIT No
Kingswood Road, Prestwich, Manchester				**TP105**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
14PRS011	29-09-14			
Contractor				Sheet
BETTS GEOENVIRONMENTAL LTD				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.20		MADE GROUND: Tarmac.			
0.20-0.50		MADE GROUND: Greyish brown and light brown (mixed) of varying fine to coarse SAND and fine to coarse GRAVEL. (layered).			
0.50-1.00		MADE GROUND: Dark orangish brown/orangish brown cobbly silty SAND & GRAVEL. Cobbles of brick.	0.60	ES	
1.00-2.00		MADE GROUND: Dark brown slightly clayey silty fine SAND. Occasional wet clay pocket. Ashy. Occasional sand of brick/pottery. Rare to occasional coal.	1.50	ES	
2.00-2.50		POSSIBLE MADE GROUND: Dark brown and light brown silty fine SAND. (Possibly Reworked).			

Shoring/Support:
Stability: Stable.



GENERAL REMARKS

Hole was terminated at 2.50m due to restriction in room for the stockpile from the excavation.

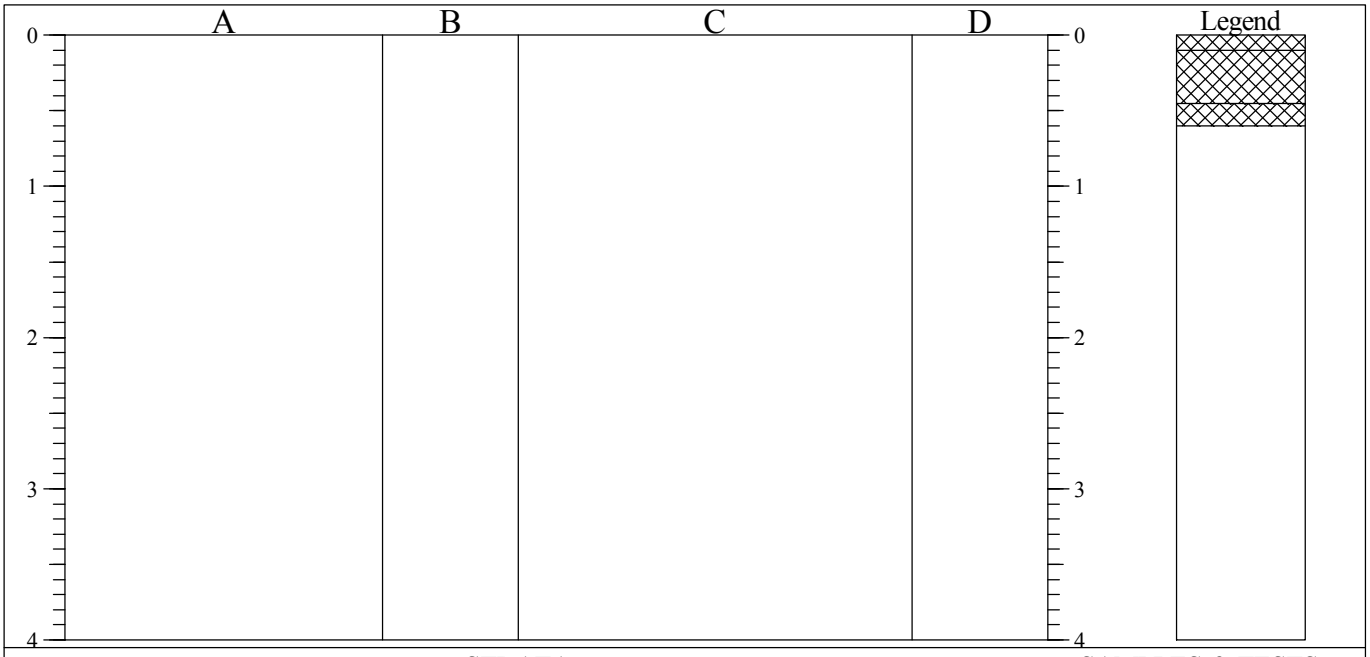
All dimensions in metres Scale 1:50	Client Prospect GB	Method/ Plant Used JCB 3CX	Logged By SM

AGS3 UK TP 14PRS011 - KINGSWOOD ROAD, PRESTWICH.GPJ GINT STD AGS 3_1.GDT 29/9/14

Betts Geoenvironmental Ltd
Old Marsh Farm Barns, Unit 6-7, Welsh Road
Flintshire, CH5 2LY
Telephone: 01244 288 179

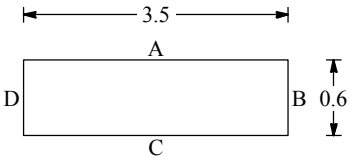
TRIAL PIT LOG

Project				TRIAL PIT No
Kingswood Road, Prestwich, Manchester				**TP106**
Job No	Date	Ground Level (m)	Co-Ordinates ()	
14PRS011	29-09-14			
Contractor				Sheet
BETTS GEOENVIRONMENTAL LTD				1 of 1



STRATA			SAMPLES & TESTS		
Depth	No	DESCRIPTION	Depth	No	Remarks/Tests
0.00-0.10		MADE GROUND: Tarmac.			
0.10-0.45		MADE GROUND: Light brown silty gravelly fine to coarse SAND. Gravel is coarse of sandstone.			
0.45-0.60		MADE GROUND: Orangish brown/dark orangish brown clayey silty fine SAND. sandy silty CLAY. (Reworked).			
		Yellow electricity tape.			

Shoring/Support:
Stability: Stable.



GENERAL REMARKS

Hole terminated at 0.60m due to yellow electricity tape being present with the hole. Catscan showed no evidence of live cables.

All dimensions in metres Scale 1:50	Client Prospect GB	Method/ Plant Used JCB 3CX	Logged By SM

AGS3 UK TP 14PRS011 - KINGSWOOD ROAD, PRESTWICH.GPJ GINT STD AGS 3_1.GDT 29/9/14

APPENDIX D

(i) Contamination Test Results

(i) Geotechnical Test Results

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envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 14/05283
Issue Number: 1 **Date:** 07 October, 2014

Client:
Betts Geo Environmental
Old Marsh Farm Barns
Welsh Road
Sealand
Flintshire
UK
CH5 2LY

Project Manager: Steven Millar
Project Name: Kingswood
Project Ref: 14-PRS011
Order No: BG1279
Date Samples Received: 30/09/14
Date Instructions Received: 01/10/14
Date Analysis Completed: 07/10/14

Prepared by:
Melanie Marshall
Laboratory Coordinator

Approved by:
Iain Haslock
Analytical Consultant

mCERTS
UKAS TESTING 1247

Envirolab Job Number: 14/05283

Client Project Name: Kingswood

Client Project Ref: 14-PRS011

Lab Sample ID	14/05283/1	14/05283/2	14/05283/3	14/05283/4	14/05283/5	14/05283/6			Units	Method ref
Client Sample No										
Client Sample ID	TP101	TP101	TP101	TP102	TP105	TP105				
Depth to Top	0.40	1.00	1.50	1.90	0.60	1.50				
Depth To Bottom										
Date Sampled	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
MCERTS Sample Matrix Code	4A	1	5	5	4A	4A				
% Stones >10mm$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	31.7	<0.1			% w/w	A-T-044
pH$_D^{M\#}$	6.05	-	-	7.26	8.75	8.31			pH	A-T-031s
Sulphate (water sol 2:1)$_D^{M\#}$	0.03	-	-	0.01	<0.01	0.03			g/l	A-T-026s
Organic matter$_D^{M\#}$	8.5	1.1	0.7	0.7	0.5	18.6			% w/w	A-T-032 OM
Arsenic$_D^{M\#}$	16	-	-	<1	1	7			mg/kg	A-T-024s
Cadmium$_D^{M\#}$	0.9	-	-	<0.5	0.9	0.7			mg/kg	A-T-024s
Copper$_D^{M\#}$	37	-	-	2	7	41			mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	-	-	<1	<1	<1			mg/kg	A-T-040s
Lead$_D^{M\#}$	99	-	-	6	59	86			mg/kg	A-T-024s
Mercury$_D$	0.31	-	-	<0.17	<0.17	0.71			mg/kg	A-T-024s
Nickel$_D^{M\#}$	15	-	-	2	12	13			mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	-	-	<1	<1	<1			mg/kg	A-T-024s
Zinc$_D^{M\#}$	49	-	-	<5	36	70			mg/kg	A-T-024s

Envirolab Job Number: 14/05283

Client Project Name: Kingswood

Client Project Ref: 14-PRS011

Lab Sample ID	14/05283/1	14/05283/2	14/05283/3	14/05283/4	14/05283/5	14/05283/6			Units	Method ref
Client Sample No										
Client Sample ID	TP101	TP101	TP101	TP102	TP105	TP105				
Depth to Top	0.40	1.00	1.50	1.90	0.60	1.50				
Depth To Bottom										
Date Sampled	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
MCERTS Sample Matrix Code	4A	1	5	5	4A	4A				
TPH CWG										
Ali >C5-C6$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C6-C8$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C8-C10$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Ali >C10-C12$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1	1.3			mg/kg	A-T-023s
Ali >C12-C16$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1	5.4			mg/kg	A-T-023s
Ali >C16-C21$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1	4.7			mg/kg	A-T-023s
Ali >C21-C35$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1	2.3			mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	13.5			mg/kg	A-T-022+23s
Aro >C5-C7$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C7-C8$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C8-C9$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C9-C10$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Aro >C10-C12$_A^\#$	<0.1	<0.1	<0.1	<0.1	<0.1	1.6			mg/kg	A-T-023s
Aro >C12-C16$_A^\#$	2.3	<0.1	<0.1	<0.1	<0.1	46.9			mg/kg	A-T-023s
Aro >C16-C21$_A^\#$	8.0	<0.1	<0.1	<0.1	<0.1	149			mg/kg	A-T-023s
Aro >C21-C35$_A^\#$	9.3	<0.1	<0.1	<0.1	<0.1	155			mg/kg	A-T-023s
Total Aromatics$_A$	19.6	<0.1	<0.1	<0.1	<0.1	353			mg/kg	A-T-022+23s
TPH (Ali & Aro)$_A$	19.6	<0.1	<0.1	<0.1	<0.1	366			mg/kg	A-T-022+23s
BTEX - Benzene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - Toluene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - m & p Xylene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
BTEX - o Xylene$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
MTBE$_A^\#$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	A-T-022s
VPH total (>C5-C10)$_A^\#$	<0.01	-	-	<0.01	<0.01	<0.01			mg/kg	A-T-022s
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_D^\#$	NAD	-	-	NAD	NAD	NAD				A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	-	-	N/A	N/A	N/A				Gravimetry

Envirolab Job Number: 14/05283

Client Project Name: Kingswood

Client Project Ref: 14-PRS011

Lab Sample ID	14/05283/1	14/05283/2	14/05283/3	14/05283/4	14/05283/5	14/05283/6			Units	Method ref
Client Sample No										
Client Sample ID	TP101	TP101	TP101	TP102	TP105	TP105				
Depth to Top	0.40	1.00	1.50	1.90	0.60	1.50				
Depth To Bottom										
Date Sampled	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
MCERTS Sample Matrix Code	4A	1	5	5	4A	4A				
PAH 16										
Acenaphthene$_A^{M\#}$	1.35	-	-	<0.01	0.01	4.35			mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	0.05	-	-	<0.01	<0.01	5.55			mg/kg	A-T-019s
Anthracene$_A^{M\#}$	1.63	-	-	<0.02	0.02	26.3			mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	3.97	-	-	<0.04	0.32	49.1			mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	3.28	-	-	<0.04	0.33	34.7			mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	4.27	-	-	<0.05	0.40	41.6			mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	1.39	-	-	<0.05	0.16	10.6			mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	1.49	-	-	<0.07	0.15	9.23			mg/kg	A-T-019s
Chrysene$_A^{M\#}$	4.44	-	-	<0.06	0.30	64.9			mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.42	-	-	<0.04	<0.04	2.98			mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	8.96	-	-	<0.08	0.55	90.3			mg/kg	A-T-019s
Fluorene$_A^{M\#}$	0.81	-	-	<0.01	<0.01	11.7			mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	1.46	-	-	<0.03	0.16	11.7			mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	0.16	-	-	<0.03	<0.03	5.59			mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	8.20	-	-	<0.03	0.07	92.2			mg/kg	A-T-019s
Pyrene$_A^{M\#}$	8.66	-	-	<0.07	0.55	77.5			mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	50.5	-	-	<0.08	3.06	538			mg/kg	A-T-019s

Envirolab Job Number: 14/05283

Client Project Name: Kingswood

Client Project Ref: 14-PRS011

Lab Sample ID	14/05283/1	14/05283/2	14/05283/3	14/05283/4	14/05283/5	14/05283/6			Units	Method ref
Client Sample No										
Client Sample ID	TP101	TP101	TP101	TP102	TP105	TP105				
Depth to Top	0.40	1.00	1.50	1.90	0.60	1.50				
Depth To Bottom										
Date Sampled	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14	29-Sep-14				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
MCERTS Sample Matrix Code	4A	1	5	5	4A	4A				
Speciated PCB-WHO12										
PCB BZ 81_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ 105_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ 114_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ $118_A^{M\#}$	<0.007	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ 123_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ 126_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ 156_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ 157_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ 167_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ 169_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ 189_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s
PCB BZ 77_A	<0.005	-	-	-	-	-			mg/kg	A-T-004s

REPORT NOTES

Notes - Soil chemical analysis
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

Notes - General
This report shall not be reproduced, except in full, without written approval from Envirolab.
Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.
All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.
All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts.
Superscript "M" indicates method accredited to MCERTS.
If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

TPH analysis of water by method A-T-007
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Asbestos in soil
Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.
Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified a being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER.
Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: METALS

Project Name Kingswood Rd, Prestwich
Project No 14-PRS011
Date 29-Sep-14

SOIL TYPE	MG	MG	N	N	MG	MG
SAMPLE LOCATION	TP101	TP101	TP101	TP102	TP105	TP105
DEPTH (m)	0.40	1.00	1.50	1.90	0.60	1.50
pH	6.05	-	-	7.26	8.75	8.31
Sulphate (water sol 2:1)	0.03	-	-	0.01	<0.01	0.03
Organic matter	8.5	1.1	0.7	0.7	0.5	18.6
Arsenic	16	-	-	<1	1	7
Cadmium	0.9	-	-	<0.5	0.9	0.7
Copper	37	-	-	2	7	41
Chromium (hexavalent)	<1	-	-	<1	<1	<1
Lead	99	-	-	6	59	86
Mercury	0.31	-	-	<0.17	<0.17	0.71
Nickel	15	-	-	2	12	13
Selenium	<1	-	-	<1	<1	<1
Zinc	49	-	-	<5	36	70
Asbestos Screen	NAD	-	-	NAD	NAD	NAD
Asbestos Level	-	-	-	-	-	-

Metals	Mean Value Test *	Range		Residential Use with Homegrown ATRisk. (mg/kg)	Residential Use with Homegrown ATRisk. (mg/kg)
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	With Homegrown Produce (1% SOM)	With Homegrown Produce (6% SOM)
pH	8.03	8.75	6.05		
Sulphate (water sol 2:1)	0.03	0.03	<0.01		
Organic matter	12.42	18.6	0.50		
Arsenic	15	16	<1	**32**	**32**
Cadmium	0.98	0.90	<0.5	**10**	**10**
Copper	45	41	2.00	**3970**	**4020**
Chromium (hexavalent)	1.00	<1	<1	**14.2**	**14.2**
Lead	111	99	6.00	**276**	**342**
Mercury**	0.64	0.71	<0.17	**6.28**	**11**
Nickel	17	15	2.00	**130**	**130**
Selenium	1	<1	<1	**350**	**350**
Zinc	72	70	<5	**16900**	**17200**

NOTE:
Any individual results and mean value tests above SGVs are shown RED highlighted.
Any outlier values which exceed relevant SGVs are shown in red

* - The calculations for the mean value test include outliers

**- Results for this determinand are assessed with no background levels taken into account

Results are expressed as mg/kg unless otherwise stated

ALL RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING **NO** FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

ALL SGVs / GAC ARE DERIVED FROM LQM/CIEH 2009 VALUES OTHER THAN THE FOLLOWING:CADNIUM, ARSENIC, NICKEL AND MERCURY VALUES FOR RESIDENTIAL ARE EA SGV 2009 VALUES. THE SGV OF LEAD IS FROM ATRISK March 2009
Note: The SGV for elemental mercury has been used to assess total mercury concentrations at the site. The Environment Agency's Science Report SC050021 / Mercury SGV states that 'for general surface contamination and to simplify the assessment the SGV's for inorganic mercury can normally be compared with chemical analysis for total mercury content....'. Based on the latter, SGV for elemental mercury (170mg/kg) in the soil assessment is used

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: PAH

Project Name Kingswood Rd, Prestwich
Project No 14-PRS011
Date 29-Sep-14

SOIL TYPE	MG	MG	MG	MG
SAMPLE LOCATION	TP101	TP102	TP105	TP105
DEPTH (m)	0.40	1.90	0.60	1.50
Acenaphthene	1.35	<0.01	0.01	4.35
Acenaphthylene	0.05	<0.01	<0.01	5.55
Anthracene	1.63	<0.02	0.02	26.3
Benzo(a)anthracene	3.97	<0.04	0.32	49.1
Benzo(a)pyrene	3.28	<0.04	0.33	34.7
Benzo(b)fluoranthene	4.27	<0.05	0.4	41.6
Benzo(ghi)perylene	1.39	<0.05	0.16	10.6
Benzo(k)fluoranthene	1.49	<0.07	0.15	9.23
Chrysene	4.44	<0.06	0.3	64.9
Dibenzo(ah)anthracene	0.42	<0.04	<0.04	2.98
Fluoranthene	8.96	<0.08	0.55	90.3
Fluorene	0.81	<0.01	<0.01	11.7
Indeno(123-cd)pyrene	1.46	<0.03	0.16	11.7
Naphthalene	0.16	<0.03	<0.03	5.59
Phenanthrene	8.2	<0.03	0.07	92.2
Pyrene	8.66	<0.07	0.55	77.5
Organic Matter	8.5	0.7	0.5	18.6

PAH	Mean Value Test *	Range		LQM / CIEH 2009 Guidelines For Residential use- WITH Homegrown Produce	LQM / CIEH 2009 Guidelines For Residential use- WITH Homegrown Produce	LQM / CIEH 2009 Guidelines For Residential use- WITH Homegrown Produce
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	2.5% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Acenaphthene	3.84	4.35	<0.01	210	480	1000
Acenaphthylene	4.66	5.55	<0.01	170	400	850
Anthracene	22.16	26.30	<0.02	2300	4900	9200
Benzo(a)anthracene	41.47	49.10	<0.04	3.1	4.7	5.9
Benzo(a)pyrene	29.36	34.70	<0.04	0.83	0.94	1
Benzo(b)fluoranthene	35.24	41.60	<0.05	5.6	6.5	7
Benzo(ghi)perylene	9.02	10.60	<0.05	44	46	47
Benzo(k)fluoranthene	7.89	9.23	<0.07	8.5	9.6	10
Chrysene	54.74	64.90	<0.06	6	8	9.3
Dibenzo(ah)anthracene	2.54	2.98	<0.04	0.76	0.86	0.9
Fluoranthene	76.44	90.30	<0.08	260	460	670
Fluorene	9.87	11.70	<0.01	160	380	780
Indeno(123-cd)pyrene	9.94	11.70	<0.03	3.2	3.9	4.2
Naphthalene	4.70	5.59	<0.03	1.5	3.7	8.7
Phenanthrene	77.94	92.20	<0.03	92	200	380
Pyrene	65.72	77.50	<0.07	560	1000	1600

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4 ASSUMING **NO** FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

BETTS ASSOCIATES
GEO ENVIRONMENTAL

SUMMARY OF CONTAMINATION ANALYSIS: TPH

Project Name Kingswood Rd, Prestwich
Project No 14-PRS011
Date 29-Sep-14

SOIL TYPE	MG	MG	N	N	MG	MG
SAMPLE LOCATION	TP101	TP101	TP101	TP102	TP105	TP105
DEPTH (m)	0.40	1.00	1.50	1.90	0.60	1.50
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C8-C10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ali >C10-C12	<0.1	<0.1	<0.1	<0.1	<0.1	1.3
Ali >C12-C16	<0.1	<0.1	<0.1	<0.1	<0.1	5.4
Ali >C16-C21	<0.1	<0.1	<0.1	<0.1	<0.1	4.7
Ali >C21-C35	<0.1	<0.1	<0.1	<0.1	<0.1	2.3
Total Aliphatics	<0.1	<0.1	<0.1	<0.1	<0.1	13.5
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C8-C9	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C9-C10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aro >C10-C12	<0.1	<0.1	<0.1	<0.1	<0.1	1.6
Aro >C12-C16	2.3	<0.1	<0.1	<0.1	<0.1	46.9
Aro >C16-C21	8	<0.1	<0.1	<0.1	<0.1	149
Aro >C21-C35	9.3	<0.1	<0.1	<0.1	<0.1	155
Total Aromatics	19.6	<0.1	<0.1	<0.1	<0.1	353
TPH (Ali & Aro)	19.6	<0.1	<0.1	<0.1	<0.1	366
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MTBE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Organic Matter	8.5	1.1	0.7	0.7	0.5	18.6

TPH	Mean Value Test *	Range		LQM / CIEH 2009 Guidelines For Residential use- WITH Homegrown Produce	LQM / CIEH 2009 Guidelines For Residential use- WITH Homegrown Produce	LQM / CIEH 2009 Guidelines For Residential use- WITH Homegrown
	US_{95}	Largest Value (mg/kg)	Smallest Value (mg/kg)	1% SOM WITHOUT Free Product***	2.5% SOM WITHOUT Free Product***	6% SOM WITHOUT Free Product***
Ali >C5-C6	0.01	<0.01	<0.01	30	55	110
Ali >C6-C8	0.01	<0.01	<0.01	73	160	370
Ali >C8-C10	0.01	<0.01	<0.01	19	46	110
Ali >C10-C12	0.70	1.30	<0.1	48	118	283
Ali >C12-C16	2.76	5.40	<0.1	24	59	142
Ali >C16-C21	2.41	4.70	<0.1	45000	64000	76000
Ali >C21-C35	1.21	2.30	<0.1			
Total Aliphatics	6.83	13.50	<0.1			
Aro >C5-C7	0.01	<0.01	<0.01	65	130	280
Aro >C7-C8	0.01	<0.01	<0.01	120	270	611
Aro >C8-C9	0.01	<0.01	<0.01	27	65	151
Aro >C9-C10	0.01	<0.01	<0.01	27	65	151
Aro >C10-C12	0.85	1.60	<0.1	69	160	346
Aro >C12-C16	23.85	46.9	<0.1	140	310	593
Aro >C16-C21	75.78	149.0	<0.1	250	480	770
Aro >C21-C35	78.94	155.0	<0.1	890	1100	1230
Total Aromatics	179.55	353.0	<0.1			
TPH (Ali & Aro)	186.08	366.0	<0.1			
BTEX - Benzene	0.01	<0.01	<0.01	0.08	0.18	0.33
BTEX - Toluene	0.01	<0.01	<0.01	120	320	610
BTEX - Ethyl Benzene	0.01	<0.01	<0.01	65	180	350
BTEX - m & p Xylene	0.01	<0.01	<0.01	42	120	230
BTEX - o Xylene	0.01	<0.01	<0.01	42	120	250
MTBE	0.01	<0.01	<0.01			

	UU Drinking Water Guidelines
	PE Threshold
Total BTEX &MTBE	0.1
EC5-EC10 Ali-Aro	2
EC10-EC16 Ali-Aro	10
EC16-EC40 Ali-Aro	500

Results expressed as mg/kg air dried unless otherwise stated.

* - The calculations for the mean value test include outliers

*** THESE RESULTS PRESENTED ARE ASSESSED UNDER THE COMBINED CLEA ASSESSMENT CRITERION AS OUTLINED WITHIN SR4ASSUMING **NO** FREE PRODUCT WAS OBSERVED DURING FIELDWORK- SEE 'GUIDANCE NOTES ON CONTAMINATION'.

NOTES:

For the Purpose of this investigation- results will be assessed agains **RESIDENTIAL GUIDELINES WITH HOMEGROWN PRODUCE WITH NO FREE PRODUCT.**

APPENDIX E

(ii) Geo Assist Site Investigation Reports

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APPENDIX F

(i) Conceptual Model

The report aims to identify land which could potentially be affected by contamination, such that it could affect the value or re-use of the land, or such that mitigation would be required for certain proposed end uses of the land.

The assessment also aims to identify land which would be regarded as 'contaminated land' under the terms of the Environmental Protection Act 1990, Part IIa. This act includes a stricter test for contaminated land than that outlined above. Land is considered to be contaminated if either:

- the land is causing significant harm to people, ecosystems or infrastructure; or
- there is a significant possibility that such harm could be caused; or
- Pollution of controlled waters is being, or is likely to be, caused.

The following situations are defined as being where harm is to be regarded as significant:

- chronic or quite toxic effect, serious injury or death to humans;
- irreversible or other adverse harm to the ecological system;
- substantial damage to or failure of buildings;
- death of, or disease or other physical damage affecting, livestock or crops;
- Pollution of controlled waters.

The risk assessment uses a 'Source-Pathway-Receptor' methodology for assessing whether a source of contamination could potentially lead to harmful consequences. This means that there needs to be a pollutant linkage from source to receptor for harm to be caused, this linkage consisting of:

- a source of pollution;
- a pathway for the pollutant to move along;
- A receptor that is affected by the pollutant.

As an example, the pollutant source could be an identified leak of oil or an area of dumped waste.

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The pathways could include transport of the contaminant by groundwater, surface water, windblown dust, or vapours, and for human receptors will include the means, by which contaminants enter the body, for example skin contact, ingestion and inhalation.

Receptors include people, other living organisms, the built environment and groundwater and surface waters (these latter two also being contaminant pathways).

The source-pathway-receptor methodology relationship allows an assessment of the environmental risk to be determined, based on the nature of the source, the degree of exposure of the receptor to the source and the sensitivity of the receptor.

This section of the report is based on the information set out in the previous sections of the report and should not be read independently of such sections.

Initial Conceptual Model

From the available information the preliminary conceptual model is visualised as follows:

Target (Receptor)	**POTENTIAL SOURCE-PATHWAY LINKAGE**
Site users / residents	Inhalation of soil gas, odours or dust.
	Ingestion of, and skin contact with, contaminated soil.
	Ingestion of contaminants in vegetables etc. or in soils adhering to vegetables, etc.
Construction/ maintenance workers.	Inhalation of soil gas, odours or dust
	Ingestion of, and skin contact with, contaminated soil
Plants	Adverse effects on growth caused by presence of contaminants in soil
Buildings and Structures	Flow of ground gas into buildings. Asphyxiation, toxicity, explosion and fire hazards
	Sulphate attack of foundations
	Hydrocarbons penetrating plastic water supply pipes
Groundwater	Migration of soluble contaminants into groundwater on or off site. Migration of oils into groundwater on or off site.
Surface water	Migration of soluble contaminants and/or direct run-off of contaminants. Migration of oils into groundwater on or off site.

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Initial Environmental Risk Assessment

General

It is accepted that an environmental risk assessment can be based on a source-pathway-target model. An examination is carried out as to whether a target will be at risk from a contamination source, that a source exists, and whether there are any pathways (routes of exposure) which might actually link the source to the target.

Environmental risk assessments rely heavily on numerical trigger concentrations or guidelines because exposure of targets to contamination is difficult to quantify directly. Quantification of risk is therefore mainly undertaken for general scenarios in order to derive trigger levels. These are derived for various contaminants for particular targets and routes of exposure. An example of a sensitive target would be users of a domestic back garden, where routes of exposure might be skin contact, dust inhalation, direct ingestion and indirect ingestion via cultivation and consumption of fruit and vegetables.

In March 2002, the first parts of the new CLEA risk assessment guidance were released by DEFRA/Environment Agency.

The risk assessment approach is an extension of the 'fit for use' concept whereby land is cleaned up to a standard fit for the proposed use, that is, so all remaining risks are acceptable. However, as well as being 'fit for use', the environmental risk assessment approach also addresses the soil and water environment so that these are also safeguarded where necessary. For example if a site was contaminated with heavy metals and the development comprised the proposed construction of hard standings and buildings only, the fit-for-use approach might require no remediation for the site. However, consideration of the wider environment needs to address whether groundwater is being contaminated, and if so whether remediation is required for this reason.

The following classification presented by CIRIA has been used in the assessment of risk:

Estimation of risk from consideration of magnitude, consequences and probabilities				
Probability	**Consequences**			
	Severe	**Moderate**	**Mild**	**Minor**
High	Very high	High	Moderate	Moderate / Low
Medium	High	Moderate	Moderate / Low	Low
Low	Moderate	Moderate / Low	Low	Very Low
Unlikely	Moderate / Low	Low	Very Low	Very Low

Reference: Contaminated Land Risk Management; A Guide to Good Practice, CIRIA C552:2001

CIRIA C665 Situation A Ground Gas Conceptual Model

The risk table contained in C665 is basically a modified risk assessment from CIRIA 152 1995, by which a conceptual model and semi-quantitative risk assessment can be made.

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APPENDIX G

(i) Notes on Ground Gas

Ground Gas

The Building Regulations and BRE Report 212 state that precautions are not mandatory against carbon dioxide unless 5.0% volume is exceeded. These documents do not give a threshold level for methane, but Baker suggests that this level is 0.1% volume. For methane up to 1.0% volume, and carbon dioxide above 5.0% volume, the Building Regulations and BRE Report state that passive measures may be adopted. Above 1.0% methane further specific guidance must be sought.

CIRIA Report 149 gives further guidance on the appropriate precautions for various gas regimes, called characteristic situations in this report. In the DETR Guide for Design by Ove Arup, various types of passive measures are assessed for performance with different gas regimes. The assessments used computational fluid dynamic (CFD) modelling.

A gas regime is essentially defined by two parameters:

i) The concentration of the gas (e.g. % methane)

ii) The emission rate of the gas from the ground.

The fact that two parameters are used is problematic if the site is to be classified on the basis of Table 28 in CIRIA Report 149. This is because high gas concentrations are often encountered which fall into an onerous gas regime; whereas the low flow rates which are also frequently encountered fall into less onerous gas regimes.

In order to use the Guide for Design to decide if passive measures are suitable, it is necessary to combine the gas concentration and the emission rate.

Three recent publications are used for ground gas risk assessment:

- CIRIA C665 for high rise residential / flats
- 'Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present' Report Edition No.04 March 2007 NHBC – designed for use with low rise residential properties
- BS8485:2007 'Code of practice for the characterization and remediation from ground gas in affected developments'

These documents improve upon the approach used in previous CIRIA and Wilson /Card Papers, by placing emphasis on gas flow rates, but still retain some reliance on the gas concentrations themselves.

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CIRIA C665 Situation A Ground Gas Conceptual Model

The risk table contained in C665 is basically a modified risk assessment from CIRIA 152 1995, by which a conceptual model and semi-quantitative risk assessment can be made.

High Rise / Flats (CIRIA 665 Table 8.5)

Characteristic Situation (CIRIA Report 149)	Risk Classification	Gas Screening Value (CH4 or CO2) (l/hr) [1]	Additional factors	Typical source of generation
1	Very low risk	**<0.07**	Typically methane ≤1%v/v and/or carbon dioxide ≤5%v/v. Otherwise consider increase to Situation 2	Natural soils with low Organic content. "Typical" Made Ground
2	Low risk	**<0.7**	Borehole flow rate not to exceed 70l/hr. Otherwise consider increase to Situation 3	Natural soil, high peat/organic content. "Typical" Made Ground
3	Moderate risk	**<3.5**		Old landfill, inert waste, mineworking flooded
4	Moderate to high risk	**<15**	Quantitative risk assessment required to evaluate scope of protective measures	Mineworking susceptible to flooding, completed landfill (WMP 26B criteria)
5	High risk	**<70**		Mineworking unflooded inactive with shallow workings near surface
6	Very high risk	**>70**		Recent landfill site

Notes:

1. Gas screening value: litres of gas/hour is calculated by multiplying the gas concentration (%) by the measured borehole flow rate (l/hr);
2. Site characterisation should be based on gas monitoring of concentrations and borehole flow rates for the minimum periods as defined within within CIRIA Report 665;
3. Source of gas and generation potential/performance must be identified;
4. Soil gas investigation to be in accordance with guidance contained within CIRIA Report 665;
5. If there is no detectable flow, use the limit of detection of the instrument;
6. The boundaries between the Partners in Technology classifications do not fit exactly with the boundaries for the above classification.

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Typical scope of protective measures (extract from CIRIA Report 665 Table 8.6)

Characteristic Situation (from Table 8.5)	Number of levels of protection	Typical scope of protective measures for residential building (not low-rise traditional housing)[1]
1	None	No special precautions
2	2	a) Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 1200g DPM and under-floor venting b) Beam and block or pre-cast concrete and 2000 g DPM/reinforced gas membrane and under-floor venting. All joints and penetrations sealed.
3	2	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated or positively pressurised under-floor sub-space.
4	3	All types of floor slab as above. All joints and penetrations sealed. Proprietary gas resistant membrane and passively ventilated under-floor subspace or positively pressurised under-floor sub-space, over-site capping or blinding and in ground venting layer
5	4	Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft). All joints and penetrations sealed. Proprietary gas resistant membrane and ventilated or positively pressurised under-floor sub-space, over-site capping and in ground venting layer and in ground venting wells or barriers.
6	5	Not suitable unless gas regime is reduced first and quantitative risk assessment carried out to assess design of protection measures in conjunction with foundation design.

Notes:

1. Not suitable for use with low rise traditional housing. (Use the NHBC document instead);
2. Typical scope of protective measures may be rationalised for specific developments on the basis of quantitative risk assessments;
3. Note the type of protection is given for illustration purposes only. Information on the detailing and construction of passive protection measures is given in BR414 (Johnson, 2001). Individual site specific designs should provide the same number of separate protective methods for any given characteristic situation. See CIRIA Report 49;
4. In all cases there should be minimum penetration of ground slabs by services and minimum number of confined spaces such as cupboards above the ground slab. Any confined spaces should be ventilated;
5. Foundation design must minimise differential settlement particularly between structural elements and ground-bearing slabs;
6. Commercial buildings with basement car parks, provided with ventilation in accordance with the Building Regulations, may not require gas protection for Characteristic Situations 3 and 4;
7. Floor slabs should provide an acceptable formation on which to lay the gas membrane. If a block beam floor is used it should be well detailed so it has no voids in it that membranes have to span, and all holes for service penetrations should be filled. The minimum density of the blocks should be 600kg/m3 and the top surface should have a 4:1 ratio sand to cement grout brushed into all joints before placing any membrane (this is also good practice to stabilise the floor and should be carried out regardless of the need for ground gas membranes);
8. The ground gas-resistant membrane can also act as the damp-proof membrane;
9. Based on Building Regulations Approved Document C (Office of the Deputy Prime Minister, 2004a),which states that "a membrane below the concrete could be formed with a sheet of polyethylene, which should be at least 300mu thick (1200 gauge)". Please note the alteration from 300mm (as stated in the Approved Document C) to 300mu, as 300mm is a typographical error that has been recognised and corrected for within this report and CIRIA Report 665.

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Low Rise Residential (NHBC)

Table 14.1: Gas Risk Assessment - Traffic Lights with Typical Maximum Concentrations and Gas Screening Values

	Methane [1]		Carbon Dioxide [1]	
Classification	**Typical Maximum Concentration** [3] (%v/v)	**Gas Screening Value** [2,4] (l/hr)	**Typical Maximum Concentration** [3] (%v/v)	**Gas Screening Value** [2,4] (l/hr)
Green				
	1	**0.13**	5	**0.78**
Amber 1				
	5	**0.63**	10	**1.60**
Amber 2				
	20	**1.60**	30	**3.10**
Red				

Notes:

1. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst case temporal conditions that the site may be expected to encounter will be the decider as to what Traffic Light is allocated;
2. Borehole Gas Volume Flow Rate, in litres per hour as defined in Wilson and Card (1999), is the borehole flow rate multiplied by the concentration in the air stream of the particular gas being considered;
3. The Typical Maximum Concentrations can be exceeded in certain circumstances should the Conceptual Site Model indicate it is safe to do so;
4. The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.

Table 14.2: Ground Gas Protection Measures Required for the Traffic Lights

Traffic Light	Ground Gas Protection Measures Required
Green	Ground gas protection measures are not required. (note based on standard NHBC house detail with 150mm void space under suspended floor)
Amber 1	Low-level ground gas protection measures are required, using a membrane and ventilated sub-floor void that creates a permeability contrast to limit the ingress of gas into buildings. Gas protection measures are to be installed as prescribed in BRE 414. Ventilation of the sub-floor void should be designed to provide a minimum of one complete volume change per 24 hours.
Amber 2	High-level ground gas protection measures are required, creating a permeability contrast to prevent ingress of gas into buildings. Gas protection measures are to be installed as prescribed in BRE 414. **Membranes used should always be fitted by a specialist contractor and should be fully certified (see Appendix G).** As with Amber 1, ventilation of the sub-floor void should be designed to provide a minimum of one complete volume change per 24 hours.
Red	Standard residential housing is not normally acceptable without further Ground Gas Risk Assessment and/or possible remedial mitigation measures to reduce/remove the source of the ground gases. In certain circumstances, active protection methods could be applied, but only when there is a legal agreement assuring the management and maintenance of the system for the life of the property.

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BS8485: 2007

Table 2: Required Gas Protection By Characteristic Gas Situation & Type Of Building

Characteristic gas situation, CS	NHBC traffic light	Required gas protection			
		Non-managed property, e.g. private housing	Public building [A]	Commercial buildings	Industrial buildings [B]
1	Green	0	0	0	0
2	Amber 1	3	3	2	1 [C]
3	Amber 2	4	3	2	2
4	Red	6 [D]	5 [D]	4	3
5			6 [E]	5	4
6				7	6

NOTE Traffic light indications are taken from NHBC Report no.: 10627-R01 (04) [3] and are mainly applicable to low-rise residential housing. These are for comparative purposes but the boundaries between the traffic light indications and CS values do not coincide.

A) Public buildings include, for example, managed apartments, schools and hospitals.
B) Industrial buildings are generally open and well ventilated. However, areas such as office pods might require a separate assessment and may be classified as commercial buildings and require a different scope of gas protection to the main building.
C) Maximum methane concentration 20% otherwise consider an increase to CS3.
D) Residential building on higher traffic light/CS sites is not recommended unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.
E) Consideration of issues such as ease of evacuation and how false alarms will be handled are needed when completing the design specification of any protection scheme.

Table 3: Solutions Scores

PROTECTION ELEMENT/SYSTEM		SCORE	COMMENTS
a) Venting/dilution (See Annex A)			
Passive sub floor ventilation (venting layer can be a clear void or formed using gravel, geocomposites, polystyrene void formers, etc.) A)	Very good performance	2.5	Ventilation performance in accordance with Annex A. If passive ventilation is poor this is generally unacceptable and some form of active system will be required.
	Good performance	1	
Subfloor ventilation with active abstraction/pressurization (venting layer can be a clear void or formed using gravel,		2.5	There have to be robust management systems in place to ensure the continued maintenance of any ventilation system.

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geocomposites, polystyrene void formers, etc.) A)			Active ventilation can always be designed to meet good performance. Mechanically assisted systems come in two main forms: extraction and positive pressurization.
Ventilated car park (basement or undercroft)		4	Assumes car park is vented to deal with car exhaust fumes, designed to Building Regulations Document F [5] and IStructE guidance [6].
b) Barriers			
Floor slabs			It is good practice to install ventilation in all foundation systems to effect pressure relief as a minimum. Breaches in floor slabs such as joints have to be effectively sealed against gas ingress in order to maintain these performances.
Block and beam floor slab		0	
Reinforced concrete ground bearing floor slab		0.5	
Reinforced concrete ground bearing foundation raft with limited service penetrations that are cast into slab		1.5	
Reinforced concrete cast in situ suspended slab with minimal service penetrations and water bars around all slab penetrations and at joints		1.5	
Fully tanked basement		2	
c) Membranes			
Taped and sealed membrane to reasonable levels of workmanship/in line with current good practice with validation B), C)		0.5	The performance of membranes is heavily dependent on the quality and design of the installation, resistance to damage after installation, and the integrity of joints
Proprietary gas resistant membrane to reasonable levels of workmanship/in line with current good practice under independent inspection (CQA) B), C)		1	
Proprietary gas resistant membrane installed to reasonable levels of workmanship/in line with current good practice under CQA with integrity testing and independent validation		2	
d) Monitoring and detection (not applicable to non-managed property, or in isolation)			
Intermittent monitoring using hand held equipment		0.5	
Permanent monitoring and alarm system A)	Installed in the underfloor venting/ dilution system	2	Where fitted, permanent monitoring systems ought to be installed in the underfloor venting/dilution system in the first instance but can also be provided within the occupied space as a fail safe
	Installed in the building	1	
e) Pathway Intervention			
Pathway intervention		-	This can consist of site protection measures for off-site or on-site sources (see Annex A).

NOTE In practice the choice of materials might well rely on factors such as construction method and the risk of damage after installation. It is important to ensure that the chosen combination gives an appropriate level of protection

A) It is possible to test ventilation systems by installing monitoring probes for post installation validation.

B) If a 1 200 g DPM material is to function as a gas barrier it should be installed according to BRE 212 [8]/BRE 414 [9], being taped and sealed to all penetrations.

C) Polymeric Materials >1 200 g can be used to improve confidence in the barrier. Remember that their gas resistance is robust and resistant to site damage.

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APPENDIX H

(i) Off-site Disposal of Surplus Soil Guidance Notes

The disposal of waste (including surplus soils and contaminated soils) to landfill sites is governed by the *Landfill (England & Wales) Regulations 2002*, the *Hazardous Waste Technical Guidance document WM2 (2003)* and associated legislation.

One of the aims of the above legislation is to encourage waste producers (including developers disposing of surplus soils etc) to reduce their waste (and not just discard and disown it). This can be achieved by recycling or reusing the waste. In the case of contaminated sites where leaving contaminated material in-situ poses a risk to a potential receptor such as groundwater resources, further testing and assessment for such risk could reduce the quantities requiring disposal. If there is still unacceptable risk from contaminated soil being left in place, then it may be possible to reduce the risk to an acceptable level (such that the material can be left in place) by in-situ or ex-situ clean up of the soils.

Before waste can be disposed of, the producer of the waste must undertake a number of steps. '*Initial Waste Testing and Characterisation'* is firstly undertaken to determine whether the waste is non-hazardous or hazardous. The exceptions are that some wastes such as coal tars, 'tank bottom sludge's', etc are immediately classed as hazardous, regardless of any testing or threshold concentrations.

Any inert or hazardous waste destined for landfill must undergo '*Compliance Testing'* using the Waste Acceptance Criteria (WAC). There are different inert and hazardous WAC limits relating to landfill sites that are correspondingly licensed to accept inert or hazardous waste.

If the '*Initial Waste Testing and Characterisation'* shows a waste to be hazardous, then it is a requirement that the material be tested against the WAC-hazardous suite of tests. If it *passes* the WAC-hazardous testing, then it can be taken to a hazardous waste landfill site. If the material *fails* the WAC-hazardous testing, then the material must be treated before undergoing re-characterisation, further WAC-hazardous testing and then potential disposal at a hazardous waste disposal site.

If the '*Initial Waste Testing and Characterisation'* shows a waste to be non-hazardous, then it can be taken to a non hazardous waste landfill site, without further testing. The producer may however decide to undertake WAC-inert testing, in an attempt to reclassify the waste as inert, in which case the waste could then go to an inert landfill site.

The volumes of soils associated with potential hotspots on a site (be they hazardous or non hazardous) which might require off-site disposal, could potentially be reduced by further on-site sampling and subsequent testing.

With regard to the *Compliance Testing*, it should be noted that some landfill sites are permitted to increase the standard WAC-hazardous/inert limit concentrations, such that they might accept waste that would normally fail such limits.

We would recommend that the contamination testing results (including the history of the site) be presented to the proposed landfills, to determine if they will accept waste generated at the site and what classification they would impose.

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APPENDIX I

(i) Validation Report Guidance Notes

Unforeseen Hotspots of Contamination

Given the existence of made ground on the site it would be prudent to maintain vigilance during site clearance and construction, in case any further areas of suspected contamination are encountered.

If areas are found then a suitably qualified person should undertake appropriate sampling, testing and further risk assessment.

Any hotspots encountered during site clearance, not previously encountered in the ground investigation, are to be removed to a suitably licensed landfill site.

A validation report (see below) will be produced on completion of these works. This report will serve to confirm that the works were undertaken in accordance with the relevant legislation, the method statement, specification and planning conditions.

Validation Report Recommendations

It is suggested that the following records will be kept on site to provide a basis for the validation report:

- Daily record sheets of the remediation works to include a summary of the day's activities
- Weather conditions
- Plant, personnel and visitors to the remediation site
- Aspects relating to Health & Safety, environmental control or non-compliance with the specification or the Method Statements.
- All in situ and laboratory testing results.

All requirements of the remediation specification should be complied with; on completion of the remediation a validation report should be provided. This report will comprise the relevant site records and act as certification that the remedial and ground preparation works have been carried out in accordance with the specification.

The validation report will include the following:

- A description of the works undertaken.
- Records of any remediation works, including daily diary sheets.
- Progress photographs.
- Any chemical and geotechnical validation test results.
- As built surveys, including base excavations and top and bottom of capping layer.
- A statement that the works have been undertaken in accordance with the agreed specification

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APPENDIX J

(i) Notes on Limitations

This report does not consider ecological impacts (e.g. bats) or botanical risks (e.g. Japanese knotweed). It is recommended that these are considered as part of the assessment of development constraints for the site.

The assessment and judgements given in this report are directed by both the finite data on which they are based and the proposed works to which they are addressed. The data essentially comprised a study of available documented information from various sources (including Client Furnished reports) together with discussions with relevant authorities and other interested parties. There may also be circumstances at the site that are not documented. The information reviewed is not exhaustive and has been accepted in good faith as providing representative and true data pertaining to site conditions. If additional information becomes available which might impact our environmental conclusions, we request the opportunity to review the information, reassess the potential concerns and modify our opinion if warranted.

It should be noted that any risks identified in this report are perceived risks based on the available information. Actual risks can only be assessed following a physical investigation of the site.

The site investigation has been carried out to provide information concerning the type and degree of contamination, and ground and groundwater conditions to allow a reasonable risk assessment to be made. Betts Geo Environmental Ltd undertake to exercise all reasonable skill, care and due diligence in the exercise of the investigation with respect to sampling techniques, sample storage and report interpretation.

The assessments and judgement given in this report are directed by both the finite data on which they are based and the proposed works to which they are addressed. Data acquisition is subject to the limitations of the methods of investigation used. Exploratory holes undertaken during fieldwork investigate small a small volume of ground in relation to the size of the site and as such can only provide an indication of site conditions. There may be conditions pertaining to the site and the proposed development i.e. localised “hotspots” of contamination, which have not been disclosed by the investigations.

The findings and opinions are relevant to the dates of our site works and should not be relied upon to represent conditions at substantially later dates. Conditions at the site will change over time due to natural variations and anthropogenic activities. Groundwater, surface water and soil gas conditions should be anticipated to change with diurnal, seasonal and meteorological variations.

The opinions expressed in this report regarding any contamination are based on simple statistical analysis and comparison with available guidance values. No liability can be accepted for the retrospective effects of any changes or amendments to these values.

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