Castledine & Co
Environmental Consultants

2 Wymeswold Road, Hoton
Loughborough
Leicestershire
LE12 5SN

Phase 1 Land Contamination Risk Assessment

for

Change of use of agricultural building to dwelling

on the site of

Yew Tree Farm New Road Quadring Eaudyke Spalding

Date: December 2018

Status:	Final Report
Reference:	1355G P1 Sutton - Spalding
Date:	02/12/2018

EXECUTIVE SUMMARY

The site is currently occupied by discussed farm buildings.

Based on the information contained in this report, it is the opinion of Castledine & Co that the site represents a Low risk with respect to the proposed development.

It is recommended that the Buildings on site should be subject to an asbestos survey and removal by appropriately qualified personal prior to any demolition or redevelopment occurring in order to ensure site works do not cause future contamination of the site.

It is not envisaged that any further works will be required

A watching brief should be had during the course of demolition, site clearance and construction works for any obvious contamination (e.g. oil spillage in ground, buried waste, possible asbestos containing material) development should stop and Castledine & Co should be contact to determine if further assessment or changes to the remediation scheme are required.

CONTENTS

1.0 QUALITY ASSURANCE 1

2.0 LIMITATIONS 1

3.0 INTRODUCTION 2

4.0 SCOPE 2

5.0 SITE DESCRIPTION 4

6.0 REGULATORY AUTHORITY AND OTHER ENVIRONMENTAL DATA 4

6.1 HYDROLOGICAL 5

6.1.1 AQUIFER 5
6.1.2 ABSTRACTIONS AND PRIVATE WATER SUPPLIES 5
6.1.3 SOURCE PROTECTION ZONE 6
6.1.4 GROUNDWATER VULNERABILITY AND SOIL LEACHING POTENTIAL 6
6.1.5 POTENTIAL SURFACE WATER 6
6.1.6 DISCHARGE CONSENTS 6

6.2 PERMITTED PROCESSES 6

6.3 POLLUTION INCIDENTS 6

6.4 RADIOACTIVE SUBSTANCES REGISTRATIONS 6

6.5 WASTE 6

6.5.1 LICENSED WASTE MANAGEMENT FACILITIES (LOCATIONS) 6
6.5.2 LANDFILL SITES 6

6.6 HAZARDOUS SUBSTANCES 6

6.7 ECOLOGICAL RECEPTORS 6

6.8 SOILS AND GEOLOGY 7

6.8.1 SUPERFICIAL DEPOSITS 7
6.8.2 BEDROCK 7
6.8.3 COAL MINING 7
6.8.4 NON-COAL MINING 7
6.8.5 RADON 7

6.9 AERIAL PHOTOGRAPHY 7

6.9.1 BING 7
6.9.2 GOOGLE MAPS 8
6.9.3 GOOGLE EARTH 8
6.9.4 ENVIRONMENTAL SEARCH 8

6.10 GOOGLE STREET VIEW 8

6.11 HISTORIC MAPPING 8

6.12 CURRENT LAND USE DATA 9

6.13 PETROL AND FUEL SITES 10

6.14 HISTORICAL PETROL AND FUEL SITE DATABASE 10

6.15 POTENTIAL CONTAMINATIVE LAND USES IDENTIFIED ON MAPPING 10
6.16 HISTORICAL TANK DATABASE 10
6.17 HISTORICAL ENERGY FACILITIES 10
6.18 HISTORICAL GARAGE AND MOTOR VEHICLE REPAIR DATABASE 10
6.19 POTENTIALLY INFILLED LAND 10
7.0 POLLUTANT LINKAGE ASSESSMENT 10
7.1 SOURCES 11
7.1.1 ONSITE 11
7.1.2 OFFSITE 11
7.2 PATHWAYS 11
7.3 RECEPTORS 12
8.0 CONCEPTUAL SITE MODEL 12
8.1 PRELIMINARY CONCEPTUAL SITE MODEL 13
8.1.1 SOIL CONTAMINATION 13
8.1.2 HAZARDOUS GROUND GAS AND VAPOURS 13
9.0 PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT 16
10.0 FURTHER ENVIRONMENTAL INVESTIGATION 17
11.0 REMEDIAL ACTIONS AND VERIFICATION 17
12.0 REFERENCES 18
12.1 LEGISLATION AND REGULATIONS 18
12.1.1 ACTS 18
12.1.2 PLANNING REGULATIONS 18
12.1.3 CONTAMINATED LAND REGULATIONS 18
12.2 STATUTORY GUIDANCE 18
12.3 BRITISH STANDARDS 19
12.4 NON STATUTORY TECHNICAL GUIDANCE 19
12.4.1 ENVIRONMENT AGENCY 19
12.4.2 CIRIA PUBLICATIONS 19
12.4.3 CL:AIRE 19
13.0 APPENDICES 20

LIST OF APPENDICES

APPENDIX A	ENVIRONMENTAL SEARCH	21
APPENDIX B	PROPOSED AND CURRENT SITE PLANS	22
APPENDIX C	SITE PHOTOS AND LOCATIONS	25
APPENDIX D	SOIL SCREENING CRITERIA	38

LIST OF TABLES

TABLE 1.	SUMMARY OF SIGNIFICANT POLLUTION LINKAGES	14
TABLE 2.	RISK CLASSIFICATION MATRIX	15
TABLE 3.	CLASSIFICATION OF RISK	16

1.0 QUALITY ASSURANCE

Castledine & Co. confirm that all reasonable efforts have been made to ensure that the information outlined within this report is accurate.

Castledine & Co. would further confirm that due care, attention and technical skill were used in the creation of this report.

For and on behalf of Castledine & Co.

Kevin Castledine

(Proprietor)

2.0 LIMITATIONS

The conclusions and recommendations made in this report are limited to those based on the findings of the investigation. Where comments are made based on information obtained from third parties, Castledine & Co. assumes that all third party information is true and correct. No independent action has been undertaken to validate the findings of third parties. The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at the time.

This survey has not included asbestos within existing structures, invasive plant species or any elements unconnected with potential ground contamination at the site. If required, such surveys should be undertaken by suitably accredited organisations.

There may be other conditions prevailing at the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

3.0 INTRODUCTION

Castledine & Co. have been appointed by Lee and Stella Sutton to undertake a Phase 1 Desk study on Yew Tree Barn, New Road, Quadring Eaudyke, Spalding

4.0 SCOPE

Castledine & Co. have prepared this report for the sole use and reliance of Lee and Stella Sutton and their appointees for the purpose of ensuring compliance with:

- paragraph 170, 178, & 179 of the National Planning Policy Framework 2018,
- part C1 of the building regulations.
- Condition 6 of the South Holland District Council planning approval reference H15-0766-17 https://planning.sholland.gov.uk/OcellaWeb/showDocuments?reference=H15-0766-17&module=pl

6 The development hereby permitted shall not be commenced until a scheme to deal with any contamination of land or pollution of controlled waters has been submitted to and approved in writing by the Local Planning Authority (LPA) and until the measures approved in that scheme have been implemented. The scheme shall include all of the following measures:

i) a desk-top study carried out to identify and evaluate all potential sources of contamination and the impacts on land and/or controlled waters, relevant to the site. The desk-top study shall establish a 'conceptual site model' and identify all plausible pollutant linkages. Furthermore, the assessment shall set objectives for intrusive site investigation works/Quantitative Risk Assessment (or state if none required). Two full copies of the desk- top study and a non-technical summary shall be submitted to the LPA without delay upon completion.

ii) if identified as being required following the completion of the desk-top study, a site investigation shall be carried out to fully and effectively characterise the nature and extent of any land contamination and/or pollution of controlled waters. It shall specifically include a risk assessment that adopts the Source-Pathway-Receptor principle, in order that any potential risks are adequately assessed taking into account the sites existing status and proposed new use. Two full copies of the site investigation and findings shall be forwarded to the LPA without delay upon completion.

iii) thereafter, a written method statement detailing the remediation requirements for land contamination and/or pollution of controlled waters affecting the site shall be submitted to and approved in writing by the LPA, and all requirements shall be implemented and completed to the satisfaction of the LPA. No deviation shall be made from this scheme. If during redevelopment contamination not previously considered is identified, then the LPA shall be notified immediately and no further work shall be carried out until a method statement detailing a scheme for dealing with the suspect contamination has been submitted to and agreed in writing by the LPA.
iv) two full copies of a full closure report shall be submitted to and approved in writing by the LPA. The report shall provide verification that the required works regarding contamination have been carried out in accordance with the approved Method Statement(s). Post-remediation sampling and monitoring results shall be included in the closure report to demonstrate that the required remediation has been fully met.

This report may not be used or relied upon by any unauthorised third party, or for any other proposed use than that specified above, without the explicit written agreement of Castledine & Co.

The report consists of a preliminary risk assessment in accordance with BS10175:2011+A1:2013 and CLR11 “Model Procedures for the Management of Land Contamination”.

The objectives of the report are:-

- To assess historical activities at the site with respect to their potential impact on the site environment.
- To characterise the environmental setting of the site, identify migration pathways and vulnerable receptors for contamination originating at the site, focusing on potential soil and groundwater liabilities.
- To assess historical and current surrounding land use in relation to known or potential off site contamination issues that may impact on the subject site and
- To develop a preliminary conceptual site model (CSM).

5.0 SITE DESCRIPTION

The site is located near Quadring Eaudike at National Grid Reference 524760,333639 and is approximately 0.21ha in area.

The site slopes gently from west to east from country lane roadway. The west side of the barn has a grass verge. The entrance way and drive has a grass topping over some hardcore, sloping down to the shed apron which is concrete.

The internal L of the barn is made up of brick hardcore, with soil on top. This is level. Perimeter is grass.

Client has informed us that the previous use of barn (last use 1950's) Hayloft and stables, for horses and cattle. Work shop and shed last used 1995 for grain drying/ storage.

No evidence of machinery storage, chemical storage or fuel storage was visible on site

Photos of the site are present in Appendix C

6.0 REGULATORY AUTHORITY AND OTHER ENVIRONMENTAL DATA

An environmental search listing historical and environmental factors likely to affect the property has been reviewed.

The most pertinent information is summarised in the following sections.

A copy is presented in Appendix A

Additional geological and hydrological data was obtained from the British Geological Survey.

6.1 HYDROLOGICAL

6.1.1 AQUIFER

6.1.1.1 SUPERFICIAL GEOLOGY

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.1.1.2 BEDROCK GEOLOGY

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.1.2 ABSTRACTIONS AND PRIVATE WATER SUPPLIES

ID	Distance (m)	Direction	Designation	Description
3	26	W	Surface Water Abstraction	Status: Historical Licence No: 5/31/14/*S/0169 Details: Spray Irrigation - Direct Direct Source: SURFACE WATER SOURCE OF SUPPLY Point: FARM DRAINS, PINCHBECK-POINT A Data Type: Line Name: PROCTOR BROS (GOSBERTON) LTD Annual Volume (m^3): 100000 Max Daily Volume (m^3): 6000 Application No: - Original Start Date: 01/04/1992 Expiry Date: - Issue No: 101 Version Start Date: 28/09/2011 Version End Date:

6.1.3 SOURCE PROTECTION ZONE

Not in a source protection zone

6.1.4 GROUNDWATER VULNERABILITY AND SOIL LEACHING POTENTIAL

No data available

6.1.5 POTENTIAL SURFACE WATER

There are minor water courses to the east and west

6.1.6 DISCHARGE CONSENTS

None within 250m

6.2 PERMITTED PROCESSES

None within 250m

6.3 POLLUTION INCIDENTS

None within 250m

6.4 RADIOACTIVE SUBSTANCES REGISTRATIONS

None within 250m.

6.5 WASTE

6.5.1 LICENSED WASTE MANAGEMENT FACILITIES (LOCATIONS)

None within 250m

6.5.2 LANDFILL SITES

None within 250m

6.6 HAZARDOUS SUBSTANCES

None within 250m

6.7 ECOLOGICAL RECEPTORS

None within 250m

6.8 SOILS AND GEOLOGY

"Contains British Geological Survey materials © NERC 2018" obtained from http://www.bgs.ac.uk/data/mapViewers/home.html under the Open Government Licence

6.8.1 SUPERFICIAL DEPOSITS

Tidal Flat Deposits - Clay And Silt. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by shorelines (U).

6.8.2 BEDROCK

Oxford Clay Formation - Mudstone. Sedimentary Bedrock formed approximately 157 to 166 million years ago in the Jurassic Period. Local environment previously dominated by shallow seas.

6.8.3 COAL MINING

Property is not in a coal mining area

6.8.4 NON-COAL MINING

No non-coal mining areas within 50m

6.8.5 RADON

The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.. No radon protective measures are necessary as described in publication BR211:2015 by the Building Research Establishment

6.9 AERIAL PHOTOGRAPHY

Aerial photography shows the following

6.9.1 BING

Site is shown as occupied by 2 buildings.

6.9.2 GOOGLE MAPS

Site is shown as occupied by 2 buildings.

6.9.3 GOOGLE EARTH

7 images are held in the historic imagery dataset, as follows:

Date	Description
1999	Site is shown as occupied by 2 buildings
23/04/2004	Site is shown as occupied by 2 buildings
17/04/2005	Site is shown as occupied by 2 buildings. There appears to a stock pile of material between the 2 buildings
2007	Site is shown as occupied by 2 buildings
2010	Site is shown as occupied by 2 buildings
12/08/2015	Site is shown as occupied by 2 buildings
30/08/2016	Site is shown as occupied by 2 buildings

6.9.4 ENVIRONMENTAL SEARCH

Image taken 12/08/2015

Site is shown as occupied by 2 buildings

6.10 GOOGLE STREET VIEW

1 set of images is available taken Mar 2009

The single story brick building is visible adjacent to the road

A stock pile of manure I shown to the south of the buildings

The larger building is visible

6.11 HISTORIC MAPPING

The following historic maps have been reviewed as part of this assessment. Castledine and Co. do not hold a license for the reproduction and/or distribution of this data.

Map	Onsite	Offsite
OS County Series: LINCOLNSHIRE 1888 1:2,500	Building adjacent to the road is shown	A pump is shown to the north and several nearby ponds are shown building is shown to the south
OS County Series: LINCOLNSHIRE 1890-1891 1:10,560	No discernable change	No discernable change
OS County Series: LINCOLNSHIRE 1904-1905 1:2,500	No discernable change	No discernable change
OS County Series: LINCOLNSHIRE 1906 1:10,560	No discernable change	No discernable change
OS County Series: LINCOLNSHIRE 1931-1932 1:10,560	No discernable change	No discernable change
OS County Series: LINCOLNSHIRE 1931 1:2,500	No discernable change	No discernable change
OS County Series: LINCOLNSHIRE 1951 1:10,560	No discernable change	No discernable change
OS Plan 1956 1:10,560	No discernable change	No discernable change
OS Plan 1973 1:2,500	Large 2nd building is now shown	House to the north (Lindum House) is shown
OS Plan 1977 1:10,000	No discernable change	No discernable change
OS Plan 1977-1990 1:10,000	No discernable change	No discernable change

6.12 CURRENT LAND USE DATA

ID	Distance [m]	Direction	Company	Activity	Category
1	188	SW	Silo	Hoppers and Silos	Farming
2	190	SW	Silo	Hoppers and Silos	Farming
3	245	SW	Pump	Water Pumping Stations	Industrial Features

6.13 PETROL AND FUEL SITES

None within 250m

6.14 HISTORICAL PETROL AND FUEL SITE DATABASE

None within 250m

6.15 POTENTIAL CONTAMINATIVE LAND USES IDENTIFIED ON MAPPING

None recorded

6.16 HISTORICAL TANK DATABASE

None within 250m

6.17 HISTORICAL ENERGY FACILITIES

None within 250m

6.18 HISTORICAL GARAGE AND MOTOR VEHICLE REPAIR DATABASE

None within 250m

6.19 POTENTIALLY INFILLED LAND

None within 250m

7.0 POLLUTANT LINKAGE ASSESSMENT

The risk posed by any contaminants in soil or groundwater will depend on the nature of the hazard, the probability of exposure, the pathway by which exposure occurs, and the likely effects on the receptors. A contaminant is defined as a substance that has the potential to cause harm, while a risk is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.

The following sections discuss all the identified potential on and off site sources, pathways and receptors in the context of the proposed development and plausible pollutant linkages which may represent a risk to identified receptors from the data gained from the desk study. At this

stage the assessment is qualitative and aimed to determine all pollutant linkages, irrespective of significance or allowing for uncertainty.

Three impact potentials exist for any given site, these are:

- The site impacting upon itself;
- The site impacting on its surroundings; and
- The surroundings impacting on the site.

All three impacts need to be considered in a risk assessment.

7.1 SOURCES

The following potential sources of contamination have been identified.

7.1.1 ONSITE

- agricultural use of the site
- Unknown use of the buildings

7.1.2 OFFSITE

- Made ground (filled ponds)

7.2 PATHWAYS

A pathway is defined as a mechanism or route by which a contaminant comes into contact with, or otherwise affects a receptor. Pathways by which the identified receptors may be impacted upon in the context of the proposed development are identified as follows:

- Ingestion;
- Skin contact;
- Inhalation;
- Plant uptake,
- Direct contact by buried structures;
- Leaching of soluble contamination into groundwater

7.3 RECEPTORS

Receptors are defined as people, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by contaminant(s).

- Human Health
  - Current users of the site;
  - Future users of the site;
  - Users of neighbouring sites;
  - Construction workers; and
  - Services personnel working in trenches.
  - Construction Materials
- Buried concrete, which may be affected by high concentrations of sulphate and/or low pH, in the soils and groundwater underlying the site; and
- Buried water pipes.
- Controlled Waters
- Ecological Receptors
- Flora and fauna using the proposed development

8.0 CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) is a hypothesis of the nature and sources of contamination, potential receptors that may be the recipient of contamination arising from those sources and any pathways that may exist. It creates a plausible source-pathway-receptor pollutant linkage (hazard), set within the context of the ground and proposed end use of the site.

8.1 PRELIMINARY CONCEPTUAL SITE MODEL

8.1.1 SOIL CONTAMINATION

Site is currently occupied by agricultural building .

Derelict barn. Previous use of barn (last use 1950's) Hayloft and stables, for horses and cattle. Work shop and shed last used 1995 for grain drying/ storage.

There is no evidence of contamination in the vicinity of the barn and the workshop is being retained the risk to the proposed use is low.

8.1.2 HAZARDOUS GROUND GAS AND VAPOURS

No significant sources of ground gas have been identified. Some minor potential sources ground gases (filled ponds) have been identified however given the small size of the sites the protection offered by modern building regulations compliant floor is likely to provide sufficient protection as outlined in CL:AIRE RB17 A Pragmatic Approach to Ground Gas Risk Assessment.

TABLE 1. SUMMARY OF SIGNIFICANT POLLUTION LINKAGES

Contaminant	Pathway	Receptor	Probability of Pollutant Linkage	Consequence	Risk	Possible Mitigation
Contaminated Soils	Direct Ingestion & Direct Contact	Site Workers	Ul	Md	L	Site workers to wear appropriate PPE for health and safety reasons
Contaminated Soils	Inhalation of Dust	Site Workers	Ul	Md	L	
Contaminated Soils	Direct Ingestion & Direct Contact	End Users	Ul	Md	L	
Contaminated Soils	Inhalation of Dust	End Users	Ul	Md	L	
Contaminated Soils	Direct Ingestion	Flora and Fauna	Ul	Md	L	
Contaminated Soils	Vertical and lateral migration	Controlled Waters	Ul	Md	L	
Contaminated Soils	Direct contact	Services	Ul	Md	L	
Ground Gases (Methane and CO_2)	Vertical and lateral migration	End Users & Building Envelope	Ul	Md	L	
Volatile and Semi-volatile Organic Compounds	Vertical and lateral migration	End Users & Building Envelope	Ul	Md	L	
Radon	Vertical and lateral migration	End Users & Building Envelope	Ul	Md	L	

KEY: Probability of pollutant linkage Hi = Highly likely, Li = Likely, Lw = Low Likelihood, Ul = Unlikely
Consequence Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor,
Overall Risk VH = Very High, H = High, M = Moderate, M/L = Moderate/Low, L = Low, VL = Very Low

Based on the preliminary CSM for the site, an environmental risk assessment has been undertaken. A simple matrix can provide a consistent basis for decision making. It should be used with caution, recognising the over-simplification that it will normally represent. The probability and consequences are defined according to parameters relevant to the situation; the boundaries of risk acceptability (and tolerability, where relevant) indicated on the matrix provided in Table 2, can be tailored to the factors influencing the significance of the risk. Individual situations are mapped onto the matrix to provide a ready and consistent indication of their acceptability or tolerability.

TABLE 2. RISK CLASSIFICATION MATRIX

		Consequence			
		Severe (Sv)	**Medium (Md)**	**Mild (Mi)**	**Minor (Mr)**
Probability	**High (Hi)**	Very high risk	High risk	Moderate Risk	Moderate/ Low Risk
	Likely (Li)	High risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood (Lw)	Moderate Risk	Moderate/ Low Risk	Low Risk	Very Low Risk
	Unlikely (Ul)	Moderate/ Low Risk	Low Risk	Very Low Risk	Very Low Risk

Source: CIRIA Report C552, Contaminated Land Risk Assessment. A Guide to Good Practice, 2001

These attributes are evaluated qualitatively against individual hazard assessments to determine the likelihood of a given hazard occurring. The risk evaluations for each plausible pollutant linkage are given in the last three columns of Table 1..

TABLE 3. CLASSIFICATION OF RISK

Very high risk (Vh)	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High risk (Hi)	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer term.
Moderate risk (Md)	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.
Low risk (Lw)	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very low risk (Vl)	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Source: CIRIA Report C552, Contaminated Land Risk Assessment. A Guide to Good Practice, 2001

9.0 PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

Based on the information contained in this report, it is the opinion of Castledine & Co that the site represents a Low risk with respect to the proposed development.

It is not envisaged that any further works will be required.

It is recommended that the Buildings on site should be subject to an asbestos survey and removal by appropriately qualified personal prior to any demolition or redevelopment occurring in order to ensure site works do not cause future contamination of the site.

This should be Discussed with the Local Planning Authority / Local council Contaminated Land Officer

10.0 FURTHER ENVIRONMENTAL INVESTIGATION

It is not envisaged that further testing will be required.

This should be Discussed with the Local Planning Authority / Local council Contaminated Land Officer

11.0 REMEDIAL ACTIONS AND VERIFICATION

It is not envisaged that any remediation will be required

A watching brief should be had during the course of demolition, site clearance and construction works for any obvious contamination (e.g. oil spillage in ground, buried waste, possible asbestos containing material) development should stop and Castledine & Co should be contact to determine if further assessment or changes to the remediation scheme are required.

12.0 REFERENCES

12.1 LEGISLATION AND REGULATIONS

12.1.1 ACTS

[1] Environmental Protection Act 1990, Part IIA: inserted by Environment Act 1995, Section 57. See Environment Act 1995 for text of Part IIA.

12.1.2 PLANNING REGULATIONS

[2] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 SI1999/No.293

[3] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) (Amendment) Regulations 2000 SI2000/No.2867

12.1.3 CONTAMINATED LAND REGULATIONS

[4] The Contaminated Land (England) Regulations 2000. SI2000/No.227

[5] The Contaminated Land (England) (Amendment) Regulations 2001 SI2001/No.663

[6] The Contaminated Land (England) Regulations 2006 SI2006/No.1380

12.2 STATUTORY GUIDANCE

[7] Department of Environment, Food and Rural Affairs. 2012. *Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance.* Department of Environment, Food and Rural Affairs

[8] Communities and local Government, 2012: National Planning Policy Framework.

12.3 BRITISH STANDARDS

[9] BS 5930:1999 Code of practice for site investigations

[10] BS 10175:2011+A1:2013 Investigation of potentially contaminated sites - Code of practice

[11] BS 8485:2015 bs 8485 - 2015 - Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings

[12] BS 8576:2013 Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs)

12.4 NON STATUTORY TECHNICAL GUIDANCE

12.4.1 ENVIRONMENT AGENCY

[13] Cassella Stranger, 2002. Model Procedures for the Management of Contaminated Land, Contaminated Land Report (CLR) 11, Department for Environment, Food, and Rural Affairs.

12.4.2 CIRIA PUBLICATIONS

[14] Wilson, S., Oliver, S., Mallett, H., Hutchings, H., and Card, G.. 2007, *C 665 Assessing risks posed by hazardous ground gases to buildings* London: Construction Industry Research and Information Association

[15] Mallett, H., Cox, L., Wilson, S. and ,Corban M... 2014, *C 735 Good practice on the testing and verification of protection systems for buildings against hazardous ground gases* London: Construction Industry Research and Information Association

12.4.3 CL:AIRE

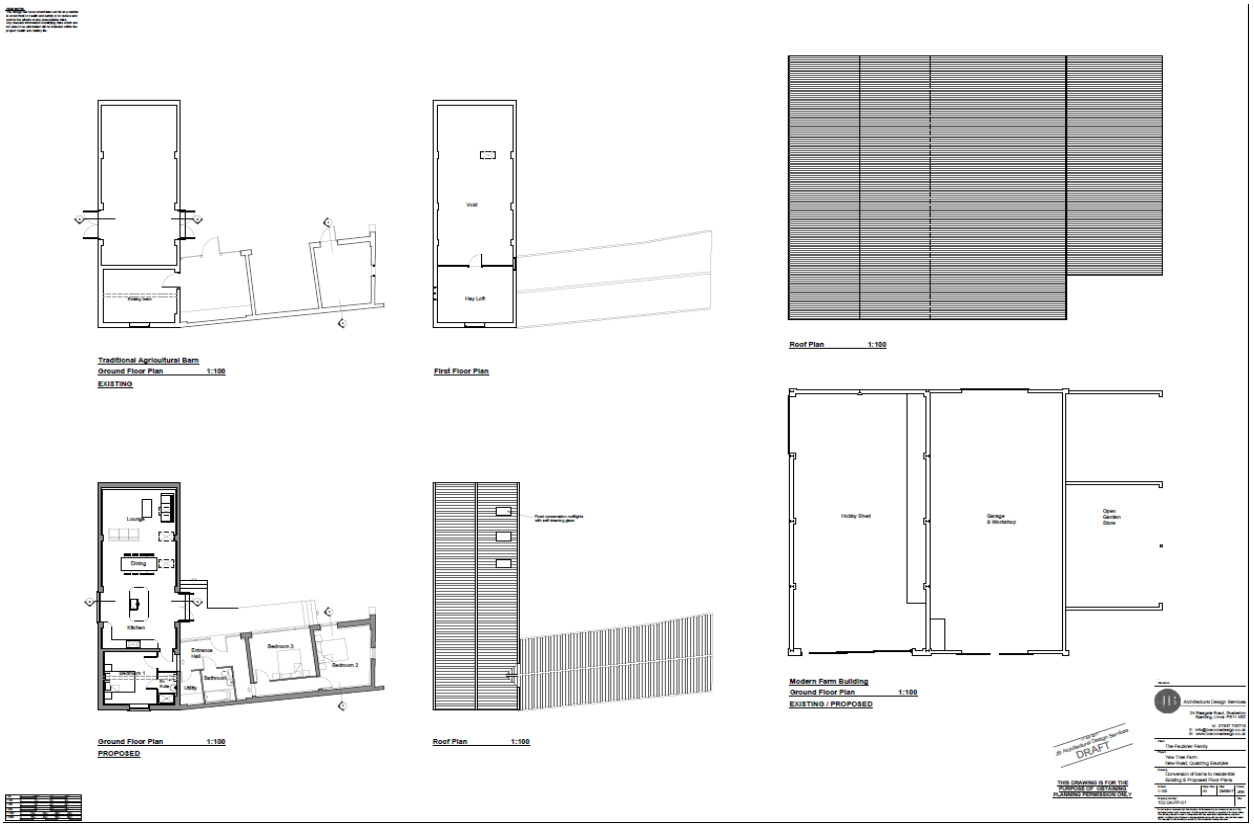
[16] Card G, Wilson S, Mortimer S. 2012. *A Pragmatic Approach to Ground Gas Risk Assessment. CL:AIRE Research Bulletin RB17*. CL:AIRE, London, UK. ISSN 2047- 6450 (Online)

13.0 APPENDICES

APPENDIX A ENVIRONMENTAL SEARCH

APPENDIX B PROPOSED AND CURRENT SITE PLANS


Proposed Hobby Shed
Hardstanding
Proposed Garage & Workshop
Proposed Residential Dwelling
Covered Store
Yew Tree Farm
New Road
Gravel Driveway
Existing Access
Proposed Block Plan 1:200
Location Plan 1:1250
Modern Farm Building
Traditional Agricultural Barn
Yew Tree Farm
New Road
Existing Block Plan 1:500
N
THIS DRAWING IS FOR THE PURPOSE OF OBTAINING PLANNING PERMISSION ONLY
Architectural Design Services
The Faulkner Family
Yew Tree Farm
New Road, Quadring Eaudyke
Conversion of barns to residential
Location & Block Plans


Traditional Agricultural Barn
Ground Floor Plan 1:100
EXISTING
First Floor Plan
Roof Plan 1:100
Ground Floor Plan 1:100
PROPOSED
Roof Plan 1:100
Modern Farm Building
Ground Floor Plan 1:100
EXISTING / PROPOSED
DRAFT
THIS DRAWING IS FOR THE PURPOSE OF OBTAINING PLANNING PERMISSION ONLY

APPENDIX C SITE PHOTOS AND LOCATIONS


2
Proposed Hobby Shed
Hardstanding
11
10
9
8
Proposed Garage & Workshop
Proposed Residential Dwelling
7
6
Covered Store
Yew Tree Farm
5
New Road
1
Gravel Driveway
4
3
Existing Access

1.



2.



3.



4.



5.



6.



7.



8.



9.



10. 

11. 

APPENDIX D SOIL SCREENING CRITERIA

S4ULS are copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3693. All rights reserved

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POSresi (1%SOM)	POSresi (2.5%SOM)	POSresi (6%SOM)	POSpark (1%SOM)	POSpark (2.5%SOM)	POSpark (6%SOM)
Default Suite																			
Arsenic	C4SL			40			37			49			640			79			170
Beryllium	S4UL			1.7			1.7			35			12			2.2			63
Boron	S4UL			290			11000			45			240000			21000			46000
Cadmium	C4SL			22			150			3.9			410			220			880
Chromium (III)	S4UL			910			910			18000			8600			1500			33000
Chromium (VI)	C4SL			21			21			170			49			21			250
Copper	S4UL			2400			7100			520			68000			12000			44000
Lead	C4SL			310			200			80			2330			630			1300
Mercury Elemental	S4UL			1.2			1.2			21			58 VAP (25.8)			16			30 VAP (25.8)
Mercury inorganic	S4UL			40			56			19			1100			120			240
Mercury methyl	S4UL			11			19			6			320			40			68
Nickel	S4UL			180			180			230			980			230			3400
Selenium	S4UL			250			430			88			12000			1100			1800
Vanadium	S4UL			410			1200			91			9000			2000			5000
Zinc	S4UL			3700			40000			620			730000			81000			170000
Phenol	S4UL	280	550	1100	750	1300	2300	66	140	280	760 DIR (31000)	1500 DIR (35000)	3200 DIR (37000)	760 DIR (11000)	1500 DIR (11000)	3200 DIR (11000)	760 DIR (8600)	1500 DIR (9700)	3200 DIR (11000)
Acenaphthene	S4UL	3000 SOL (57)	4700 SOL (141)	6000 SOL (336)	210	510	1100	34	85	200	84000 SOL (57.0)	97000 SOL (141)	100000	15000	15000	15000	29000	30000	30000
Acenaphthylene	S4UL	2900 SOL (86.1)	4600 SOL (212)	6000 SOL (506)	170	420	920	28	69	160	83000 SOL (86.1)	97000 SOL (212)	100000	15000	15000	15000	29000	30000	30000

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POSresi (1%SOM)	POSresi (2.5%SOM)	POSresi (6%SOM)	POSpark (1%SOM)	POSpark (2.5%SOM)	POSpark (6%SOM)
Anthracene	S4UL	31000 VAP (1.17)	35000	37000	2400	5400	11000	380	950	2200	520000	540000	540000	74000	74000	74000	150000	150000	150000
Benz(a)anthracene	S4UL	11	14	15	7.2	11	13	2.9	6.5	13	170	170	180	29	29	29	49	56	62
Benzo(a)pyrene	S4SL	3.2	3.2	3.2	2.2	2.7	3.0	0.97	2.0	3.5	35	35	36	5.7	5.7	5.7	11	12	13
Benzo(b)fluoranthene	S4UL	3.9	4.0	4.0	2.6	3.3	3.7	0.99	2.1	3.9	44	44	45	7.1	7.2	7.2	13	15	16
Benzo(ghi)perylene	S4UL	360	360	360	320	340	350	290	470	640	3900	4000	4000	640	640	640	1400	1500	1600
Benzo(k)fluoranthene	S4UL	110	110	110	77	93	100	37	75	130	1200	1200	1200	190	190	190	370	410	440
Chrysene	S4UL	30	31	32	15	22	27	4.1	9.4	19	350	350	350	57	57	57	93	110	120
Dibenz(ah)anthracene	S4UL	0.31	0.32	0.32	0.24	0.28	0.3	0.14	0.27	0.43	3.5	3.6	3.6	0.57	0.57	0.58	1.1	1.3	1.4
Fluoranthene	S4UL	1500	1600	1600	280	560	890	52	130	290	23000	23000	23000	3100	3100	3100	6300	6300	6400
Fluorene	S4UL	2800 SOL (30.9)	3800 SOL (76.5)	4500 SOL (183)	170	400	860	27	67	160	63000 SOL (30.9)	68000	71000	9900	9900	9900	20000	20000	20000
Indeno(123cd)pyrene	S4UL	45	46	46	27	36	41	9.5	21	39	500	510	510	82	82	82	150	170	180
Naphthalene	S4UL	2.3	5.6	13	2.3	5.6	13	4.1	10	24	190 SOL (76.4)	460 SOL (183)	1100 SOL (432)	4900	4900	4900	1200 SOL (76.4)	1900 SOL (183)	3000
Phenanthrene	S4UL	1300 SOL (36)	1500	1500	95	220	440	15	38	90	22000	22000	23000	3100	3100	3100	6200	6200	6300
Pyrene	S4UL	3700	3800	3800	620	1200	2000	110	270	620	54000	54000	54000	7400	7400	7400	15000	15000	15000
TPH fractions																			
TPH ali EC05-EC06	S4UL	42	78	160	42	78	160	730	1700	3900	3200 SOL (304)	5900 SOL (558)	12000 SOL (1150)	570000 SOL (304)	590000	600000	95000 SOL (304)	130000 SOL (558)	180000 SOL (1150)
TPH ali >EC06-EC08	S4UL	100	230	530	100	230	530	2300	5600	13000	7800 SOL (144)	17000 SOL (322)	40000 SOL (736)	600000	610000	620000	150000 SOL (144)	220000 SOL (322)	320000 SOL (736)
TPH ali >EC08-EC10	S4UL	27	65	150	27	65	150	320	770	1700	2000 SOL (78)	4800 VAP (190)	11000 VAP (451)	13000	13000	13000	14000 SOL (78)	18000 VAP (190)	21000 VAP (451)

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POSresi (1%SOM)	POSresi (2.5%SOM)	POSresi (6%SOM)	POSpark (1%SOM)	POSpark (2.5%SOM)	POSpark (6%SOM)
TPH ali >EC10-EC12	S4UL	130 VAP (48)	330 VAP (118)	770 VAP (283)	130 VAP (48)	330 VAP (118)	760 VAP (283)	2200	4400	7300	9700 SOL (48)	23000 VAP (118)	47000 VAP (283)	13000	13000	13000	21000 SOL (48)	23000 VAP (118)	24000 VAP (283)
TPH ali >EC12-EC16	S4UL	1100 SOL (24)	2400 SOL (59)	4400 SOL (142)	110 SOL (24)	2400 SOL (59)	4300 SOL (142)	11000	13000	13000	59000 SOL (24)	82000 SOL (59)	90000 SOL (142)	13000	13000	13000	25000 SOL (24)	25000 SOL (59)	26000 SOL (142)
TPH ali >EC16-EC35	S4UL	65000 SOL (8.48)	92000 SOL (21)	110000	65000 SOL (8.4)	92000 SOL (21)	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000
TPH ali >EC35-EC44	S4UL	65000 SOL (8.48)	92000 SOL (21)	110000	65000 SOL (8.48)	92000 SOL (21)	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000
TPH aro EC05-EC07	S4UL	370	690	1400	70	140	300	13	27	57	26000 SOL (1220)	46000 SOL (2260)	86000 SOL (4710)	56000	56000	56000	76000 SOL (1220)	84000 SOL (2260)	92000 SOL (4710)
TPH aro >EC07-EC08	S4UL	860	1800	3900	130	290	660	22	51	120	56000 VAP (869)	110000 SOL (1920)	180000 VAP (4360)	56000	56000	56000	87000 VAP (869)	95000 SOL (1920)	100000 VAP (4360)
TPH aro >EC08-EC10	S4UL	47	110	270	34	83	190	8.6	21	51	3500 VAP (613)	8100 VAP (1500)	17000 VAP (3580)	5000	5000	5000	7200 VAP (613)	8500 VAP (1500)	9300 VAP (3580)
TPH aro >EC10-EC12	S4UL	250	590	1200	74	180	380	13	31	74	16000 SOL (364)	28000 SOL (899)	34000 SOL (2150)	5000	5000	5000	9200 SOL (364)	9700 SOL (899)	10000
TPH aro >EC12-EC16	S4UL	1800	2300 SOL (419)	2500	140	330	660	23	57	130	36000 SOL (169)	37000	38000	5100	5100	5000	10000	10000	10000
TPH aro >EC16-EC21	S4UL	1900	1900	1900	260	540	930	46	110	260	28000	28000	28000	3800	3800	3800	7600	7700	7800
TPH aro >EC21-EC35	S4UL	1900	1900	1900	1100	1500	1700	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900
TPH aro >EC35-EC44	S4UL	1900	1900	1900	1100	1500	1700	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900
TPH >EC44-EC70	S4UL	1900	1900	1900	1600	1800	1900	1200	2100	3000	28000	28000	28000	3800	3800	3800	7800	7800	7900
VOCs - BTEX & MTBE																			
Benzene	C4SL			0.87			3.3			0.18			98			140			230

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POSresi (1%SOM)	POSresi (2.5%SOM)	POSresi (6%SOM)	POSpark (1%SOM)	POSpark (2.5%SOM)	POSpark (6%SOM)
Toluene	S4UL	880 VAP (869)	1900	3900	130	290	660	22	51	120	56000 VAP (869)	110000 VAP (1920)	180000 VAP (4360)	56000	56000	56000	100000 VAP (869)	100000 VAP (192)	100000 VAP (4360)
Ethylbenzene	S4UL	83	190	440	47	110	260	16	39	91	570 VAP (518)	13000 VAP (1220)	27000 VAP (2840)	24000	24000	25000	17000 VAP (518)	22000 VAP (1220)	27000 VAP (2840)
Xylene, o-	S4UL	88	210	480	60	140	330	28	67	160	6600 VAP (478)	15000 SOL (1120)	33000 SOL (2620)	41000	42000	43000	17000 SOL (478)	24000 SOL (1120)	33000 SOL (2620)
Xylene, m-	S4UL	82	190	450	59	140	320	31	74	170	6200 VAP (625)	14000 VAP (1470)	31000 VAP (3460)	41000	42000	43000	17000 VAP (625)	24000 VAP (1470)	32000 VAP (3460)
Xylene, p- (use this for combined m & p)	S4UL	79	180	430	59	130	310	29	69	160	5900 SOL (576)	14000 SOL (1350)	30000 SOL (3170)	41000	42000	43000	17000 SOL (576)	23000 SOL (2620)	31000 SOL (3170)
VOCs – chlorobenzenes																			
Chlorobenzene	S4UL	0.46	1	2.4	0.46	1	2.4	5.9	14	32	56	130	290	11000	13000	14000	1300 SOL (675)	2000 SOL (1520)	2900
1,2-Dichlorobenzene	S4UL	24	57	130	23	55	130	94	230	540	2000 SOL (571)	4800 SOL (1370)	11000 SOL (3240)	90000	95000	98000	24000 SOL (571)	36000 SOL (1370)	51000 SOL (3240
1,3-Dichlorobenzene	S4UL	0.44	1.1	2.5	0.4	1	2.3	0.25	0.6	1.5	30	73	170	300	300	300	390	440	470
1,4-Dichlorobenzene	S4UL	61	150	350	61	150	350	15	37	88	4400 VAP (224)	10000 VAP (540)	2500 VAP (1280)	17000	17000	17000	36000 VAP (224)	36000 VAP (540)	36000 VAP (1280)
Hexachlorobenzene	S4UL	4.1 VAP (0.2)	5.7 VAP (0.5)	6.7 VAP (1.2)	1.8 VAP (0.2)	3.3 VAP (0.5)	4.9	0.47	1.1	2.5	110 VAP (0.2)	120	120	16	16	16	30	30	30
Pentachlorobenzene	S4UL	19	30	38	5.8	12	22	1.2	3.1	7	640 SOL (43)	770 SOL (107)	830	100	100	100	190	190	190
1,2,3-trichlorobenzene	S4UL	1.5	3.7	8.8	1.5	3.6	8.6	4.7	12	28	102	250	590	1800	1800	1800	770 VAP (134)	1100 VAP (330)	1600 VAP (789)
1,2,4-trichlorobenzene	S4UL	2.6	6.4	15	2.6	6.4	15	55	140	320	220	530	1300	15000	17000	19000	1700 VAP (318)	2600 VAP (786)	4000 VAP (1880)

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POSresi (1%SOM)	POSresi (2.5%SOM)	POSresi (6%SOM)	POSpark (1%SOM)	POSpark (2.5%SOM)	POSpark (6%SOM)
1,3,5-trichlorobenzene	S4UL	0.33	0.81	1.9	0.33	0.81	1.9	4.7	12	28	23	55	130	1700	1700	1800	380 VAP (36.7)	580 VAP (90.8)	860 VAP (217)
1,2,3,4-tetrachlorobenzene	S4UL	24	56	120	15	36	78	4.4	11	26	1700 VAP (122)	3080 VAP (304)	4400 VAP (728)	830	830	830	1500 VAP (122)	1600	1600
1,2,3,5-tetrachlorobenzene	S4UL	0.75	1.9	4.3	0.66	1.6	3.7	0.38	0.90	2.2	49 VAP (39.4)	120 VAP (98.1)	240 VAP (235)	78	79	79	110 VAP (39)	120	130
1,2,4,5-tetrachlorobenzene	S4UL	0.73	1.7	3.5	0.33	0.77	1.6	0.06	0.16	0.37	42 SOL (19.7)	72 SOL (49.1)	96	13	13	13	25	26	26
VOCs - chloroalkanes & alkanes																			
Chloroethene (aka vinyl chloride)	S4UL	0.00077	0.0010	0.0015	0.00064	0.00087	0.0014	0.00055	0.0010	0.0018	0.059	0.077	0.12	3.5	3.5	3.5	4.8	5	5.4
1,2-Dichloroethane	S4UL	0.0092	0.013	0.023	0.0071	0.011	0.019	0.0046	0.0083	0.016	0.67	0.97	1.7	29	29	29	21	24	28
Tetrachloroethene	S4UL	0.18	0.4	0.92	0.18	0.39	0.9	0.65	1.5	3.6	19	42	95	1400	1400	1400	810 SOL (424)	1100 SOL (951)	1500
1,1,1,2-Tetrachloroethane	S4UL	1.5	3.5	8.2	1.2	2.8	6.4	0.79	1.9	4.4	110	250	560	1400	1400	1400	1500	1800	2100
1,1,2,2-Tetrachloroethane	S4UL	3.9	8	17	1.6	3.4	7.5	0.41	0.89	2.0	270	550	1100	1400	1400	1400	1800	2100	2300
Tetrachloromethane	S4UL	0.026	0.056	0.13	0.026	0.056	0.13	0.45	1	2.4	2.9	6.3	14	890	920	950	190	270	400
Trichloroethene	S4UL	0.017	0.036	0.080	0.016	0.034	0.075	0.041	0.091	0.21	1.2	2.6	5.7	120	120	120	70	91	120
1,1,1-Trichloroethane	S4UL	9	18	40	8.8	18	39	48	110	240	660	1300	3000	140000	140000	140000	57000 VAP (1425)	76000 VAP (2915)	100000 VAP (6392)
Trichloromethane	S4UL	1.2	2.1	4.2	0.91	1.7	3.4	0.42	0.83	1.7	99	170	350	2500	2500	2500	2600	2800	3100
Other phenols & chlorophenols																			
Chlorophenols	S4UL	0.87	2	4.5	94	150	210	0.13	0.3	0.7	3500	4000	4300	620	620	620	1100	1100	1100
Pentachlorophenol	S4UL	27 VAP (16.4)	29	31	0.22	0.52	1.2	0.03	0.08	0.19	400	400	400	60	60	60	110	120	120
Pesticides																			
Aldrin	S4UL	7.3	7.4	7.5	5.7	6.6	7.1	3.2	6.1	9.6	170	170	170	18	18	18	30	31	31

Contaminant	Source of GAC	Human Health Generic Assessment Criteria (mg/kg)																	
		residential without plant uptake (1%SOM)	residential without plant uptake (2.5%SOM)	residential without plant uptake (6%SOM)	residential with plant uptake (1%SOM)	residential with plant uptake (2.5%SOM)	residential with plant uptake (6%SOM)	allotments (1%SOM)	allotments (2.5%SOM)	allotments (6%SOM)	commercial (1%SOM)	commercial (2.5%SOM)	commercial (6%SOM)	POSresi (1%SOM)	POSresi (2.5%SOM)	POSresi (6%SOM)	POSpark (1%SOM)	POSpark (2.5%SOM)	POSpark (6%SOM)
Atrazine	S4UL	610	620	620	3.3	7.6	17.4	0.5	1.2	2.7	9300	9400	9400	1200	1200	1200	2300	2400	2400
Dichlovos	S4UL	6.4	6.5	6.6	0.032	0.066	0.14	0.0049	0.010	0.022	140	140	140	16	16	16	26	26	27
Dieldrin	S4UL	7	7.3	7.4	0.97	2	3.5	0.17	0.41	0.96	170	170	170	18	18	18	30	30	31
Endosulfan - alpha	S4UL	160 VAP (0.003)	280 VAP (0.007)	410 VAP (0.016)	7.4	18	41	1.2	2.9	6.8	5600 VAP (0.003)	7400 VAP (0.007)	8400 VAP (0.016)	1200	1200	1200	2400	2400	2500
Endosulfan - beta	S4UL	190 VAP (0.00007)	320 VAP (0.0002)	440 VAP (0.0004)	7	17	39	1.1	2.7	6.4	6300 VAP (0.00007)	7800 VAP (0.0002)	8700	1200	1200	1200	2400	2400	2500
Hexachlorocyclohexanes - alpha (inc. Lindane)	S4UL	6.9	9.2	11	0.23	0.55	1.2	0.035	0.087	0.21	170	180	180	24	24	24	47	48	48
Hexachlorocyclohexanes - beta (inc. Lindane)	S4UL	3.7	3.8	3.8	0.085	0.2	0.46	0.013	0.032	0.077	65	65	65	8.1	8.1	8.1	15	15	16
Hexachlorocyclohexanes - gamma (inc. Lindane)	S4UL	2.9	3.3	3.5	0.06	0.14	0.33	0.0092	0.023	0.054	67	69	70	8.2	8.2	8.2	14	15	15
Explosives																			
HMX	S4UL	6700	6700	6700	5.7	13	26	0.86	1.9	3.9	110000	110000	110000	13000	13000	13000	23000 VAP (0.35)	23000 VAP (0.39)	24000 VAP (0.48)
RDX	S4UL	13000	13000	13000	120	250	540	17	38	85	210000	210000	210000	26000	26000	27000	49000 SOL (18.7)	51000	53000
2,4,6-Trinitrotoluene	S4UL	65	66	66	1.6	3.7	8.1	0.24	0.58	1.4	1000	1000	1000	130	130	130	260	270	270
Other organics																			
Carbon disulphide	S4UL	0.14	0.29	0.62	0.14	0.29	0.62	4.8	10	23	11	22	47	11000	11000	12000	1300	1900	2700
Hexachloro-1,3-butadiene	S4UL	0.29	0.7	1.6	0.32	0.78	1.8	0.25	0.61	1.4	31	66	120	25	25	25	48	50	51

VAP S4UL exceeds vapour saturation limit (presented in brackets)
SOL S4UL exceeds solubility saturation limit (presented in brackets)
DIR S4UL based on threshold protective of direct skin contact (value in brackets based on health effects of long term exposure)