

**Phase 1 Land Contamination
Risk Assessment**

for

**Demolition of current building
and erection of residential
Dwellings**

on the site of

**Hardy and Hanson Site, Summit
Works. Longlands Road,
Dewsbury. WF13 4AB**

Date: December 2015

Status:

Final Report

Reference:

01091 Haworth - Dewsbury

Date:

17/12/2015

EXECUTIVE SUMMARY

The site is currently an over grown plot with a commercial building, the site and the surrounding land have a long history of commercial use

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

It is recommended that further investigation in line with section 10.0 is undertaken in order to further clarify the potential risks.

CONTENTS

<u>1.0</u>	<u>QUALITY ASSURANCE</u>	<u>1</u>
<u>2.0</u>	<u>LIMITATIONS</u>	<u>1</u>
<u>3.0</u>	<u>INTRODUCTION</u>	<u>2</u>
<u>4.0</u>	<u>SCOPE</u>	<u>2</u>
<u>5.0</u>	<u>SITE DESCRIPTION</u>	<u>3</u>
<u>6.0</u>	<u>REGULATORY AUTHORITY AND OTHER ENVIRONMENTAL DATA</u>	<u>3</u>
6.1	HYDROLOGICAL	3
6.1.1	AQUIFER	3
6.1.2	ABSTRACTIONS AND PRIVATE WATER SUPPLIES	4
6.1.3	SOURCE PROTECTION ZONE	4
6.1.4	GROUNDWATER VULNERABILITY AND SOIL LEACHING POTENTIAL	4
6.1.5	POTENTIAL SURFACE WATER	4
6.1.6	DISCHARGE CONSENTS	4
6.2	PERMITTED PROCESSES	4
6.3	POLLUTION INCIDENTS	5
6.4	RADIOACTIVE SUBSTANCES REGISTRATIONS	5
6.5	WASTE	5
6.5.1	LICENSED WASTE MANAGEMENT FACILITIES (LOCATIONS)	5
6.5.2	REGISTERED LANDFILL SITES	5
6.5.3	REGISTERED WASTE TREATMENT OR DISPOSAL SITES	5
6.6	HAZARDOUS SUBSTANCES	5
6.7	ECOLOGICAL RECEPTORS	5
6.8	SOILS AND GEOLOGY	5
6.8.1	SUPERFICIAL DEPOSITS	6
6.8.2	BEDROCK	6
6.8.3	COAL MINING	6
6.8.4	NON-COAL MINING	6
6.8.5	RADON	6
6.9	AERIAL PHOTOGRAPHY	6
6.9.1	BING	6
6.9.2	GOOGLE MAPS	6
6.9.3	GOOGLE EARTH	7
6.9.4	MAPBOX	7
6.9.5	ENVIRONMENTAL SEARCH	7
6.10	GOOGLE STREET VIEW	8
6.10.1	MILLBROOK GARDENS	8
6.10.2	ONGLANDS ROAD	8
6.11	HISTORIC MAPPING	9

6.12	CURRENT LAND USE DATA	10
6.13	PETROL AND FUEL SITES	10
6.14	HISTORICAL PETROL AND FUEL SITE DATABASE	11
6.15	POTENTIAL CONTAMINATIVE LAND USES IDENTIFIED ON MAPPING	11
6.16	HISTORICAL TANK DATABASE	12
6.17	HISTORICAL ENERGY FACILITIES	12
6.18	HISTORICAL GARAGE AND MOTOR VEHICLE REPAIR DATABASE	13
6.19	POTENTIALLY INFILLED LAND	14
6.20	PLANNING HISTORY	15
<u>7.0</u>	<u>POLLUTANT LINKAGE ASSESSMENT</u>	<u>18</u>
7.1	SOURCES	18
	7.1.1 ONSITE	18
	7.1.2 OFFSITE	18
7.2	PATHWAYS	19
7.3	RECEPTORS	19
<u>8.0</u>	<u>CONCEPTUAL SITE MODEL</u>	<u>20</u>
8.1	PRELIMINARY CONCEPTUAL SITE MODEL	20
<u>9.0</u>	<u>PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT</u>	<u>24</u>
<u>10.0</u>	<u>FURTHER ENVIRONMENTAL INVESTIGATION</u>	<u>25</u>
<u>11.0</u>	<u>POTENTIAL REMEDIAL ACTIONS AND VERIFICATION</u>	<u>25</u>
<u>12.0</u>	<u>REFERENCES</u>	<u>27</u>
12.1	LEGISLATION AND REGULATIONS	27
	12.1.1 ACTS	27
	12.1.2 PLANNING REGULATIONS	27
	12.1.3 CONTAMINATED LAND REGULATIONS	27
12.2	STATUTORY GUIDANCE	27
12.3	BRITISH STANDARDS	28
12.4	NON STATUTORY TECHNICAL GUIDANCE	28
	12.4.1 ENVIRONMENT AGENCY	28
	12.4.2 CIRIA PUBLICATIONS	28
	12.4.3 CL:AIRE	28
<u>13.0</u>	<u>APPENDICES</u>	<u>29</u>

LIST OF APPENDICES

APPENDIX A	ENVIRONMENTAL SEARCH	30
APPENDIX B	PROPOSED AND CURRENT SITE PLANS	31
APPENDIX C	SITE PHOTOS AND LOCATIONS	32
APPENDIX D	SOIL SCREENING CRITERIA	40
APPENDIX E	COAL AUTHORITY REPORT	49

LIST OF TABLES

TABLE 1.	SUMMARY OF SIGNIFICANT POLLUTION LINKAGES	21
TABLE 2.	RISK CLASSIFICATION MATRIX	23
TABLE 3.	CLASSIFICATION OF RISK	24

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 Whitby & Chandler Ltd to undertake a Phase 1 Desk study on Hardy and Hanson Site, Summit Works. Longlands Road, Dewsbury. WF13 4AB

4.0 SCOPE

Castledine & Co. have prepared this report for the sole use and reliance of Whitby & Chandler Ltd and their appointees for the purpose of ensuring compliance with:

- paragraphs 120 and 121 of the NPPF,
- part C1 of the building regulations.

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 situated in the Dewsbury at National Grid 423393,422964 and is approximately 0.22ha in area.

The site is currently a commercial site occupied by several buildings of varying construction (block, brick and concrete sectional) with what appears to be potentially asbestos containing roofing.

Whole building has concrete floors, unstained.

Adhesive store shown in pic 10.

Area to north (pic 7) and east (pic 5) rough grass showing good growth.

Grass at back (5) is elevated about a meter above yard level.

Factory accepts sheets of textile felt, cuts and packs.

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**

No records available

6.1.1.2 BEDROCK GEOLOGY

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

6.1.2 ABSTRACTIONS AND PRIVATE WATER SUPPLIES

None within 250m

6.1.3 SOURCE PROTECTION ZONE

Not in a source protection source

6.1.4 GROUNDWATER VULNERABILITY AND SOIL LEACHING POTENTIAL

Minor Aquifer/High Leaching Potential HU Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.1.5 POTENTIAL SURFACE WATER

There is a pond 20m to the south

6.1.6 DISCHARGE CONSENTS

None within 250m

6.2 PERMITTED PROCESSES

None within 250m

6.3 POLLUTION INCIDENTS

ID	Distance (m)	Direction	NGR	Description
1	49	SW	423350 422889	Incident Date: 27-Sep-2001 Incident Identification: 33264 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

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 REGISTERED LANDFILL SITES

None within 250m

6.5.3 REGISTERED WASTE TREATMENT OR DISPOSAL 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 2015" obtained from <http://www.bgs.ac.uk/data/mapViewers/home.html> under the [Open Government Licence](#)

6.8.1 SUPERFICIAL DEPOSITS

None recorded onsite

6.8.2 BEDROCK

Birstall Rock - Sandstone. Sedimentary Bedrock formed approximately 312 to 313 million years ago in the Carboniferous Period. Local environment previously dominated by rivers.

6.8.3 COAL MINING

Property is in a coal mining area. A coal report is attached as Appendix E.

A seam of coal at a depth of 240m below the site was last worked in 1883. There are no mine entries or shafts within 20m of the site.

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 occupied by a large commercial building. There is hard standing to the south west of the building to the boundary. North of the building is obscured by trees. The site is surrounded by housing.

6.9.2 GOOGLE MAPS

Site is occupied by a large commercial building. There is hard standing to the south west of the building to the boundary, 4 cars are parked there.

North of the building is law and deciduous trees.

2 shipping containers are present on site.

What appears to be a pile of pallets is present in the North west of the site. The site is surrounded by housing.

6.9.3 GOOGLE EARTH

3 images are held in the historic imagery dataset. Dates are in the format year / month / date

6.9.3.1 2002/??/??

Site is occupied by a large commercial building. There is hard standing to the south west of the building to the boundary. North of the building is obscured by trees. The site is surrounded by housing.

6.9.3.2 2009/05/30

Site is occupied by a large commercial building. There is hard standing to the south west of the building to the boundary, 4 cars are parked there. North of the building is obscured by trees. 2 shipping containers are present on site. What appears to be a pile of pallets is present in the North west of the site. The site is surrounded by housing.

6.9.3.3 2011/09/28

Site is occupied by a large commercial building. There is hard standing to the south west of the building to the boundary, 4 cars are parked there. North of the building is law and deciduous trees. 2 shipping containers are present on site. What appears to be a pile of pallets is present in the North west of the site. The site is surrounded by housing.

6.9.4 MAPBOX

Site is occupied by a large commercial building. There is hard standing to the south west of the building to the boundary, 4 cars are parked there. North of the building is obscured by trees. 2 shipping containers are present on site. What appears to be a pile of pallets is present in the North west of the site. The site is surrounded by housing.

6.9.5 ENVIRONMENTAL SEARCH

Image taken 2012/03/26

Site is occupied by a large commercial building. There is hard standing to the south west of the building to the boundary, 5 cars are parked onsite. North of the building is law and deciduous trees. 2 shipping containers are present on site. What appears to be a pile of pallets is present in the North west of the site. The site is surrounded by housing.

6.10 GOOGLE STREET VIEW

6.10.1 MILLBROOK GARDENS

6.10.1.1 2009/08

A yellow skip can be seen onsite

2 Green shipping containers are visible onsite. 1 to the north of the building is open cannot determine contents

Building roofs appear to be potentially asbestos containing material

Trees and vegetation on site all appear healthy

Buildings are a mix of block, brick and concrete sectional construction.

6.10.1.2 2012/10

2 blue shipping containers are visible

1 of the green shipping containers is visible other appears to have been removed

A pile of pallets is present

6.10.1.3 2014/09

1 blue and 2 green shipping containers are present on site

A lot of vegetation along the western site boundary appears to have been removed/cut back

6.10.2 LONGLANDS ROAD

6.10.2.1 2011/05

North end of site appears lower than road. banked up to the north of the buildings

2 green shipping containers are present on site

6.10.2.2 2012/10

2 green and 2 blue shipping containers are visible on site

6.10.2.3 2014/09

2 green and 2 blue shipping containers are visible on site

6.10.2.4 2015/05

2 green and at least 1 blue shipping containers are visible onsite

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 YORKSHIRE 1854- 1855 1:10560	Site is part of a larger field	Major road to north is labelled Wakefield and Halifax Trust A quarry is shown to the east
OS County Series YORKSHIRE 1894- 1895 1:10560	Site is an empty field	Land to the west is occupied by buildings labelled Mills Pond is present to the south Quarry to the east is no longer shown and is occupied by buildings
OS County Series YORKSHIRE 1894 1:2500	Site is outlined by trees	Land to the north west is labelled as timber yard Building to the west are labelled as Staincliffe Low Mills (woollen) Buildings to the north west (beyond timber yard) are labelled as Providence Mills (Cotton) Major road to the north is labelled as Halifax Road
OS County Series YORKSHIRE 1907 1:2500	Site is no longer outlined by trees. Banking is shown along the western and southern site boundaries	Major road to the North (Halifax Road) is labelled as a tramway
OS County Series YORKSHIRE 1908 1:10560	No discernable change	No discernable change
OS County Series YORKSHIRE 1922 1:2500	No discernable change	Tanks are labelled to the west of the site Pond to the south is labelled as reservoir
OS County Series YORKSHIRE 1938 1:10560	No discernable change	No discernable change
OS County Series YORKSHIRE 1938 1:2500	No discernable change	No discernable change
OS Plan 1955-1957 1:10560	No discernable change	No discernable change
OS Plan 1955 1:1250	Site is labelled as "Summit Works (felt)"	No discernable change
OS Plan 1956 1:2500	No discernable change	No discernable change

Map	Onsite	Offsite
OS Plan 1961-1969 1:1250	No discernable change	No discernable change
OS Plan (partial) 1967 1:10560	No discernable change	No discernable change
OS Plan (partial) 1971 1:2500	No discernable change	No discernable change
OS Plan 1972-1974 1:10000	No discernable change	No discernable change
OS Plan 1982-1983 1:10000	No discernable change	No discernable change
OS Plan 1989-1993 1:10000	No discernable change	No discernable change
OS Plan (partial) 1989 1:1250	Site is labelled as works	Reservoir to the south is now labelled water and has reduced in size

6.12 CURRENT LAND USE DATA

ID	Distance (m)	Direction	Company	Activity	Category
1	0	On Site	Works	Unspecified Works Or Factories	Industrial Features
2	207	W	Dewsbury and District Hospital	Accident and Emergency Hospitals	Health Practitioners and Establishments
3	212	NW	Heckmondwike Service Station	Petrol and Fuel Stations	Road and Rail
4a	215	NE	A P M Luxury Mini Coaches	Vehicle Hire and Rental	Hire Services
5	232	SW	Electricity Sub Station	Electrical Features	Infrastructure and Facilities
6	245	N	Electricity Sub Station	Electrical Features	Infrastructure and Facilities
7	246	NW	Gas Governor Station	Gas Features	Infrastructure and Facilities

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

ID	Distance [m]	Direction	Use	Date
1A	0	On Site	Unspecified Mills	1948
2A	0	On Site	Unspecified Mills	1905
3	0	On Site	Unspecified Mills	1931
4A	0	On Site	Unspecified Mills	1931
5B	0	On Site	Unspecified Mills	1955
6B	0	On Site	Unspecified Mill	1981
7B	0	On Site	Unspecified Mill	1988
8	7	SW	Unspecified Mills	1892
9C	60	SW	Hospital	1955
10C	60	SW	Hospital	1974
11C	60	SW	Hospital	1967
12	60	SW	Hospital	1988
13	60	SW	Hospital	1981
14D	63	SW	Infirmity	1931
15D	65	SW	Unspecified Workhouse	1905
16AM	78	SE	Refuse Heap	1967
17	87	W	Unspecified Workhouse	1892
18E	95	SW	Infirmity	1955
19E	95	SW	Infirmity	1948
20E	97	SW	Infirmity	1931
21E	98	SW	Infirmity	1948
22F	113	W	Unspecified Mills	1905
23F	113	W	Unspecified Mill	1948
24F	114	W	Unspecified Mill	1931
25F	114	W	Unspecified Mill	1948
26F	115	W	Unspecified Mill	1967
27F	115	W	Unspecified Commercial/Industrial	1981
28F	115	W	Unspecified Commercial/Industrial	1974
29F	115	W	Unspecified Mill	1955

ID	Distance [m]	Direction	Use	Date
30F	115	W	Unspecified Mill	1931
31AN	117	E	Unspecified Quarry	1892
32F	120	W	Unspecified Mills	1892
29F	115	W	Unspecified Mill	1955
30F	115	W	Unspecified Mill	1931
31AN	117	E	Unspecified Quarry	1892
32F	120	W	Unspecified Mills	1892
33AP	208	S	Unspecified Ground Workings	1948
34G	227	E	Unspecified Quarry	1892
35AQ	239	SW	Refuse Heap	1892
36AR	240	SW	Refuse Heap	1905
37G	250	E	Unspecified Ground Workings	1974

6.16 HISTORICAL TANK DATABASE

ID	Distance(m)	Direction	Use	Date
130V	12	W	Tanks	1933
131V	12	W	Tanks	1922
132V	12	W	Tanks	1938
133W	103	W	Unspecified Tank	1922
134W	103	W	Unspecified Tank	1938
135W	103	W	Unspecified Tank	1933

6.17 HISTORICAL ENERGY FACILITIES

ID	Distance (m)	Direction	Use	Date
154AB	31	N	Electricity Substation	1993
155AB	31	NW	Electricity Substation	1981
156AB	31	NW	Electricity Substation	1989
157AB	31	NW	Electricity Substation	1985
158AB	31	NW	Electricity Substation	1989
159AB	37	NW	Electricity Substation	1968
160AB	37	NW	Electricity Substation	1955

ID	Distance (m)	Direction	Use	Date
161AB	37	NW	Electricity Substation	1955
162AC	226	SW	Electricity Substation	1988
163AC	226	SW	Electricity Substation	1955
164AC	226	SW	Electricity Substation	1968
165AC	227	SW	Electricity Substation	1969
166AC	228	SW	Electricity Substation	1955
167AD	228	NW	Electricity Substation	1955
168AD	228	NW	Electricity Substation	1968
169AD	228	NW	Electricity Substation	1955
170AC	232	SW	Electricity Substation	1996
171AC	232	SW	Electricity Substation	1999
172AD	236	NW	Electricity Substation	1993
173AD	236	NW	Electricity Substation	1996
174AD	236	NW	Electricity Substation	1999
175AD	237	NW	Electricity Substation	1985
176AD	237	NW	Electricity Substation	1981
177AD	237	NW	Electricity Substation	1989
178AD	237	NW	Electricity Substation	1989
179	249	NW	Gas Governor	1999

6.18 HISTORICAL GARAGE AND MOTOR VEHICLE REPAIR DATABASE

ID	Distance (m)	Direction	Use	Date
202AI	153	NW	Garage	1955
203AI	153	NW	Garage	1955
204AJ	180	NW	Garage	1981
205AJ	180	NW	Garage	1985
206AJ	180	NW	Garage	1989
207AJ	180	NW	Garage	1989
208AJ	180	NW	Garage	1999
209AJ	180	NW	Garage	1996
210AJ	180	NW	Garage	1993
211AJ	192	NW	Garage	1968

6.19 POTENTIALLY INFILLED LAND

ID	Distance (m)	Direction	Use	Date
225AL	8	SW	Pond	1981
226AL	8	SW	Reservoir	1974
227AL	8	SW	Pond	1967
228AL	9	SW	Reservoir	1955
229AL	11	SW	Reservoir	1931
230AL	12	SW	Pond	1988
231AL	13	SW	Reservoirs	1948
232AL	13	SW	Pond	1905
233AM	78	SE	Refuse Heap	1967
234AN	117	E	Unspecified Quarry	1892
235AO	122	W	Reservoirs	1948
236AO	122	W	Ponds	1905
237AO	123	W	Reservoirs	1931
238AO	124	W	Reservoir	1981
239AO	124	W	Reservoir	1974
240AO	124	W	Reservoir	1967
241AO	126	W	Reservoirs	1955
242AO	127	W	Ponds	1892
243AP	208	S	Unspecified Ground Workings	1948
244G	227	E	Unspecified Quarry	1892
245AQ	239	SW	Refuse Heap	1892
246AR	240	SW	Refuse Heap	1905

6.20 PLANNING HISTORY

This information is taken from the Kirklees council planning website

http://www.kirklees.gov.uk/business/planning/application_search/default.aspx. As no mapping search was available on the website a simple address search of the surrounding addresses was conducted..

Reference	Address	Proposal	Hyperlink
2015/91219	27, Longlands Road, Dewsbury, WF13 4AB	Works to TPO(s) 26/78	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2015/91219
2014/93200	29, Longlands Road, Dewsbury, WF13 4AB	Works to TPO(s) 26/78	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2014/93200
2014/92839	29, Longlands Road, Dewsbury, WF13 4AB	Works to TPO(s) 26/78	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2014/92839
2014/90687	43, Longlands Road, Dewsbury, WF13 4AB	Works to TPO(s) 26/78	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2014/90687
2012/91753	Brooklyn House, 11, Longlands Road, Dewsbury, WF13 4AB	Erection of orangery extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2012/91753
2010/93522	9B, Halifax Road, Dewsbury, WF13 4AB	Erection of extension and alterations to create two additional flats	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2010/93522
2009/91187	37, Longlands Road, Dewsbury, WF13 4AB	Demolition of garage and erection of 2 storey extension providing garage, reception room, 2 bedrooms and bathroom	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2009/91187
2006/91230	47 Longlands Road, Staincliffe, Dewsbury, WF13 4AB	Erection of two storey, first floor and single storey extensions	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2006/91230
2004/95192	47 Longlands Road, Staincliffe, Dewsbury, WF13 4AB.	Outline application for erection of one dwelling	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2004/95192
2000/93115	40, Halifax Road, Dewsbury, WF13 4AB.	Erection of first floor extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2000/93115

Reference	Address	Proposal	Hyperlink
2014/92175	68, Millbrook Gardens, Dewsbury, WF13 4SF	Erection of 2 storey side extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2014/92175
2014/91072	88, Millbrook Gardens, Dewsbury, WF13 4SF	Erection of extensions	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2014/91072
2014/91058	88 Millbrook Gardens, Dewsbury, WF13 4SF	The proposal is for erection of single storey rear extension. The extension projects 6m beyond the rear wall of the original dwellinghouse. The maximum height of the extension is 4m, the height of the eaves is 2.4m	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2014/91058
2013/91633	25, Millbrook Gardens, Batley, WF13 4SF	Works to TPO(s) 52/92	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2013/91633
2012/93861	21, Millbrook Gardens, Dewsbury, WF13 4SF	Works to TPO(s) 52/92	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2012/93861
2012/91266	20, Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF	Erection of two storey extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2012/91266
2011/92240	20, Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF	Erection of two storey extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2011/92240
2009/90589	56, Millbrook Gardens, Dewsbury, WF13 4SF	Erection of sun lounge and alterations to convert existing integral garage to accommodation	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2009/90589
2008/94465	19, Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF	Erection of front, side and rear extensions	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2008/94465
2008/93329	58, Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF	Erection of 2 Storey Extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2008/93329
2008/91387	19, Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF	Erection of 2 storey side & rear extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2008/91387
2007/94845	52, Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF	Erection of two storey extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2007/94845

Reference	Address	Proposal	Hyperlink
2007/93036	52 Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF	Erection of 2 storey extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2007/93036
2006/92790	38, Millbrook Gardens, Dewsbury, WF13 4SF	Erection of two storey extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2006/92790
2006/92737	94 Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF	Erection of two storey extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2006/92737
2005/94570	56, Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF	Erection of 2 storey extension and conservatory	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2005/94570
2004/93135	18 Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF.	Erection of porch	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2004/93135
2003/94907	29 Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF.	Erection of detached garage	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2003/94907
2002/94379	64, Millbrook Gardens, Staincliffe, Dewsbury, WF13 4SF.	Erection of shower room extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2002/94379
2000/90756	66, Millbrook Gardens, Staincliffe, Dewsbury.	Erection of 2-storey extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2000/90756
2000/90751	62, Millbrook Gardens, Staincliffe, Dewsbury.	Erection of 2-storey extension	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=2000/90751
99/92062	12 Millbrook Gardens, Dewsbury.	Erection of conservatory	http://www.kirklees.gov.uk/business/planning/application_search/detail.aspx?id=99/92062

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

- Unknown storage related to commercial use of site.
- Unknown Commercial use of the site
- made ground

7.1.2 OFFSITE

- Various mills producing fabrics
- Tanks (unknown usage)
- Made ground

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

Site is currently a commercial site with several buildings.

No substantial sources of ground gas were identified in the vicinity. Any small amounts of made ground in the vicinity are unlikely to produce substantial volumes of ground gas and in line with CL:AIRE RB17 A Pragmatic Approach to Ground Gas Risk Assessment. The protection already offered by a modern building regulations compliant building is sufficient to mitigate the minimal risk.

Commercial use of the site and surrounding sites has the potential to have contaminated the site with various substances including

- Metals and metalloids;
- Polycyclic aromatic hydrocarbons (PAH's);
- Petroleum hydrocarbons
- Asbestos

When detailed layout plans for the site become available this assessment may require revising.

TABLE 1. SUMMARY OF SIGNIFICANT POLLUTION LINKAGES

Contaminant	Pathway	Receptor	Comments	Probability of Pollutant Linkage	Consequence	Risk	Possible Mitigation
Contaminated Soils	Direct Ingestion & Direct Contact	Site Workers		Li	Md	M	Site workers to wear appropriate PPE for health and safety reasons
Contaminated Soils	Inhalation of Dust	Site Workers		Li	Md	M	
Contaminated Soils	Direct Ingestion & Direct Contact	End Users		Li	Md	M	
Contaminated Soils	Inhalation of Dust	End Users		Li	Md	M	
Contaminated Soils	Direct Ingestion	Flora and Fauna		Li	Md	M	
Contaminated Soils	Vertical and lateral migration	Controlled Waters		Li	Md	M	
Contaminated Soils	Direct contact	Services		Li	Md	M	

Contaminant	Pathway	Receptor	Comments	Probability of Pollutant Linkage	Consequence	Risk	Possible Mitigation
Ground Gases (Methane and CO ₂)	Vertical and lateral migration	End Users & Building Envelope		UI	Md	L	
Volatile and Semi-volatile Organic Compounds	Vertical and lateral migration	End Users & Building Envelope		Li	Md	M	
Radon	Vertical and lateral migration	End Users & Building Envelope		UI	Md	L	

KEY:

Probability of pollutant linkage Hi = Highly likely, Li = Likely, Lw = Low Likelihood, UI = 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/Lo w Risk	Low Risk
	Low Likelihood (Lw)	Moderate Risk	Moderate/ Low Risk	Low Risk	Very Low Risk
	Unlikely (UI)	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. Based on the previous activities that have taken place adjacent to the site, the pollution linkage assessment combined with the historical and topographical knowledge of the site has indicated that these activities represent a low risk to human health set in the context of the proposed development.

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 Moderate risk with respect to the proposed development.

The Building on site should be subject to an asbestos survey and removal by appropriately qualified personnel prior to demolition.

It is recommended that further investigation in line with section 10.0 is undertaken.

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

10.0 FURTHER ENVIRONMENTAL INVESTIGATION

It is recommended that the following further investigation be carried preferably following demolition and removal of the existing building.

The Building on site should be subject to an asbestos survey and removal by appropriately qualified personal prior to demolition.

At least 6 samples from near surface soils in proposed soft landscaping areas to be tested for the following

- metal and metalloids (Arsenic, Cadmium, Chromium (Total), Hex Chromium, Lead, Mercury, Nickel, Copper, Zinc)
- Speciated PAH's (Speciated USEPA 16)
- pH
- asbestos screen
- if visual and/or olfactory evidence suggest the presence of hydrocarbons testing for Speciated Hydrocarbons (TPHCWG)

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

11.0 POTENTIAL REMEDIAL ACTIONS AND VERIFICATION

It is unknown at this time what remediation may be required however the below is a potential worst case given the historic use of the site

1. The Building on site should be subject to an asbestos survey and removal by appropriately qualified personal prior to demolition.
2. Capping of soft-landscaping areas with a minimum of 600mm of clean material. Prior to the placement of material it should be tested in line with Guidance And Good Practice Verification Of Cover Systems – Testing Criteria For Subsoil And Topsoil, page 10, NHBC Technical Extra Note Issue 8 Nov 2012.

(<http://www.nhbc.co.uk/NHBCPublications/LiteratureLibrary/Technical/TechnicalExtra/filedownload,48980,en.pdf>). The chemical testing criteria are presented in Appendix D.

The suitability of the soil should be confirmed with the **Local Planning Authority** prior to its importation.

All transfer notes and/or receipts for the soil should be retained.

The thickness of the soil placed will require evidence either via photographs during its placement or by digging of post placement verification trial holes

3. 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

APPENDIX C

SITE PHOTOS AND LOCATIONS



1.



2.



3.



4.



5.



6.



7.



8.



9.



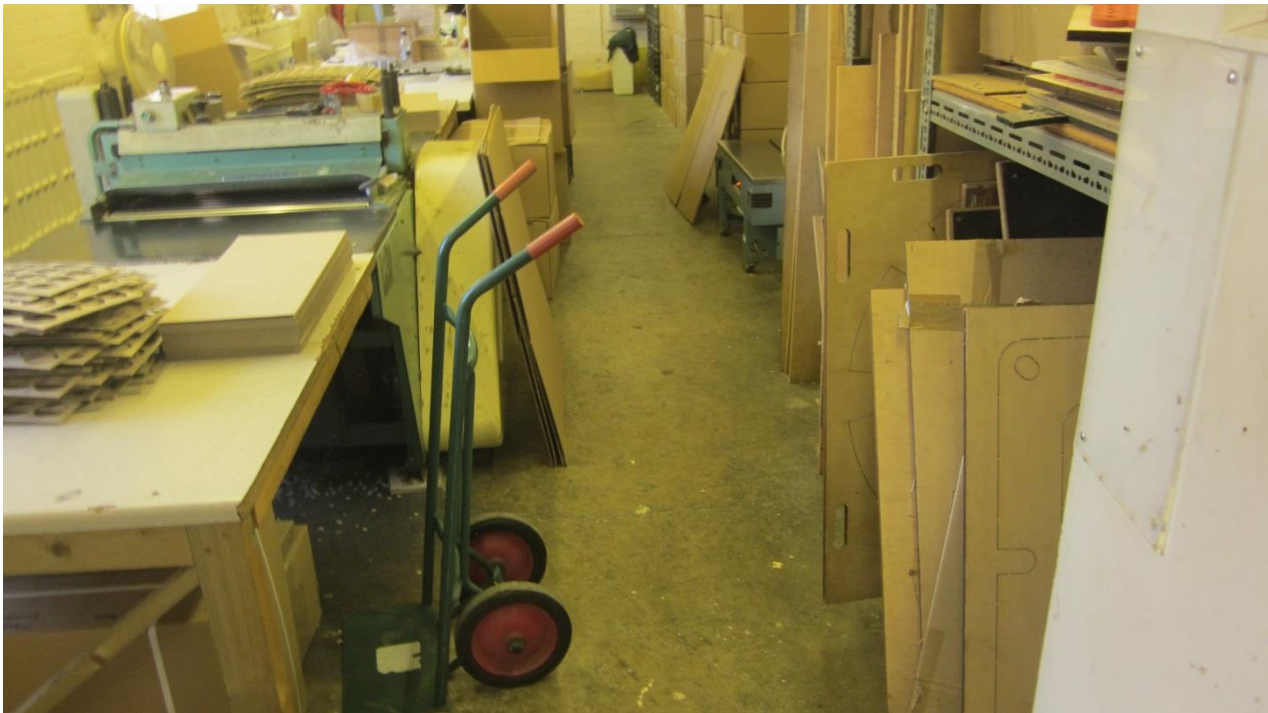
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11.



12.



APPENDIX D SOIL SCREENING CRITERIA

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	SGV report + CLEA 1.06	35	35	35	32	32	32	43	43	43	640	640	640	79	79	79	170	170	170
Beryllium	LQM/CIEH + CLEA 1.06	51	51	51	51	51	51	55	55	55	420	420	420	93	93	93	670	670	670
Boron	LQM/CIEH + CLEA 1.06	1000	1000	1000	290	290	290	45	45	45	190000	190000	190000	21000	21000	21000	46000	46000	46000
Cadmium	SGV report + CLEA 1.06	85	85	85	11	11	11	1.9	1.9	2	230	230	230	120	120	120	560	560	560
Chromium (III)	LQM/CIEH + CLEA 1.06	630	630	630	630	630	630	15000	15000	15000	8800	8800	8800	1500	1500	1500	27000	27000	27000
Chromium (VI)	LQM/CIEH + CLEA 1.06	4.3	4.3	4.3	4.3	4.3	4.3	2.2	2.2	2.2	35	35	35	7.7	7.7	7.7	220	220	220
Copper	LQM/CIEH + CLEA 1.06	6200	6200	6200	2300	2300	2300	520	520	520	72000	72000	72000	12000	12000	12000	44000	44000	44000
Lead	C4SL	310	310	310	200	200	200	80	80	80	2330	2330	2330	630	630	630	1300	1300	1300
Mercury, inorganic	SGV report + CLEA 1.06	240	240	240	170	170	170	80	80	80	3600	3600	3600	470	470	470	1100	1100	1100
Nickel	SGV report + CLEA 1.06	130	130	130	130	130	130	230	230	230	1800	1800	1800	290	290	290	3500	3500	3500
Selenium	SGV report + CLEA 1.06	600	600	600	350	350	350	120	120	120	13000	13000	13000	1400	1400	1400	2600	2600	2600
Vanadium	LQM/CIEH + CLEA 1.06	190	190	190	74	74	74	18	18	18	3200	3200	3200	440	440	440	970	970	970
Zinc	LQM/CIEH + CLEA 1.06	40000	40000	40000	3700	3700	3700	620	620	620	670000	670000	670000	81000	81000	81000	170000	170000	170000
Cyanide (free)	Hydrock + CLEA 1.06	760	760	760	750	750	750	2300	2300	2300	16000	16000	16000	1600	1600	1600	3400	3400	3400
Phenol	SGV report + CLEA 1.06	310	420	520	180	290	420	66	140	280	3200	3200	3200	3200	3200	3200	3200	3200	3200
Acenaphthene	LQM/CIEH + CLEA 1.06	2000	3100	3900	210	480	1000	34	85	200	85000	98000	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)
Acenaphthylene	LQM/CIEH + CLEA 1.06	2000	3000	3900	170	400	850	28	69	160	84000	97000	100000	15000	15000	15000	29000	30000	30000
Anthracene	LQM/CIEH + CLEA 1.06	20000	22000	23000	2300	4900	9200	380	950	2200	520000	540000	540000	74000	74000	74000	150000	150000	150000
Benz(a)anthracene	LQM/CIEH + CLEA 1.06	3.7	5.2	6.2	3.1	4.7	5.9	2.5	5.5	10	89	95	97	17	18	18	26	33	40
Benzo(a)pyrene	LQM/CIEH + CLEA 1.06	1	1	1	0.83	0.94	1	0.6	1.2	2.1	14	14	14	2.6	2.6	2.6	4.5	5.6	6.5
Benzo(b)fluoranthene	LQM/CIEH + CLEA 1.06	7	7.3	7.4	5.6	6.5	7	3.5	7.4	13	100	100	100	18	18	18	30	38	45
Benzo(ghi)perylene	LQM/CIEH + CLEA 1.06	47	47	47	44	46	47	70	120	160	650	660	660	120	120	120	270	310	350
Benzo(k)fluoranthene	LQM/CIEH + CLEA 1.06	10	10	10	8.5	9.6	10	6.8	14	23	140	140	140	26	26	26	46	57	67
Chrysene	LQM/CIEH + CLEA 1.06	8.8	9.7	10	6	8	9.3	2.6	5.8	12	140	140	140	25	26	26	34	45	55
Dibenz(ah)anthracene	LQM/CIEH + CLEA 1.06	0.86	0.91	0.93	0.76	0.86	0.9	0.76	1.5	2.3	13	13	13	2.3	2.3	2.3	4.5	5.5	6.3
Fluoranthene	LQM/CIEH + CLEA 1.06	970	990	1000	260	460	670	52	130	290	23000	23000	23000	3100	3100	3100	6300	6300	6400
Fluorene	LQM/CIEH + CLEA 1.06	1900	2500	2900	160	380	780	27	67	160	64000	69000	71000	9900	9900	9900	20000	20000	20000
Indeno(123cd)pyrene	LQM/CIEH + CLEA 1.06	4.2	4.4	4.4	3.2	3.9	4.2	1.8	3.8	7.1	60	61	62	11	11	11	17	22	26
Naphthalene	LQM/CIEH + CLEA 1.06	1.6	3.9	9.3	1.5	3.7	8.7	4.1	9.9	23	200	480	1100	3900	4100	4200	1100	1600	2300
Phenanthrene	LQM/CIEH + CLEA 1.06	840	930	970	92	200	380	16	38	90	22000	22000	23000	3100	3100	3100	6200	6300	6300
Pyrene	LQM/CIEH + CLEA 1.06	2300	2400	2400	560	1000	1600	110	270	620	54000	54000	55000	7400	7400	7400	15000	15000	15000
TPH fractions																			
TPH ali EC05-EC06	LQM/CIEH + CLEA 1.06	30	55	110	30	55	110	740	1700	3900	300	560	1200	300	560	600000	300	560	1200
TPH ali >EC06-EC08	LQM/CIEH + CLEA 1.06	73	160	370	73	160	370	2300	5600	13000	140	320	740	600000	610000	620000	140	320	740

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 >EC08-EC10	LQM/CIEH + CLEA 1.06	19	46	110	19	46	110	320	770	1700	78	190	450	13000	13000	13000	77	190	450
TPH ali >EC10-EC12	LQM/CIEH + CLEA 1.06	48	120	280	48	120	280	2200	4400	7300	48	120	280	13000	13000	13000	48	120	280
TPH ali >EC12-EC16	LQM/CIEH + CLEA 1.06	24	59	140	24	59	140	11000	13000	13000	24	59	140	13000	13000	13000	24	59	140
TPH ali >EC16-EC35	LQM/CIEH + CLEA 1.06	45000	64000	77000	45000	64000	76000	260000	270000	270000	1000000	1000000	1000000	250000	250000	250000	460000	480000	490000
TPH ali >EC35-EC44	LQM/CIEH + CLEA 1.06	45000	64000	77000	45000	64000	76000	260000	270000	270000	1000000	1000000	1000000	250000	250000	250000	460000	480000	490000
TPH aro EC05-EC07	LQM/CIEH + CLEA 1.06	260	480	980	65	130	280	13	27	57	1200	2300	4700	56000	56000	56000	1200	2300	4700
TPH aro >EC07-EC08	LQM/CIEH + CLEA 1.06	610	1300	2700	120	270	610	22	51	120	870	1900	4400	56000	56000	56000	870	1900	4400
TPH aro >EC08-EC10	LQM/CIEH + CLEA 1.06	33	81	190	27	65	150	8.6	21	51	610	1500	3600	5000	5000	5000	610	1500	3600
TPH aro >EC10-EC12	LQM/CIEH + CLEA 1.06	180	420	870	69	160	350	13	31	74	360	900	2200	5000	5000	5000	360	900	10000
TPH aro >EC12-EC16	LQM/CIEH + CLEA 1.06	1250	1600	1700	140	310	590	23	57	130	36000	37000	38000	5000	5000	5000	10000	10000	10000
TPH aro >EC16-EC21	LQM/CIEH + CLEA 1.06	1300	1300	1300	250	480	770	46	110	260	28000	28000	28000	3800	3800	3800	7600	7700	7800
TPH aro >EC21-EC35	LQM/CIEH + CLEA 1.06	1300	1300	1300	890	1100	1200	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900
TPH aro >EC35-EC44	LQM/CIEH + CLEA 1.06	1300	1300	1300	890	1100	1200	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900
TPH >EC44-EC70	LQM/CIEH + CLEA 1.06	1300	1300	1300	1200	1300	1300	1200	2100	3000	28000	28000	28000	3800	3800	3800	7800	7800	7900
VOCs - BTEX & MTBE																			
Benzene	SGV report + CLEA 1.06	0.27	0.49	1	0.08	0.16	0.33	0.017	0.035	0.075	28	50	95	72	72	73	90	100	110
Toluene	SGV report + CLEA 1.06	610	1300	2700	120	270	610	22	51	120	870	1900	4400	56000	56000	56000	870	1900	4400
Ethylbenzene	SGV report + CLEA 1.06	170	380	840	65	150	350	16	39	91	520	1200	2800	25000	25000	25000	520	1200	2800

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Xylene, o-	SGV report + CLEA 1.06	60	140	320	45	110	250	28	67	160	480	1100	2600	41000	42000	43000	480	1100	2600
Xylene, m-	SGV report + CLEA 1.06	55	130	300	44	100	240	31	74	180	630	1500	3500	41000	42000	43000	630	1500	3500
Xylene, p- (use this for combined m & p)	SGV report + CLEA 1.06	53	130	290	42	98	230	29	70	160	580	1400	3200	41000	42000	43000	580	1400	3200
MTBE	EIC/AGS/CL:AIRE + CLEA 1.06	73	120	220	49	84	160	23	44	90	7900	13000	24000	75000	75000	75000	20000	33000	63000
VOCs - other benzenes																			
Iso-propylbenzene	EIC/AGS/CL:AIRE + CLEA 1.06	12	28	67	11	27	64	32	79	190	390	950	2300	25000	25000	25000	390	950	2300
Propylbenzene	EIC/AGS/CL:AIRE + CLEA 1.06	40	97	230	34	82	190	34	83	200	400	980	2300	25000	25000	25000	400	980	2300
1,2,4-Trimethylbenzene	EIC/AGS/CL:AIRE + CLEA 1.06	0.41	0.99	2.3	0.35	0.86	2	0.38	0.93	2.2	42	99	220	250	250	250	310	360	410
VOCs - chlorobenzenes																			
Bromobenzene	EIC/AGS/CL:AIRE + CLEA 1.06	0.91	2.1	4.9	0.88	2	4.7	3.2	7.6	18	97	220	520	5200	5400	5600	850	2000	3500
Chlorobenzene	LQM/CIEH + CLEA 1.06	0.33	0.74	1.7	0.33	0.73	1.7	5.9	14	32	59	130	310	12000	13000	14000	680	1500	2900
1,2-Dichlorobenzene	LQM/CIEH + CLEA 1.06	17	40	94	16	39	91	94	230	540	570	1400	3200	95000	100000	100000	570	1400	3300
1,3-Dichlorobenzene	LQM/CIEH + CLEA 1.06	0.31	0.74	1.7	0.29	0.7	1.7	0.25	0.61	1.5	32	77	180	300	300	300	390	440	470
1,4-Dichlorobenzene	LQM/CIEH + CLEA 1.06	42	100	230	30	72	170	15	37	88	230	540	1300	17000	17000	17000	220	540	1300
Hexachlorobenzene	LQM/CIEH + CLEA 1.06	0.2	0.5	1.7	0.2	0.5	1.4	0.18	0.42	0.92	0.2	53	55	6.5	6.5	6.5	11	11	11
Pentachlorobenzene	LQM/CIEH + CLEA 1.06	14	21	27	5.2	10	17	1.2	3.1	7	43	110	830	110	110	110	190	190	190
1,2,3-trichlorobenzene	LQM/CIEH + CLEA 1.06	1.1	2.6	6.2	1	2.6	6.1	4.7	12	28	110	270	630	1700	1800	1800	130	330	1600
1,2,4-trichlorobenzene	LQM/CIEH + CLEA 1.06	1.8	4.5	11	1.8	4.5	11	31	75	180	230	560	1300	10000	11000	12000	320	790	1900

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1,3,5-trichlorobenzene	LQM/CIEH + CLEA 1.06	0.23	0.57	1.4	0.23	0.57	1.4	4.7	12	28	24	590	140	1600	1700	1800	37	91	220
1,2,3,4-tetrachlorobenzene	LQM/CIEH + CLEA 1.06	17	39	84	12	29	62	4.4	11	26	120	300	730	830	830	830	120	1600	1600
1,2,3,5-tetrachlorobenzene	LQM/CIEH + CLEA 1.06	0.53	1.3	3	0.49	1.2	2.8	0.38	0.94	2.2	39	98	240	79	79	79	39	120	130
1,2,4,5-tetrachlorobenzene	LQM/CIEH + CLEA 1.06	0.51	1.2	2.4	0.3	0.68	1.4	0.064	0.16	0.37	20	49	97	13	13	13	25	26	26
VOCs - chloroalkanes & alkanes																			
Bromodichloromethane	EIC/AGS/CL:AIRE + CLEA 1.06	0.019	0.034	0.07	0.016	0.03	0.061	0.016	0.032	0.068	2.1	3.7	7.6	73	73	74	56	67	81
Bromoform	EIC/AGS/CL:AIRE + CLEA 1.06	5.2	11	2.3	2.8	6	13	0.95	2.1	4.6	760	1500	3100	3900	3900	4000	2700	4700	5200
Chloroethane	EIC/AGS/CL:AIRE + CLEA 1.06	8.4	11	18	8.3	11	18	110	210	380	960	1300	2100	2600	3500	5700	2600	3500	5700
Chloroethene (aka vinyl chloride)	LQM/CIEH + CLEA 1.06	0.00054	0.0007	0.0011	0.00047	0.00064	0.00099	0.00055	0.001	0.0018	0.063	0.081	0.12	3.5	3.5	3.5	4.8	5	5.4
Chloromethane	EIC/AGS/CL:AIRE + CLEA 1.06	0.0085	0.0099	0.013	0.0083	0.0098	0.013	0.066	0.13	0.23	1	1.2	1.6	540	550	560	140	150	170
1,1-Dichloroethane	EIC/AGS/CL:AIRE + CLEA 1.06	2.5	4.1	7.7	2.4	3.9	7.4	9.2	17	35	280	450	850	46000	47000	48000	1800	3000	5600
1,2-Dichloroethane	LQM/CIEH + CLEA 1.06	0.0065	0.0093	0.016	0.0053	0.008	0.014	0.0046	0.0083	0.016	0.71	1	1.8	29	29	29	21	24	28
1,1-Dichloroethene	EIC/AGS/CL:AIRE + CLEA 1.06	0.23	0.41	0.82	0.23	0.4	0.82	2.8	5.6	12	26	46	92	2200	3900	11000	2200	3900	5900
Cis 1,2 Dichloroethene	EIC/AGS/CL:AIRE + CLEA 1.06	0.12	0.2	0.39	0.11	0.19	0.37	0.26	0.5	1	15	24	47	1300	1300	1400	690	840	1000
Trans 1,2 Dichloroethene	EIC/AGS/CL:AIRE + CLEA 1.06	0.19	0.35	0.71	0.19	0.34	0.7	0.93	1.9	4	22	40	81	3800	4000	4000	1700	2100	2700
Dichloromethane	EIC/AGS/CL:AIRE + CLEA 1.06	2.1	2.8	4.5	0.58	0.98	1.7	0.1	0.19	0.34	270	360	560	760	760	760	1500	1500	1500
1,2-Dichloropropane	EIC/AGS/CL:AIRE + CLEA 1.06	0.024	0.042	0.085	0.024	0.042	0.085	0.62	1.2	2.6	3.3	5.9	12	1700	1900	2200	160	210	290

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Hexachloroethane	EIC/AGS/CL:AIRE + CLEA 1.06	0.22	0.54	1.3	0.2	0.48	1.1	0.27	0.67	1.6	8.2	20	48	120	130	130	8.2	20	48
Tetrachloroethene	LQM/CIEH + CLEA 1.06	1	2.3	5.3	0.94	2.1	4.8	1.6	3.7	8.7	130	290	660	3400	3400	3400	420	950	2200
1,1,1,2-Tetrachloroethane	LQM/CIEH + CLEA 1.06	1.1	2.5	5.8	0.89	2.1	4.8	0.78	1.9	4.4	120	260	590	1400	1400	1400	1500	1800	2100
1,1,2,2-Tetrachloroethane	LQM/CIEH + CLEA 1.06	2.9	5.8	13	1.4	2.9	6.5	0.41	0.89	2	300	600	1200	1400	1400	1400	1800	2100	2300
Tetrachloromethane	LQM/CIEH + CLEA 1.06	0.018	0.04	0.09	0.018	0.039	0.089	0.16	0.37	0.85	3	6.7	15	340	350	350	170	240	320
Trichloroethene	LQM/CIEH + CLEA 1.06	0.11	0.23	0.51	0.11	0.22	0.49	0.43	0.95	2.2	12	25	55	1200	1300	1300	660	860	1100
1,1,1-Trichloroethane	LQM/CIEH + CLEA 1.06	6.3	13	28	6.2	13	28	48	110	240	700	1400	3100	140000	140000	140000	1400	2900	6400
1,1,2 Trichloroethane	EIC/AGS/CL:AIRE + CLEA 1.06	0.88	1.8	3.9	0.6	1.2	2.7	0.28	0.61	1.4	95	190	400	990	990	1000	1100	1300	1500
Trichloromethane	LQM/CIEH + CLEA 1.06	0.92	1.6	3.2	0.75	1.3	2.7	0.36	0.7	1.5	110	190	370	1700	1700	1700	2700	2900	3100
Other phenols & chlorophenols																			
2-Chlorophenol	LQM/CIEH + CLEA 1.06	65	94	120	3.7	8.4	18	0.58	1.4	3.2	3600	4000	4300	610	610	610	1100	1100	1100
2,4-Dichlorophenol	LQM/CIEH + CLEA 1.06	58	85	110	0.88	2	4.4	0.13	0.3	0.7	3500	4000	4200	610	610	610	1000	1100	1100
2,4-Dimethylphenol	EIC/AGS/CL:AIRE + CLEA 1.06	210	410	730	19	43	97	3.1	7.2	17	1400	3100	7200	5000	5000	5000	1400	9600	9900
2-Methylphenol	EIC/AGS/CL:AIRE + CLEA 1.06	3700	5400	6900	82	180	400	13	28	64	160000	180000	180000	25000	25000	25000	15000	48000	49000
3-Methylphenol	EIC/AGS/CL:AIRE + CLEA 1.06	4700	6300	7500	81	180	400	12	28	63	170000	180000	180000	25000	25000	25000	27000	48000	49000
4-Methylphenol	EIC/AGS/CL:AIRE + CLEA 1.06	3800	5500	7000	81	180	400	12	28	63	160000	180000	180000	25000	25000	25000	27000	48000	49000
Pentachlorophenol	LQM/CIEH + CLEA 1.06	22	31	35	0.55	1.3	3	0.084	0.21	0.49	1200	1300	1400	180	180	180	220	250	270
2,3,4,6-Tetrachlorophenol	LQM/CIEH + CLEA 1.06	82	110	130	0.87	2	4.7	0.13	0.31	0.73	3900	4200	4400	610	610	610	1000	1100	1100

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2,4,6-Trichlorophenol	LQM/CIEH + CLEA 1.06	82	110	130	1.4	3.3	7.5	0.22	0.51	1.2	3900	4200	4400	610	610	610	1100	1100	1100
Phthalates																			
Bis (2-ethylhexyl) phthalate	EIC/AGS/CL:AIRE + CLEA 1.06	2700	2800	2800	280	610	1100	48	120	280	85000	86000	86000	9700	9700	9700	17000	17000	17000
Butyl benzyl phthalate	EIC/AGS/CL:AIRE + CLEA 1.06	43000	44000	44000	1400	3400	7300	220	550	1300	940000	940000	950000	130000	130000	130000	250000	260000	260000
Diethyl Phthalate	EIC/AGS/CL:AIRE + CLEA 1.06	14	29	65	120	260	570	19	41	94	14	29	65	49000	50000	50000	14	93000	96000
Di-n-butyl phthalate	EIC/AGS/CL:AIRE + CLEA 1.06	4.7	11	450	13	31	67	2	5	12	4.7	15000	15000	1300	1300	1300	2600	2700	2600
Di-n-octyl phthalate	EIC/AGS/CL:AIRE + CLEA 1.06	3400	3400	3400	2300	2800	3100	940	2100	3900	89000	89000	89000	11000	11000	11000	20000	20000	20000
Pesticides																			
Aldrin	LQM/CIEH + CLEA 1.06	2.1	2.1	2.2	1.7	2	2.1	1.3	2.6	4	54	54	54	6.6	6.6	6.6	13	13	13
Atrazine	LQM/CIEH + CLEA 1.06	31	32	32	0.24	0.56	1.3	0.037	0.085	0.2	870	880	880	100	100	100	180	180	180
DDD	Hydrock + CLEA 1.06	1300	1300	1300	890	1100	1100	400	790	1200	22000	22000	22000	2700	2700	2700	5700	5700	5700
DDE	Hydrock + CLEA 1.06	1300	1300	1300	860	1100	1200	370	770	1300	22000	22000	22000	2700	2700	2700	5700	5700	5700
DDT	Hydrock + CLEA 1.06	1100	1200	1200	770	940	1000	330	660	1100	21000	21000	21000	2600	2600	2600	5500	5500	5500
Dichlovos	LQM/CIEH + CLEA 1.06	25	32	37	0.29	0.6	1.3	0.044	0.091	0.2	840	870	890	120	120	120	140	160	180
Dieldrin	LQM/CIEH + CLEA 1.06	3.5	3.8	3.9	0.69	1.4	2.2	0.13	0.32	0.73	90	91	92	12	12	12	23	23	23
Endosulfan - alpha	LQM/CIEH + CLEA 1.06	44	78	110	2.9	7	16	0.47	1.2	2.7	2300	3000	3400	490	490	490	940	970	990
Endosulfan - beta	LQM/CIEH + CLEA 1.06	53	89	120	2.8	6.6	15	0.44	1.1	2.6	2600	3200	3500	490	490	490	950	980	990
Hexachlorocyclohexa nes - alpha (inc.	LQM/CIEH + CLEA 1.06	460	580	650	19	46	100	3	7.4	18	14000	15000	15000	2000	2000	2000	4000	4100	4100

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Lindane)																			
Hexachlorocyclohexanes - beta (inc. Lindane)	LQM/CIEH + CLEA 1.06	50	52	52	1.7	3.9	8.5	0.26	0.64	1.5	1100	1100	1100	150	150	150	300	300	310
Hexachlorocyclohexanes - gamma (inc. Lindane)	LQM/CIEH + CLEA 1.06	18	22	23	0.58	1.4	3	0.089	0.22	0.52	530	550	550	71	71	71	140	140	140
Dioxins, furans & dioxin-like-PCBs																			
Total dioxins, furans & DL-PCB (aerial dep.)	SGV report + CLEA 1.06	0.0099	0.0099	0.0099	0.0085	0.0087	0.0087	0.0073	0.008	0.0083	0.24	0.24	0.24	0.023	0.023	0.023	0.049	0.049	0.049
Non-dioxin-like PCBs																			
PCB-28	Hydrock + CLEA 1.06	0.39	0.39	0.39	0.2	0.27	0.32	0.058	0.13	0.23	9	9	9	1.2	1.2	1.2	2.5	2.5	2.5
PCB-52	Hydrock + CLEA 1.06	0.39	0.39	0.39	0.2	0.28	0.34	0.062	0.14	0.28	9	9	9	1.2	1.2	1.2	2.5	2.5	2.5
PCB-101	Hydrock + CLEA 1.06	0.39	0.39	0.39	0.34	0.37	0.38	0.03	0.53	0.76	9	9	9	1.2	1.2	1.2	2.5	2.5	2.5
PCB-138	Hydrock + CLEA 1.06	0.39	0.39	0.39	0.36	0.37	0.38	0.41	0.67	0.89	9	9	9	1.2	1.2	1.2	2.5	2.5	2.5
PCB-153	Hydrock + CLEA 1.06	0.39	0.39	0.39	0.36	0.38	0.38	0.51	0.77	0.96	9	9	9	1.2	1.2	1.2	2.5	2.5	2.5
PCB-180	Hydrock + CLEA 1.06	0.39	0.39	0.39	0.37	0.38	0.39	0.6	0.87	1.1	9	9	9	1.2	1.2	1.2	2.5	2.5	2.5
Explosives																			
HMX	LQM/CIEH + CLEA 1.06	6500	6500	6500	5.7	13	26	0.86	1.9	3.9	110000	110000	110000	13000	13000	13000	0.35	0.4	0.5
RDX	LQM/CIEH + CLEA 1.06	370	370	370	3.5	7.4	16	0.52	1.1	2.5	6400	6400	6400	790	800	800	19	1500	1600
2,4,6-Trinitrotoluene	LQM/CIEH + CLEA 1.06	57	57	58	1.6	3.7	7.8	0.24	0.58	1.4	1000	1000	1100	130	130	130	260	270	270
Other inorganics																			

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Antimony	EIC/AGS/CL:AIRE + CLEA 1.06	370	370	370	180	180	180	52	52	52	6800	6800	6800	740	740	740	1700	1700	1700
Barium	EIC/AGS/CL:AIRE + CLEA 1.06	1300	1300	1300	780	780	780	260	260	260	22000	22000	22000	2700	2700	2700	5800	5800	5800
Mercury, elemental	SGV report + CLEA 1.06	0.17	0.42	1	0.17	0.42	1	4.3	11	26	4.3	11	26	4.3	11	26	4.3	11	26
Molybdenum	EIC/AGS/CL:AIRE + CLEA 1.06	670	670	670	250	250	250	58	58	58	18000	18000	18000	1400	1400	1400	2900	2900	2900
Thiocyanate	Hydrock + CLEA 1.06	8.9	8.9	8.9	8.8	8.8	8.8	28	28	28	190	190	190	25	25	25	53	53	53
Other organics																			
Biphenyl	EIC/AGS/CL:AIRE + CLEA 1.06	34	84	200	34	84	200	14	35	84	34	84	200	9500	9500	9500	34	84	19000
Carbon disulphide	LQM/CIEH + CLEA 1.06	0.1	0.2	0.44	0.1	0.2	0.44	4.8	10	23	12	23	50	11000	11000	12000	1300	1900	2700
2,4-Dinitrotoluene	EIC/AGS/CL:AIRE + CLEA 1.06	170	170	170	1.5	3.2	7.2	0.22	0.49	1.1	3700	3800	3800	500	500	500	140	960	990
2,6-Dinitrotoluene	EIC/AGS/CL:AIRE + CLEA 1.06	78	84	87	0.78	1.7	3.9	0.12	0.27	0.61	1900	1900	1900	250	250	250	290	490	500
Hexachloro-1,3-butadiene	LQM/CIEH + CLEA 1.06	0.22	0.55	1.3	0.21	0.51	1.2	0.25	0.61	1.4	32	69	120	25	25	25	48	50	51
Mercury, methyl	SGV report + CLEA 1.06	8.4	11	14	7.4	9.6	11	7.9	8	8	370	390	410	53	53	53	73	93	97
Styrene	EIC/AGS/CL:AIRE + CLEA 1.06	35	78	170	8.1	19	43	1.6	3.7	8.7	630	1400	3400	3000	3000	3000	630	1400	3400
Tributyl tin oxide	EIC/AGS/CL:AIRE + CLEA 1.06	8.4	9.8	11	0.27	0.64	1.4	0.042	0.1	0.25	230	230	240	31	31	31	63	64	65
2-Chloronaphthalene	EIC/AGS/CL:AIRE + CLEA 1.06	3.8	9.3	22	3.7	9.2	22	40	98	230	390	960	2200	7500	8400	9000	110	1800	2800

APPENDIX E

COAL AUTHORITY REPORT