Glan Llyn
Phase 4E
Remediation Strategy

Glan Llyn, Newport
Phase 4E

Remediation Strategy

For

Brighton STM Developments Limited (BSTMDL)

DATE: May 2026

REV: P01

18669-RLL-26-XX-RP-O-0858-P01

Document Reference & Control

Project Name:	**Glan Llyn, Phase 4E**
Project Reference:	**P18-669**
Report Title:	**Remediation Strategy**
Client:	**Brighton STM Developments Limited (BSTMDL)**
Document Reference:	**18669-RLL-26-XX-RP-O-0858**
Report Status:	**S2 - Information**

Approval Status	Name & Position
Prepared by:	**Aimee Meredith-Smith** BSc (Hons) MScR FGS Geo-Environmental Consultant
Reviewed by:	**Jason Bradley** BSc (Hons) MSc Cgeol CEnv FGS MIEnvSc Principal Engineer
Approved by:	**Chris Wilson** BSc (Hons) MCIWEM Principal Geo-Environmental Consultant

Revision Status	Date	Summary of Revision
P01	May 2026	First issue

Contents

1.0	**Introduction**	**1**
1.1.	Terms of Reference	1
1.2.	Purpose	1
1.3.	Objectives	2
1.4.	Reference Reports	2
1.5.	Limitations and Confidentiality	3
2.0	**Background Information**	**4**
2.1.	Proposed Development	4
2.2.	Site Description	4
2.3.	Site History	4
2.4.	Geology	5
2.5.	Hydrogeology	5
2.6.	Hydrology and Flooding	6
2.7.	Radon	6
3.0	**Ground Investigations and Surveys**	**7**
3.1.	Existing Reports	7
3.2.	Geological Summary	7
3.3.	Made Ground – Surfacing	7
3.4.	Made Ground - General	7
3.5.	Superficial Deposits	8
3.6.	Bedrock	8
3.7.	Perched Water	8
3.8.	Groundwater	9
3.9.	Visual and Olfactory Evidence from Previous Ground Investigations	9
3.10.	Buried Obstructions	9
3.11.	Ground Gas Monitoring	10
3.12.	Contamination Summary	10
4.0	**Conceptual Site Model**	**13**
4.5.	Conceptual Site Model and Risk Assessment	16
4.6.	Summary of Conceptual Site Model	16
5.0	**Controlled Waters Detailed Quantitative Risk Assessment**	**20**
5.1.	RLL CWDQRA Summary	20
5.2.	HFCL Glan Llyn: Soils Validation Strategy for Protection of Controlled Waters	21
6.0	**Remediation Strategy**	**22**
6.1.	Remediation Approach	22
6.2.	Remediation Specification	22

6.3. Proposed Sequence of Remediation Tasks 22
6.4. Removal of Obstructions 23
6.5. Visual Evidence of Contamination 23
6.6. Protection of Human Health 24
6.7. Protection of Controlled Waters 24
6.9. Materials Management Plan 26
6.10. Clean Cover System 26
6.11. Ground Gas Protection Measures 27
6.12. Risks to Construction Workers 27
6.13. Onward Developer Actions 27
6.14. Environmental Monitoring 28
6.15. Surface Water Monitoring 28
6.16. Dust and Air Quality 28
6.17. Noise and Vibration 28
7.0 Contingency for Unexpected Contaminated Soil 29
8.0 Re-use of Site Won Material 30
8.1. Re-use of Site Generated Materials 30
8.2. Soil for Formation of Clean Cover 30
8.3. General Site Fill Beneath Clean Cover 30
8.4. Offsite Disposal 31
9.0 Validation 32
9.1. General 32
9.2. Validation of Turnover 32
9.3. Validation of Clean Cover 34
9.4. Geotechnical Validation 35
10.0 Supervision and Reporting 36

Appendices

Appendix A – Drawings and Plans

Appendix B – Chemical data screening

Appendix C – Glan Llyn Controlled Waters DQRA

Appendix D – Phase 4E Controlled Waters DQRA Addendum

Appendix E - Glan Llyn: Soils validation strategy for protection of controlled waters

Appendix F – Glan llyn, Validation Plan

Tables

Table 1: Assessment Criteria for Clean Cover: Residential End Use with Homegrown Produce

Table 2: Assessment Criteria for Clean Cover: Public Open Space near Residential End Use

Table 3: Hannah Fraser Consulting Soils Validation Strategy for Protection of Controlled Waters – Agreed Soil Re-use Values (SRVs)

Table 4: Surface Water Testing Suite and Relevant Critical Criteria

Table 5: Risk Classification Matrix (C552 CIRIA, 200

1.0 Introduction

1.1. Terms of Reference

Phase 4E of the Glan Llyn development in Newport (hereafter referred to as the 'Site') is situated within the ongoing redevelopment of the former Llanwern Steelworks. The site location plan is shown on Drawing 18669-RLL-24-XX-DR-O-0657-P01, included in **Appendix A.**

In July 2024 the Client, St Modwen Developments were rebranded to be called Revantage Real Estate, then in 2025 to Brighton STM Developments Limited (BSTMDL). Any reference to the previous company name in this report should be referred to accordingly.

A contractor shall be employed by Revantage Real Estate to undertake the ground preparation and remediation works, to include the requirements of this strategy. A monitoring engineer will oversee the works to monitor that the requirements of this strategy are achieved.

1.2. Purpose

This report has been prepared pursuant to the discharge of Planning Condition 27 of the Outline Planning Permission Reference 06/0471 for the proposed development of residential development Phase 4E as part of a wider mixed-use development at Llanwern, Newport.

Planning Condition 27 states the following:

"(27) Prior to the commencement of each phase of development as defined by Condition 03 (or at such other date or stage in development or for such specified activities or works as may be agreed in writing with the Local Planning Authority), the following components of a scheme to deal with the risks associated with contamination relating to that phase or activity shall each be submitted to and approved, in writing, by the Local Planning Authority:

(1) A preliminary risk assessment which has identified:
- *(a) all previous uses;*
- *(b) potential contaminants associated with those uses;*
- *(c) a conceptual model of the site indicating sources, pathways and receptors;*
- *(d) potentially unacceptable risks arising from contamination at the site.*

(2) A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off site.

(3) The site investigation results and the detailed risk assessment (2) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.

(4) A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in (3) are complete and identifying any requirements for longer term monitoring of pollutant linkages, maintenance and arrangements for contingency action. Any changes to these components require the express consent of the Local Planning Authority.

Reason: To ensure that the proposed development will not cause pollution of the environment or harm to human health."

The scope of this report is detailed in Section 1.3 below. It is considered that this report addresses the requirements of Condition 27 part 3 and part 4. Part 1 and part 2 has been addressed in the Phase 4E Desk Study & Ground Investigation Report (document reference 18669-RLL-26-XX-RP-O-0856, dated May 2026).

1.3. Objectives

The objective of this document is to specify both the remediation and validation works required to facilitate the proposed development and mitigate identified potential risks to human health and Controlled Waters. The remediation works will also seek to mitigate previously unidentified risks to human health, should unexpected contamination be encountered.

The potential risks associated with controlled waters shall be managed in accordance with the Soils Validation Strategy for Protection of Controlled Waters and validated in a forthcoming Controlled Waters Validation report by H Fraser Consulting Ltd (HFCL). The primary objective of the remediation work is to reduce rainwater infiltration through Made Ground, This will be achieved by re-engineering existing soils and the introduction of increased hardstanding coverage to limit mobilisation of leachable contaminants to the surface waters.

The remediation will comprise the excavation of buried obstructions and removal of contamination identified from previous phases of ground investigation, and any unexpected contamination found during the Made Ground turnover. The Made Ground will be turned over and placed with a subsequent verification sampling programme to assess compliance with the remediation criteria established within this document.

Remedial requirements for the onward developer are detailed in Section 6.8.

1.4. Reference Reports

The following documents and data sources have been reviewed in preparation of this document and should be read in conjunction with this report:

- RLL, Phase 4E Desk Study and Ground Investigation Report, ref. 18669-RLL-26-XX-RP-O-0856-P01, dated May 2026.
- RLL, Updated Controlled Waters Detailed Quantitative Risk Assessment, Glan Llyn, ref. 18669-RLE-19-RP-O-0006, dated June 2022.
- RLL, Phase 4E Controlled Waters Detailed Quantitative Risk Assessment Addendum ref. 18669-RLL-26-XX-RP-O-0865-P01-P01, dated May 2026.
- H Fraser Consulting (HFCL), Glan Llyn: Soils Validation Strategy for Protection of Controlled Waters December 2024.
- RLL, Glan Llyn Validation Plan, ref. 18669-RLL-26-XX-RP-O-0841-P01, dated May 2026.

1.5. Limitations and Confidentiality

All conclusions and recommendations made within this report are based on and limited to the factual information. No responsibility can be taken by RLL for information obtained by third parties and it has been assumed that all third-party information provided is true and correct.

No liability can be accepted for conditions not revealed within the exploratory holes or pits undertaken. The exploratory points cover only a small portion of the total Site area. RLL has, where necessary, undertaken extrapolation between locations and no responsibility can be taken for different conditions which may occur between locations.

RLL has undertaken the work in accordance with our understanding of current best practice at the time of undertaking the report. Further assessment and revision of the report may be required should new information come to light or legislation/ changes to best practice be introduced after the date of issue of the report. RLL has prepared the report for the sole use and reliance of the Client. The report may not be used or relied upon by any unauthorised third party without the explicit written agreement of RLL.

The work undertaken within this report remains the intellectual property of RLL and must not be divulged to any commercial third party without the prior written agreement of RLL.

2.0 Background Information

2.1. Proposed Development

It is understood that the Site is proposed to be redeveloped for a residential end-use. An illustrative masterplan (ref. 8111-08-A011, dated April 2019) is available in **Appendix A**.

The development will form part of the wider Glan Llyn development.

2.2. Site Description

The Site is located within the Glan Llyn development at the former Llanwern Steelworks, approximately 5.5km to the east of Newport City Centre at approximate National Grid Reference 336317E, 186693N. The wider Glan Llyn development covers approximately 250 hectares and is proposed to be redeveloped for residential, commercial, and public open space use.

The Site is irregular in shape, covers an area of approximately 1.50ha, and is in the approximate centre of the wider Glan Llyn development. The Site historically housed, on its western side, part of a sinter plant and open space across much of the central, southern and eastern areas. In addition, roads are indicated to cross the Site in an approximate north to south orientation, and a conveyor and associated pipelines cross the northern section of the Site in an approximate east to west orientation.

The Site boundary is shown on drawing 18669-RLL-24-XX-DR-O-0657-P01, **Appendix A**.

2.3. Site History

A detailed assessment of historical maps is provided within the RLL Desk Study & Ground Investigation Report (18669-RLL-26-XX-RP-O-0856-P01), a brief summary is provided below.

Historically, the Site comprised part of four open fields segregated by reens and trees, until 1967 when the Site formed part of Llanwern Steelworks. 1973 historical mapping shows railway sidings and access tracks to run approximately north to south through the centre of Site and the western side to form part of the ore stockyard. To the west of the Site were ore stockpiles, conveyors, travelling booms, roadways, a wetland area with drains, marshland and a small pond. As the steelworks expanded a sinter plant was constructed, encroaching on the western side of the Site alongside associated structures, conveyors, and tracks. The Site currently comprises an area used for the stockpiling of materials from the wider Glan Llyn Site.

2.4. Geology

Information pertaining to underlying ground conditions has been obtained via the British Geological Survey's (BGS) Onshore Geoindex[1].

The published geological information shows artificial ground to be absent. However, due to the Site's history, Made Ground is likely to be present associated with the previous development and subsequent demolition.

Superficial deposits are shown to comprise Tidal Flat Deposits. Historical or alternative names for the Tidal Flat Deposits include the Estuarine Alluvium, as reported on published geological maps[2] and historical logs.

Tidal Flat Deposits are described by the BGS as *'unconsolidated sediment, mainly mud and/ or sand. They may form the top surface of a deltaic deposit. Normally a consolidated soft silty clay, with layers of sand, gravel and peat.'*

The underlying bedrock is shown to be the Mercia Mudstone Group. The Mercia Mudstone Group was historically known as the Red Marl and is referenced as such in historic borehole logs.

The Mercia Mudstone Group is described by the BGS as comprising '*predominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite bearing units in some basinal areas. Thin beds of gypsum/ anhydrite are widespread; sandstones are also present'.*

There is an inferred fault approximately 700m northeast of the Site which trends roughly north to south and extends northwards away from Site.

2.5. Hydrogeology

The Mercia Mudstone Group strata is defined as a Secondary B Aquifer and the superficial Tidal Flat Deposits are defined as Unproductive Strata.

Secondary B Aquifers are classified as comprising *'predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifer'*.

Unproductive Strata classification has been given to cases where *'rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow'*.

[1] http://mapapps2.bgs.ac.uk/geoindex/home.html
[2] BGS Lexicon of Named Rock Units - Result Details (Accessed 22 May 2026)

2.6. Hydrology and Flooding

	Summary
Surface Water features	**On-Site:** No records of surface water features within Phase 4E. **Off-Site:** The Site is located within a privately drained system. The nearest surface watercourse within the private system on completion of the development is proposed to be the East Lake and Kings Wall Reen, both located off the northern Site boundary. Monk's Ditch is located approximately 450m east of the Site, it is a primary inland river of the Usk and Llwyd catchment. Monks Ditch is canalised in a concrete channel and flows south beneath the Queensway, it is proposed that the future surface water network of reens and lakes in Glan Llyn will discharge via a pumping system into Monk's Ditch. The River Usk is located approximately 3.7km to the west and the Severn Estuary is located approximately 4.5km to the south.
Surface Water Abstractions	No active water abstraction records within 500m.
Flood Risk	The Site lies within an area shown as having a Low Flood Risk from Sea according to Natural Wales Flood Risk mapping from Natural Resources Wales.

2.7. Radon

Information available from the 'UK Maps of Radon'[3] interactive map, shows the Site to lie within a radon affected area, where the maximum radon potential is 1-3%. As such, the site is in a radon effected area but no radon protection measures are likely to be required in the construction of the new development.

[3] UKradon - UK maps of radon

3.0 Ground Investigations and Surveys

3.1. Existing Reports

Two ground investigations have been undertaken within the current Site boundary, as summarised in the following table.

Summary of Historical Exploratory Holes within the Site Boundary	
Report	**Exploratory Holes**
IFA (2016)	1 Dynamic Sample Borehole (CWWS31) and 1 Cable Percussion Borehole (CWCP31)
Atkins (2018)	28 Trial Pits (4GC1, 4GC2, 4GC3, 4GC4, 4GC5, 4GC6, 4GD1, 4GD2, 4GD3, 4GD4, 4GD5, 4GD6, 4GD7, 4GE1, 4GE2, 4GE3, 4GE4, 4GE5, 4GE6, 4GF1, 4GF2, 4GF3, 4GF4, 4GF5, 4GF6, 4GF7, 4GG5, 4GG6)

Drawing 18669-RLL-22-XX-DR-O-0376 presented in **Appendix A** shows the location of the exploratory holes.

3.2. Geological Summary

The Site was found to be underlain by Made Ground overlying superficial deposits, comprising Tidal Flat Deposits and bedrock strata of the Mercia Mudstone Group.

3.3. Made Ground – Surfacing

Surfacing of tarmac was encountered in three locations (4GC6, 4GF7 & 4GG5) from ground level to 0.15mbgl.

3.4. Made Ground - General

Made Ground was encountered within all 30 exploratory holes. The Made Ground was encountered from ground level or underlying the surfacing at thicknesses of between 0.60m to 3.60m, and was generally described as:

- Black/ dark brown/brown/light brown/ light grey/ reddish brown gravelly SAND with cobbles and occasional slag;
- Black/ dark brown gravelly ashy SAND with cobbles;
- Dark brown/ brown/light brown/orange clayey gravelly SAND;
- Light grey slightly clayey silty SAND;
- Black/ dark brown/ red/ blue/ purple sandy GRAVEL with cobbles;
- Dark brown/ brown/ light brown clayey sandy GRAVEL with occasional cobbles;
- Light brown CLAY;
- Dark brown/ brown/ light brown/ red gravelly CLAY; and
- Dark brown/ brown/ light brown/ dark grey/ grey sandy gravelly CLAY.

Gravel and cobble components typically comprised concrete, brick, iron ore, slag, mudstone, coke, tarmac, siltstone, steel slag and furnace slag.

Two locations (4GC3 and 4GC6) refused at depths of 0.60mbgl and 1.50mbgl. Refusal occurred within slag layers/ fused slag horizons or was due to obstructions from iron ore aggregate and/or concrete.

Visual and olfactory evidence of contamination are discussed in Section 3.9.

Buried obstructions and services are discussed in Section 3.10.

3.5. Superficial Deposits

Tidal Flat Deposits were encountered beneath the Made Ground in 28 locations (CWWS31, CWCP31, 4GC1, 4GC2, 4GC4, 4GC5, 4GD1, 4GD2, 4GD3, 4GD4, 4GD5, 4GD6, 4GD7, 4GE1, 4GE2, 4GE3, 4GE4, 4GE5, 4GE6, 4GF1, 4GF2, 4GF3, 4GF4, 4GF5, 4GF6, 4GF7, 4GG5, 4GG6). The top of the strata was encountered from depths of between 1.65mbgl and 3.60mbgl. The base of the formation was not encountered during the 2018 Atkins ground investigation, although the formation was recorded to depths of up to 3.70m. The base of the formation was recorded at 10.00mbgl during the 2016 IFA ground investigation.

The Tidal Flat Deposits were generally described as:

- Soft to firm blue peaty silty CLAY;
- Firm blue/ brownish grey/ greenish grey mottled brown silty CLAY with rootlets or rare roots;
- Very soft to soft dark brown/ brown/ dark grey/ blue fibrous PEAT;
- Very soft grey SILT; and
- Loose grey slightly gravelly fine to medium SAND.

3.6. Bedrock

Bedrock of the Mercia Mudstone Group was not encountered in the 2018 Atkins ground investigation. However, the Mercia Mudstone was encountered in one of the IFA boreholes (CWCP31). The top of the strata was encountered at 10.00m bgl. The base of the formation was not encountered but the strata was recorded to a maximum depth of 10.95mbgl.

The Mercia Mudstone Group was described as:

- Very stiff reddish brown mottled grey, silty CLAY (Mercia Mudstone Group Grade IVa).

3.7. Perched Water

During the Attkins intrusive investigation, perched water was encountered in 27 locations, typically perched within the Made Ground, or towards the base of the

Made Ground perched on top of the natural clay. The depth below ground level was recorded from 0.6m to 1.50m.

3.8. Groundwater

In the IFA intrusive investigation, groundwater was encountered in 1 location (CWCP31), within the Tidal Flat Deposits. The depth below ground level was recorded at 9.50m.

3.9. Visual and Olfactory Evidence from Previous Ground Investigations

During the intrusive investigation, visual or olfactory evidence of contamination was encountered in 10 locations as detailed in the following table.

Visual / Olfactory Evidence of Contamination			
Exploratory Hole	**Depth (m)**	**Strata***	**Remarks**
4GC4	1.20	MG	Oil sheen coming from N seepages, no hydrocarbon odour.
4GC6	1.10	MG	Oil sheen in groundwater.
4GD6	0.70	MG	Oil sheen in groundwater, slight hydrocarbon odour.
4GE3	0.00	MG	Oil sheen in groundwater.
4GE4	0.60	MG	Slight hydrocarbon odour.
4GE5	0.70	MG	Oil sheen in groundwater, slight hydrocarbon odour.
4GF1	1.40	MG	Light hydrocarbon odour.
4GF2	0.85	MG	Oil sheen in groundwater, hydrocarbon odour.
4GF4	0.60	MG	Sight hydrocarbon odour.
4GF5	0.75	MG	Oil sheen in groundwater, light hydrocarbon odour.

Notes: *MG= Made Ground

3.10. Buried Obstructions

Buried obstructions or services were encountered in 7 exploratory locations as detailed in the following table.

Encountered Buried Obstructions			
Borehole	**Depth (m)**	**Strata***	**Remarks**
4GC1	0.50	MG	Steel cables
4GC3	1.50	MG	Concrete Slab
4GD2	0.50	MG	Cables
4GD3	0.00	MG	Electric cables and brick wall
4GD4	0.15	MG	Electric cables and brick wall
4GD5	0.00	MG	Electric cables and brick wall
4GG6	0.60	MG	Slag/iron ore aggregate

Notes: *MG= Made Ground, TFD= Tidal Flat Deposits; **base of obstruction not encountered.

3.11. Ground Gas Monitoring

No gas monitoring was undertaken during the 2016 IFA and 2018 Atkins ground investigation. A programme of shallow gas monitoring is recommended following turnover and earthworks reengineering.

The classification of the Site will depend on the competency of the upper clay of the Tidal Flat Deposits. A site-specific ground gas assessment is recommended following the completion of the earthworks.

3.12. Contamination Summary

During the 2018 Atkins ground investigation, 79 samples were tested for heavy metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), BTEX, pH, soil organic matter (SOM), cyanide, phenols, ammoniacal nitrogen and select samples were also tested for asbestos. The samples were taken from the Made Ground and superficial deposits (superficial deposits samples suffix "-V").

The samples collected were conservatively assessed against LQM/ CIEH 2015 S4ULs (Suitable for Use Levels) for a residential end use with plant uptake (1% SOM). A summary of exceedances is presented in the following table, and the chemical analysis results are presented in full in the Phase 4E Desk Study and Phase 2 Report (18669-RLL-26-XX-RP-O-0856-P01).

Summary of Exceedances of S4ULs Residential with Plant Uptake Criteria.				
Contaminant	**Screening Value (mg/kg)**	**No. of Exceedances**	**Concentration Range (mg/kg)**	**Location of Exceedances (Depth in m)**
Lead	200.00	1 of 79 (1.27%)	276.00	4G-E3-V
Vanadium	410.00	5 of 79 (6.33%)	515.00 – 2400.00	4G-C2, 4G-F3, 4G-C7, 4G-D3, 4G-D7
Benzene	0.087	79 of 79 (100.00%)	0.18 – 1.80	All Samples
Benzo[b]fluoranthene	2.60	5 of 79 (6.33%)	2.94 – 7.74	4G-C1, 4G-C5, 4G-F1, 4G-D6, 4G-E6
Benzo[a]pyrene	2.20	3 of 79 (3.80%)	5.58 – 3.08	4G-C1, 4G-F1, 4G-E6
Dibenz(a,h)Anthracene	0.24	10 of 79 (12.66%)	0.24 – 1.26	4G-C1, 4G-C2, 4G-C3, 4G-C5, 4G-D2, 4G-F1, 4G-C7, 4G-D6, 4G-E5, 4G-E6

Chemical analysis of soil samples has identified concentrations higher than Residential with Plant Uptake S4ULs for lead, vanadium, benzene, benzo[b]fluoranthene, benzo[a]pyrene and dibenz(a,h)anthracene. Locations of the exceedances are shown on RLL Drawing 18669-RLL-26-XX-DR-O-0860-P01, presented in **Appendix A**.

79 of 79 samples were shown to exceed the screening criteria for benzene. It should be noted that only two samples had concentrations above the limit of detection for benzene. The detection limit for benzene tested listed by the laboratory was between 90µg/kg (74 samples), 180µg/kg (2 samples) or 1800µg/kg (1 sample) these are greater than the screening value of 87µg/kg (0.087mg/kg) and causes a significant skew in the results. Where samples are reported at the detection limit, for screening purposes, it has been conservatively assumed that the value is 90µg/kg, 180µg/kg or 1800µg/kg. The true concentration is likely to be significantly lower than this value.

The samples collected from the Made Ground were also assessed against the agreed soil re-use values (SRVs) presented Hannah Fraser Consulting Soils Validation Strategy (30937 R2, **Appendix E**). A summary of exceedances is presented in the following table, full screening is presented in **Appendix B**.

Summary of Exceedances of HFC Soil Re-Use Values:				
Contaminant	**No. of Exceedances**	**Location of Exceedances (Depth in m)**	**Exceedance Concentration Range (mg/kg)**	**Screening Value (mg/kg)**
Cyanide (total)	5 of 79 (6.33%)	4G-F1-V, 4G-E1, 4G-D5, 4G-D6, 4G-D7	2.41 – 7.38	2.02
Ammoniacal Nitrogen	12 of 79 (15.20%)	4G-C1-V, 4G-E2-V, 4G-F1-V, 4G-F2-V, 4G-C6-V, 4G-D1-V, 4G-E1-V, 4G-D5-V, 4G-E6-V, 4G-E4,V, 4G-F4-V, 4G-F5-V	155.00 – 1590.00	154.00
Iron (Total)	1 of 79 (1.27%)	4G-F7	452000.00	305000.00
Vanadium	1 of 79 (1.27%)	4G-C7	2400.00	1606.00
Fluoranthene	2 of 79 (2.53%)	4G-C1, 4G-E6	9.72 – 12.80	6.64
Benzo[b]fluoranthene	3 of 79 (3.80%)	4G-C1, 4G-F1, 4G-E6	4.89 – 7.74	3.42

Exceedances of HFC Soil Re-Use Values (SRVs) were recorded for cyanide, iron (total), vanadium, fluoranthene and benzo[b]fluoranthene from samples of the made ground; and ammoniacal nitrogen from the underlying natural ground. Exceedances of the HFC SRVs locations are shown on RLL Drawing 18669-RLL-26-XX-DR-O-0861-P01, **Appendix A**. It is considered that ammoniacal nitrogen is associated with the organic matter/ peat within the Tidal Flat Deposits.

More detailed information including the calculated reuse criteria is available in the Hannah Fraser Consulting Soils Validation Strategy (30937 R2, **Appendix E**).

Asbestos was identified in 5 samples from the 30 analysed; a summary of the asbestos identified is given in the below table.

Summary of Asbestos Identified within the Site		
Location (Depth in m)	**Asbestos Type**	**Quantification (%)**
4G-D5 (0.50)	Amosite	0.0035
4G-E5 (0.2)	Amosite	<0.001
4G-F3 (0.6)	Amosite	<0.001
4G-C1 (1.0)	Amosite	0.0077
4G-C5 (1.2)	Amosite	<0.001

Asbestos was identified in five samples; all positive samples were tested to ascertain the amount of asbestos tested and returned results of <0.001% to 0.0077%. The Institute of Occupational Medicine (IOM) risk assessment report for the reuse of soils containing asbestos at Llanwern (Ref. 401134-IOM-14-XX-RP-Z-0001) states that a minimum of 0.6m of clean soil (asbestos content <0.001%) will be placed across the Llanwern site. Soil will be screened and, if asbestos contamination is less than 0.02% (200PPM) in the soil, that soil may be used in residential areas below clean cover.

No groundwater samples have been taken from within the Site, however, samples taken from the wider development as part of previous investigations have identified elevated concentrations of contamination in line with the historical site usage. Elevated concentrations of contamination within on-Site soils also have the potential to leach and migrated into groundwater. A potential risk to Controlled Waters may therefore exist.

4.0 Conceptual Site Model

4.1. Potential Pollutant Linkages

This section provides a qualitative assessment of the risks posed from on-Site contamination sources identified from the information presented in the previous sections. The Conceptual Site Model (CSM) considers the findings of both the ground investigations/ surveys that have been undertaken at the Site and the Site's history. The CSM is based on current conditions at the Site and makes recommendations for likely remediation and mitigation measures that may be required.

The assessment carried out assumes that the Site will operate as a residential development comprising houses with gardens, therefore a 'residential end use with plant uptake' scenario has been used as the most conservative approach. Should the end-use or proposed layout be altered in any way, potential pathways and receptors should be re-assessed.

The CSM below has been developed based on the source-pathway-receptor model as detailed within the Environment Agency's Land Contamination Risk Management (LCRM, updated from CLR11 'Model Procedures for the Management of Land Contamination') guidance.

4.2. Sources

The Site makes up part of the former Llanwern Steelworks; the Site historically housed a part of a sinter plant along with various associated infrastructure and various conveyors and pipelines, in addition to roads and an open space area.

79 soil samples were collected during the Atkins 2018 ground investigation for contamination testing, all of which were taken from the Made Ground and underlying superficial deposits.

Chemical analysis of soil samples has identified concentrations higher than Residential with Plant Uptake S4ULs for lead, vanadium, benzene, benzo[b]fluoranthene, benzo[a]pyrene and dibenz(a,h)anthracene. Locations of the exceedances are shown on RLL Drawing 18669-RLL-26-XX-DR-O-0860-P01, presented in **Appendix A**.

Chemical analysis of soil samples has identified concentrations higher than the agreed soil re-use values (SRVs) for cyanide, ammoniacal nitrogen, iron (total), vanadium, fluoranthene and benzo[b]fluoranthene. Exceedance locations are shown on RLL Drawing 18669-RLL-26-XX-DR-O-0861-P01, **Appendix A.**

Asbestos was identified within five of the soil samples tested in the form of debris and loose fibres at concentrations of <0.001% to 0.0077%.

Potential contaminant sources are summarised in the following table.

Summary of Identified On Site Sources of Contamination		
Source	**Site Area**	**Key Contaminants**
Deep Made Ground, including slag material	Whole Site	Heavy metals, PAHs, TPH, cyanide. Potential for ground gas generation (methane and carbon dioxide).
Historical Steelworks infrastructure	Whole Site	Heavy metals, PAHs, TPH, cyanide
Made Ground	Isolated locations across the Site	Low concentrations of asbestos.
Natural Strata	Whole Site	Potential for ground gas (methane and carbon dioxide) from organic materials in the Tidal Flat Deposits Potential for ammoniacal nitrogen in the underlying Tidal Flat Deposits and sulphates and pyrites in the Mercia Mudstone Group.

4.3. Potential Pathways

Human Health

There is potential for exposure of Site users (future and proposed) to contaminants in soils via the following pathways, assuming a residential end use (based on the Environment Agency's *Updated Technical Background to the CLEA Model - SR3*):

- Direct soil and dust ingestion;
- Dermal contact with soil directly and indoor dust;
- Plant uptake followed by consumption of homegrown produce;
- Inhalation of vapours;
- Inhalation of dust; and
- Inhalation of gases.

The presence of contamination within the Site presents a potential risk to construction workers within the Site boundary, as such appropriate risk assessments and safety measures (use of PPE/ hygiene rules) will need to be enforced in order to provide adequate protection.

Controlled Waters

Currently Monk's Ditch crosses the wider development within a concrete channel and no connection with the private drainage system presently exists. It is proposed that the future surface water network of reens and lakes will discharge via a pumping system into Monk's Ditch. This on-site surface water system will discharge, via a permit, into Monk's Ditch once the specified quality criteria are met and the application to connect the system is approved.

As such, Monk's Ditch currently isn't a Receptor (it is understood to be hydraulically isolated as it flows between the Glan Llyn development and commercial land to the east within a concrete channel) although it could potentially be a future Receptor when the surface water discharge permit into the Monks Ditch is approved and then enacted.

Site monitoring of areas of site where earthworks have been undertaken show that the re-engineered Made Ground will be unlikely to enable a continuous groundwater horizon to exist. It is therefore considered unlikely that any significant groundwater flow will develop within the Made Ground.

With regard to controlled waters, the following pathways are considered applicable to the Site, following completion of the development and once relevant approvals have been granted to allow discharge into Monks Ditch:

- Leaching of soil-borne contamination in Made Ground and subsequent lateral migration through permeable pathways in Made Ground to Monks' Ditch via onsite reens.

No effective pathway was identified between the shallow perched water in the Made Ground and the deep groundwater within the Mercia Mudstone Secondary B Aquifer due to the low permeability of the clay-rich Tidal Flat Deposits.

Details relating to the Controlled Waters Risk Assessment are summarised in Section 5.0.

Structures

Concrete classification testing has not been undertaken. A Design Sulphate (DS) class and Aggressive Chemical Environment for Concrete (ACEC) class should be derived for the Site in accordance with the recommendations given within BRE SD1 and based on pH and sulphate testing.

Dependent on finished levels, it is considered likely that chemical resistant barrier pipes will be required.

A site-specific ground gas assessment is recommended following the earthworks. The classification of the Site will depend on the permeability of the upper clay of the Tidal Flat Deposits.

4.4. Potential Receptors

The following receptors (current and proposed) have been identified at the Site. Given the absence of significant ecological designations in the vicinity of the Site, ecological receptors are not considered below.

Humans:

- Construction workers and maintenance workers; and
- Residents on and off-site (current and future).

Controlled Waters:

- Mercia Mudstone Group (Secondary B Aquifer) and Tidal Flat Deposits (Secondary [Undifferentiated] Aquifer); and
- Monk's Ditch (once relevant approvals have been granted to allow discharge into Monk's Ditch).

Private Drainage System:

- The nearest proposed water feature comprises the private drainage system located on the northern Site boundary (Central Lake and East Lake).

Property:

- Existing and proposed buildings and services on and immediately surrounding the Site; and
- Proposed infrastructure on the Site.

4.5. Conceptual Site Model and Risk Assessment

Based on the information currently available, plausible pollutant linkages have been identified and a risk assessment has been undertaken for the Site. The estimation of the potential significance of each linkage is based on the proposed Site redevelopment, the mobility and the predicted magnitude of potential contaminants, and the nature of the identified migration/ exposure pathways.

4.6. Summary of Conceptual Site Model

The following table presents what are considered to be potential receptors for contamination both pre- and post- remediation. Should the end-use be altered, potential pathways and receptors should be re-assessed.

Risk levels have been determined according to the CIRIA Risk Classification Matrix (C552 CIRIA, 2001), presented in Table 5.

Summary of Pre-Remediation and Post Remediation Conceptual Site Model (CSM) for Phase 4E										
Sources	**Key Contaminants**	**Receptor**	**Pathway**	**Pre-Remediation**			**Post-Remediation**			
				Probability	**Consequence**	**Risk Level**	**Mitigation**	**Probability**	**Consequence**	**Risk Level**
Made Ground Contaminants within soil and generation of gases.	Inorganic substances (heavy metals/ asbestos) Organic Substances, petroleum hydrocarbons, PAHs, VOCs, SVOCs)	Human Health: Construction Workers End Users (on and off site)	Direct Contact – dermal contact, absorption through skin, ingestion. Inhalation of vapours (VOCs) from soil derived gas via Made Ground. Migration and build-up of carbon dioxide from soils derived gas via Made Ground (risk of asphyxiation). Inhalation of contaminants in soils/dust/fibres.	Likely	Medium	Moderate	During construction, appropriate PPE should be worn when coming into contact with arisings. The installation of a clean cover system shall sever the pathway between Made Ground and receptors. Additional post-remedial ground gas/ vapour assessment is required.	Low likelihood	Medium	Low
		Property: Future on Site Buildings Future on Site Infrastructure	Direct contact – contaminants in soils, soil derived dust, perched water and groundwater. Concrete in contact with aggressive ground.	Likely	Medium	Moderate	Additional post-remedial ground gas/ vapour assessment is required. Design of concrete in accordance with BRE Special Digest 1. Dependent on finished levels, it is likely that chemical resistant barrier pipes will be required.	Low likelihood	Medium	Low
			Migration and build-up of methane from soil derived gas via Made Ground (risk of explosion).	Likely	Medium	Moderate	Additional post-remedial ground gas/ vapour assessment is required to further assess the Site.	Low likelihood	Medium	Moderate / Low
		Controlled Waters: Secondary B Aquifer	Migration of leachable contaminants through shallow groundwater.	Likely	Medium	Moderate	Analysis of the groundwater data to validate the conclusions of the Controlled Waters Risk Assessment which	Low likelihood	Medium	Moderate / Low

Summary of Pre-Remediation and Post Remediation Conceptual Site Model (CSM) for Phase 4E										
Sources	**Key Contaminants**	**Receptor**	**Pathway**	**Pre-Remediation**			**Post-Remediation**			
				Probability	**Consequence**	**Risk Level**	**Mitigation**	**Probability**	**Consequence**	**Risk Level**
		Private Drainage System: Central Lake and East Lake					has shown the leachable effect of the Made Ground on the controlled waters receptors is acceptable. The proposed remediation and construction will reduce infiltration resulting in less soil interaction with perched water and therefore contaminant migration.			
		Flora and Fauna	Uptake through roots of contaminants in soils.	Low likelihood	Medium	Low	Importation of suitable topsoil material for use within garden areas and landscaped areas.	Unlikely	Medium	Low
Residual contaminants in groundwater	Inorganic substances (heavy metals) Organic substances (ammoniacal nitrogen, petroleum hydrocarbons, PAHs, VOCs, SVOCs)	Human health: Construction Workers End Users	Direct contact – dermal contact, absorption through skin, ingestion. Inhalation of vapours (VOCs) from soil derived gas via Made Ground.	Likely	Medium	Moderate	Appropriate PPE should be worn when coming into contact with perched water. Should potentially contaminated perched water be encountered during site works, it should be contained and disposed of off-site at a suitably permitted facility. Due to the depth of the groundwater and with the installation of clean cover, it is unlikely that residential end users will come into contact with it, therefore no viable pathway is present. Vapour resistant membranes may be	Low likelihood	Medium	Moderate / Low

Summary of Pre-Remediation and Post Remediation Conceptual Site Model (CSM) for Phase 4E										
Sources	**Key Contaminants**	**Receptor**	**Pathway**	**Pre-Remediation**			**Post-Remediation**			
				Probability	**Consequence**	**Risk Level**	**Mitigation**	**Probability**	**Consequence**	**Risk Level**
							required following a detailed site investigation and risk assessment.			
		Property: Future on Site Buildings Future on Site Infrastructure	Migration and build-up of soil/ water-derived vapours via Made Ground.	Low likelihood	Medium	Moderate	Additional post-remedial ground gas/ vapour assessment is required to further assess and zone the Site.	Unlikely	Medium	Low
		Controlled Waters: Secondary B Aquifer Private Drainage System: Central Lake & East Lake	Migration of contaminants through shallow groundwater.	Likely	Severe	Moderate	Remedial works to remove free product/ grossly contaminated soils and treatment of soils/ dissolved phase will significantly reduce the sources onsite reducing the risk to receptors. Low permeability of Tidal Flat Deposits means a viable pathway for downward migration is unlikely.	Low	Medium	Moderate / Low

5.0 Controlled Waters Detailed Quantitative Risk Assessment

5.1. RLL CWDQRA Summary

In 2019, RLL prepared a Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) for the wider Glan Llyn development site (**Appendix C**). This assessment incorporated a comprehensive dataset of concentrations of contamination recorded in soils across the development, and included data taken from the 2018 investigations within the Site. Screening analysis of soil, soil leachate, groundwater and surface water data revealed potential moderate to low levels of inorganic and organic contamination present onsite in line with contaminants associated with former steelworks sites. Made Ground comprising clayey sandy gravels with local slag, burnt shale, tarmac, concrete, brick and mudstone was found to be a potential source of contamination. Calculation of representative re-use criteria for a commercial end use was undertaken using a dilution assessment methodology based on the site-wide water balance, incorporating site specific permeability and infiltration parameters. No allowance was made for dilution of discharged waters within Monks' Ditch itself as part of this calculation as, this being the receptor, it is proposed that the water quality in this Controlled Water be maintained (as far as possible) at EQS values.

Comparison of re-use criteria against available soil chemical testing established that much of the Made Ground was likely to be suitable for re-use onsite, however, localised source materials existed containing higher concentrations of contamination (particularly elevated concentrations of iron, manganese and vanadium), and ammoniacal and cyanide components, may require remediation, or offsite disposal.

Further modelling of these contaminants was undertaken using Remedial Target Methodology (RTM) to assess the potential extent of attenuation of these specific determinands within the ground where these soils may be placed, with the receiving surface waters being assumed to be existing Blueways (reens), which were considered as the Compliance Points. The compliance point for the Business Park is at the pumping station and will require an enacted permit for discharge to occur.

Initial modelling was carried out by Atkins (Glan Llyn, Llanwern Controlled Waters Detailed Quantitative Risk Assessment dated February 2017), with this approach being adopted within later revisions of this Report in the Rodgers Leask, Controlled Waters Detailed Quantitative Risk Assessment, Glan Llyn (sitewide) Update (2019), using the Equation presented in the EA Table 5.2 – soil-water partitioning of the EA Remedial Targets Methodology Guidance (2006) where a pore-water concentration (Cp) was determined from soil concentration analyses to derive soil reuse criteria at the site as a whole. Subsequently, and purely to gauge the potential distance that re-engineered Made Ground could be placed from the respective Compliance

Point(s), further modelling was carried out for specific determinands using the EA RT Excel Worksheets, based on maximum and average soils concentrations determined within samples of re-engineered Made Ground and available site derived data.

Further modelling was carried out for specific determinands (including specific PAHs) using the EA Remedial Target Excel Worksheets, based on maximum and average soils concentrations did indicate that there was little attenuation of the initial porewater PAH concentrations on migration within the re-engineered Made Ground toward the nearest reen Receptors. However, the presence of elevated porewater PAH concentrations were only theoretical and based on calculated values derived using the Equation presented in the EA Table 5.2 – soil-water partitioning of the EA Remedial Targets Methodology Guidance (2006). Actual PAH concentrations determined more recently in groundwater samples recovered (where sufficient groundwater was available for sampling purposes), were generally lower, and potentially significantly lower, than the calculated values which were derived using soils analyses data. Additionally, as previously mentioned, there was little evidence obtained of hydraulicly continuous groundwater horizon(s) within the re-engineered Made Ground beneath areas proposed for residential and commercial development. Therefore, there have been no proven PAH (or other contaminant) migration pathways towards the reens.

As the data used within the CWDQRA has utilised ground investigation data taken from within the Site, it is therefore considered that the findings of this assessment are representative of the Site and therefore adoption of the calculated re-use criteria and recommendations presented within the CWQRA are appropriate. To confirm this RLL have prepared an addendum CWDQRA for Phase 4E, this is presented within **Appendix D**.

5.2. HFCL Glan Llyn: Soils Validation Strategy for Protection of Controlled Waters

Following queries from Natural Resources Wales (NRW), H F Consulting Limited (HFCL) were commissioned by RLL to assist with NRW liaison and reporting pursuant to the discharge of PC28. Following discussion with NRW, RLL and the developer, HFCL prepared a revised methodology for the validation of soils in relation to the protection of controlled waters.

The assessment included distance specific remedial targets that model the attenuation of contaminants in the saturated zone allowing for advection, dispersion, retardation and decay during transport. In addition to the inclusion of distance specific remedial targets, further statistical and spatial analysis was carried out on contaminants of concern.

More detail is provided in the HFCL Glan Llyn: Soils Validation Strategy for the Protection of Controlled Waters (30937 R2) (**Appendix E**).

6.0 Remediation Strategy

6.1. Remediation Approach

Based on the results of the previous ground investigations and CWDQRA, the key driver for the remediation of the Site is considered to be the removal of significant sources of contamination, below ground obstructions and re-engineering of Made Ground to reduce infiltration for the protection of surface waters and installation of a clean cover system for the protection of human health.

Encountered chemical exceedances of S4ULs Residential with Plant Uptake Criteria are shown on RLL Drawing 18669-RLL-26-XX-DR-O-0860-P01, exceedances of relevant SRVs are shown on RLL Drawing 18669-RLL-26-XX-DR-O-0861-P01, both in **Appendix A**.

The potential risks to controlled waters when a future connection exists has been assessed in an CWDQRA report included as **Appendix F** (18669-RLE-19-XX-RP-O-0006, dated August 2019), the methodology for assessing these risks has been presented in the Hannah Fraser Soils Validation Strategy for Protection of Controlled Waters (**Appendix E**).

Protection of human health will be achieved by breaking the pathway between the Made Ground and end user with the introduction of suitable clean cover or construction of hardstanding. Ground gas/ vapour protection may be required.

6.2. Remediation Specification

6.3. Proposed Sequence of Remediation Tasks

The sequence of deliverables listed below is proposed:

- Materials Management Plan to enable the movement and re-use of excavated and stockpiled materials in accordance with the limitations set out in this document.
- Removal of vegetation.
- Excavation and turnover of Made Ground to natural clay and removal of unsuitable material and buried obstructions.
- Disposal of impacted soils (where required).
- Chemical and geotechnical validation of the placement of material following turnover.
- Post remediation ground gas and vapour assessment with recommendations for mitigation (if required).
- Preparation of an enabling phase Remediation Validation Report.
- Regulator liaison and submission pursuant to the discharge of relevant planning conditions; and
- Onward housebuilder construction phase obligations to include.
    a. Placement and validation of a clean cover system (where required).

b. Provision and validation of appropriate gas/ vapour membranes in buildings (where required).
c. Designing of appropriate concrete for aggressive ground.
d. Installation of appropriate chemical resistant water pipes.

6.4. Removal of Obstructions

A Materials Management Plan (MMP) will be prepared to allow the on-site reuse of materials in accordance with the CL:AIRE Definition of Waste, Development Industry Code of Practice.

The recommended approach involves excavation of Made Ground to a depth where the natural underlying Tidal Flat Deposits are exposed. Obstructions, where encountered, shall be removed leaving only the supporting piles. Supporting piles shall be cropped at the level of the underlying natural geology.

The recyclable materials generated (i.e. concrete removed from floor slabs, foundations and buried structures) are to be moved to a material processing area where they will be screened, crushed and validated for re-use within the onward development, in accordance with the MMP. Appropriate revisions will be made to the approved MMP as required.

Asbestos has previously been encountered as free fibres in the Made Ground. Concrete shall therefore be assessed prior to crushing in order to limit the risk of asbestos contamination of crushed concrete stockpiles and care shall be taken to ensure it is not cross contaminated with Made Ground.

Drawing 18669-RLL-26-XX-DR-O-0862-P01 presented in **Appendix A** shows the location of buried obstruction encountered during the Phase 4E ground investigations. However, other unencountered buried obstructions may be present across the Site.

6.5. Visual Evidence of Contamination

As part of previous investigations, some visual and olfactory evidence of contamination has been identified within the Site (see Section 3.9). Additional caution and supervision should be taken when undertaking turnover within these areas. If any visual or olfactory evidence of contamination of soils or groundwater is encountered in these areas, it should either be treated or removed from Site in accordance with procedures outlined in Section 7.0.

Where visual or olfactory evidence of contamination is encountered during the turnover works, the soils shall be excavated with a watching brief to delineate and segregated in a separate stockpile. Subsequent suitability testing and assessment will be undertaken to determine if the material can be reused.

During remediation, if any unexpected evidence of contamination (i.e. free product or grossly impacted soils) the contractor should inform the Client's Engineer on and propose a method for its treatment that will allow re-use (at the supervising engineers discretion) or, options for off-site disposal.

6.6. Protection of Human Health

The remedial criteria adopted for the clean cover system at the Site are based on S4ULs (suitable for use levels) and C4SLs (category 4 screening levels) for a residential end use with plant uptake.

It is likely that human exposure to contaminants during the operational phase of the development will be restricted to inhalation of dust and dermal contact/ ingestion of contaminants within gardens, public open spaces and soil adhering to home grown produce. Risks to human health may be mitigated through either excavation of the contaminants, provision of clean cover, or construction of hardstanding (or a combination of these); this is intended to prevent exposure to these contaminants and thus break the pollutant linkages.

The overall philosophy for remediation of the Site with regards to protection of human health is therefore severance of linkage pathways, by means of the removal of significant sources of contamination from the sub-surface and installation of a clean cover system or hardstanding in order to provide a safe development platform. This includes a turnover strategy as part of the earthworks. Additional measures, such as the provision of clean cover, soil-gas protection, water pipe protection etc, are then to be provided by the future housebuilder.

6.7. Protection of Controlled Waters

The CWDQRA (**Appendix C**) has found that once remediation has been undertaken and the removal of any free product and highly contaminated soils has been completed in accordance with the remedial targets the Site is unlikely to pose a risk to controlled waters.

The ground investigation data has been assessed against the RLL criteria within the Phase 4E controlled waters risk assessment (**Appendix D**); however it is intended that the validation will be completed in accordance with, and in line with the criteria set out in, the Hannah Fraser Soils Validation Strategy (**Appendix E**).

RLL Drawing 18669-RLL-26-XX-DR-O-0861-P01 (**Appendix A**) shows the locations where exceedances of the HFC reuse screening criteria were recorded during the 2018 trial pitting, the re-use of materials exceeding the specified criteria should be done so in accordance with the Hannah Fraser Soils Validation Strategy (**Appendix E**).

Grids that are lacking trial pitting data were not investigated due to the presence of onsite obstructions, specifically stockpiles. These locations will be subject to further investigation and the findings will be documented in a separate validation report.

The earthworks will be validated in accordance with the Hannah Fraser Soils Validation Strategy (**Appendix E**).

To align with this strategy the works shall comprise the "*excavation of Made Ground materials, removal of materials unsuitable for re-use in the development platform, and re-compaction of suitable Made Ground materials as an engineered fill. A drainage layer, formed as part of the normal construction phase, will then be installed above the engineered fill layer, to reduce infiltration to the Made Ground*."

Following the earthworks operation Hydraulic conductivity rates will be reduced to 1 x 10^{-6} m/d or less for the engineered fill. These rates will be validated by taking at least three hydraulic conductivity measurements per phase, with a guide density of one test per 6.25 ha. During the construction phase a drainage layer will be placed comprising appropriate granular material and evidence of its installation layer will be a requirement of the construction phase.

A controlled waters validation report shall be prepared on completion of the earthworks to present the verification information relating to the remediation works undertaken on the Site relating to controlled waters.

6.8. Re-Use of Arisings

Trial pitting has been undertaken to assess and characterise the Made Ground for suitability for reuse as detailed in Section 3. The results were compared to S4ULs (suitable for use levels) and C4SLs (category 4 screening levels) for a residential end use with plant uptake presented in **Table 1** and **Table 2** included to the rear of this report.

Material present within the Site shall be reused where suitable, in accordance with an approved Materials Management Plan prepared in accordance with the CL:AIRE Definition of Waste, Development Industry Code of Practice.

Where material is not considered suitable for retention, it shall be transferred and re-used in the commercial phase of the development, in accordance with an approved Materials Management Plan prepared in accordance with the CL:AIRE Definition of Waste, Development Industry Code of Practice.

Where material is not suitable for either a residential or commercial end use, or during remediation, if any material exhibits previously unencountered significant evidence of contamination (i.e. free product or grossly impacted soils) the contractor should inform the Client's Engineer on and propose a method for its treatment that will allow re-use (at the supervising engineers discretion) or, options for off-site disposal.

The re-use of treated materials will be subject to regulatory approval and an approved Materials Management Plan prepared in accordance with the CL:AIRE Definition of Waste, Development Industry Code of Practice. On-site treatment and processing will be undertaken where possible to reduce contaminant concentrations so the arisings will be either:

- Suitable for shallow residential garden use (part of the clean cover layer);
- Suitable for re-use at depth (e.g. below the clean cover or within POS landscaped areas).

If treatment is required, then testing shall be undertaken at a frequency of 1 sample per 100m^3 and compared against the re-use screening criteria for the various potential end-uses detailed in **Table 1** and **Table 2** included to the rear of this report.

6.9. Materials Management Plan

In the interest of sustainability and in order to avoid the unnecessary transport of material from the Site to landfill, it is proposed to re-use the Made Ground and any recycled aggregates generated as part of the works. Re-use of material will be in accordance with the CL:AIRE's Definition of Waste, Development Industry Code of Practice (DoW:CoP). A compliant Materials Management Plan (MMP) will be prepared, or an existing one updated to include the requirements of this strategy.

Material movements shall be tracked by the Contractor on daily or weekly material tracking sheets, to include:

- Survey plans of material sources and destinations.
- Summaries of volumes and composition of materials moved.
- Associated chemical testing to demonstrate suitability.
- Locations and ongoing volumes of temporary stockpiles.

Material movement records shall be maintained by the Contractor on-Site for inclusion in the Validation Report.

6.10. Clean Cover System

To reasonably prevent contact between Site end users and contaminants within the Made Ground, a clean cover system shall be placed in gardens and areas of public open space. Following completion of the remediation works, gardens and POS areas shall be left >600mm below from Finished Floor Levels (FFL). This is to incorporate drainage arisings (150mm) and facilitate the installation of the clean cover system for residential gardens and public open spaces (POS), which will comprise a minimum of 600mm of suitable material. Material is considered suitable after being assessed against the criteria detailed in **Table 1** and **Table 2** at the rear of this document. Material proposed for reuse within residential gardens is to be assessed in accordance with **Table 1**. Material to be reused within public open

space near residential areas (i.e. landscaping for an apartment block) is to be assessed in accordance with **Table 2**.

The cover system will comprise suitable imported naturally occurring subsoil and topsoil and is to be placed by the onward developer. A Validation Report is required for the cover system and this shall be submitted to the regulators to satisfy planning conditions. It is advised that the onward developer shall also share details of the clean cover system with their chosen housing insurer (NHBC, LABC or equivalent) for approval in accordance with their guidance. The clean cover requirements for areas of public open space are anticipated to be 600mm of suitable material in accordance with **Table 2**.

6.11. Ground Gas Protection Measures

The assessment of ground gas protection measures is to be updated following the remedial works. The classification of the Site will depend on the permeability of the upper clay of the Tidal Flat Deposits, however there is also potential for ground gas to be generated from the Made Ground. A site-specific ground gas assessment is recommended following the earthworks. In accordance with BS8485:2015+A1:2019.

Risks from vapours has not been assessed as part of the 2018 ground investigation and will be assessed as part of the post remediation ground gas assessment detailed within this Remediation Strategy.

6.12. Risks to Construction Workers

Site workers are advised to follow normal health and safety procedures, including the use of suitable PPE (e.g. gloves and overalls) and following hygiene rules, particularly when handling the Made Ground. Contamination is present within the Made Ground (including asbestos), therefore specific contractor RAMS (with reference to guidelines presented in Control of Asbestos Regulations 2012) may need to be produced to mitigate the risks.

A watching brief should be maintained during excavation works as part of the development to check for the presence of previously unexpected contamination.

6.13. Onward Developer Actions

The following actions are deferred to the onward developer:

- Placement of a clean cover system (600mm), construction materials (including piling mat), soils in residential gardens and areas of public open space as part of the overall development;
- Validation of the thickness and chemical composition of soils placed in gardens (as part of the clean cover system) in accordance with NHBC (or equivalent housing insurer) recommendations;

- Provision of appropriate gas/ vapour membranes in buildings and validation in accordance with BS: 8485:2015+A1:2019 and CIRIA C735, if necessary;
- Designing concrete in accordance with BRE Special Digest 1 will prevent significant risks from concrete degrading if in contact with aggressive ground; and
- Installation of appropriate chemical resistant water pipes (if required).

6.14. Environmental Monitoring

The Construction Environmental Management Plan (Atkins, April 2014) should be read in conjunction with this section for the environmental monitoring requirements.

6.15. Surface Water Monitoring

Phase 4E is bounded to the north by East Lake and Kings Wall Reen which form part of the wider site drainage system, however, no connection between the site private drainage system and Monks Ditch currently exists. Surface water monitoring shall be undertaken from the wider private drainage system and from Monks Ditch at numerous appropriate locations across the site, shown on Drawing 18669-RLL-24-XX-DR-O-0544-P04 (**Appendix A**). Visual monitoring of the surface waters will be undertaken on a daily basis and chemical samples will be taken on a fortnightly basis.

The results of chemical analysis shall be compared against the EQS determinands detailed in **Table 4** at the end of this document.

6.16. Dust and Air Quality

Dust monitoring is required throughout the works as residential and commercial receptors are located near to the Site boundary on all sides. Monitoring locations are detailed in the Construction Environmental Management Plan (CEMP); however the locations shall be reviewed and adapted based on working areas and actual conditions encountered on Site.

6.17. Noise and Vibration

The Contractor will ensure that operations are undertaken in a manner considerate to sensitive receptors, including adjacent residential properties. This includes limiting noise and vibration as far as is reasonably practicable. Details of required monitoring are included in the CEMP.

7.0 Contingency for Unexpected Contaminated Soil

Should the Contractor or Employer's Environmental Engineer identify suspected areas of gross contamination, the suspected contaminated soils shall be excavated and stockpiled separately on polythene sheeting with appropriate bunding and suitably identified.

Contaminated soils shall be defined as soils exhibiting visual evidence of contamination (e.g. soils with hydrocarbon content above the saturation limit) or olfactory indications of contamination (e.g. organic odour indicative of hydrocarbons). Initial vapour screening of the impacted Made Ground/ natural deposits may be undertaken using a photoionization detector (PID), where visual or olfactory evidence of organic contamination is recorded.

Representative samples of affected soils shall be tested for the suspected contaminants of concern. The minimum number of samples will be five i.e. one from each side and one from the base of each excavation. As a minimum and dependent on contamination type, one sample shall be taken for every 10m along the side per contaminated horizon and one sample per 100m^2 base area. If the thickness of the contaminated zone is greater than 1.0m, one sample shall be taken per 1.5m of vertical face. Results shall be compared against the criteria detailed in the tables at the rear if this document, which will determine a suitable end-use and the material will be re-used accordingly (in accordance with the MMP). Should samples exceed the criteria, soils will be deemed unsuitable for re-use without liaison with the regulator and further risk assessment and/ or treatment. Any material deemed unsuitable following further risk assessment shall require treatment or disposal from the Site.

Should soils require disposal from the Site, the soil's chemical results shall be used to begin the assessment of the material as non-hazardous or hazardous waste. Waste Acceptance Criteria (WAC) testing may be required prior to off-site disposal. Material sent to landfill must be hauled by a registered waste carrier in accordance with the Waste Duty of Care: Code of Practice. The Contractor shall be responsible for keeping all records including waste transfer notes.

Validation testing of the sides and base of the resultant excavation shall be carried out by the appropriate monitoring Engineer, in accordance with Section 9 this document. The contaminated soils will be considered to have been successfully removed once the validation samples of the sides and base meet the respective criteria for re-use.

The extent and location of contaminated soils removed shall be surveyed and recorded by the Contractor.

8.0 Re-use of Site Won Material

8.1. Re-use of Site Generated Materials

In the interest of sustainability and in order to avoid the unnecessary transport of material from the Site to landfill, it is proposed to re-use the Made Ground and any recycled aggregates generated as part of the works, if proven to be suitable for reuse. Re-use of material will be in accordance with the CL:AIRE Definition of Waste, Development Industry Code of Practice. A compliant Materials Management Plan has previously been prepared for the wider site.

Material movements shall be tracked by the Contractor on daily or weekly material tracking sheets, to include:

- Survey plans of material sources and destinations.
- Summaries of volumes and composition of materials moved.
- Associated chemical testing to demonstrate suitability.
- Locations and ongoing volumes of temporary stockpiles.

Material movement records shall be maintained by the Contractor on Site for inclusion in the Validation Report.

8.2. Soil for Formation of Clean Cover

The placement of clean cover will be the responsibility of the onward housebuilder/ developer.

Subsoil and topsoil proposed for formation of capping layers shall be tested at source prior to import and subsequently tested on arrival to Site, and compared to screening criteria in **Tables 1** and **2** included at the rear of this document. Soils shall be tested at a frequency of one sample per 250m^3 and a minimum of four samples per import round.

8.3. General Site Fill Beneath Clean Cover

Suitable site won materials and existing validated stockpiled material may be used as general fill below formation level (i.e. below the clean cover), providing they are chemically suitable when compared with the criteria in **Table 3**. Soils that are impacted with free product or grossly contaminated will not be acceptable for re-use without further treatment/ assessment. Screened materials will be tested at a frequency of 1 sample per 500m^3 and compared against the screening criteria detailed at the rear of this document.

If asbestos is identified, through laboratory testing, dependent on the concentration, it shall be re-used in accordance with the depths detailed in the Institute of Occupational Medicine: Llanwern, Assessment of Asbestos Contamination at

Former Llanwern Steelworks Site. The report concludes that a minimum of 600mm of clean soil (the clean cover system) will be placed across the Site. Beneath the clean soils, Made Ground may be used in residential areas if asbestos contamination is less than 0.02% (200ppm) and used in commercial areas if asbestos contamination is less than 0.03% (300ppm).

Should material be found to contain contaminants above the re-use criteria, then the upper 95th percentile value (US^{95}) and upper confidence limit of the mean value may be used to assess the material for suitability for re-use subject to agreement with the Local Authority.

8.4. Offsite Disposal

Material sent to landfill must be hauled by a registered waster carrier in accordance with the Waste Duty of Care: Code of Practice. The Contractor shall be responsible for surveying the source areas of all off site material, recording volumes, relevant compliance and classification testing results and the keeping of records including waste transfer notes, consignment notes and material tracking sheets for inclusion in the Validation Report.

9.0 Validation

9.1. General

A validation plan detailing the various validation requirements for controlled waters, human health and onward developer actions has been prepared in a separate RLL report, 18669-RLL-26-XX-RP-O-0841-P01, dated May 2026 (**Appendix F**).

The remediation and/ or earthworks activities described in this strategy will be supervised full-time by the suitably qualified Monitoring Engineer. As an addendum to the sitewide Remediation Strategy, following consultation with Newport City Council and Natural Resources Wales, technical notes have been prepared to capture additional relevant phase specific information as part of the validation exercise. The technical notes prepared as an addendum to the Remediation Strategy are described and presented as appendices in the RLL Validation Plan Report 18669-RLL-26-XX-RP-O-0841-P01, dated May 2026. Technical Note 0192, ref. 18669-RLL-22-XX-RP-O-0192 presents additional information relating to the remediation strategy and the setting out the process to collect additional validation information to assess the contamination status of the formation surface. Technical Note 260, ref. 18669-RLL-22-XX-RP-O-0260 presents a validation plan to assess the hydraulic conductivity of the reengineered Made Ground outlined within the CWDQRA.

The re-use of materials in relation to controlled waters should validated in accordance with the Hannah Fraser Soils Validation Strategy (**Appendix E**).

Remediation shall be confirmed using the methodology presented in the Validation of Remediation of Land Contamination - Science Report SC030114/R1 (Environment Agency, 2010).

A Validation Report shall be prepared on completion of the works. The Validation Report will be submitted to the Local Planning Authority pursuant to the discharge of relevant planning conditions.

Post-remediation ground gas/ vapour monitoring will be required to further zone the Site with regard to the required gas/ vapour protection measures.

9.2. Validation of Turnover

Turnover works will be undertaken under a full-time watching brief by the Monitoring Engineer. Material exhibiting visual or olfactory evidence of contamination will be segregated and further assessed. Records of wider material movements will also be kept and detailed within the MMP.

Non-targeted grid validation sampling shall be undertaken at a frequency of 1 sample per 500m^3 of placed material. Formation level is to be left up to 600mm

below final floor level (FFL) to account for the placement of clean cover. Soil samples shall be compared to the following criteria.

- Made Ground used within residential gardens as part of the clean cover system (i.e. above formation level) shall be compared with the criteria detailed in **Table 1**;
- Made Ground used within public open space as part of the clean cover system (i.e. above formation level) within or near a residential area shall be compared with the criteria detailed in **Table 2**;
- Made Ground used underlying residential areas at depth (i.e. below the cover system) shall be compared with the criteria detailed in **Table 3**; and
- A 600mm clean cover system will be placed across the Site. Beneath the clean soils, Made Ground may be used in residential areas if asbestos contamination is less than 0.02% (200ppm).

Validation will generally comprise the following procedure:

I. Delineation of Unexpected Contamination (if encountered)

Material exhibiting evidence of visual or olfactory gross contamination will be removed. A photo ionization detector (PID) should be used to determine the extent of the contamination. Soil sampling and testing shall be undertaken until the results meet the respective re-use criteria detailed in **Table 1** and **Table 2** and the material is not grossly impacted, at which point the extent of the potential hot spot will be regarded as having been delineated.

II. Excavation of Contaminated Material

Material which does not meet the re-use criteria detailed in the tables at the rear of this document or is visually impacted with free product/ grossly impacted will be removed by the Contractor and stockpiled on-site for further assessment/treatment; if necessary the material will be removed from Site. The extent of the excavation may be increased should it be deemed necessary, for example, if further visual or olfactory evidence of significant contamination is present.

III. Hot-Spot Validation Sampling (if required)

Soil samples will be obtained for validation testing on the sides and base of the hot-spot excavation following soil removal. Samples will be tested for the contaminants that did not meet the respective criteria at that particular hot-spot location.

The minimum number of samples will be five i.e. one from each side and one from the base of the excavation. As a minimum, and dependent on

contamination type, one sample shall be taken for every 10m along the side per contaminated horizon and one sample per 100m^2 base area. If the thickness of the contaminated zone is greater than 1m, one sample shall be taken per 1.5m of vertical face.

If validation samples do not meet the criteria, further soil will be excavated horizontally and vertically and additional validation samples taken. The procedure will be repeated until samples meet the remedial targets. Any deviation from the above methods will require liaison and approval from the regulator.

IV. Survey

The extent of the excavation will be surveyed to Ordnance Datum (co-ordinates and levels) and a plan produced showing the location of relevant samples taken. Obstructions left in-situ will also be recorded on the survey.

An as dug survey will also be completed for the whole area of the earthworks across the Site showing depth of excavation / turnover per 5m grid and increased survey points array for any deeper excavations.

V. Sampling, Sample Transfer and Analytical Laboratories

Soils for chemical testing shall be sampled in accordance with the following British and Eurocode Standards, BS 10175:2011+A2 2017 – 'Investigation of potentially contaminated Sites – Code of practice', Eurocode 7, and the BS 5930:2015 – 'Code of Practice for Site investigations – Incorporating Amendment No.2' for contamination testing and for geotechnical testing.

Sample containers required for soils shall include vials for volatile organic compound (VOC) testing, amber jars for hydrocarbon testing and a 1kg sized plastic containers for testing of metals and asbestos screening.

Soil, groundwater and surface water samples are to be stored in a cool box, maintained at a temperature between 2°C and 4°C in darkness and shall be transported under these conditions to the accredited laboratory.

Internal and external laboratories shall be UKAS/ MCERTS (or equivalent) accredited or it shall be demonstrated that appropriate quality systems have been implemented in lieu of accreditation for non-accredited tests.

9.3. Validation of Clean Cover

It is proposed that clean cover in residential areas shall be placed as part of the construction of each plot. The clean cover shall be 600mm thick and comprise suitable construction materials, imported naturally occurring subsoil and topsoil.

Clean cover will also be required in areas of public open space within the residential and commercial development of 600mm thickness.

Placement and validation of the clean cover layer, either construction materials or soils in residential gardens, shall be undertaken by the housebuilder in accordance with requirements of the regulators and NHBC.

9.4. Geotechnical Validation

Excavated material will be placed, compacted and tested for compliance with a phase specific Earthworks Specifications. Areas of deeper Made Ground, fill and remnant structures will be surveyed and recorded on a drawing.

10.0 Supervision and Reporting

The post-demolition and remediation works described in this report shall be supervised by the suitably qualified Monitoring Engineer.

Survey plans and test results shall be presented within the Validation Report.

The Contractor shall be responsible for obtaining the necessary licences, permits and consents for the works (correspondence shall be forwarded to the Employer' Environmental Engineer) with the exception of the Materials Management Plan and associated Declaration to CL:AIRE, which shall be updated by the Employer's Environmental Engineer upon regulatory approval of this Remediation Strategy.

The Contractor shall maintain records of:

- Survey plans and material tracking of the movements of material from source to final destination.
- Base of excavation and obstruction survey.
- Type and volumes of any materials removed from the Site for disposal, together with the Duty of Care documentation / waste transfer notes.
- Geochemical and geotechnical sampling locations,
- Records of the works including Daily Records Sheets.
- Health and Safety documentation.
- Noise and dust monitoring carried out.
- Records of the complaints received regarding noise and dust.

The Contractor's Environmental Engineer will prepare a Validation Report for the remedial works undertaken under their supervision. The Validation Report shall be compliant with the Environment Agency's Land Contamination Risk Management (LCRM) guidance and 'Verification of remediation of land contamination (SC030114/R1)', providing the following:

- Details of the earthworks and material movements completed.
- Details of hot-spots/ contaminated material removal (if required),
- Details of the validation and verification analytical testing.

The Validation Report shall be submitted to the regulatory authorities to satisfy the requirements of the planning permission with respect to contamination issues. The report will also contain all earthworks testing data, proof of compliance with the targets and all survey data.

Tables

Table 1: Assessment Criteria for Clean Cover in Residential Gardens (600mm): Residential End Use with Homegrown Produce

Category	Determinand	Criteria mg/kg			Source
	Arsenic	37			a
	Boron	290			b
	Cadmium	26			a
	Chromium VI	6			b
	Chromium III	910			b
	Lead	200			a
	Elemental Mercury	1.2			b
	Inorganic Mercury	40			b
	Methyl Mercury	11			b
	Nickel	130			b
	Selenium	250			b
	Beryllium	1.7			b
	Copper	2400			b
	Vanadium	410			b
	Zinc	3700			b
Soil Organic Matter Content (SOM) dependent		**SOM 1%**	**SOM 2.5%**	**SOM 6%**	
Phenols	Phenol	120	200	380	b
Petroleum Hydrocarbons	Aliphatic EC 5-6	42	78	160	b
	Aliphatic EC>6-8	100	230	530	b
	Aliphatic EC>8-10	27	65	150	b
	Aliphatic EC>10-12	130 (48)[vap]	330 (118)[vap]	760 (283)[vap]	b
	Aliphatic EC>12-16	1100 (24)[sol]	2400 (59)[sol]	4300 (142)[sol]	b
	Aliphatic EC>16-35	65000 (8.48)[sol]	92000 (21)[sol]	110000	b
	Aliphatic EC>35-44	65000 (8.48) [sol]	92000 (21) [sol]	110000	b
	Aromatic EC 5-7 (Benzene)	70	140	300	b
	Aromatic EC>7-8 (Toluene)	130	290	660	b
	Aromatic EC>8-10	34	83	190	b
	Aromatic EC>10-12	74	180	380	b
	Aromatic EC>12-16	140	330	660	b
	Aromatic EC>16-21	260	540	930	b
	Aromatic EC>21-35	1100	1500	1700	b
	Aromatic EC>35-44	1100	1500	1700	b
	Aliphatic + Aromatic EC>44-70	1600	1800	1900	b
Polycyclic Aromatic Hydrocarbons	Acenaphthene	210	510	1100	b
	Acenaphthylene	170	420	920	b
	Anthracene	2400	5400	11000	b
	Benz(a)anthracene	7.2	11	13	b
	Benzo(a)pyrene	2.2	2.7	3.0	b
	Benzo(b)fluoranthene	2.6	3.3	3.7	b
	Benzo(ghi)perylene	320	340	350	b
	Benzo(k)fluoranthene	77	93	100	b
	Chrysene	15	22	27	b

Category	Determinand	Criteria mg/kg			Source
	Dibenzo(a,h) anthracene	0.24	0.28	0.3	b
	Fluoranthene	280	560	890	b
	Fluorene	170	400	860	b
	Indeno(1,2,3cd) pyrene	27	36	41	b
	Naphthalene	2.3	5.6	13	b
	Phenanthrene	95	220	440	b
	Pyrene	620	1200	2000	b
Chloroalkanes & alkenes	1,2-Dichloroethane	0.0071	0.011	0.019	b
	1,1,1-trichloroethane	8.8	18	39	b
	1,1,2,2 Tetrachloroethanes (PCA)	1.6	3.4	7.5	b
	1,1,1,2 Tetrachloroethanes (PCA)	1.2	2.8	6.4	b
	Tetrachloroethene (PCE)	0.18	0.39	0.90	b
	Tetrachloromethane (Carbon Tetrachloride)	0.026	0.056	0.13	b
	Trichloroethene (TCE)	0.016	0.034	0.075	b
	Vinyl Chloride (chloroethene)	0.00064	0.00087	0.0014	b
BTEX	o-xylene	60	140	330	b
	m-xylene	59	140	320	b
	p-xylene	56	130	310	b
	Toluene	130	290	660	b
	Ethylbenzene	47	110	260	b
	Benzene	0.087	0.17	0.37	b
	Asbestos	Zero fibres			

Source of Criteria

Category 4 Screening Level (C4SL)
LQM/CIEH Suitable for Use Level (S4UL)

Notes

Organic matter content does not affect assessment criteria for metals
Arsenic S4UL is based on a comparison of oral and dermal soil exposure with oral Index Dose.
Cadmium C4SL is based on lifetime exposure
Beryllium S4UL is based on comparison of inhalation exposure with inhalation TDI
Chromium VI S4UL are based on localised effects comparing inhalation exposure with inhalation ID only
Values for total xylene should be compared with the most protective S4UL for xylene
Methyl mercury is not a routine contaminant but a S4UL has been generated for Sites where this may be present due to past industrial use. Unless methyl and elemental mercury is suspected to be present, a total mercury concentration can be compared with the GAC for inorganic mercury.
^{vap} S4UL presented exceeds the vapour saturation limit, which is presented in brackets.
^{sol} S4UL presented exceeds the solubility limit, which is presented in brackets.
All assessment criteria assume no free phase contamination is present.

Table 2: Assessment Criteria for Clean Cover in POS Near Residential Houses (300mm): Residential End Use without Homegrown Produce

Category	Determinand	Criteria mg/kg			Source
Metals*	Arsenic	79			a
	Boron	21000			b
	Cadmium	220			a
	Chromium VI	7.7			b
	Chromium III	1500			b
	Lead	630			a
	Inorganic Mercury	120			b
	Nickel	230			b
	Selenium	1100			b
	Beryllium	2.2			b
	Copper	12000			b
	Vanadium	2000			b
	Zinc	81000			b
Soil Organic Matter Content (SOM) dependent		**SOM 1%**	**SOM 2.5%**	**SOM 6%**	
Phenols	Phenol	440dir (10000)	690dir (10000)	1300dir (10000)	b
Petroleum Hydrocarbons	Aliphatic EC 5-6	570000 (304) sol	590000	600000	b
	Aliphatic EC>6-8	600000	610000	620000	b
	Aliphatic EC>8-10	13000	13000	13000	b
	Aliphatic EC>10-12	13000	13000	13000	b
	Aliphatic EC>12-16	13000	13000	13000	b
	Aliphatic EC>16-35	250000	250000	250000	b
	Aliphatic EC>35-44	250000	250000	250000	b
	Aromatic EC 5-7 (Benzene)	56000	56000	56000	b
	Aromatic EC>7-8 (Toluene)	56000	56000	56000	b
	Aromatic EC>8-10	5000	5000	5000	b
	Aromatic EC>10-12	5000	5000	5000	b
	Aromatic EC>12-16	5100	5100	5000	b
	Aromatic EC>16-21	3800	3800	3800	b
	Aromatic EC>21-35	3800	3800	3800	b
	Aromatic EC>35-44	3800	3800	3800	b
	Aliphatic + Aromatic EC>44-70	3800	3800	3800	b
Polycyclic Aromatic Hydrocarbons	Acenaphthene	15000	15000	15000	b
	Acenaphthylene	15000	15000	15000	b
	Anthracene	74000	74000	74000	b
	Benz(a)anthracene	29	29	29	b
	Benzo(a)pyrene	5.7	5.7	5.7	b
	Benzo(b)fluoranthene	7.1	7.2	7.2	b
	Benzo(ghi)perylene	640	640	640	b
Polycyclic Aromatic Hydrocarbons	Benzo(k)fluoranthene	190	190	190	b
	Chrysene	57	57	57	b
	Dibenzo(a,h) anthracene	0.57	0.57	0.58	b

Category	Determinand	Criteria mg/kg			Source
	Fluoranthene	3100	3100	3100	b
	Fluorene	9900	9900	9900	b
	Indeno(1,2,3cd)pyrene	82	82	82	b
	Naphthalene	4900	4900	4900	b
	Phenanthrene	3100	3100	3100	b
	Pyrene	7400	7400	7400	b
Chloroalkanes & alkenes	1,2-Dichloroethane	29	29	29	b
	Trichloroethene (TCE)	120	120	120	b
	Vinyl Chloride (chloroethene)	3.5	3.5	3.5	b
BTEX	o-xylene	41000	42000	43000	b
	m-xylene	41000	42000	43000	b
	p-xylene	41000	42000	43000	b
	Toluene	56000	56000	56000	b
	Ethylbenzene	24000	24000	25000	b
	Benzene	72	72	73	b

Source of Criteria

a Category 4 Screening Level (C4SL)

b LQM/CIEH Suitable for Use Level (S4UL)

Notes

- Organic matter content does not affect assessment criteria for metals
- Arsenic S4UL is based on a comparison of oral and dermal soil exposure with oral Index Dose.
- Cadmium C4SL is based on lifetime exposure
- Beryllium S4UL is based on comparison of inhalation exposure with inhalation TDI
- Chromium VI S4UL are based on localised effects comparing inhalation exposure with inhalation ID only
- Values for total xylene should be compared with the most protective S4UL for xylene
- Methyl mercury is not a routine contaminant but a S4UL has been generated for Sites where this may be present due to past industrial use. Unless methyl and elemental mercury is suspected to be present, a total mercury concentration can be compared with the GAC for inorganic mercury.
- ^{vap} S4UL presented exceeds the vapour saturation limit, which is presented in brackets.
- ^{sol} S4UL presented exceeds the solubility limit, which is presented in brackets.
- All assessment criteria assume no free phase contamination is present.

Table 3: Hannah Fraser Consulting Soils Validation Strategy for Protection of Controlled Waters – Agreed Soil Re-use Values (SRVs)

Determinand	Residential Area
	Soil re-use values (mg/kg)
Inorganic Metals and Metalloids	
Arsenic	2533
Cadmium	73
Chromium	9431
Copper	451
Iron	3.05E+5
Lead	1.57E+4
Manganese	3.33E+4
Mercury	132
Nickel	1.15E+4
Selenium	702
Vanadium	1606
Zinc	1.38E+5
Other Inorganics	
Ammoniacal Nitrogen	154
Cyanide	2.02
Organics	
Benzene	3.80
Toluene	128
Ethylbenzene	80
Xylene	74
Phenol	3.05
TPH Criteria Working Group	
Aliphatics >C5-C6	73
Aliphatics >C6-C8	359
Aliphatics >C8-C10	2841
Aliphatics >C10-C12	2.25E+4
Aliphatics >C12-C16	4.50E+5
Aliphatics >C16-C21	5.66E+7
Aliphatics >C21-C35	5.66E+7
Aliphatics >C35-C44	5.66E+7
Aromatics >EC5-EC7	8.51
Aromatics >EC7-EC8	177
Aromatics >EC8-EC10	144
Aromatics >EC10-EC12	227
Aromatics >EC12-EC16	451
Aromatics >EC16-EC21	1424
Aromatics >EC21-EC35	1.13E+4
Aromatics >EC35-EC44	1.13E+4
Aromatics >EC40-EC44	1.13E+4
Polyaromatic Hydrocarbons	
Acenaphthylene	16.7
Acenaphthene	30
Anthracene	34
Benz(a)anthracene	607
Benzo(a)pyrene	34
Benzo(b)fluoranthene	3.42
Benzo(k)fluoranthene	5.05
Benzo(g,h,i)perylene	13
Chrysene	621
Dibenzo(a,h)anthracene	838
Indeno(1,2,3-cd)pyrene	25
Fluoranthene	6.64
Fluorene	27
Naphthalene	27
Phenanthrene	27
Pyrene	76

Table 4: Surface Water Testing Suite and Relevant Critical Criteria

Contaminant	Unit	Freshwater EQS*/Gwent Levels SSSI WQS**
pH	-	6-9*
Cyanide, total	mg/l	0.001*
Ammonia	mg/l	0.2*
Ammoniacal Nitrogen as NH4	mg/l	1.1**
Nitrate as NO3	mg/l	-
Sulphate	mg/l	300**
Arsenic	mg/l	0.05*
Barium	mg/l	-
Beryllium	mg/l	-
Boron, Water Soluble	mg/l	2*
Cadmium	mg/l	0.00015*
Chromium	mg/l	0.0034*
Copper	mg/l	0.001*
Iron	mg/l	1*
Lead	mg/l	0.0012*
Mercury	mg/l	0.00007*
Nickel	mg/l	0.004*
Selenium	mg/l	-
Vanadium	mg/l	0.02*
Zinc	mg/l	0.0109*
Manganese	mg/l	0.123*
TPH-CWG split banding	mg/l	0.01*
Naphthalene	mg/l	0.002*
Acenaphthylene	mg/l	0.00000017*
Acenaphthene	mg/l	0.00000017*
Chrysene	mg/l	0.00000017*
Benzo(b)fluoranthene	mg/l	0.000017*
Benzo(k)fluoranthene	mg/l	0.000017*
Benzo(a)pyrene	mg/l	0.00000017*
Indeno(1,2,3-c,d)pyrene	mg/l	-
Dibenzo(a,h)anthracene	mg/l	-
Fluorene	mg/l	-
Phenanthrene	mg/l	0.00000017*
Anthracene	mg/l	0.0001*
Fluoranthene	mg/l	0.0000063*
Pyrene	mg/l	-
Benzo(a)anthracene	mg/l	0.000017*
Benzo(g,h,i)perylene	mg/l	0.0000082*
PAH 4, Total	mg/l	-
Benzene	mg/l	0.01*
Toluene	mg/l	0.074*
Phenol	mg/l	0.0077*

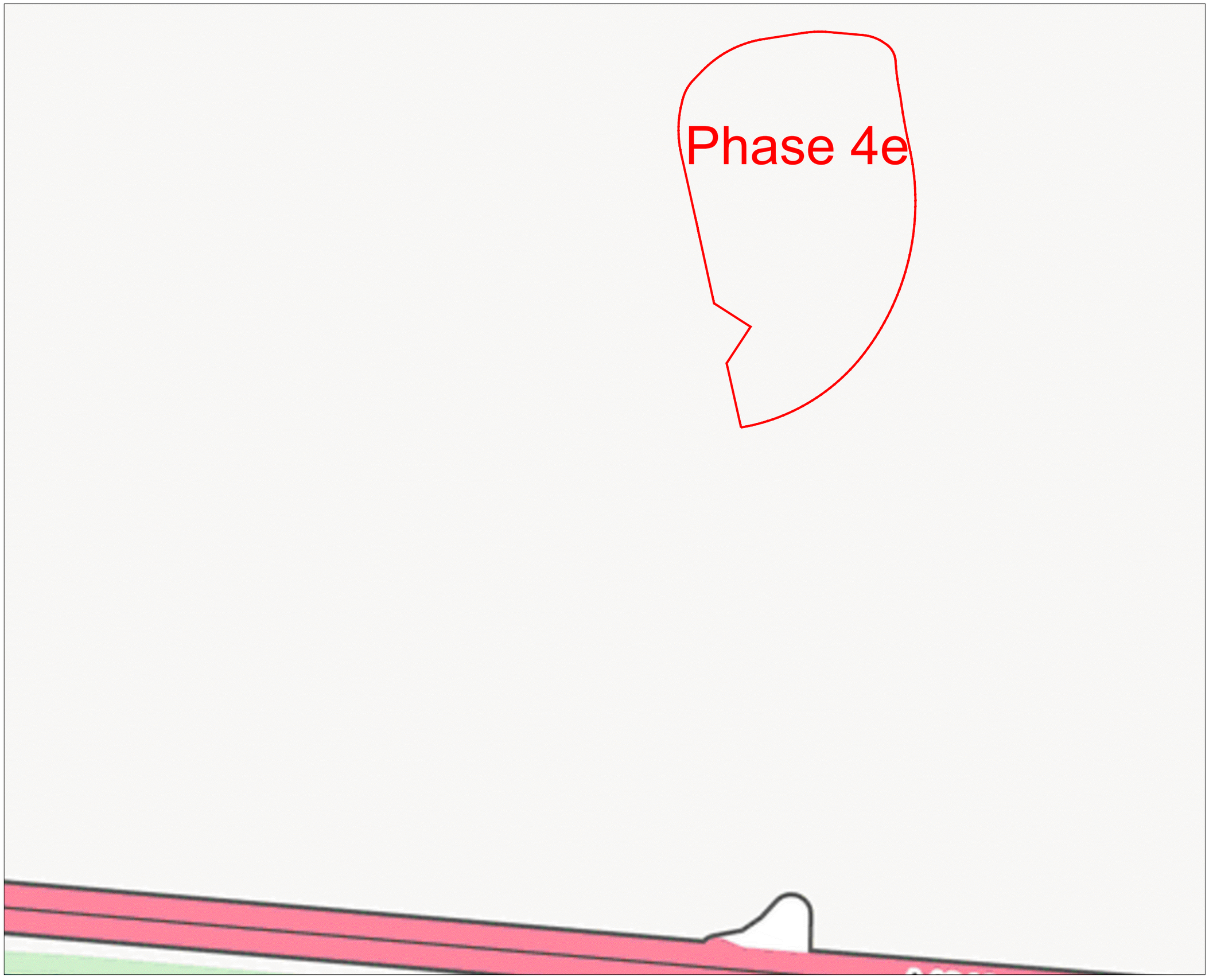
Notes: Assuming CaCO3 100-200mg/l where relevant.

Table 5: Risk Classification Matrix (C552 CIRIA, 2001)

Risk Classification Matrix					
(CIRIA C552, 2001, Page 82)		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High	High	Moderate	Moderate
	Likely	High	Moderate	Moderate / Low	Low
	Low Likelihood	Moderate	Moderate / Low	Low	Very Low
	Unlikely	Moderate / Low	Low	Very Low	Very Low

Appendices

Appendix A – Drawings and Plans



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

Approximate Site Boundary

Rev	Date	Amendments	By	Chk

Client

St Modwen Developments

Project

P18-669 Llanwern Reclamation

Drawing Title

Phase 4e

Site Location Plan

INFORMATION

	Drawn	Checked	Date
1:1250 @ A1	AMS	CW	28.10.24

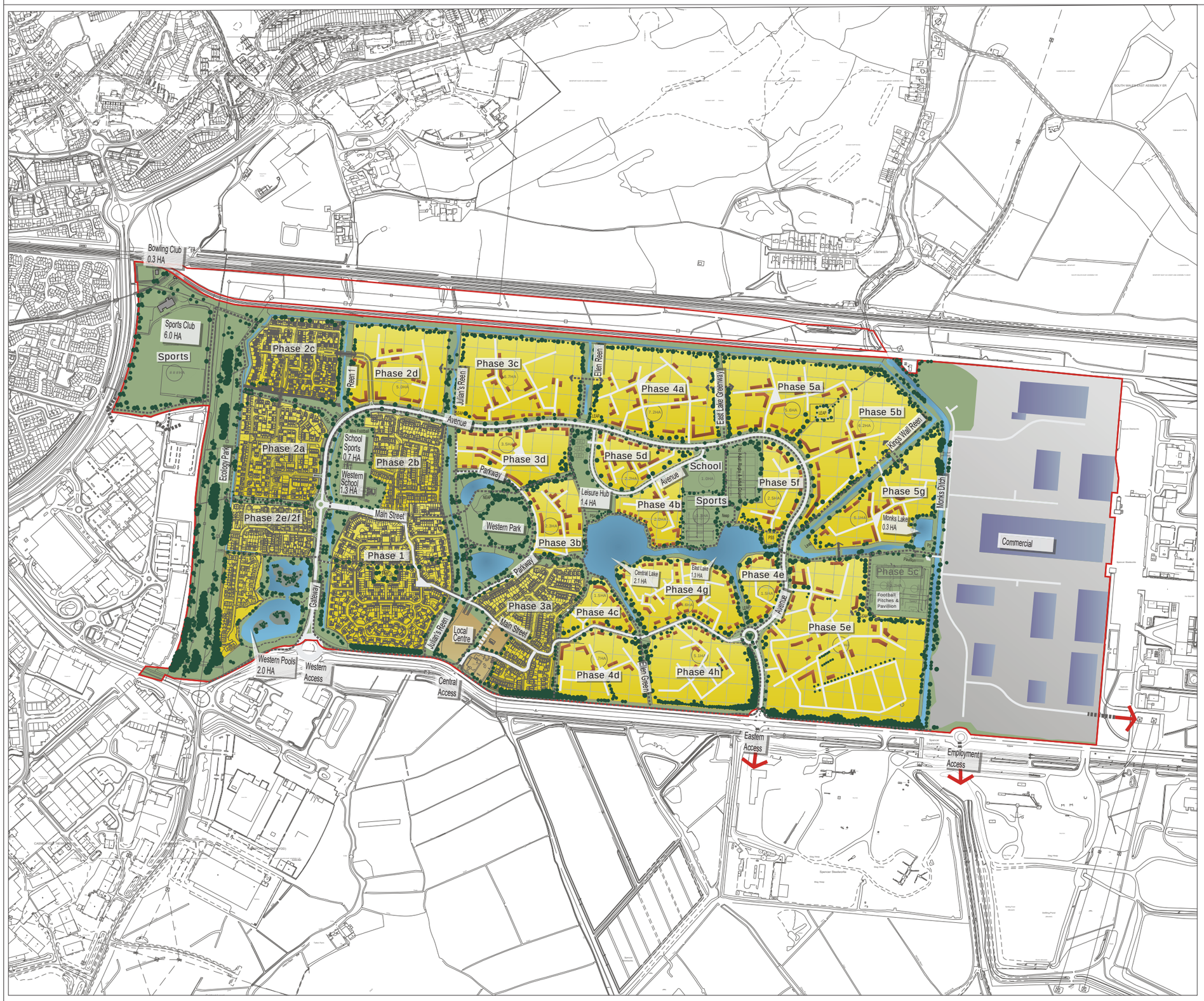
Drawing No. Rev.

18669-RLL-24-XX-DR-O-0657 P01

Copyright © Rodgers Leask Limited

Seven House ● 18 High Street ● Longbridge ● B31 2UQ ● Tel: 0121 475 8462 ● Fax: 01332 291728 ● www.rodgersleask.co.uk

Glan Llyn -ESAMP Indicative Masterplan



Glan Llyn Residential Numbers (based on existing masterplan)					
Phase/Plot	Outlet	Area (HA)	Area (Acres)	Density (HA)	Total Units
1	Persimmon	**9.77**	**24.15**	31.4	307
2/a	Bellway	5.20	12.84	35	182
2/b	SMH	4.06	10.02	35	142
2/c	Bellway	4.30	10.62	35.3	152
2/d	Persimmon	4.98	12.30	35	174
2/e&f	SMH	5.10	12.61	29.8	152
1 and 2/Total		**33.40**	**82.54**		**1109**
3a		5.86	14.49	35	205
3b		2.32	5.74	35	81
3c		6.72	16.60	38.1	256
3d		3.45	8.53	35	121
3 Total		18.36	45.36		663
4a		7.19	17.78	34.8	250
4b		2.04	5.04	35	71
4c		1.53	3.78	35	54
4d		3.65	9.03	35	128
4e		1.49	3.68	35	52
4f		-	-	-	-
4g		4.64	11.46	35	162
4h		5.15	12.73	35	180
5a		5.65	13.95	35	198
5b		6.23	15.41	35	218
5c	Sports	2.67	6.60	35	93
5d		2.24	5.53	35	78
5e		13.72	33.90	35	480
5f		2.49	6.15	35	87
5g		5.06	12.50	35	177
4 and 5/Total		**63.75**	**157.53**		**2230**
1,2,3,4,5 Total		**115.51**	**285.44**		**4002**

NOTE: Areas and housing numbers assume that plot 5c sports is moved to CBP and converted to resi

SGP
Architects + Masterplanners

Waterfront House,
2a Smith Way, Grove Park,
Enderby, Leicester,
LE19 1SX
t: +44 (0)116 247 0557
www.stephengeorge.co.uk

SGP File Ref: 8111-08-A011
Project No: 8111-08
Drawn By: NV
Date: 10/04/2019

Drawing No: 8111-08-A011
Rev: Rev P09
Scale: 1:5000 @A1

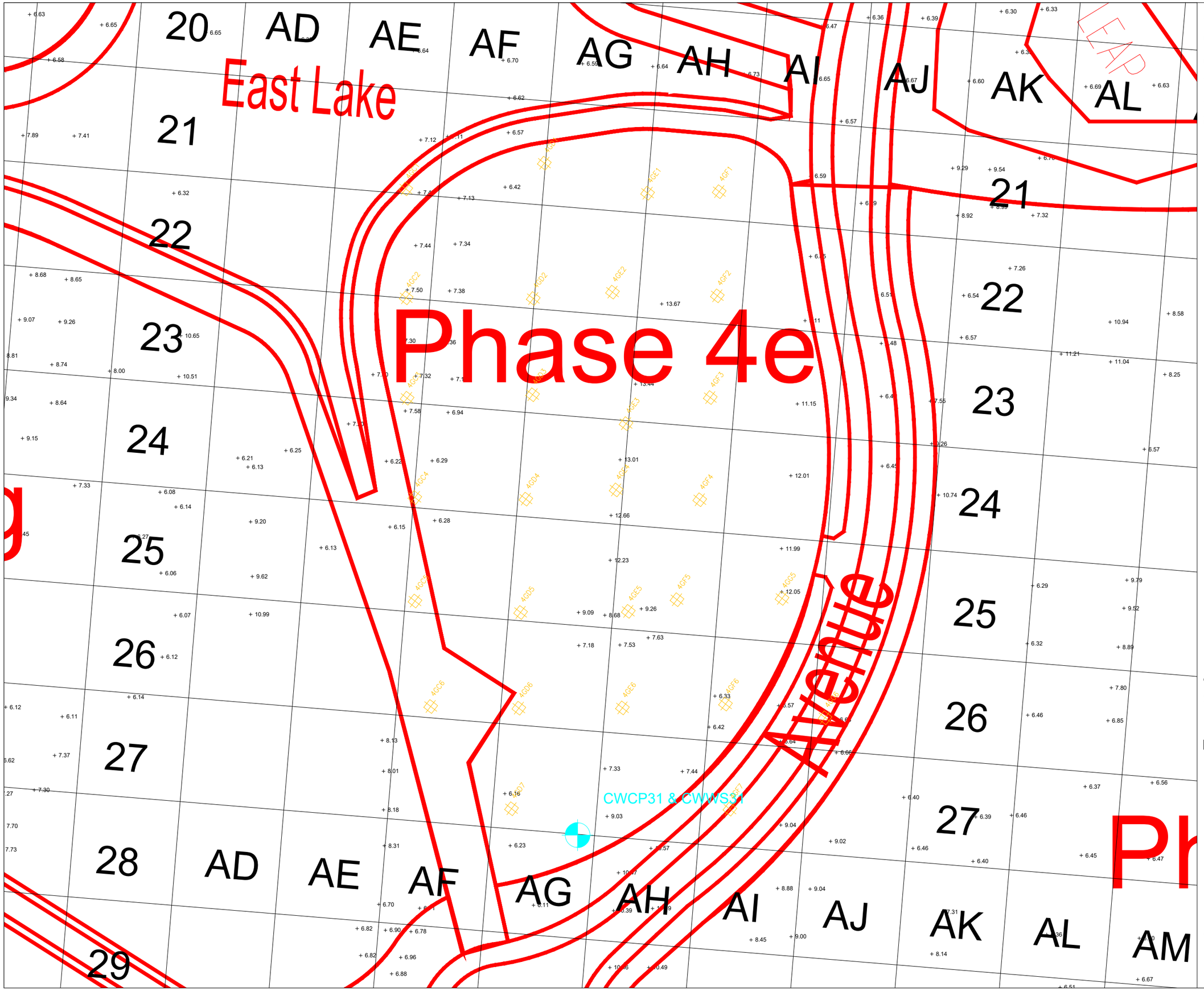
Notes:
Residential areas quoted are approximate gross site areas and include Leaps, Laps and on plot road infrastructure

Notes:
Residential areas quoted are approximate gross site areas and include Leaps, Laps and on plot road infrastructlayture

0 50 100 200 250 300 400 500
Metres at scale 1:5000

ST.MODWEN

This drawing, the works and concepts depicted are copyright of Stephen George + Partners LLP and may not be reproduced or made use of, either directly or indirectly without express written consent. Do not scale off this drawing. All heights, levels, sizes and dimentions to be checked on site before any work is put to hand.



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

PHASE BOUNDARY

CWRA BOREHOLE

ATKINS TRIAL PITS

Rev	Date	Amendments	By	Chk
A	22:12:22	Atkins TPs Added	SR	CW

Client

ST Modewn Developments

Project

P18-669 Llanwern Reclamation

Drawing Title

4e Historical BH plan

INFORMATION

	Drawn	Checked	Date
NTS	ET	CW	05/12/22

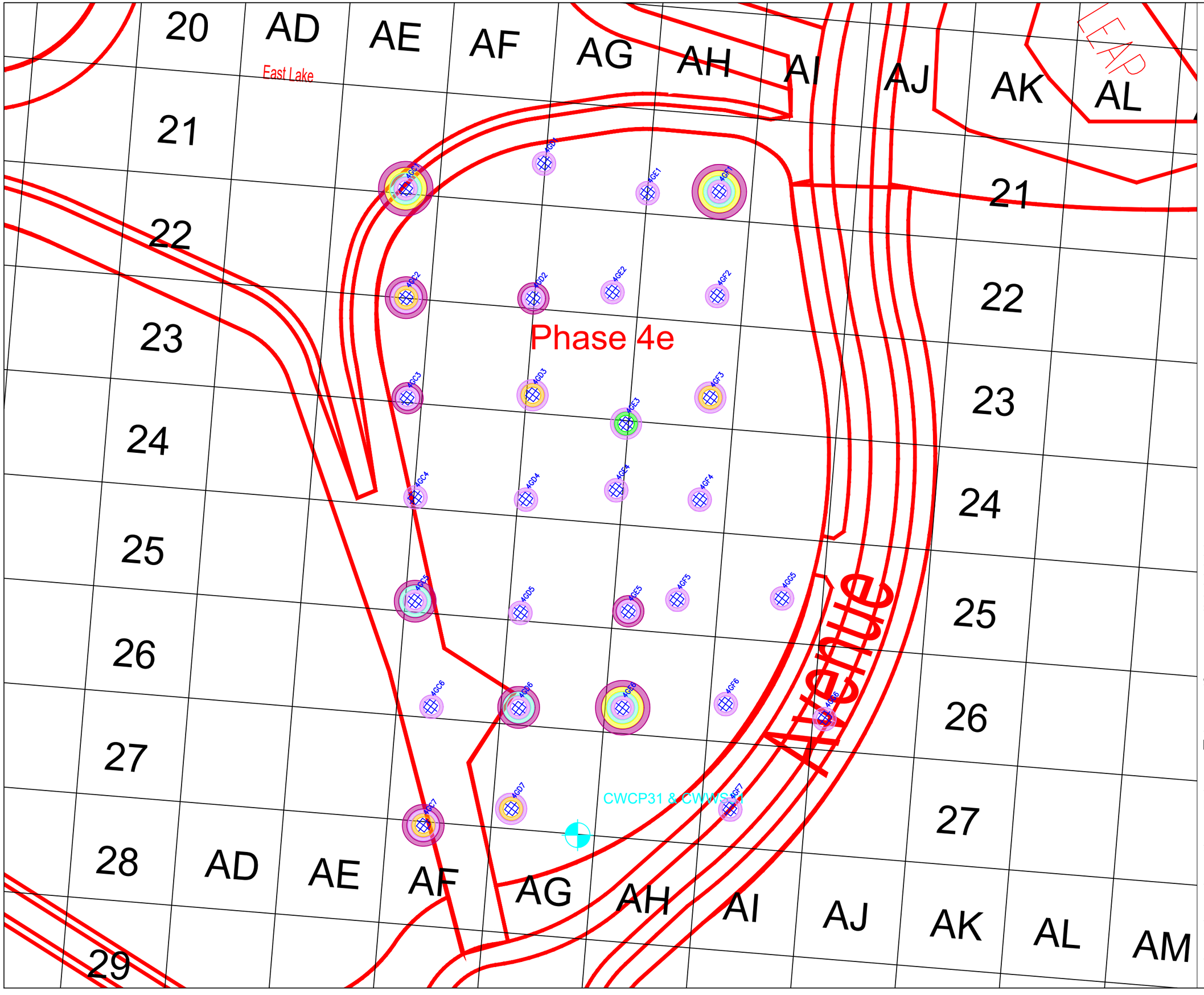
Drawing No.

18669-RLL-22-XX-DR-O-0376

Rev.

Copyright © Rodgers Leask Limited

Seven House ● 18 High Street ● Longbridge ● B31 2UQ ● Tel: 0121 475 8462 ● Fax: 01332 291728 ● www.rodgersleask.co.uk



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

- PHASE BOUNDARY
- CWRA BOREHOLE
- ATKINS TRIAL PITS
- LEAD
- VANADIUM
- BENZENE
- BENZO[B]FLUORANTHENE
- BENZO[A]PYRENE
- DIBENZ(A,H)ANTHRACENE

Rev	Date	Amendments	By	Chk
P01	04/03/2026	First Issue	AMS	CW

Client

Revantage Real Estate

Project

P18-669 Llanwern Reclamation

Drawing Title

Phase 4E Exploration Hole S4UL

Exceedance Location Plan

INFORMATION

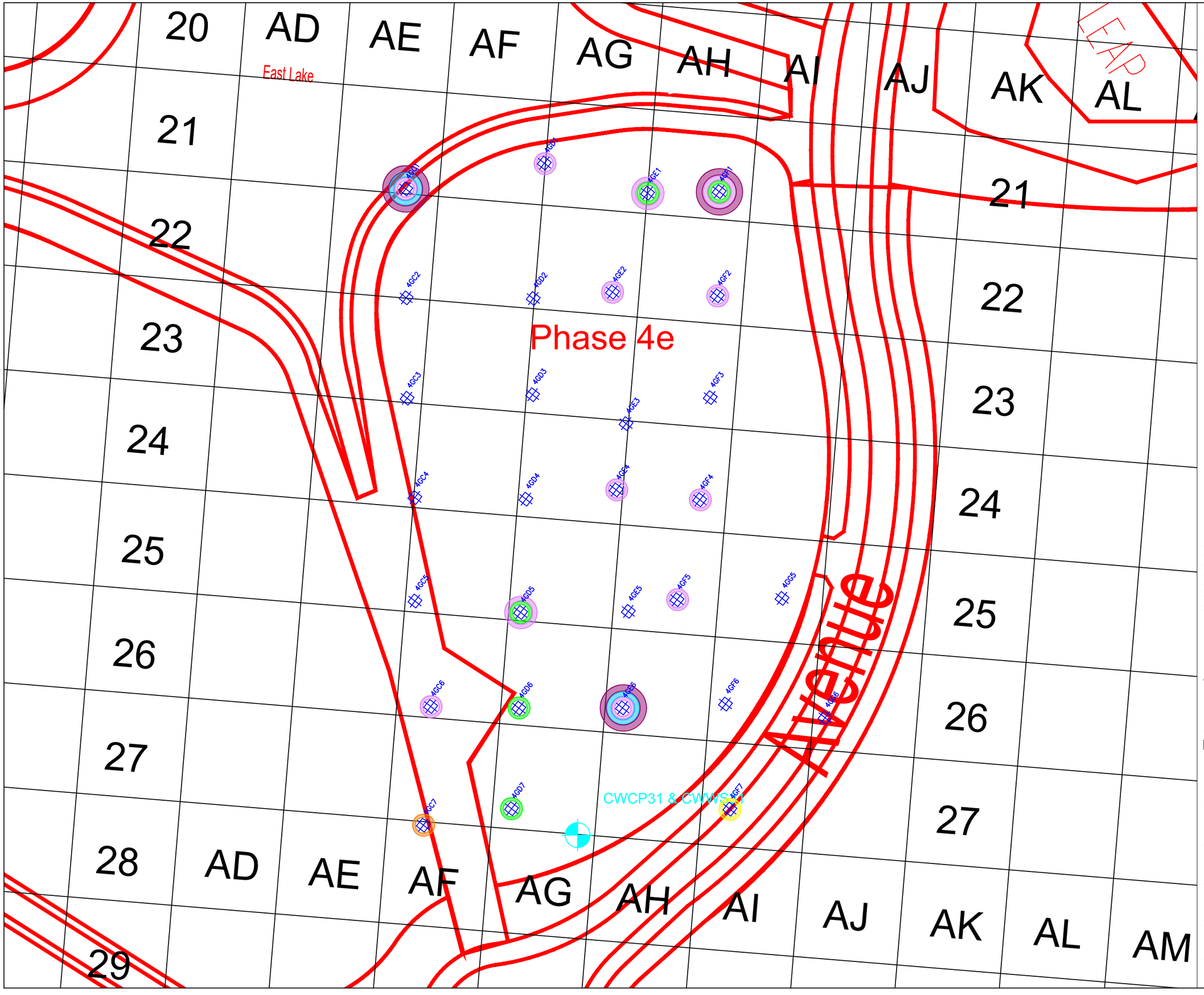
	Drawn	Checked	Date
NTS	AMS	CW	04/03/26

Drawing No. — Rev.

18669-RLL-26-XX-DR-O-0860 P01

Copyright © Rodgers Leask Limited

1/100A Woodlands Court ● Ash Ridge Road ● Bristol ● B32 4LB ● Tel: 01332 285 000 ● www.rodgersleask.co.uk



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

- PHASE BOUNDARY
- CWRA BOREHOLE
- ATKINS TRIAL PITS
- CYANIDE (TOTAL)
- AMMONIACAL NITROGEN
- IRON (TOTAL)
- VANADIUM
- FLUORANTHENE
- BENZO[B]FLUORANTHENE

Rev	Date	Amendments	By	Chk
P01	04/03/2026	First Issue	AMS	CW

Client

Revantage Real Estate

Project

P18-669 Llanwern Reclamation

Drawing Title

Phase 4E Exploration Hole HFC SRVs

Exceedance Location Plan

INFORMATION

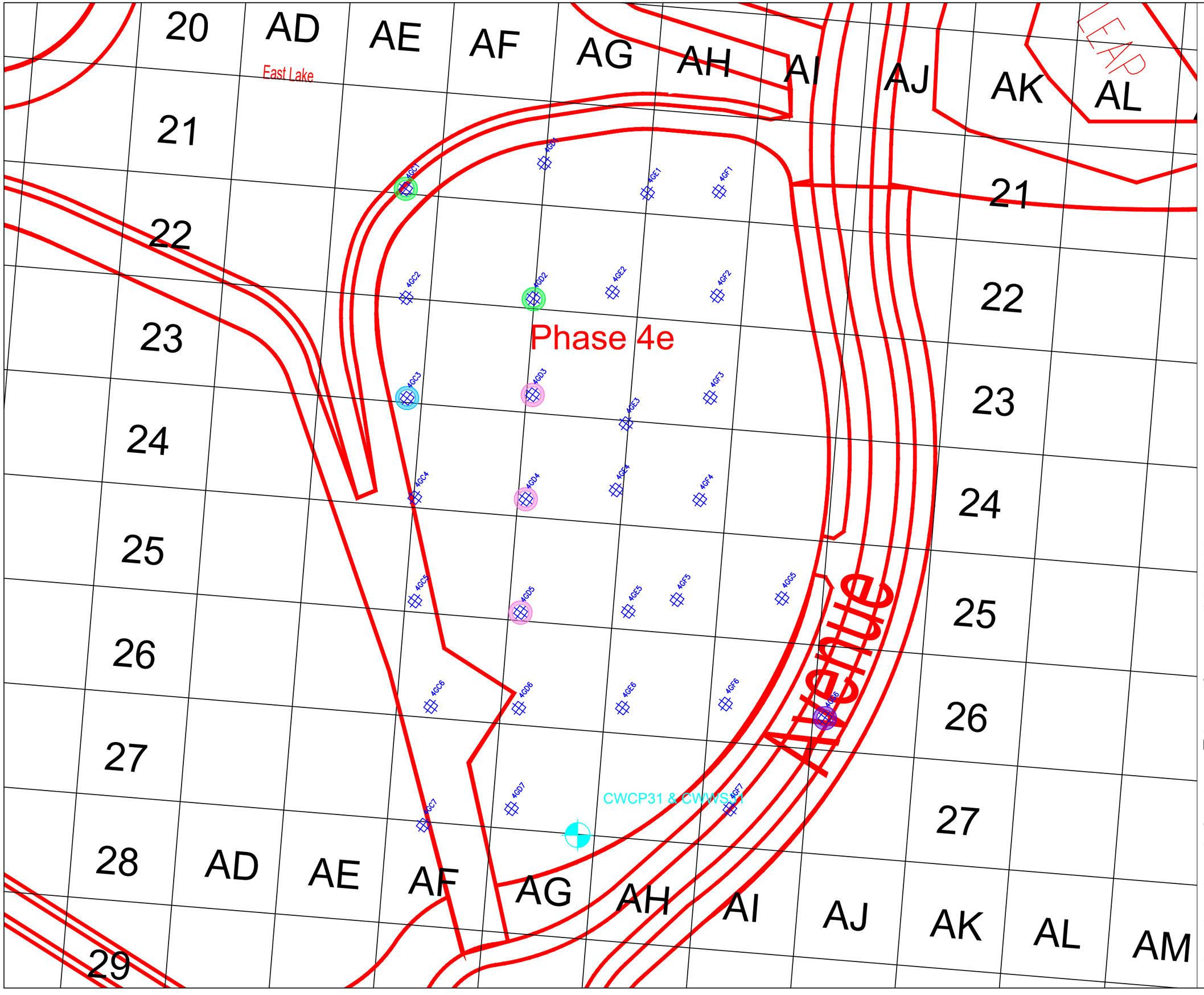
	Drawn	Checked	Date
NTS	AMS	CW	04/03/26

Drawing No. Rev.

18669-RLL-26-XX-DR-O-0861 P01

Copyright © Rodgers Leask Limited

1/100A Woodlands Court • Ash Ridge Road • Bristol • B32 4LB • Tel: 01332 285 000 • www.rodgersleask.co.uk



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

- PHASE BOUNDARY
- CWRA BOREHOLE
- ATKINS TRIAL PITS
- STEEL CABLES / CABLES
- CONCRETE SLAB
- ELECTRIC CABLES & BRICK WALL
- SLAG/IRON ORE AGGREGATE

Rev	Date	Amendments	By	Chk
P01	05/03/2026	First Issue	AMS	CW

Client

Revantage Real Estate

Project

P18-669 Llanwern Reclamation

Drawing Title

Phase 4E Encountered Buried Obstructions Location Plan

INFORMATION

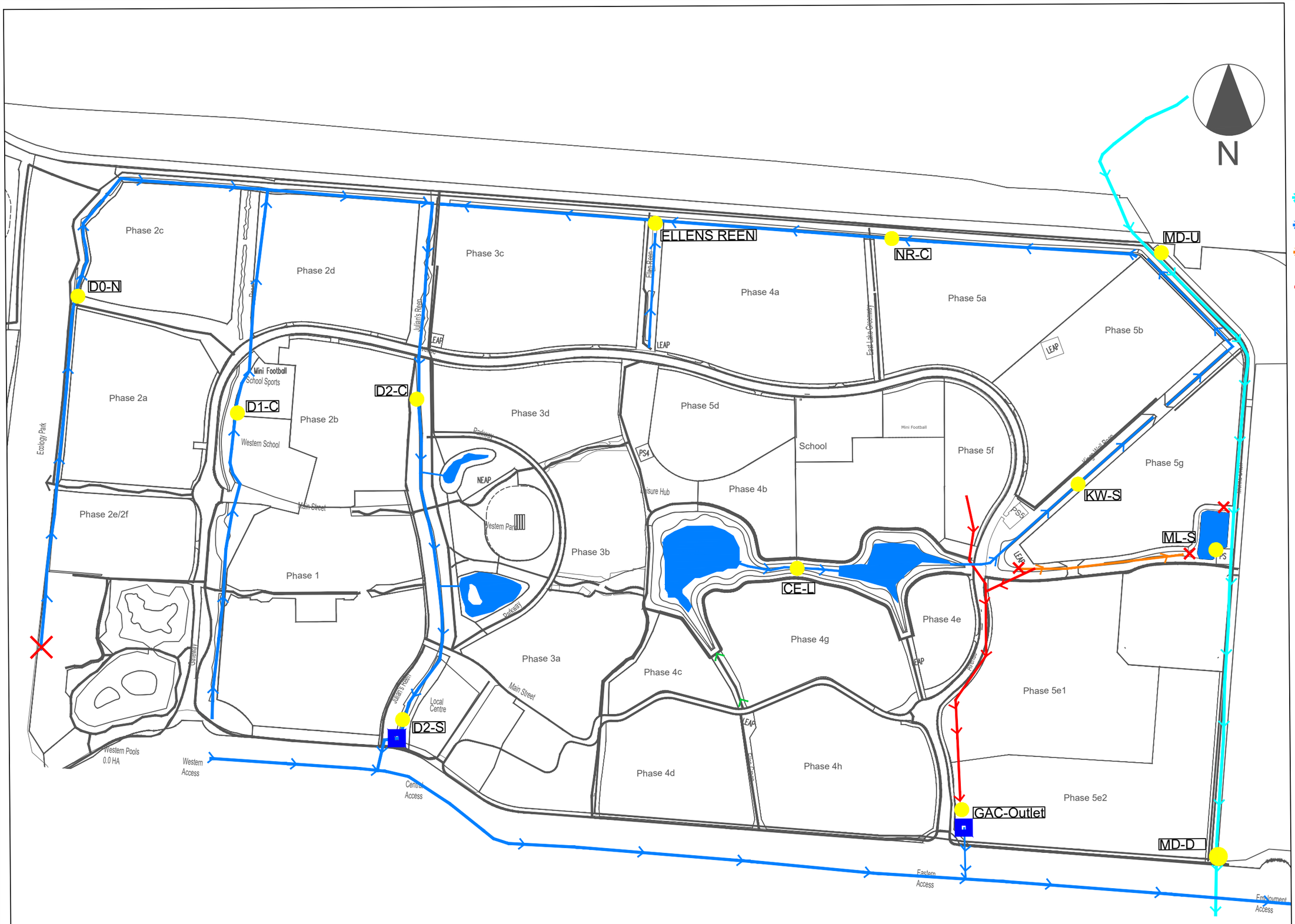
	Drawn	Checked	Date
NTS	AMS	CW	05/03/26

Drawing No. — Rev.

18669-RLL-26-XX-DR-O-0862 P01

Copyright © Rodgers Leask Limited

1/100A Woodlands Court • Ash Ridge Road • Bristol • B32 4LB • Tel: 01332 285 000 • www.rodgersleask.co.uk



KEY:

- Monks Ditch
- Clean discharge
- Construction Water
- Site discharge through Englobe treatment works
- ML-S Sampling Location
- Blocked off drain
- Discharge Control Point

Rev	Date	Amendments	By	Chk
P04	10/02/2025	2025 System Wide Update	DM	CW
P03	07/11/2024	Dust Positions Amended	AMS	CW
P02	28/10/2024	Sampling Positions Amended & Added	AMS	CW
P01	17/01/2023	Sampling Positions Added	SR	CW

Client

St Modwen Developments

Project

P18-669 Llanwern Reclemation

Drawing Title

Residential Site Surface Water Monitoring Location Plan

INFORMATION

	Drawn	Checked	Date
NTS	DM	CW	12.01.24

Drawing No. — Rev.

18669-RLL-24-XX-DR-O-0544 P04

Copyright © Rodgers Leask Limited

Seven House ● 18 High Street ● Longbridge ● B31 2UQ ● Tel: 0121 475 8462 ● Fax: 01332 291728 ● www.rodgersleask.co.uk

Appendix B – Phase 4E HFC Chemical Screening

18-669 Llanwern Phase 4E Soil Chemical Screening

Project: P18-669																																				
Client: Rodgers Leask Environmental				**Job No.:**		181103-16	181103-16	181103-16	181103-16	181103-16	181103-16	181106-25	181106-25	181106-25	181106-25	181106-25	181106-25	181106-25	181106-25	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181107-11
Quotation No.: Q21-24056				**Sample ID.:**		4G-C1	4G-C1	4G-C1-V	4G-C2	4G-C2	4G-C2-V	4G-C3	4G-C3	4G-C4	4G-C4	4G-C4-V	4G-C5	4G-C5	4G-C5-V	4G-D2	4G-D2	4G-D2-V	4G-E2	4G-E2-V	4G-E3	4G-E3-V	4G-F1	4G-F1	4G-F1-V	4G-F2	4G-F2-V	4G-F3	4G-F3	4G-F3-V	4G-C6	
Order No.: -				Client Sample Ref.:		18660995	18661004	18661009	18661027	18660971	18660978	18673492	18673554	18673566	18673570	18673574	18673578	18673584	18673593	18689483	18689487	18689421	18689474	18689478	18689430	18689437	18689416	18689455	18689459	18689464	18689468	18689441	18689447	18689451	18681149	
				Sample Type:	HFC Table 2.1 Agreed Soil Re-Use Values (SRVs)	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	
				Top Depth (m):		0.40-0.40	1.00-1.00	2.20-2.20	0.50-0.50	1.00-1.00	2.30-2.30	0.50-0.50	1.00-1.00	0.30-0.30	0.80-0.80	2.10-2.10	0.70-0.70	1.20-1.20	1.90-1.90	0.40-0.40	0.80-0.80	1.80-1.80	0.80-0.80	1.95-1.95	0.80-0.80	2.20-2.20	0.50-0.50	1.00-1.00	2.40-2.40	0.50-0.50	2.00-2.00	0.20-0.20	0.60-0.60	2.50-2.50	0.50-0.50	
				Bottom Depth (m):																																
				Date Sampled:		02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	11/6/2018	
				Asbestos Lab:																																
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																																
ACM Type	U	2192		N/A			Amosite (Brown) Asbestos											Amosite (Brown) Asbestos															Amosite (Brown) Asbestos			
Asbestos Identification	U	2192		N/A			Detected			Not Detected		Not Detected			Not Detected			Detected		Not Detected			Not Detected		Not Detected		Not Detected			Not Detected			Detected		Not Detected
Asbestos by Gravimetry	U	2192	%	0.001			0.0074											<0.001															<0.001		
Total Asbestos	U	2192	%	0.001			0.0077											<0.001															<0.001		
Moisture	N	2030	%	0.020		7.3	10	24	11	8.1	24	7.7	9.5	16	11	24	13	11	23	12	15	22	11	33	12	23	6.1	12	23	6.9	32	11	1	26	9.3	
Soil Colour	N	2040		N/A		Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Grey	Dark Brown	Dark Brown	Black	Dark Brown	Black	Black	Dark Brown	Dark Brown	Black	Dark Brown	Grey	Dark Brown	Dark Brown	Black	Grey	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Black	Grey	Dark Brown	
Other Material	N	2040		N/A		Glass & Stones	Stones	None	Stones	Stones	None	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Vegetation	Stones	Stones	None	Vegetation	Vegetation	Stones	None	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Stones	Stones	None	Stones	
Soil Texture	N	2040		N/A		Sandy Loam	Sandy Loam	Clay	Sandy Loam	Sandy Loam	Clay	Loamy Sand	Loamy Sand	Loamy Sand	Sandy Loam	Sandy Clay	Sand	Loamy Sand	Sandy Loam	Sand	Sandy Loam	Clay	Sand	Sandy Loam	Sand	Clay	Sandy Loam	Sandy Loam	Loamy Sand	Sandy Loam	Sandy Loam	Sand	Sand	Clay	Sand	
pH	M	2010		4.0		11.6	10.7	7.87	11.3	11.4	7.84	10.9	11.3	11.3	11.2	7	11.4	12	8.12	8.85	8.93	8.08	8.34	6.94	8.63	7.32	9.95	8.57	8.52	10	7.39	9.39	12.2	8.18	8.98	
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	<1	<2	<1	<1	<1	<1	<1	<1	1.27	1.02	<1	1.64	<1	<1	1.96	<1	<1	<1	<1	1.56	<1	1.5	<1	5.64	<1	<1	<1	<1	<1	<1	<1	
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	<12	<12	274	<12	<12	136	<12	<12	<12	20.3	134	<12	<12	79.3	<12	<12	76	<12	702	<12	133	<12	<12	573	<12	661	<12	<12	19.6	<12	
Iron (Total)	N	2430	mg/kg	100	3.05E+05	101000	88200	40000	90200	260000	38700	91600	49500	49100	48100	29900	35600	17200	34400	190000	36800	37800	32900	29700	32300	35700	30300	54100	41100	49400	34200	107000	183000	35400	19300	
Arsenic	M	2450	mg/kg	1	2533	9.5	<6	11.3	11.7	7.34	14.5	11.6	9.95	9.69	9.25	10.8	10.9	6.62	13.4	14.5	8.79	12.8	16.5	13.1	13.6	13.7	11.6	11.3	9.4	6.18	13.7	10.2	<6	11.6	5.67	
Cadmium	M	2450	mg/kg	0.1	73	1.11	<0.2	0.362	<0.02	<0.2	0.377	<0.2	0.775	0.702	<0.02	0.409	<0.02	0.0249	0.363	2.07	<0.02	<0.02	<0.02	<0.02	0.553	16.9	<0.2	0.821	<0.02	<0.2	<0.02	<0.02	1.62	<0.02	<0.02	
Chromium	M	2450	mg/kg	1	9431	139	30.3	34.4	116	114	31.7	256	99.4	104	12.6	40.1	14.4	25.6	33.2	81.7	56.7	29.5	11.2	36	18.7	56.7	<9	1.56	28.9	36.2	34.8	<0.9	547	28.4	14.4	
Manganese	M	2450	mg/kg	5	3.33E+04	12100	3850	1310	10700	13700	1380	1230	9570	10300	2020	535	2070	2930	1270	7160	2960	1530	661	228	1520	342	4750	1400	1820	2990	590	3260	39500	723	4470	
Copper	M	2450	mg/kg	0.5	451	17.7	16.4	10.8	15.6	<14	11.7	21.6	22	32.8	14.1	24.8	20	8.24	11.4	34.4	23.6	9.12	42.6	14.9	40.8	356	31.6	50.8	9.07	16.9	15.5	<14	18	11.3	11.1	
Mercury	M	2450	mg/kg	0.1	132	<0.14	<1.4	<0.14	<0.14	<1.4	<0.14	<1.4	<0.14	0.268	<0.14	<0.14	<0.14	<0.14	<0.14	<1.4	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<1.4	<0.14	<0.14	<1.4	<0.14	<0.14	<1.4	<0.14	<0.14	
Nickel	M	2450	mg/kg	0.5	1.15E+04	30.1	39.5	41.1	14.6	27.6	36.9	12.2	11.5	24.7	17.6	37.8	13.4	7.55	35.8	40.4	20.6	33.4	38.8	28.5	42.5	41.2	60.2	26.3	31.6	14.6	32.2	15	8.22	31.8	10.2	
Lead	M	2450	mg/kg	0.5	1.57E+04	44.7	49.8	27.7	42.5	<7	23.9	40.1	41.4	54.6	27.4	27	38.1	21.6	23.8	103	31.2	21	27.9	31.5	33.1	276	167	36.7	21.2	35.3	24.8	20	47.2	23.5	25.7	
Selenium	M	2450	mg/kg	0.2	702	3.67	<10	<1	4.15	<10	<1	<10	3.69	3.92	<1	<1	1.5	2.04	<1	<10	1.7	<1	<1	<1	1.11	<1	<10	1.26	<1	<10	<1	<1	18.4	<1	3.7	
Vanadium	U	2450	mg/kg	5	1606	142	41.3	59.2	163	591	56	226	124	170	33.5	63.4	38.7	52.4	58.7	86.4	78.9	53.7	33.3	57	38.2	60.9	179	41.1	51.8	116	59.4	38.1	1270	51.1	35.4	
Zinc	M	2450	mg/kg	0.5	1.38E+05	202	92.5	108	471	28.1	101	202	338	165	145	119	173	46.7	103	254	70.3	100	78.5	115	137	1680	250	203	122	106	116	93.6	91	141	218	
Organic Matter	M	2625	%	0.4		8.29	28.1	1.2	4.48	<0.35	0.957	1.81	3.83	10.1	1.31	4.5	34.1	12.6	1.3	38.1	6.6	0.741	17.6	5.65	9.28	1.62	11.7	25	1.13	2.95	4.02	40.2	2.74	1.01	2.02	
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0357	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.033	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359	0.0755	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.194	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.122	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	0.054	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.115	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.137	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	0.0583	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0656	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.057	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	2.61	8.85	0.243	4.2	<0.1	<0.1	2.58	1.93	0.267	0.918	0.443	5.99	1.21	<0.1	<0.1	<0.1	<0.1	0.793	0.216	<0.1	<0.1	<0.1	<0.1	<0.1	0.182	<0.1	<0.1	<0.1	<0.1	0.809	
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	29.4	33.2	0.376	42.4	5.33	<0.1	18.4	17.6	3.07	8.81	<0.1	27.1	7.45	<0.1	10.1	2.95	<0.1	0.835	<0.1	0.195	<0.1	7.64	1.21	<0.1	1.14	<0.1	8.35	1.03	<0.1	4.67	
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	145	131	2.8	167	43.1	<0.1	198	399	18.7	14.9	1.22	151	21.3	<0.1	86.2	23.3	<0.1	4.1	1.66	4.38	<0.1	26.2	6.45	3.44	16	0.782	34.9	17.2	<0.1	33.6	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	29.4	42.5	10.4	48.7	9.87	0.462	37.4	46.3	3.25	3.77	<0.1	43.5	2.38	<0.1	15.9	8.15	<0.1	<0.1	0.537	<0.1	<0.1	7.35	0.948	1.53	5.11	<0.1	13.5	2.79	<0.1	17	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5		207	215	13.8	262	58.3	0.462	256	465	25.2	28.4	1.67	227	32.3	<0.1	112	34.4	<0.1	5.73	2.42	4.57	<0.1	41.2	8.6	4.98	22.4	0.782	56.8	21	<0.1	56.1	
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0449	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	0.0356	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0759	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.09	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	0.0388	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0437	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0375	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	7.37	21.4	<0.1	7.44	2.01	0.363	4.04	1.7	1.11	0.302	<0.1	8.94	2.07	<0.1	3.46	1.45	0.608	0.782	<0.1	1.15	<0.1	2.51	1.23	<0.1	0.711	<0.1	1.79	1.29	0.814	1.98	
Aromatic TPH >C16-C21	U	2680	mg/kg	1	1424	28.9	103	<0.1	54.1	8.83	0.866	21.4	10.9	6.46	2.02	0.212	35.4	10.2	<0.1	19	4.41	1.39	1.36	<0.1	6.67	<0.1	15.3	4.5	<0.1	5.21	0.219	13.9	18.9	1.47	12.9	
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	107	431	4.53	168	52.6	10.8	133	152	41.3	19.5	7.47	135	32.8	3.2	113	32.7	2.42	4.57	22.7	14.8	3.14	93.7	12.5	5.22	40.9	10.1	64.1	147	3.65	84.9	
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	48.8	128	0.892	70.3	26.9	7.35	63	40.7	14.2	14.3	1.11	40.7	9.99	<0.1	51.2	22	0.267	0.657	6.1	4.75	0.463	40.7	5.9	4.45	16.5	1.09	36.7	43.6	0.537	49.9	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5		192	683	5.43	300	90.3	19.4	222	205	63.1	36.1	8.8	220	55.1	3.2	187	60.5	4.69	7.37	28.8	27.4	3.6	152	24.1	9.66	63.3	11.5	117	211	6.47	150	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10		399	899	19.2	562	149	19.8	478	670	88.4	64.5	10.5	448	87.4	3.2	299	94.9	4.69	13.1	31.7	32	3.6	193	32.7	14.6	85.7	12.2	173	232	6.47	206	
Benzene	M	2760	µg/kg	1	3800	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<180	<90	<90	<90	<90	<1800	<90	<90	<90	<90	<90	<90	<90	<180	<90	<90	<90
Toluene	M	2760	µg/kg	1	128000	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	108	<70	<70	140	<70	<70	<70	<70	1400	<70	<70	<70	<70	<70	<70	140	<70	<70	<70	
Ethylbenzene	M	2760	µg/kg	1	80000	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	80	<40	<40	<40	<40	800	<40	<40	<40	<40	<40	<40	80	<40	<40	<40	
m & p-Xylene	M	2760	µg/kg	1	74000.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	200	<100	<100	<100	<100	2000	<100	<100	<100	<100	<100	<100	200	<100	<100	<100	
o-Xylene	M	2760	µg/kg	1	74000.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	200	<100	<100	<100	<100	2000	<100	<100	<100	<100	<100	<100	200	<100	<100	<100	
Methyl Tert-Butyl Ether	M	2760	µg/kg	1		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	200	<100	<100	<100	<100	2000	<100	<100	<100	<100	<100	<100	200	<100	<100	<100	
Naphthalene	M	2800	mg/kg	0.1	27.00	0.469	0.855	<0.009	0.523	0.0501	0.0167	0.303	<0.09	0.131	0.0492	<0.009	0.909	0.224	<0.009	0.22	0.266	<0.009	0.051	<0.009	0.118	<0.009	0.24	0.106	0.0948	0.0304	<0.009	0.103	<0.045	<0.009	0.402	
Acenaphthylene	N	2800	mg/kg	0.1	16.70	0.195	0.488	<0.012	0.297	0.0155	<0.012	0.212	<0.12	0.0289	0.0145	<0.012	0.218	0.0659	<0.012	0.234	0.0679	<0.012	0.0146	<0.012	0.0864	<0.012	0.913	<0.012	<0.012	0.013	<0.012	0.108	<0.06	<0.012	0.113	
Acenaphthene	M	2800	mg/kg	0.1	30.00	0.0557	0.148	<0.008	<0.04	0.0202	<0.008	0.0515	<0.08	0.0221	<0.008	<0.008	0.0441	0.00959	<0.008	0.0527	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0168	<0.008	0.0134	<0.04	<0.008	0.018	
Fluorene	M	2800	mg/kg	0.1	27.00	0.153	0.363	<0.01	0.15	0.0161	<0.01	0.16	<0.1	0.0358	<0.01	<0.01	0.157	0.0343	<0.01	0.0843	0.0188	<0.01	<0.01	<0.01	0.013	<0.01	0.0434	<0.01	<0.01	0.0108	<0.01	0.0369	<0.05	<0.01	0.0508	
Phenanthrene	M	2800	mg/kg	0.1	27.00	1.34	4.99	<0.015	1.23	0.244	<0.015	1.41	0.276	0.388	0.13	<0.015	1.92	0.517	<0.015	1.78	0.167	<0.015	0.121	<0.015	0.287	<0.015	0.359	0.179	0.0341	0.229	<0.015	0.675	<0.075	<0.015	0.611	
Anthracene	M	2800	mg/kg	0.1	34.00	0.437	1.32	<0.016	0.345	0.064	<0.016	0.4	<0.16	0.104	0.0347	<0.016	0.472	0.215	<0.016	0.438	0.0409	<0.016	0.0187	<0.016	0.0473	<0.016	0.227	<0.016	<0.016	0.0453	<0.016	0.161	<0.08	<0.016	0.179	
Fluoranthene	M	2800	mg/kg	0.1	6.64	2.5	9.72	<0.017	2.55	0.55	<0.017	3.04	0.391	0.785	0.288	<0.017	3.24	1.07	<0.017	3.14	0.31	<0.017	0.0971	<0.017	0.317	<0.017	2.01	0.101	0.0598	0.508	<0.017	1.47	<0.085	<0.017	1.25	
Pyrene	M	2800	mg/kg	0.1	76.00	2.02	7.88	<0.015	2.33	0.599	<0.015	2.61	0.449	0.707	0.271	<0.015	2.67	0.882	<0.015	2.28	0.266	<0.015	0.0774	<0.015	0.261	<0.015	1.95	0.0877	0.0443	0.443	<0.015	1.1	<0.075	<0.015	0.995	
Benzo[a]anthracene	M	2800	mg/kg	0.1	607.00	1.3	5.81	<0.014	1.47	0.408	<0.014	1.71	0.218	0.646	0.245	<0.014	1.92	0.646	<0.014	1.53	0.214	<0.014	0.0609	<0.014	0.202	<0.014	1.78	0.0558	0.0329	0.274	<0.014	0.674	<0.07	<0.014	0.75	
Chrysene	M	2800	mg/kg	0.1	621.00	1.22	4.83	<0.01	1.48	0.481	<0.01	1.54	0.261	0.647	0.261	<0.01	1.72	0.632	<0.01	1.38	0.231	<0.01	0.0818	<0.01	0.17	<0.01	1.23	0.0669	0.0335	0.327	<0.01	0.594	<0.05	<0.01	0.636	
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	1.11	7.74	<0.015	2.29	0.718	<0.015	2.04	0.378	1.2	0.505	<0.015	2.94	0.762	<0.015	2.44	0.424	0.0244	0.062	<0.015	0.467	<0.015	4.89	0.115	0.058	0.539	<0.015	1.14	<0.075	<0.015	1.33	
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	0.569	2.75	<0.014	0.644	0.292	<0.014	0.898	<0.14	0.465	0.167	<0.014	0.959	0.292	<0.014	0.885	0.137	<0.014	0.0251	<0.014	0.157	<0.014	1.35	0.0375	<0.014	0.17	<0.014	0.331	<0.07	<0.014	0.343	
Benzo[a]pyrene	M	2800	mg/kg	0.1	34.00	1.1	5.58	<0.015	1.32	0.465	<0.015	1.85	0.261	0.906	0.364	<0.015	1.8	0.656	<0.015	1.52	0.275	<0.015	0.0531	<0.015	0.267	<0.015	3.08	0.053	0.0356	0.309	<0.015	0.61	<0.075	<0.015	0.802	
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25.00	0.697	3.73	<0.018	0.817	0.296	<0.018	1.15	<0.18	0.589	0.24	<0.018	1.3	0.447	<0.018	1.12	0.206	<0.018	0.0505	<0.018	0.234	<0.018	3.02	0.0441	0.0284	0.247	<0.018	0.449	<0.09	<0.018	0.618	
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838.00	0.203	1.26	<0.023	0.244	0.077	<0.023	0.349	<0.23	0.164	0.0673	<0.023	0.361	0.126	<0.023	0.339	0.0578	<0.023	<0.023	<0.023	0.0631	<0.023	0.72	<0.023	<0.023	0.0635	<0.023	0.143	<0.115	<0.023	0.161	
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13.00	0.812	3.95	<0.024	1.04	0.361	<0.024	1.34	<0.24	0.684	0.278	<0.024	1.37	0.503	<0.024	1.22	0.215	<0.024	0.0512	<0.024	0.241	<0.024	3.46	0.0527	<0.024	0.297	<0.024	0.496	<0.12	<0.024	0.69	
Total Of 16 PAH's	N	2800	mg/kg	2		14.2	61.4	<0.118	16.7	4.66	<0.118	19.1	2.23	7.5	2.92	<0.118	22	7.08	<0.118	18.7	2.89	<0.118	0.765	<0.118	2.93	<0.118	25.3	0.899	0.421	3.52	<0.118	8.1	<0.59	<0.118	8.94	
Resorcinol	M	2920	mg/kg	0.02																																
Phenol	M	2920	mg/kg	0.02	3.05	0.0108	<0.01	<0.01	<0.01	<0.01	<0.01	0.0108	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Cresols	M	2920	mg/kg	0.02		<0.01	0.0111	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Xylenols	M	2920	mg/kg	0.02		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.0217	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	
1-Naphthol	N	2920	mg/kg	0.02																																
Trimethylphenols	M	2920	mg/kg	0.02																																
Total Phenols	M	2920	mg/kg	0.1		<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	

18-669 Llanwern Phase 4E Soil Chemical Screening

Project: P18-669																																			
Client: Rodgers Leask Environmental				**Job No.:**		181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83
Quotation No.: Q21-24056				**Sample ID.:**		4G-C6	4G-C7	4G-C6-V	4G-C7-V	4G-D1	4G-D1	4G-D1-V	4G-E1	4G-E1	4G-E1-V	4G-D3	4G-D3	4G-D4	4G-D4	4G-D5	4G-D6	4G-D6	4G-D3-V	4G-D4-V	4G-D5-V	4G-D6-V	4G-E5	4G-E5	4G-E6	4G-E6	4G-E5-V	4G-E6-V	4G-F6	4G-F6	4G-F6
Order No.: -				Client Sample Ref.:		18681204	18681222	18681216	18681232	18681178	18681182	18681187	18681194	18681198	18681210	18733119	18733124	18733095	18733099	18733084	18733005	18733106	18733131	18733112	18733089	18733139	18733046	18733057	18733146	18733151	18733071	18733158	18733163	18733168	18733173
				Sample Type:	HFC Table 2.1 Agreed Soil Re-Use Values (SRVs)	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
				Top Depth (m):		0.80-0.80	0.50-0.50	2.50-2.50	1.80-1.80	0.50-0.50	1.00-1.00	2.10-2.10	0.50-0.50	1.00-1.00	3.60-3.60	0.20-0.20	0.50-0.50	0.20-0.20	0.50-0.50	0.50-0.50	0.20-0.20	0.60-0.60	1.80-1.80	1.70-1.70	1.70-1.70	1.70-1.70	0.20-0.20	0.60-0.60	0.30-0.30	0.50-0.50	3.00-3.00	2.20-2.20	0.40-0.40	0.60-0.60	1.20-1.20
				Bottom Depth (m):																															
				Date Sampled:		11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018
				Asbestos Lab:																															
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																															
ACM Type	U	2192		N/A																Amosite (Brown) Asbestos							Amosite (Brown) Asbestos							
Asbestos Identification	U	2192		N/A			Not Detected			Not Detected				Not Detected			Not Detected		Not Detected	Detected		Not Detected					Detected		Not Detected				Not Detected		Not Detected
Asbestos by Gravimetry	U	2192	%	0.001																0.0034							<0.001								
Total Asbestos	U	2192	%	0.001																0.0035							<0.001								
Moisture	N	2030	%	0.020		8.6	8.7	57	23	6.3	11	31	0	13	73	9	11	8.6	17	11	8.5	21	24	9.4	32	22	14	24	14	25	25	26	6.7	6.7	7.6
Soil Colour	N	2040		N/A		Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Light Brown	Light Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Grey	Dark Brown	Dark Brown	Dark Brown	Dark Brown
Other Material	N	2040		N/A		Stones	Stones	Vegetation	Vegetation	Stones	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Stones	Stones	Vegetation	None	Stones	Stones	None	Vegetation	Vegetation	Vegetation	Vegetation	None	Vegetation	Vegetation	Vegetation	Vegetation
Soil Texture	N	2040		N/A		Sand	Sand	Clay	Clay	Loamy Sand	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Peat	Sandy Loam	Loamy Sand	Sandy Loam	Sandy Loam	Loamy Sand	Loamy Sand	Sandy Loam	Sandy Clay Loam	Loamy Sand	Clay	Clay	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Clay	Loamy Sand	Loamy Sand	Sandy Loam	Sandy Loam
pH	M	2010		4.0		8.81	12.4	7.32	8.1	11.1	10.1	7.61	9.25	11.2	7.4	9.04	9.2	8.8	7.99	9	11.5	10.4	8.38	8.69	6.79	8.5	9.99	9.21	11.1	8.61	8.2	7.14	11	12.2	10.7
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	<1	<1	<1	<1	<1	<1	<1	3.26	<1	<1	<1	<1	<1	<1	2.8	<1	2.41	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	<12	<12	155	45.6	<12	<12	427	<12	<12	1590	<12	<12	<12	71.6	<12	141	<12	29	20.9	271	48.5	<12	<12	<12	<12	105	331	<12	<12	<12
Iron (Total)	N	2430	mg/kg	100	3.05E+05	24600	192000	29200	35500	77000	26400	38300	228000	125000	7810	124000	64700	72200	30400	95800	48600	23800	25900	38500	25400	31100	101000	59400	113000	8800	31300	36700	173000	264000	155000
Arsenic	M	2450	mg/kg	1	2533	6.37	7.49	16.1	11.4	<6	7.6	16.1	8.99	9.44	3.74	9.39	14.3	8.57	12.3	10.5	8.24	7.93	12.2	10.1	15.9	11.2	10.6	6.73	7.12	5.96	12.8	15.4	8.24	10.1	11.6
Cadmium	M	2450	mg/kg	0.1	73	<0.02	<0.2	0.0926	<0.02	<0.2	<0.02	<0.02	<0.2	<0.2	0.0218	<0.2	<0.2	<0.02	<0.02	<0.2	<0.02	0.15	0.277	0.505	<0.02	<0.02	<0.2	<0.2	<0.2	<0.02	<0.02	<0.02	<0.2	<0.2	<0.2
Chromium	M	2450	mg/kg	1	9431	24.2	695	23.5	28.6	12.8	14.2	32.7	<9	267	12.6	21	360	2.8	24.7	18.1	43.3	7.04	23.5	10	35	25.2	58.5	<9	446	3.08	24.9	30.6	<9	<9	19.1
Manganese	M	2450	mg/kg	5	3.33E+04	2650	4710	352	1070	3710	2730	441	4770	207	226	5490	19100	7400	778	3770	4370	574	917	1850	268	1190	4010	1060	16700	164	1170	472	3380	3880	3530
Copper	M	2450	mg/kg	0.5	451	18	35.8	23	9.1	<14	17.4	16.7	22.9	27.9	16.8	17.2	69.7	17.2	8.2	28	9.53	28.6	10.1	33.2	16.4	8.94	19.6	<14	18.6	23.2	7.9	11.2	15.8	15.2	17.6
Mercury	M	2450	mg/kg	0.1	132	<0.14	<1.4	<0.14	<0.14	<1.4	<0.14	<0.14	<1.4	<1.4	<0.14	<1.4	<1.4	<0.14	<0.14	<1.4	<0.14	0.575	<0.14	<0.14	<0.14	<0.14	<1.4	<1.4	<1.4	0.81	<0.14	<0.14	<1.4	<1.4	<1.4
Nickel	M	2450	mg/kg	0.5	1.15E+04	15	27.2	27.8	32.3	14.2	16.4	27.5	37.4	18	13.7	23.1	32.3	13.1	29.3	27.3	9.47	11.8	29.3	21.9	29.7	31.9	24	11.7	18.1	8.3	30.3	34.7	31	32.8	24.2
Lead	M	2450	mg/kg	0.5	1.57E+04	18.9	15.9	35	22.2	43.8	44.8	33.5	150	43.7	4.85	39.7	89	47.8	21.5	82.9	32.6	45.2	20.6	31.6	40.2	22.2	84.1	8.2	58.6	12.2	23	29.3	29.3	32.1	40.9
Selenium	M	2450	mg/kg	0.2	702	2.13	23	<1	<1	<10	1.83	<1	<10	10.3	2.25	<10	11.6	2.69	<1	<10	1.7	<1	<1	2.57	<1	<1	<10	<10	10.4	<1	<1	<1	<10	<10	<10
Vanadium	U	2450	mg/kg	5	1606	33.7	2400	43.2	51.9	37.4	31.7	57.2	120	271	20.4	50.8	515	27.5	46.1	54.2	73.5	17.5	41.7	34.8	53.1	43.7	85.4	18	327	8.23	44.3	55	87.7	112	96.1
Zinc	M	2450	mg/kg	0.5	1.38E+05	63	120	129	96.2	135	86.1	119	228	125	25.5	149	289	156	102	320	398	225	94.3	78.1	139	90.7	353	25.1	206	23.7	95.1	107	160	195	167
Organic Matter	M	2625	%	0.4		5.12	0.521	21.4	0.841	17.1	4.41	5.6	23.1	0.521	47.9	20.9	0.459	10.7	3.02	18.8	7.88	>100	0.56	9.1	4.93	0.765	13.7	>100	24.8	-	0.94	1.9	18.6	4.93	12.5
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	<0.02	<0.02	0.0782	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359	<0.02	<0.02	0.177	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0244	0.0694	0.0725	<0.02	<0.02	0.05	<0.02	<0.02	<0.02
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	<0.02	<0.02	0.244	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0267	0.0524	0.069	<0.02	<0.02	0.0459	<0.02	<0.02	<0.02
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	<0.02	<0.02	1.73	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0301	0.0761	<0.02	<0.02	0.023	<0.02	<0.02	<0.02
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	<0.1	2.27	5.06	<0.1	0.765	<0.1	0.419	1.66	<0.1	<0.1	2.03	<0.1	2.21	<0.1	2.3	2.24	4.56	<0.1	0.525	<0.1	<0.1	2.48	4.02	4.32	4.96	<0.1	<0.1	2.6	2.28	2.54
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	1.7	7.03	2.5	<0.1	5.69	4.2	<0.1	7.21	2.14	<0.1	7.91	2.72	7.77	<0.1	9.98	12.4	103	<0.1	2.48	<0.1	<0.1	15.7	94.9	29.3	140	<0.1	<0.1	13.7	16.4	10.9
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	17.4	51.5	23.3	<0.1	45.2	18.6	4.58	25	28	22.9	49	12.1	64.4	<0.1	93.6	67.6	63.3	<0.1	14.2	3.17	<0.1	105	46.2	110	44.3	<0.1	<0.1	1.65	70.7	118	71
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	9.3	17.2	<0.1	<0.1	18.2	6.57	<0.1	5.55	8.66	0.655	12.4	4.06	15.5	<0.1	34.8	31.5	8.84	<0.1	3.23	0.875	<0.1	38.3	5.19	46.7	3.7	<0.1	<0.1	30.8	23.7	21.4
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5		28.4	78	30.9	<0.1	69.8	29.4	5	39.5	38.8	23.6	71.4	18.9	89.9	<0.1	141	114	179	<0.1	20.4	4.04	<0.1	161	150	191	193	<0.1	1.65	118	160	106
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	<0.02	<0.02	0.161	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0341	0.0456	<0.02	<0.02	0.0297	<0.02	<0.02	<0.02
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	<0.02	<0.02	1.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0503	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	<0.1	1.27	16.6	<0.1	1.08	0.945	0.418	3.2	1.11	3	2.23	0.447	3.42	<0.1	2.55	1.04	16.6	<0.1	1.37	0.858	<0.1	5.86	4.19	10.9	12.4	<0.1	<0.1	1.94	0.966	0.973
Aromatic TPH >C16-C21	U	2680	mg/kg	1	1424	1.7	11.7	23.8	<0.1	4.97	4.11	1.22	29.5	7.16	9.36	13.2	6.68	15.4	<0.1	12.5	8.13	134	<0.1	2.86	<0.1	<0.1	35.6	19.4	74.6	108	<0.1	<0.1	8.2	5.67	4.94
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	20.6	68.7	230	<0.1	34	28.5	44.8	155	57.3	217	66.1	24.4	76.4	2.21	84.6	41.9	482	<0.1	9.26	31.8	1.49	114	55	206	256	<0.1	5.68	45.7	37.3	33.1
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	17.2	29.5	23.3	<0.1	24.1	21.8	3.13	60.7	26.6	29.3	29.1	9.37	36.7	0.566	56.4	38.2	104	<0.1	3.42	4.3	<0.1	54.6	9.53	97.6	37.7	<0.1	<0.1	30.9	14.5	18.4
Total Aromatic Hydrocarbons	N	2680	mg/kg	5		39.6	111	294	<0.1	64.2	55.4	49.6	249	92.1	258	111	40.9	132	2.78	156	89.3	736	<0.1	16.9	37	1.49	210	88.1	389	414	<0.1	5.68	86.7	58.4	57.4
Total Petroleum Hydrocarbons	N	2680	mg/kg	10		68	189	328	<0.1	134	84.8	54.6	288	131	282	182	59.8	222	2.78	297	203	915	<0.1	37.3	41	1.49	372	239	580	607	<0.1	7.48	205	219	163
Benzene	M	2760	µg/kg	1	3800	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	314	<90	<90	<90	<90	<90
Toluene	M	2760	µg/kg	1	128000	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70
Ethylbenzene	M	2760	µg/kg	1	80000	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40
m & p-Xylene	M	2760	µg/kg	1	74000.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
o-Xylene	M	2760	µg/kg	1	74000.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Methyl Tert-Butyl Ether	M	2760	µg/kg	1		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Naphthalene	M	2800	mg/kg	0.1	27.00	0.0605	0.105	0.3	<0.009	0.36	0.0918	0.0226	<0.09	0.0678	<0.009	0.0873	0.0356	0.245	<0.009	0.131	0.116	1.11	<0.009	0.0433	<0.009	<0.009	0.373	0.407	4.73	5.1	0.0205	<0.009	0.143	0.0479	0.123
Acenaphthylene	N	2800	mg/kg	0.1	16.70	<0.012	0.0405	0.0337	<0.012	0.216	0.0369	<0.012	<0.12	0.11	<0.012	0.194	0.049	0.259	<0.012	0.13	0.0642	0.277	<0.012	0.0423	<0.012	<0.012	0.201	0.051	1.2	0.252	<0.012	<0.012	0.0919	<0.012	0.0483
Acenaphthene	M	2800	mg/kg	0.1	30.00	<0.008	0.0947	1.14	<0.008	0.0315	0.0126	<0.008	<0.08	0.0396	<0.008	0.0102	0.0144	0.0192	<0.008	0.0219	0.0144	0.0665	<0.008	<0.008	<0.008	<0.008	0.0433	0.0207	0.448	0.0245	<0.008	<0.008	0.0182	0.0138	0.0138
Fluorene	M	2800	mg/kg	0.1	27.00	0.0114	0.0742	1.38	<0.01	0.0476	0.0133	<0.01	<0.1	0.0188	<0.01	0.0293	0.0162	0.0823	<0.01	0.0463	0.0319	0.141	<0.01	<0.01	<0.01	<0.01	0.162	0.0385	1.84	0.103	<0.01	<0.01	0.0737	0.0204	0.0271
Phenanthrene	M	2800	mg/kg	0.1	27.00	0.198	0.966	3.61	<0.015	0.776	0.182	0.0327	<0.15	0.256	<0.015	0.343	0.189	0.709	<0.015	0.457	0.322	1.08	<0.015	0.167	<0.015	<0.015	1.75	0.281	9.17	1.03	<0.015	<0.015	0.612	0.168	0.319
Anthracene	M	2800	mg/kg	0.1	34.00	0.0364	0.322	0.619	<0.016	0.191	0.0436	<0.016	<0.16	0.0813	<0.016	0.12	0.0883	0.178	<0.016	0.147	0.0973	0.366	<0.016	0.0263	<0.016	<0.016	0.506	0.0402	3.03	0.247	<0.016	<0.016	0.137	0.0385	0.113
Fluoranthene	M	2800	mg/kg	0.1	6.64	0.3	2.3	1.45	<0.017	1.63	0.311	0.053	0.359	0.893	<0.017	0.973	1.15	1.6	<0.017	0.895	0.861	2.02	<0.017	0.145	<0.017	<0.017	3.28	0.211	12.8	0.379	<0.017	0.0232	0.778	0.219	0.622
Pyrene	M	2800	mg/kg	0.1	76.00	0.239	2.1	0.942	<0.015	1.21	0.251	0.0435	0.32	1.04	<0.015	0.78	0.826	1.18	<0.015	0.659	0.83	1.69	<0.015	0.105	<0.015	<0.015	2.47	0.187	9.83	0.368	<0.015	<0.015	0.607	0.175	0.487
Benzo[a]anthracene	M	2800	mg/kg	0.1	607.00	0.184	1.32	0.222	<0.014	0.849	0.197	<0.014	0.259	0.796	<0.014	0.668	1.38	1.1	<0.014	0.578	0.601	1.74	<0.014	0.0703	<0.014	<0.014	1.63	0.173	5.33	0.192	<0.014	<0.014	0.391	0.0959	0.349
Chrysene	M	2800	mg/kg	0.1	621.00	0.198	1.26	0.278	<0.01	0.737	0.207	0.0243	0.213	0.685	<0.01	0.863	1.45	1.14	<0.01	0.618	0.546	2.08	<0.01	0.084	<0.01	<0.01	1.45	0.27	5.37	0.29	<0.01	0.0197	0.433	0.134	0.391
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	0.182	2.31	0.282	<0.015	1.55	0.356	0.0274	0.505	1.65	<0.015	1.45	2.31	1.98	<0.015	0.895	1.17	3.23	<0.015	0.132	<0.015	<0.015	2.44	0.379	6.47	0.402	<0.015	0.0235	0.583	0.16	0.511
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	0.0897	0.701	0.0869	<0.014	0.526	0.117	<0.014	0.201	0.554	<0.014	0.472	0.773	0.564	<0.014	0.307	0.284	0.981	<0.014	0.0445	<0.014	<0.014	0.772	0.105	2.31	0.122	<0.014	<0.014	0.233	0.0435	0.197
Benzo[a]pyrene	M	2800	mg/kg	0.1	34.00	0.181	1.51	0.13	<0.015	0.906	0.213	<0.015	0.47	1.14	<0.015	0.836	0.987	1.03	<0.015	0.458	0.955	1.91	<0.015	0.0721	<0.015	<0.015	1.41	0.179	4.2	0.185	<0.015	<0.015	0.321	0.0759	0.286
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25.00	0.116	1.04	0.106	<0.018	0.758	0.168	<0.018	0.391	0.834	<0.018	0.726	0.395	1.05	<0.018	0.504	0.908	1.63	<0.018	0.109	<0.018	<0.018	0.847	0.161	3.15	0.234	<0.018	<0.018	0.292	0.0738	0.257
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838.00	0.0359	0.246	<0.023	<0.023	0.195	0.0473	<0.023	<0.23	0.196	<0.023	0.158	0.102	0.23	<0.023	0.0823	0.204	0.368	<0.023	<0.023	<0.023	<0.023	0.242	0.0399	0.706	0.0716	<0.023	<0.023	0.0563	<0.023	0.0467
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13.00	0.149	1.19	0.118	<0.024	0.801	0.194	<0.024	0.467	0.903	<0.024	0.685	0.318	0.982	<0.024	0.369	0.882	1.58	<0.024	0.086	<0.024	<0.024	0.971	0.167	2.55	0.202	<0.024	<0.024	0.243	0.0756	0.206
Total Of 16 PAH's	N	2800	mg/kg	2		1.98	15.6	10.7	<0.118	10.8	2.44	0.203	3.19	9.27	<0.118	8.4	10.1	12.4	<0.118	6.3	7.89	20.3	<0.118	1.13	<0.118	<0.118	18.5	2.71	73.1	9.21	<0.118	<0.118	5.01	1.34	4
Resorcinol	M	2920	mg/kg	0.02																															
Phenol	M	2920	mg/kg	0.02	3.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0117	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cresols	M	2920	mg/kg	0.02		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0117	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenols	M	2920	mg/kg	0.02		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
1-Naphthol	N	2920	mg/kg	0.02																															
Trimethylphenols	M	2920	mg/kg	0.02																															
Total Phenols	M	2920	mg/kg	0.1		<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035

18-669 Llanwern Phase 4E Soil Chemical Screening

Project: P18-669																											
Client: Rodgers Leask Environmental				**Job No.:**		181114-83	181114-83	181114-83	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181121-47	181121-47	181121-47	**Number of Exceedances**	**Maximum Concentration Check**	**Minimum Exceedance Concentration**
Quotation No.: Q21-24056				**Sample ID.:**		4G-F6-V	4G-G6	4G-G6	4G-E4	4G-E4-V	4G-F4	4G-F4	4G-F5	4G-F7	4G-F7	4G-F4-V	4G-F5-V	4G-F7-V	4G-G5	4G-G5	4G-G5-V	4G-D7	4G-D7	4G-D7-V			
Order No.: -				Client Sample Ref.:		18733019	18733028	18733037	18775424	18775457	18775464	18775470	18775478	18775444	18775448	18775474	18775482	18775453	18775486	18775490	18775431	18786553	18786557	18786495			
				Sample Type:	**HFC Table 2.1 Agreed Soil Re-Use Values (SRVs)**	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID			
				Top Depth (m):		2.70-2.70	0.30-0.30	0.50-0.50	0.40-0.40	2.20-2.20	0.20-0.20	0.40-0.40	0.50-0.50	0.40-0.40	0.80-0.80	2.40-2.40	2.60-2.60	2.60-2.60	0.40-0.40	0.70-0.70	3.20-3.20	0.30-0.30	0.60-0.60	1.70-1.70			
				Bottom Depth (m):																							
				Date Sampled:		13/11/2018	13/11/2018	13/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	20/11/2018	20/11/2018	20/11/2018			
				Asbestos Lab:																							
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																							
ACM Type	U	2192		N/A																							
Asbestos Identification	U	2192		N/A			Not Detected		Not Detected			Not Detected	Not Detected	Not Detected					Not Detected			Not Detected			**5**	0.0000	0.0000
Asbestos by Gravimetry	U	2192	%	0.001																							
Total Asbestos	U	2192	%	0.001																							
Moisture	N	2030	%	0.020		25	7.3	6.5	11	29	14	6.7	5.8	3.8	7.8	24	36	23	7.4	8.4	25	5.8	21	18			
Soil Colour	N	2040		N/A		Dark Brown	Dark Brown	Dark Brown	Light Brown	Dark Brown	Light Brown	Light Brown	Dark Brown	Dark Brown	Dark Brown	Grey	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown			
Other Material	N	2040		N/A		Vegetation	Vegetation	Vegetation	Stones	Vegetation	Stones	Stones	Stones	Stones	Vegetation	None	None	Vegetation	Vegetation	Vegetation	Vegetation	Stones	Stones	Vegetation			
Soil Texture	N	2040		N/A		Loamy Sand	Sandy Loam	Sandy Loam	Loamy Sand	Clay	Loamy Sand	Loamy Sand	Sand	Sand	Sandy Loam	Clay	Clay	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sand	Silty Clay			
pH	M	2010		4.0		7.88	10.4	9.82	11.7	7.35	10.7	10.4	9.44	9.55	10.6	8.01	7.14	7.76	9.82	9.91	8.59	11.4	8.55	7.99			
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.38	7.38	<1	**6**	7.38	2.41
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	115	<12	<12	38.4	281	20.8	19	<12	30.5	<12	317	412	123	<12	<12	89	<12	<12	47.1	**12**	1590.00	155.00
Iron (Total)	N	2430	mg/kg	100	3.05E+05	32900	13200	231000	232000	32700	74500	204000	179000	452000	134000	34200	19800	32500	164000	51600	28800	161000	18100	32600	**1**	452000.00	452000.00
Arsenic	M	2450	mg/kg	1	2533	12.9	2.38	14.2	<6	14.1	21.9	11.8	11.5	12.8	7.91	13.2	13.4	11.4	11.4	5.48	11.6	6.99	8.13	15.1	0	no exc.	0.00
Cadmium	M	2450	mg/kg	0.1	73	<0.02	<0.02	<0.2	<0.2	<0.02	<0.2	<0.2	0.634	<0.2	<0.2	<0.02	<0.02	<0.02	1.6	0.524	0.326	1.39	0.678	<0.02	0	no exc.	0.00
Chromium	M	2450	mg/kg	1	9431	31.9	17.8	<9	137	31.7	47.2	<9	<9	<9	<9	28.8	31.2	29.1	<9	5.37	27.1	210	10.3	27.7	0	no exc.	0.00
Manganese	M	2450	mg/kg	5	3.33E+04	626	4010	7140	8590	361	4760	2840	7110	4220	3550	1150	282	960	3660	2780	985	17900	1610	954			
Copper	M	2450	mg/kg	0.5	451	10.8	<1.4	<14	<14	11.4	36.9	<14	<14	22.1	15.9	9.01	20	9.57	<14	6.68	11	52.3	22.6	9.05	0	no exc.	0.00
Mercury	M	2450	mg/kg	0.1	132	<0.14	<0.14	<1.4	<1.4	<0.14	<1.4	<1.4	<1.4	<1.4	<1.4	<0.14	<0.14	<0.14	<1.4	<0.14	<0.14	<1.4	0.59	<0.14	0	no exc.	0.00
Nickel	M	2450	mg/kg	0.5	1.15E+04	37.3	1.36	23.7	44.1	34.3	36.6	12	52.3	37.1	17.9	34.1	24.2	34.3	15.8	6.93	35.2	36.5	10.9	32.6	0	no exc.	0.00
Lead	M	2450	mg/kg	0.5	1.57E+04	26.7	3.57	25.1	9.62	30	76.9	24	37.4	21.4	48.9	24.7	45.8	22.4	27.6	17.7	25.5	151	63	22.4	0	no exc.	0.00
Selenium	M	2450	mg/kg	0.2	702	<1	3.57	<10	<10	<1	<10	<10	<10	<10	<10	<1	<1	<1	<10	<1	<1	<10	2.02	<1	0	no exc.	0.00
Vanadium	U	2450	mg/kg	5	1606	54.6	40	76.2	106	54.2	70.2	29.4	28.2	93.6	46.1	51	46.7	49.7	38.3	36.7	49.4	1080	31.2	46.8	**1**	2400.00	2400.00
Zinc	M	2450	mg/kg	0.5	1.38E+05	103	11.8	134	133	107	270	125	95.8	149	89.7	104	146	102	72.8	57.3	105	440	285	95.2	0	no exc.	0.00
Organic Matter	M	2625	%	0.4		1.3	0.712	1.72	5.81	3.88	4.17	8	13.7	4.88	15.3	0.909	8.41	0.962	7.1	7.03	0.91	7.57	>100	0.8			
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0	no exc.	0.00
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	0.0239	0.0412	<0.02	0.022	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0	no exc.	0.00
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	0.0229	0.039	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0	no exc.	0.00
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	0.0466	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0	no exc.	0.00
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	<0.1	<0.1	6.29	1.13	<0.1	1.26	<0.1	<0.1	0.888	4.51	<0.1	0.878	<0.1	<0.1	3.09	<0.1	3.42	10.8	<0.1	0	no exc.	0.00
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	<0.1	3.03	23.4	8.1	<0.1	11.3	<0.1	4.37	5.14	16.3	<0.1	1.97	<0.1	3.35	7.46	<0.1	26.3	373	<0.1	0	no exc.	0.00
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	<0.1	15.8	125	70.6	4.06	60.9	<0.1	20.7	27.7	36.6	2.16	4.16	3.39	34.2	53.2	2.25	99.7	127	<0.1	0	no exc.	0.00
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	<0.1	12.1	77.8	15.4	<0.1	19.7	<0.1	5.23	4.18	11.5	<0.1	<0.1	<0.1	6.07	41	<0.1	26.6	19.3	<0.1	0	no exc.	0.00
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5		<0.1	30.9	233	95.2	4.06	93.1	<0.1	30.3	37.9	69	2.16	7.01	3.39	43.6	105	2.25	156	531	<0.1			
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0	no exc.	0.00
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0	no exc.	0.00
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	0.026	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0	no exc.	0.00
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	0.0314	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0	no exc.	0.00
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	<0.1	1.13	2.66	0.556	<0.1	1.58	<0.1	1.31	0.216	0.644	<0.1	<0.1	<0.1	0.719	1.23	<0.1	3.13	5.52	<0.1	0	no exc.	0.00
Aromatic TPH >C16-C21	U	2680	mg/kg	1	1424	<0.1	1.41	11	8.71	<0.1	8.71	2.14	6.31	1.55	3.9	<0.1	2.07	<0.1	3.83	5.31	<0.1	24.3	72.5	<0.1	0	no exc.	0.00
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	<0.1	10.4	133	37.9	13	48.3	5.55	29	10.8	18.4	1.75	29.2	2.03	23.6	49.2	<0.1	86.5	190	2.55	0	no exc.	0.00
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	<0.1	19.5	156	11.3	1.26	24.1	0.824	11.7	1.21	7.79	<0.1	2.02	0.615	13.3	73.4	<0.1	30.5	48.3	<0.1	0	no exc.	0.00
Total Aromatic Hydrocarbons	N	2680	mg/kg	5		<0.1	32.4	303	58.5	14.3	82.7	8.51	48.3	13.7	30.7	1.75	33.3	2.65	41.4	129	<0.1	144	317	2.55			
Total Petroleum Hydrocarbons	N	2680	mg/kg	10		<0.1	63.3	536	154	18.3	176	8.51	78.6	51.7	99.9	3.91	40.3	6.04	85.1	234	2.25	300	848	2.55			
Benzene	M	2760	µg/kg	1	3800	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	296	<90	0	no exc.	0.00
Toluene	M	2760	µg/kg	1	128000	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	0	no exc.	0.00
Ethylbenzene	M	2760	µg/kg	1	80000	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	0	no exc.	0.00
m & p-Xylene	M	2760	µg/kg	1	74000.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	0	no exc.	0.00
o-Xylene	M	2760	µg/kg	1	74000.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	0	no exc.	0.00
Methyl Tert-Butyl Ether	M	2760	µg/kg	1		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100			
Naphthalene	M	2800	mg/kg	0.1	27.00	<0.009	0.0164	0.0633	0.0963	<0.009	0.167	0.015	0.0778	0.0161	0.0307	<0.009	<0.009	<0.009	0.0265	0.0403	<0.009	0.341	1.08	<0.009	0	no exc.	0.00
Acenaphthylene	N	2800	mg/kg	0.1	16.70	<0.012	<0.012	<0.06	0.0284	<0.012	0.0987	<0.012	0.0571	<0.012	0.0133	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	0.219	0.186	<0.012	0	no exc.	0.00
Acenaphthene	M	2800	mg/kg	0.1	30.00	<0.008	<0.008	0.0474	0.0146	<0.008	0.0191	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0126	0.0643	<0.008	0.0306	0.0102	<0.008	0	no exc.	0.00
Fluorene	M	2800	mg/kg	0.1	27.00	<0.01	<0.01	<0.05	0.0236	<0.01	0.039	<0.01	0.0231	<0.01	<0.01	<0.01	<0.01	<0.01	0.0109	0.0348	<0.01	0.131	0.0175	<0.01	0	no exc.	0.00
Phenanthrene	M	2800	mg/kg	0.1	27.00	<0.015	0.0416	0.207	0.481	<0.015	0.488	0.0726	0.195	0.0454	0.0863	<0.015	0.0414	<0.015	0.118	0.209	<0.015	1.5	0.215	<0.015	0	no exc.	0.00
Anthracene	M	2800	mg/kg	0.1	34.00	<0.016	<0.016	<0.08	0.132	<0.016	0.15	<0.016	0.0683	<0.016	0.0231	<0.016	<0.016	<0.016	0.0195	<0.016	<0.016	0.409	0.108	<0.016	0	no exc.	0.00
Fluoranthene	M	2800	mg/kg	0.1	6.64	<0.017	0.0501	0.24	1.02	<0.017	1	0.0906	0.402	0.0394	0.167	<0.017	0.0776	<0.017	0.0942	0.269	<0.017	2.68	0.315	<0.017	**2**	12.80	9.72
Pyrene	M	2800	mg/kg	0.1	76.00	<0.015	0.0374	0.22	0.843	<0.015	0.943	0.0789	0.322	0.0319	0.148	<0.015	0.0633	<0.015	0.0905	0.228	<0.015	2.35	0.249	<0.015	0	no exc.	0.00
Benzo[a]anthracene	M	2800	mg/kg	0.1	607.00	<0.014	0.0282	0.0954	0.513	<0.014	0.602	0.0628	0.277	0.0271	0.098	<0.014	0.0387	<0.014	0.0493	0.13	<0.014	1.41	0.238	<0.014	0	no exc.	0.00
Chrysene	M	2800	mg/kg	0.1	621.00	<0.01	0.0293	0.139	0.546	<0.01	0.614	0.0715	0.303	0.0322	0.131	<0.01	0.0428	<0.01	0.0697	0.158	<0.01	1.51	0.313	<0.01	0	no exc.	0.00
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	<0.015	0.039	0.141	0.777	<0.015	1.05	0.1	0.474	0.0505	0.163	<0.015	0.067	<0.015	0.0798	0.175	<0.015	2.33	0.614	<0.015	**3**	7.74	4.89
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	<0.014	<0.014	<0.07	0.191	<0.014	0.343	0.0367	0.163	<0.014	0.0814	<0.014	0.0222	<0.014	0.0255	0.064	<0.014	0.833	0.189	<0.014	0	no exc.	0.00
Benzo[a]pyrene	M	2800	mg/kg	0.1	34.00	<0.015	0.0232	0.0819	0.506	<0.015	0.637	0.0718	0.284	0.0243	0.0802	<0.015	0.0355	<0.015	0.0407	0.121	<0.015	1.36	0.337	<0.015	0	no exc.	0.00
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25.00	<0.018	0.0195	<0.09	0.397	<0.018	0.589	0.0534	0.253	0.0297	0.0769	<0.018	0.0347	<0.018	0.0348	0.0994	<0.018	0.735	0.309	<0.018	0	no exc.	0.00
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838.00	<0.023	<0.023	<0.115	0.0824	<0.023	0.129	<0.023	0.0593	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	<0.023	0.213	0.0852	<0.023	0	no exc.	0.00
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13.00	<0.024	<0.024	<0.12	0.372	<0.024	0.486	0.0495	0.238	0.026	0.075	<0.024	<0.024	<0.024	0.0406	0.108	<0.024	0.94	0.413	<0.024	0	no exc.	0.00
Total Of 16 PAH's	N	2800	mg/kg	2		<0.118	0.285	1.23	6.03	<0.118	7.35	0.703	3.2	0.322	1.17	<0.118	0.423	<0.118	0.713	1.7	<0.118	17	4.68	<0.118			
Resorcinol	M	2920	mg/kg	0.02																							
Phenol	M	2920	mg/kg	0.02	3.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	no exc.	0.00
Cresols	M	2920	mg/kg	0.02		<0.01	<0.01	<0.01	<0.01	0.0141	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			
Xylenols	M	2920	mg/kg	0.02		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015			
1-Naphthol	N	2920	mg/kg	0.02																							
Trimethylphenols	M	2920	mg/kg	0.02																							
Total Phenols	M	2920	mg/kg	0.1		<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035			

Appendix C – RLL CWDQRA

Glan Llyn Llanwern

Controlled Water DQRA 2019

Controlled Waters Detailed Quantitative Risk

Assessment

Glan Llyn Llanwern (Sitewide)

2019 Update

For

St. Modwen Developments

DATE: August 2019

REV: A

18669-RLE-19-RP-O-0006

Document Reference & Control

Project Name:	**Glan Llyn Llanwern Sitewide**
Project Reference:	**P18-669**
Report Title:	**Controlled Waters DQRA 2019 Update**
Client:	**St. Modwen Developments**
Document Reference:	**18669-RLE-19-RP-O-0006**
Report Status:	**Draft for Issue**

Approval Status	Name & Position
Prepared by:	Ross Cameron BSc, MSc, MRSC, MCIWM, CEnv Environmental Geochemist
Reviewed by:	Howel Morris BSc MSc CGeol Principal Consultant

Revision Status	Date	Summary of Revision	Revision by:

Contents

1.0	**Introduction**	**6**
1.1.	Atkins Controlled Waters Detailed Quantitative Risk Assessment of 2016	6
1.2.	Rationale for Updated Model	7
1.3	Natural Attenuation from Site Features	9
2.0	**Site History and Environmental Setting**	**11**
2.1	Site Setting	11
2.2	Site History	11
2.3	Geology	11
2.4	Hydrogeology	14
3.0	**Conceptual Site Model**	**20**
4.0	**Contamination Data Assessment**	**23**
5.0	**Detailed Quantitative Risk Assessment and Re-use Assessment**	**32**
6.0	**Conclusions and Recommendations**	**35**

Appendices

Appendix A: RLEs Reclamation Performance Specification

Appendix B: Atkins Permeability Technical Note

Appendix C: Groundwater Levels Monitoring

Appendix D: Glan Llyn Diagrammatic CSM

Appendix E: Soils Analysis

Appendix F: Sampling Location Plans

Appendix G: Soil Leachate Analysis

Appendix H: Surface Waters Analysis

Appendix I: Chemical Input Parameters and Justifications

Appendix J: Table 5-4 CWDQRA Reuse Criteria for 5% & 40% Infiltration

Appendix K: Level 3 Groundwater Excel Worksheets

Drawings

Drawing 186669-RLE-19-XX-DR-O-0004 – Site Location Plan

Drawing 8111-008-A011 – Showing Proposed Site Redevelopment

Drawing 5111373-LLA-DWG-EG-0295 – CWRA Borehole Location Plan

Drawing 5111373-LLA-DWG-EG-0408 - Current Surface Water Drainage and Sampling Locations

Drawing D12-084-512 – Post-development Surface Water Drainage Plan

1.0 Introduction

Rodgers Leask Environmental Ltd (RLE) has been commissioned by St Modwen Developments Ltd (St Modwen) to update and further develop a Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) of the potential risk to Controlled Waters for the Glan Llyn development at Llanwern, Newport (herein referred to as the site). The previous version of this CWDQRA was prepared by Atkins Limited (Atkins), the latest version of which was identified as: Document Reference: 5111373-LLA-OUT-0257, Version: 3 and dated February 2017. It is recommended that reference be made to the aforementioned Atkins Report, in order to obtain greater detail on the known/documented Reporting background to this site.

The principal objectives of the current exercise is to provide, as practicably possible, future surface water flow contributions from the site are compliant upon entry in to the Monks' Ditch, surface water course, which bisects the site, following the redevelopment of the Glan Llyn site for mixed residential and commercial redevelopment and further limiting the amount of material which require off-site removal by virtue of its contaminative potential towards local Controlled Waters.

These introductory comments provide a narrative and rationale for the assumptions made within this updated model, and also provide considerations relating to the temporary management of the water whilst redevelopment is being undertaken, and sustainability of the brownfield project.

As alluded above, an interim state will exist where the site has been reclaimed, but full residential and commercial development is under construction. The reclamation, in terms of surface water quality, will be at its most effective when it is fully developed. The underlying natural clay currently provides a barrier to downward migration of water and the reens (surface water ditches) which are cut into the natural clay and/or peat, drain the water within the Made Ground.

1.1. Atkins Controlled Waters Detailed Quantitative Risk Assessment of 2016

The initial DQCWRA prepared by Atkins (Version: 3 and dated February 2017), was issued with the intention that, as site specific information was collected, the assessment would be reviewed and updated. It was described as the starting point and that the criteria were understood to be conservative. The CWDQRA modelled two site conditions for the mixed use development comprising; residential and commercial end usage.

The residential end use was assumed to have a rainwater interception/ infiltration ratio of 60:40. The commercial end use was assumed to have a rainwater interception/ infiltration ratio of 95:5. The interception is where roofs, roads and hard paving take the rain water and transfer it directly into the surface water reens. The infiltration is where rainwater lands

on grassed or landscaped areas and is able to percolate into the construction material (soils, piling mat, sub base etc) and underlying post-development Made Ground. The current evapotranspiration rate for grassed areas is estimated as 600mm/a against an annual rainfall rate of 953mm/a. The earlier Atkins value utilised, (applicable to permeable areas) was; 416mm/annually.

The Atkins CWDQRA, that generated the initial criteria, assumed that 100% of the infiltrated rainwater (12.85mm per year or 1.3% of total rainfall) mm/a) percolated through the construction material and in to the Made Ground.

Upon derivation of their soil re-use criteria (calculated to be expressed as mg/kg for direct comparison against actual soil analytical data obtained), it was previously noted by Atkins in their 2017 CWDQRA Report and demonstrated in their associated Table 5.5, that the maximum and average soil sample concentrations exhibit some exceedances for inorganic compounds, copper and vanadium. It was also noted that there were exceedances in surface water analyses for iron, manganese, cyanide, and ammoniacal nitrogen. Although these had not been previously analysed by Atkins in soil samples, subsequent analyses has included these determinands.

Exceedances were also noted in soil samples analysed for organic compounds, especially C_{12}-C_{35} species aromatic TPH (total petroleum hydrocarbons), and a number of PAH (polynuclear aromatic hydrocarbon) species as compared to the derived soil re-use criteria. Concentrations of PAHs present in actual soil analytical data obtained were, in some cases, over one order of magnitude in excess of the calculated re-use criteria, suggesting that attenuation, particularly of heavy fraction TPH and PAHs is likely to be an issue on this site requiring further consideration as part of the proposed remedial and redevelopment works. Although previous analyses of soil samples undertaken by Atkins did not include phenols, recent analyses has included this determined.

1.2. Rationale for Updated Model

The principal rationales for reviewing the model that generated the initial criteria have been:

1. The amount of additional field, site specific, data collected since preparation of the earlier Atkins CWDQRA;

2. The remedial benefits of the currently proposed pre-development turnover and reengineering process were not included in the earlier Atkins CWDQRA. Further details of this proposed Made Ground re-engineering strategy to be employed are provided by Rodgers Leask Environmental Ltd in their Reclamation Performance Specification A – Turnover – Technical Note, dated 14/12/18, Ref: 17480-RLE-18-XX-RP-O-1016). A copy of this Technical Note is provided in **Appendix A** to the current Report.

The large and increasing amount of site specific field data for soils and surface waters has provided further confirmation that the criteria, which is based on theoretical values, is conservative. This is indicated where chemical results for soil placed do not appear to deliver the modelled concentrations to the surface water. The undeveloped site is currently at a worst case scenario where rainfall is free to percolate through material that has not been reengineered. Reengineering and redevelopment will only reduce infiltration and mobilisation serving to improve the currently monitored conditions.

In 2016, geotechnical information relating to the permeability of the Made Ground was assessed (Atkins Ltd Permeability Infiltration Technical Note Ref: 5111373-LLA-OUT-0256, dated 15th December 2016), but this was not used in the model for the Atkins 2017 CWDQRA. A copy of this Technical Note is provided in **Appendix B** of the current Report. The Atkins Ltd Technical Note presented information on the characteristics of the reengineered ground. The earthworks specification for the placement of material (following the turnover to natural clay), requires particle size distribution (PSD) tests, density tests, compaction tests and air void tests on each layer to validate the material has been compacted sufficiently. The particle size distribution within the Made Ground is known to be well graded and when compacted, the permeability is assessed as having a low permeability/poor drainage potential. A number of falling head tests were undertaken within a reengineered plot, which returned failed test results. The reengineering therefore has a remediation/stabilising benefit, by creating a low permeability material and this can be validated by the geotechnical information already collected.

ln contrast to the reengineered ground, the construction materials (6F2 piling mat & clean soils) placed above the Made Ground are likely to be of good drainage potential (if they are not, then they will only serve to further limit the downward migration of rainwater).

The low permeability reengineered material inhibits the downward migration of infiltrated rainwater as the pore water in the construction material does not readily flow into the material with much reduced pore spaces (air voids <10%). Lowering the permeability of this material also greatly increases time taken by the perched water to travel within the material.

The engineered characteristics have two distinct remedial benefits as follows:

1. The volume of infiltrated water entering the body of reengineered Made Ground is reduced, therefore the volume of water exposed to mobile contaminants is also reduced;
2. The time taken for migration of the perched water within the reengineered ground is greatly increased and therefore, the volume of perched water reaching the surface water via this route is reduced, increasing the ratio of clean rainwater in the surface water reens. Where this passage is also through areas of cleaner reengineered Made Ground, there are likely to be benefits associated with increased contamination attenuation prior to reen discharge. These are the areas of the site where some retardation (degradation and/or sorption) of contaminants within the Made Ground is

considered possible. On this basis it is proposed to place 'cleaner' Made Ground closer to the reens which are known to be the surface water receptors for the perched waters.

The Atkins CWDQRA, that generated the initial criteria, assumed that in areas of soft landscaping, 100% of the infiltrated rainwater (12.85mm per year or 1.3% of total rainfall) percolated through the construction material (imported top soils) and in to the Made Ground. This value takes account of estimated surface-water run-off (55% of total rainfall) and evapotranspiration (43.7% of total rainfall). It is considered likely that the lowest achievable, permeability of the post-development Made Ground is like to be in the region of ($1x10^{-7}$ m/s).

It was also apparent in the Atkins CWDQRA and Conceptual Site Model that although lateral drainage within the capping layer was anticipated, this wasn't accounted for in the calculations, where it assumed that essentially all (1.3% of the total rainwater) passed into the underlying post-development Made Ground. It is therefore reasonable to assume that a reduction in infiltration into post-development Made Ground will be enabled by the placement of higher permeability ground surface construction materials (imported soils) and any possible introduced gradient within this layer which will encourage an element of lateral flow.

In order to gauge potential impacts on the existing calculated soil reuse criteria, a process of sensitivity analyses was therefore proposed using possible scenarios where 40% of the 12.85mm per year (5.14mm/year) or 5% (0.64mm/year) penetrates into the underlying post-development Made Ground. It is recognised that this modelling is of a further potential reduction in what is already, apparently, a low rate of rainwater infiltration (1.3% of total rainfall). Reuse criteria would then be derived for the range of determinands previously selected by Atkins, and it was proposed that these criteria now also include iron, manganese, cyanide, ammoniacal nitrogen and phenol, which would be modelled in current revision to the Report.

It was considered that the very low 5% (0.64mm/year) infiltration rate may not necessarily be achievable, but was introduced as a mechanism to reflect distance from the surface water receptors (existing reens), and effectively represent a greater travel of infiltrated water. It was proposed that the findings should be superseded by modelled travel time parameters, when appropriate, and from this would be derived what would be considered to be realistic achievable soil reuse criteria.

1.3 Natural Attenuation from Site Features

It is also considered that there is a potential for natural attenuation benefits from further improving and expanding the existing surface water features on the site, which mainly comprise reens and ponds/small lakes. This is anticipated particularly through:

1. Further establishing the vegetation within the reens which will help reduce the concentrations of organic contaminants and particularly nutrients such as ammoniacal

nitrogen. The reens are known to vegetate rapidly and require regular maintenance to remove surplus growth;

2. Undertaking organic matter enrichment of soils along margins of the reens and ponds/lakes into which water penetrating the Made Ground are likely to discharge. This could be undertaken by placement of locally excavated peat (obtained from Alluvial and underlying Tidal Flat Deposits) and other soils containing high concentrations of organic matter. This should enable a further stripping out of low concentrations of PAHs and TPH within these discharge waters. Amendment of these soils with other materials will also be considered, taking into consideration further knowledge of the residual contaminant profile, in order to provide a passive sustainable solution to the long-term remediation of this site.

2.0 Site History and Environmental Setting

2.1 Site Setting

The Glan Llyn development site is located south of Llanwern, immediately east of Newport at National Grid Reference (NGR) ST 36101 86848. The site covers an area of approximately 243 ha which comprises previously developed land (Section 2.2). The site is bound to the north by a railway line and to the south by Queen's Way (A4810). The operational Tata steelworks is located adjacent to the eastern boundary and a north-south drainage ditch borders the western boundary, beyond which lies Newport Retail Park. A plan showing the site's location is presented on Drawing 18669-RLE-19-XX-DR-O-0004. The site is proposed to be redeveloped as a mixed residential and commercial development (Drawing8111-008-A0111). Residential development is proposed for the majority of the site, whilst commercial development is limited to the Celtic Business Park area in the east of the site (Drawing 8111-008-A0111).). A copy of this Drawing is provided to the rear of this Report.

2.2 Site History

Details of the documented site history are provided in the above-noted Atkins CWDQRA Report dated February 2017. However, in summary, the site was extensively developed as a steelworks by Richard Thomas and Baldwins Ltd in the 1960s. Prior to construction, marshland and arable farmland within the site boundary was subject to significant land raise and engineering to bring ground level to current levels. Within the confines of the development site, steelworks ancillaries included but were not limited to; mineral stockyards, blast furnaces, offices, railway sidings, a 'Bit Mac' plant and coking works. Steel making operations ceased in the western half of the steelworks site in 2001, with the majority of infrastructure demolished in 2004, following land transfer to St. Modwen Developments Ltd.

It is much of the material used as part of this pre-development land raise, together with demolished former steelworks buildings and structures that comprise the existing Made Ground across the site, which will be subject to the proposed reengineering and compaction works associated with this redevelopment.

Approximately 20% of the development has been completed up to August 2019, including near completion of two residential phases (Phase 1 & Phase 2), the construction of two commercial units (Amazon & CAF), the park and a pub within the Western Sub Area.

2.3 Geology

2.3.1. Published Geology

The BGS GeoIndex (BGS, 2016a) indicates that Superficial Tidal Flat Deposits comprising clays and silts underlie the areas of interest. The BGS Lexicon of Named Rock Units (BGS, 2016b)

describes these deposits as: *'normally a consolidated soft silty clay, with layers of sand, gravel and peat. Characteristically low relief; from the tidal zone'* Bedrock geology underlying the areas of interest comprises mudstones of the Mercia Mudstone Group (BGS, 2016a); the BGS Lexicon of Named Rock Units (BGS, 2016b) describes the Mercia Mudstone as: *'dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/anhydrite* [are] *widespread, sandstones are also present.'* Given the history of development within the areas of interest, it is anticipated that a layer of Made Ground will be present across the proposed developments.

2.3.2. Local Geology

The Glan Llyn development site benefits from several phases of GI and the ground model for the site is well constrained. For ease of discussion and brevity, a summary of local geology underlying the site is presented in Atkins Table 2-1 below (reproduced from their February 2017 Report). However, a full discussion of local geology within each development phase is presented in the respective "Ground Investigation and Ground Conditions" section of the geo environmental reports (Atkins; 2015b, 2015c, 2015d). Boreholes drilled as part of the 2016 CWRA Ground Investigation (IFA, 2016) confirm the presence of Made Ground, Tidal Flat Deposits and Bedrock across the site, as outlined in Table2-1 below.

Table 2-1 Summary of Local Geology (Atkins, 2015 a)

Geological Unit		Indicative Geological Composition	Approximate Thickness
Topsoil		Soft brown slightly sandy clay.	Nominal thickness, only locally
Made Ground	Made Ground 1	Grey occasionally clayey, sandy gravel of and angular to sub-angular fine to coarse slag with occasional tarmac, concrete, brick, limestone and ceramic / fused slag.	0.02 2.6 m
	Made Ground 2	Red brown / brown clayey sandy gravel (locally gravelly sand) with cobbles and boulders	
	Made Ground 3	Red brown / brown soft to firm sandy gravelly clay with cobbles and boulders. Gravel includes sub-rounded to angular fine to coarse burnt shale, brick, slag, sandstone, mudstone, shale and occasional coal.	
Tidal Flat Deposits	Upper Tidal Clay	Generally very soft to firm blue grey slightly gravelly silty clay with rare localised pockets of peat.	7 – 10 m (IFA, 2016)
	Upper Peat	Generally a spongy dark brown occasionally clayey pseudo-fibrous to fibrous peat.	
	Lower Peat	Generally a spongy to plastic dark brown occasionally clayey occasionally sandy pseudo-fibrous to amorphous peat.	
	Lower Tidal Clay	Generally described as a soft to firm bluish grey slightly sandy slightly gravelly clay gravel is of angular to sub-angular fine to medium sandstone.	
	Red Clay	Generally described as a firm to stiff red brown mottled grey slight gravelly clay, gravel is angular to sub-angular fine to coarse mudstone.	
	Basal Sand	Generally a medium dense light brown slightly silty slightly gravelly fine grained sand the gravel is of sub-rounded to sub-angular fine siltstone and quartzite.	
Bedrock	Mercia Mudstone Group	Weathered Mercia Mudstone being described as stiff to very stiff reddish brown slightly gravelly clay and extremely weak to weak occasionally laminated red brown mudstone.	Encountered, thickness not proven

2.3.3 Post-development Ground Conditions

The post-development ground conditions on site are as detailed in Table 2-2 below. Existing Made Ground is to be excavated and re-compacted to comply with the Atkins geotechnical specification for the development (Atkins, 2016b). In addition, it was proposed that a 1 in 100 gradient (0.01) be applied to the surface of the Made Ground to prevent ponding and promote lateral drainage within the construction materials.

Potential further mitigation to promote lateral flow that may be considered is the provision of a drainage blanket to cap the reengineered material and increasing the fall from the centre of a plot to periphery.

Table 2-2 Post-Development Ground Conditions

Unit	Approximate Thickness	Description
Impermeable Construction Materials/ Housing Sub-base/Permeable Topsoil	0.6 m	Imported clean topsoil/construction materials
Piling Mat*	0.5 m	Imported 6F2 (*may be included within 600mm of construction materials)
Made Ground	1.5 – 2.0 m	Excavated and re-compacted Made Ground
Tidal Flat Deposits	7.0 – 10.0 m	No change from current conditions
Bedrock (Mercia Mudstone Group)	>1,350m	No change from current conditions

2.4 Hydrogeology

The following details are based upon information presented in the Atkins 2017 Report, and reviewed again prior to preparation of the current update.

2.4.1. Published Hydrogeology

Groundwater maps previously available on the Environment Agency website (Atkins, 2015a) show that the Mercia Mudstone bedrock deposits below the proposed developments are classified as a Secondary B Aquifer. The Environment Agency define a Secondary B Aquifer as being: *'predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.'*

The Tidal Flat Deposits are classified as non-productive strata which are defined by the Environment Agency as being: *'deposits with low permeability that have negligible significance for water supply or river base flow'.*

It is understood from investigations carried out by Atkins that the Environment Agency website indicated that there were no groundwater abstractions within 1 km of the proposed developments. Information presented on the GroundSure Enviro Data Viewer website (http://groundsure.io/), accessed August 2019, indicates that the Site is not located within a Groundwater Source Protection Zone (SPZ).

2.4.2. Local Hydrogeology

A site-wide programme of monthly groundwater level monitoring was undertaken from May to November 2016 in the shallow and deep wells installed during the CWRA GI (Drawing 5111373-LLA-DWG-EG-0295) to inform the hydrogeological conceptual site model. A copy of this Drawing is provided in the Appendices to the current Report.

This monthly monitoring was subsequently continued until 2017.

A summary of groundwater levels recorded in the deep and shallow wells were presented in Appendix A of the Atkins 2017 CWDQRA Report and are reproduced in the current Report (**Appendix C**). It is indicated that groundwater level monitoring and water strike data recorded during the Ground Investigations (GI) of each site development phase, were presented in the "Ground Investigation and Ground Conditions" section of the relevant geo-environmental Report (Atkins; 2015b, 2015c, 2015d); and are summarised in the CWRA Position Statement (Atkins, 2015a).

It was considered that groundwater levels recorded during the CWRA GI and subsequent monitoring suggested that the groundwater is present beneath the proposed development as follows (Atkins, 2015a):

- Shallow / perched groundwater within the Made Ground (shallow boreholes); and
- Groundwater within the Tidal Flat Deposits (confined to the basal sand layers) and Mercia Mudstone (deep boreholes).

Groundwater monitored within the deep boreholes was considered to be primarily derived from the bedrock geology, and hydraulic continuity between the upper perched shallow groundwater and 'regional' groundwater was considered likely to be limited. Post-development, the excavation and re-compaction of the Made Ground was recognised as likely to reduce its permeability, lowering still further, the hydraulic continuity.

The permeability of the reengineered material based on the compaction necessary to attain the requirements of the specification is likely to consistently achieve low permeability or poor drainage characteristics. This is likely to be a permeability of 10^{-7} m/s.

Downward percolation of water through the Tidal Flat Deposits was considered to be limited due to the low permeability of the clay-rich strata. This is likely to cause water to accumulate within the overlying Made Ground. Regional groundwater within the Basal Sands of the Tidal Flat Deposits and Mercia Mudstone bedrock is confined by the overlying clay within the Tidal Flat Deposits and is under sub-artesian pressure (Atkins, 2015a). These conditions are further confirmed by the presence of water strikes consistent with the top of the Mudstone/Basal Sands which rose several metres within a short time period (IFA, 2016).

Where the piezometric level in the regional aquifer is higher than shallow perched water then the shallow perched water system is likely to be hydraulically contained with limited downward leakage permitted. However, it is unknown how groundwater conditions will change throughout the hydraulic year within the post-development site. As outlined by Atkins (2015a), during hydraulic conditions where the piezometric level is below the level of the shallow perched water, slow downward migration of this water through the Tidal Flat

Deposits is to be expected. Table 2-4 of the Atkins 2017 CWDQRA Report, below (reproduced from their February 2017 Report), presents deep – shallow groundwater levels (mAOD) for the available groundwater level data across the site. It was indicated by Atkins that based on a review of the water levels in the deep and shallow borehole pairs, there are examples of both conditions being present at the proposed development site during all 2016 monitoring rounds. It was indicated that the majority of differences between piezometric levels are less than half a metre across the site, with only four occurrences where shallow piezometric levels are at or greater than 1.00m than deep levels (BH05 03/11/16, BH06 03/11/16, BH21 05/10/16 and 07/07/16, BH30 05/10/16).

Table 2-4 Deep and Shallow Groundwater Level Comparison

Deep Borehole	Shallow Borehole	Deep Groundwater Level (mAOD) – Shallow Groundwater Level (mAOD)*						
		10/05/2016	06/06/2016	07/07/2016	02/08/2016	01/09/2016	05/10/2016	03/11/2016
CWCP-03	CWWS-03	0.195	0.005	-0.145	0.035	-0.025	n/a	-0.305
CWCP-04	CWWS-04	-0.264	-0.764	-0.664	-0.584	-0.544	n/a	-0.774
CWCP-05	CWWS-05	0.181	-0.819	n/a	-0.429	-0.659	-0.769	-1.069
CWCP-06	CWWS-06	n/a	n/a	n/a	-0.336	n/a	n/a	-1.186
CWCP-07	CWWS-07	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-08	CWWS-08	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-09	CWWS-09	0.018	-0.682	-0.982	0.068	-0.162	-0.122	-0.432
CWCP-10	CWWS-10	-0.089	n/a	n/a	-0.279	-0.389	-0.399	-0.419
CWCP-11	CWWS-11	0.048	0.018	-0.012	-0.092	0.018	-0.032	-0.012
CWCP-12	CWWS-12	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-13	CWWS-13	-0.904	-0.834	-0.984	-0.844	-0.894	-0.774	-0.864
CWCP-14	CWWS-14	0.008	0.078	-0.022	-0.112	-0.002	-0.212	-0.132
CWCP-15	CWWS-15	0.078	0.118	0.668	-0.032	0.178	-0.242	0.108
CWCP-18	CWWS-18	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-19	CWWS-19	-0.112	-0.072	-0.232	-0.082	-0.182	-0.252	-0.112
CWCP-20	CWWS-20	n/a	n/a	n/a	n/a	n/a	n/a	n/a
CWCP-21	CWWS-21	-0.93	-0.77	-1.06	0.34	-0.82	-1.18	n/a
CWCP-22	CWWS-22	-0.818	0.152	0.002	0.682	0.232	-0.088	-0.048
CWCP-23	CWWS-23	0.526	0.596	0.856	0.146	0.036	0.036	0.026
CWCP-24	CWWS-24	0.607	0.127	0.117	-0.013	0.127	n/a	-0.253
CWCP-25	CWWS-25	-0.617	-0.257	-0.247	-0.397	-0.337	0.553	-0.637
CWCP-26-e	CWWS-26-e	-0.006	0.014	-0.196	-0.116	-0.156	-1.196	-0.206
CWCP-26-w	CWWS-26-w	0.525	0.365	0.345	0.325	0.155	0.675	-0.305
CWCP-27	CWWS-27	n/a	-0.09	-0.1	-0.17	-0.15	-0.31	-0.36
CWCP-28	CWWS-28	0.189	0.069	0.039	-0.021	0.179	0.069	0.219
CWCP-29	CWWS-29	-0.193	-0.363	-0.413	-0.263	-0.383	0.487	-0.553
CWCP-30	CWWS-30	0.38	0.17	0.15	0.2	-1	0	0.13
CWCP-31	CWWS-31	-0.298	-0.328	-0.398	n/a	-1.088	-0.388	-0.508
CWCP-32	CWWS-32	-0.562	-0.452	-0.552	-0.702	-0.702	-0.562	-0.552
CWCP-34	CWWS-34	n/a	n/a	n/a	n/a	n/a	-5.468	n/a
CWCP-35	CWWS-35	-0.27	-0.47	-0.47	-0.36	0.6	-0.51	-0.44
CWCP-36	CWWS-36	n/a	-0.165	-0.295	n/a	-0.385	n/a	n/a

*n/a indicates no two corresponding samples available for comparison (i.e. dry borehole/no data), where value is negative deep groundwater levels are lower than shallow, positive values indicate deep groundwater levels above shallow.

Further analysis of regional groundwater data (13/10/2015) from the boreholes installed into the bedrock geology was undertaken in the CWRA Position Statement (Atkins, 2015a). Deep groundwater contours produced suggest a regional groundwater flow direction towards the south and south east towards the estuary of the River Severn, which is broadly expected. This is confirmed by analysis of recent groundwater level monitoring data.

Review of the shallow perched water system indicates that it is likely to be extremely complex with no discernible single flow direction (Atkins, 2015a). The Made Ground is known to be highly heterogeneous (Table 2-1), resultant flow of perched water is likely to be discontinuous and tortuous through permeable and connected pathways only. In addition, flow within the Made Ground is fragmented across the site by the extensive network of surface water drainage ditches (reens) across the site (Section 2.5.1); it is anticipated that flow converges towards these surface water features where permeable pathways exist within the Made Ground. As a result of natural clay lining of the reens around the periphery of the site (Section 2.5.1), no lateral hydraulic connection exists between the Made Ground onsite and surrounding superficial deposits.

2.4.2.1. Hydrogeological Properties

Capping Drainage Layer

The gravels of the capping drainage layer are expected to have a permeability of approximately 1x10-3 m/s (Freeze and Cherry, 1979), assuming the material to have good drainage characteristics consistent with a clean gravel/sand (Atkins, 2016b).

Made Ground

It was indicated by Atkins, that soakaway tests undertaken within the re-engineered Made Ground onsite (in accordance with BRE 365 (BRE, 2007)) produced very little seepage and therefore analysis of results was not possible. It was noted that composition of the Made Ground as indicated by Particle Size Distribution (PSD) laboratory tests approximate the hydraulic conductivity of the post-development Made Ground at 1x10-7 m/s (Atkins, 2016b). It was therefore indicated that the assigned hydraulic conductivity of the re-engineered Made Ground be based on the values included within Barnes (2010) for a material with poor drainage characteristics as indicated by the soakaway tests. It was noted that this value is consistent with previous analysis undertaken by Atkins. The results of these tests are presented in Table 2-5, as reproduced below.

Table 2.5: Properties of the Re-engineered Made Ground

Made Ground	PSD No./ Average	BRE Soakaway Test Result	Adopted Permeability(*k*)
Test 1	102 No./ 11% fines, 22% sand, 62% gravel, 5% cobbles	Fell 4mm in 3hrs	1 x 10^{-7} m/s
Test 2		Fell 20mm in 2hrs	1 x 10^{-7} m/s

2.5. Hydrology

2.5.1. Surface Water Features

It was previously indicated by Atkins that, the surface water drainage onsite comprises several man-made surface water drainage ditches (reens) cut into the natural clay which divide the site north to south, receiving water from the land to the north in addition to onsite drainage and baseflow. A maximum channel flow of 10.64 l/s was previously recorded at sampling location D5N. The reens are connected to east-west drains which run the length of the site along the A4810 (Queen's Way Road) within 50 m from the southern boundary and the northern carrier drain within the site adjacent to the northern boundary(Drawing 5111373-LLA-DWG-EG-0408); ultimately discharging to the water treatment works at the operational Tata steelworks to the east. Drawing 5111373-LLA-DWG-EG-0408 depicts the current surface water drainage onsite and indicates sampling locations.

Monks' Ditch, a main river (Waterbody ID GB109056026850) crosses the site flowing north to south. The river flows across the site in a fully contained deep piled concrete channel approximately 7 m wide and 3 m deep (Rodgers Leask, 2016) before crossing the Gwent Levels to the south as a natural channel (Section 2.5.3) and discharging to the Severn Estuary via a tidal exclusion gate. A number of reens and watercourses controlled and maintained by Cyfoeth Naturiol Cymru / Natural Resources Wales (CNC/NRW) surround the site and are described in the surface water drainage strategy (Rodgers Leask, 2016).

A comprehensive surface water drainage strategy for the site has been developed by Rodgers Leask (2016), considering areas already developed (Western Sub Area and parts of the Celtic Business Park) and those yet to be developed. The strategy outlines the sustainable surface water management planned for the finished development. Approximately 399,000 m3 of storage is planned within the site, taking the form of an extensive network of blueways/reens, lakes and Sustainable Drainage Systems (SuDS), receiving all surface water runoff from the site. A post-development surface water drainage plan is presented in Drawing D12- 084-512 and summarised below:

- Blueways (Reen 1, Reen 2, Julian's Reen, Ellen Reen, East Lake Reen, King's Wall Reen and Celtic Business Park Reens) – primary surface water channels comprising existing and newly created reens which will be engineered to flow south to north across the site, culminating in a west-east channel adjacent to the northern boundary of the site, from which water will be discharged to Monk's Ditch. Reens within the site boundary will be unlined (other than being cut into the underlying clay to achieve the required invert level therefore the base and deeper parts of banks will be formed in the natural clay);
- Greenways – high level dry, shallow ditches intended to channel overland surface water from the development plots into the blueways;
- Lakes – a number of lakes and ponds are anticipated to be connected to the blueway system to provide amenity with some additional storage for surface water runoff; and
- Monks' Ditch – surface water from the site is proposed to be pumped to the Main River at a maximum flow rate of 750 l/s as specified by CNC/NRW.

The strategy as submitted (Rodgers Leask, 2016), states that discharges to Monks' Ditch will be allowed once the specified quality criteria and quality control systems have been

established and are met, until that point discharges to the Tata system will continue from the development site.

2.5.2. Rainfall

In the absence of an onsite rain gauge, rainfall data used within the Atkins 2017 CWDQRA assessment was taken from MAFF (1976) for the area surrounding Newport. Literature values for annual total rainfall, (953 mm, MAFF, 1976) are comparable to available data from nearby CNC/NRW rain gauge at Newport for the year 2015 (945 mm).

2.5.3. Designated Areas

Gwent Levels (Nash and Gold Cliff) Site of Special Scientific Interest (SSSI) encompasses the area between the southern site boundary and the Severn Estuary and comprises a large area of ancient grazing marshes, farmed wetland, and reens. The area is part of a series of adjoining SSSI designated for their wildlife and archaeology; specifically water beetles and dragonflies found in the reens, farmland birds, and brown hare, otter and water vole.

3.0 Conceptual Site Model

3.1 Introduction

A Conceptual Site Model (CSM) was previously prepared by Atkins for the Glan Llyn site, as a whole, and presented in their 2017 CWDQRA Report. It was indicated that the CSM, which was considered to be representative of the site in an un-remediated, undeveloped scenario, considered all available geological and hydrogeological information relating to the proposed development to produce a CSM upon which a detailed assessment of the risk to Controlled Waters could be assessed. Risks to Human health via inhalation, direct ingestion or dermal contact of soils did not form part of the CSM. Again, it is recommended that the relevant chapter of the Atkins Report is read in conjunction with this section of the current Report. However, much of the earlier Atkins CSM is presented again below for convenience.

3.2 Potential Sources of Contamination

The following potential sources of contamination were identified with respect to Controlled Waters considering the available historical and recent data for the site:

The Made Ground, which was historically used to build up the level of the site was known to include imported waste products (slag, concrete, brick, burnt shale) from other steelworks in addition to natural deposits (Table 2-1).

Chemical compounds which have the potential to contaminate the ground outlined by the Department of Environment (DoE, 1995) as being associated with metal production industry are: metals and metalloids, inorganic compounds, acids and alkalis. Contaminants, particularly related to coke-making include; PAHs, cyanides, ammoniacal liquors, sulphur and sulphates, BTEX VOCs and also include petroleum-based fuels and oils. Contaminants of Concern (CoC) are presented in Section 5.1.1.

It was noted by Atkins that groundwater within the bedrock has previously been impacted by contaminants associated with the former steel producing industry formerly located on this site. However given the direction of the groundwater flow and the location of elevated concentrations a link between the steelworks as a source and regional groundwater could not be confirmed.

3.3 Potential Receptors

Receptors relating to Controlled Waters are identified to comprise:

- Monks' Ditch (into which surface water from the development site is pumped);
- Engineered surface water reens onsite;
- Perched groundwater within the Made Ground;
- Groundwater within the Tidal Flat Deposits Unproductive Strata; and
- Mercia Mudstone Secondary B Aquifer.

It was indicated that the Made Ground and Tidal Flat Deposits (unproductive strata) are not considered to be a Controlled Waters receptor in the context of the assessment due to their anticipated low resource potential. The post-development surface water reens within the site were not considered to be Controlled Waters given the artificial nature of their origin and the fact that discharge from this system will always be entirely managed by on site pumping stations. The reens are therefore treated as part of the engineered water management system in the same way that SuDS features are on many developments.

Monks' Ditch, as a Main River, was considered to the principal receptor for any Controlled Waters impact at the site.

3.4 Potential Pathways

Potential Controlled Waters pathways were identified as follows:

Leaching of soil-borne contamination in Made Ground and subsequent lateral migration through permeable pathways in Made Ground to Monks' Ditch via onsite reens.

No effective pathway was identified between the shallow groundwater in the Made Ground and the deep groundwater within the Mercia Mudstone Secondary B Aquifer, due to the low permeability of the clay-rich Tidal Flat Deposits.

3.5 Potential Pollutant Linkages

It was assessed that contamination present within the Made Ground onsite is anticipated to directly leach into the underlying perched shallow groundwater via infiltration and diffusion. The degree of leaching from the source materials present within the Made Ground is a function of portioning to the soil matrix and volatilisation potential to the gaseous phase. Little dilution was anticipated to occur within the Made Ground as the site was considered to be hydraulically isolated from the surrounding superficial deposits by reens formed in the natural clay, preventing inflow of uncontaminated groundwater. The base of the reens are also known to be excavated into the clay-rich Tidal Flat Deposits.

The prevailing flow of perched groundwater was anticipated to be separated along the central north-south divide of each sub-area, flowing laterally to the adjacent reen following the slope of the Made Ground (Section 2.3.3). Groundwater flow was considered to be able to move laterally within the Made Ground without impedance. However, it is recognised that areas of low hydraulic conductivity are likely to exist in the Made Ground (i.e. due to the presence of silts and clays), which will baffle flow locally and prevent bulk advection of contaminants.

It was assumed that no dilution occurs within the shallow groundwater in the Made Ground and that concentrations of contaminants reach equilibrium. Substantial dilution will occur within the reens as groundwater mixes with surface water runoff from the site.

Water in the reens is proposed to be physically pumped into the Controlled Waters receptor, Monks' Ditch; details of which are outlined in the Surface Water Drainage Strategy (Rodgers

Leask, 2016). Currently it is understood that the surface water discharge from site flows into the Tata surface water system and is controlled and discharged as part of their industrial discharge consent.

As previously outlined, due to the low resource potential and low permeability nature of the Made Ground, Tidal Flat Deposits and Mercia Mudstone, in addition to the restricted pathway between shallow and deep groundwater, no credible groundwater receptors were realised. A diagrammatic CSM was prepared, which has been reproduced by RLE (dated 05/07/19) and is provided in **Appendix D**.

4.0 Contamination Data Assessment

4.1. Water Quality Standards

The Atkins CSM identified Monks' Ditch as a Controlled Waters receptor for the site. Therefore, the annual average Inland Surface Waters EQS applicable under the Water Framework Directive was adopted as the primary WQS (DEFRA/Welsh Ministers, 2015). Where a value was not available for a particular element or compound, then the following standards were used in order of preference:

- EU Statutory EQS (Protection of Surface Water Quality) (Council Directive 2000/60/EC);
- UK Statutory EQS (Protection of Aquatic Life) (Council Directive 76/464/EEC);
- UK Non-statutory EQSs (Protection of Aquatic Life) (Council Directive 76/464/EEC) and;
- UK Drinking Water Standard (DWS) (Water Supply (Water Quality) Regulations, 2000).

There are no current UK WQS for TPH; however, a concentration of 0.01 mg/l was used, which is based on the UK DWS in the former 1989 regulations (Water Supply (Water Quality) Regulations, 1989).

It is considered upon further review that the EQS Values for Controlled Water as applied in the earlier Atkins 2017 CWDQRA, still remain appropriate for this site, and therefore have remained unchanged in the current Revision.

4.2 Soil Quality Assessment Methodology

In order to determine the potential impacts through leachability of the existing insitu Made Ground, derivation of Screening Values (expressed as mg/kg) was previously undertaken by Atkins for a range of determinands using the Environment Agency calculation provided in their Remedial Target Worksheet (Level 1 Soils), using, where possible, site specific data. These previously derived Screening Values have been retained and utilised as part of the current revised assessment. Details as to the methodology utilised are provided in the earlier Atkins 2017 CWDQRA Report, and it is recommended that this methodology employed be read in conjunction with the current Report.

4.3 Atkins Earlier Findings from July 2015 to September 2016

For greater detail of these findings, reference should be made here to the earlier Atkins 2017 CWDQRA Report. However, in brief summary:

4.3.1 Soils

From analyses of 243 (No.) samples of Made Ground recovered from unremediated stockpiles across the site, it was noted, upon comparison, that total concentrations of determinands (which included metals, petroleum hydrocarbons and PAHs), were found in many of these samples, to exceed their respective calculated Level 1 Soils Screening Values,

based upon application of the proposed site specific EQS Values for Controlled Waters. The full results are presented in Appendix B of the earlier Atkins 2017 CWDQRA Report.

4.3.2 Soil Leachates

114 (No.) soil leachates were also generated from samples of Made Ground recovered. It was noted that upon analyses for an appropriate suite of inorganic determinands (mainly metals), and upon comparison with the proposed site specific EQS values, that a number of these (particularly chromium, copper and vanadium), were also found in many of these samples to exceed the respective EQS values. The full results are presented in Appendix B of the earlier Atkins 2017 CWDQRA Report.

4.3.3 Groundwater Samples

Concentrations of a range of metal determinands, consistent with the former usage of the site in the metal production industry, were also analysed in shallow and deep groundwater samples recovered from boreholes installed across the site. The full results are presented in Appendix C of the earlier Atkins 2017 CWSQRA Report. In view of the relative degree of hydraulic isolation of the shallow and deep groundwater horizons present across the site, these findings were considered separately.

4.3.3.1 Shallow Groundwater Horizon Samples

These samples were considered to be representative of groundwater in contact with existing Made Ground present on the site.

A total of 68 (No.) samples were recovered from the shallow groundwater within the Made Ground across 24 locations during May, June and July 2016 based upon a specification presented in an earlier monitoring strategy (Atkins, 2016a). The WQS standards adopted for groundwater quality screening are as outlined in Section 4.1 of the Atkins 2017 CWDQRA Report, and a summary of exceedances is presented in Table 4-3 of the same Report as it was determined that the LoD (limit of detection) was greater than or equal to the WQS for many of the determinands, for screening purposes exceedances were only considered for samples where analytical results were found to be above the LoD.

It was noted that, as expected, the determinands in exceedance of the WQS in the soil samples (consistent with those associated with the metal production industry (DOE, 1995)) are also reflected in the results of analyses of the shallow groundwater samples.

A review and discussion of the results of analyses of shallow groundwater samples is presented below, together with consideration of the results of more recent (post 2017) monitoring and analyses.

4.3.3.2 Deep Groundwater Horizon Samples

A total of 138 (No.) samples were recovered from the deep groundwater within the Tidal Flat Deposits and underlying Mudstone across 47 locations during May, June and July 2016 based upon a specification presented in an earlier monitoring strategy (Atkins, 2016a). Again, as the LoD was greater than or equal to the WQS for many of the determinands, for screening purposes exceedances were only considered for samples above the LoD. A summary of WQS exceedances is presented in Table 4-4 of the Atkins 2017 CWDQRA Report.

4.3.4 Surface Water Quality

It was indicated that surface water quality data was collected monthly from the reens and ponds onsite based upon a specification presented in an earlier monitoring strategy (Atkins, 2016a). A total of 104 (no.) samples were collected from June to November 2016 and were screened as outlined in Section 4.1 of the Atkins 2017 CWDQRA Report. Again, as the LoD was greater than or equal to the WQS for many of the determinands, for screening purposes exceedances were only considered for samples above the LoD.

4.3.4.1 Onsite Surface Water Quality

Of the 104 (No.) samples, 94 (No.) were from onsite. The determinands detected above the WQS within the onsite surface water samples were considered to be broadly consistent with those identified within the soil samples (Table 4-1 of the Atkins 2017 CWDQRA Report). Cyanide, iron, manganese, SVOC and VOCs were in exceedance of the WQS in the surface water, however they were not tested for in the soil samples, so a comparison may not be made.

Upon further review of the results obtained, it may be noted that:

67% exceeded the ammoniacal nitrogen WQS;
6% exceeded the total cyanide WQS;
4.3% samples exceeded the copper WQS, where bioavailable copper is considered only;
5.4% exceeded the vanadium WQS;
6.5% exceeded the nickel WQS.

4.3.4.2. Monks' Ditch Surface Water Quality

Of the 104 (No.) samples recovered, 10 (No.) were from the Monks' Ditch monitoring locations (MD-N and MD-S). The exceedances of the WQS present within Monks' Ditch were presented in Table 4-6 of the Atkins 2017 CWDQRA Report. It was indicated that the exceedances reported were spread across all samples and collection dates. As the Monks' Ditch is understood to be hydraulically isolated as it flows through the Glan Llyn Llanwern Site, then assuming that this is the case, then it may be inferred that where elevated concentrations of contaminant determinands are recorded, then these are likely to have originated from an offsite up-gradient/up-flow source.

4.4 Assessment of Data from 2017 Onwards

4.4.1 Soils

Subsequent soils analyses have been undertaken on samples recovered from across the site, over a period from 01/05/17 to 03/04/19, with a total number of 1806 (No.) samples being analysed. The results of analyses are provided in **Appendix E** of the current Report Details of specific areas of the site where these samples have been recovered are presented in **Appendix F** of the current Report. From analyses of 1806 (No.) samples of Made Ground recovered from unremediated ground across the site, it may be noted again, upon comparison, that total concentrations of determinands (which included metals, petroleum hydrocarbons and PAHs), may be found in many of these samples, to exceed their respective calculated Level 1 Soils Screening Values, based upon application of the proposed site specific WQS Values for Controlled Waters.

4.4.2 Soil Leachates

Subsequent soil leachate analyses have been undertaken on samples recovered from across the site, over a period from 01/06/18 to 11/04/19, with a total number of 1121 (No.) samples being analysed for metals. The results of analyses are provided in **Appendix G** of the current Report. Details of specific areas of the site where these samples have been recovered are presented in **Appendix F.** It was noted that upon comparison of metals results with the proposed site specific WQS values, that a number of these, again, particularly; arsenic, chromium, copper, vanadium and to a lesser extent; lead and zinc, were also found in a significant number of these samples to exceed their respective WQS values. It should be recognised, however, that the laboratory preparation of leachate samples produces results which will tend to be conservative and of limited relevance where shallow surface water quality results are available (as in the case of this site), for comparison purposes.

However, it is noted that of the samples analysed:

- 83% exceeded the arsenic WQS;
- 54% exceeded the chromium WQS;
- 86% exceeded the copper WQS;
- 66% exceeded the nickel WQS;
- 76% exceeded the selenium WQS;
- 92% exceeded the vanadium WQS;
- 42% exceeded the lead WQS;
- 66% exceeded the zinc WQS;
- A low to very low number of exceedances for BTEX VOCs were recorded;
- No samples exceeded the respective WQS values for PAHs;
- No samples exceeded the respective WQS values for TPHs.

4.4.3 Groundwater

No additional groundwater monitoring samples have been recovered.

4.4.4 Surface Water Quality

4.4.4.1 Onsite Surface Water Quality

A further significant volume of additional data has been obtained from monitoring of the quality of surface waters across the site, with a total number of 998 samples being recovered over a period from 06/03/2018 to 30/04/19. The results of analyses are provided in **Appendix H** of the current Report. It is noted that of the samples analysed:

- 63% exceeded the ammoniacal nitrogen WQS;
- 3.4% exceed the free cyanide WQS;
- No samples exceeded the copper WQS where bioavailable copper is considered only;
- 25.5% exceeded the vanadium WQS
- No samples exceeded the nickel WQS where bioavailable nickel is considered only;
- 4.3% of samples exceeded the TPH WQS;
- 90% of samples exceeded their WQS for a range of PAHs.

4.4.4.2 Monks' Ditch Surface Water Quality

Of the 104 (No.) samples taken, 48 (No.) were from the Monks' Ditch monitoring locations (MD-N and MD-S). The flow direction is from MD-N to MD-S, in a southerly direction.

It may be noted that for the MD-N location:

- 16% exceeded the ammoniacal nitrogen WQS;
- 4% exceeded the aliphatic TPH (C_{21}-C_{35} aliphatic carbon chain) WQS;
- 88% of samples exceeded their WQS for a range of PAHs;
- Exceedances were noted for a range of metals in unfiltered samples, but did not exceed their respective WQS in filtered samples and corrected for bioavailability;
- pH values recorded ranged between 7.80 and 8.24 and were within the proposed WQS range.

It may be noted that for the MD-S location:

- 39% exceeded the ammoniacal nitrogen WQS;
- 83% of samples exceeded their WQS for a range of PAHs;
- Exceedances were noted for a range of metals in unfiltered samples, but did not exceed their respective WQS in filtered samples and corrected for bioavailability;
- 22% of samples exceeded the proposed WQS range for pH. Values recorded ranged between 7.54 and 9.68.

4.5. Discussion of Results

4.5.1 Surface Waters

4.5.1.1 Inorganics

Compared to earlier data, there appears to be a significant increase in the number of surface water samples analysed which exceed the vanadium WQS concentration. It is known that

vanadium becomes concentrated (between 2-3% mass) in BOF- (basic oxygen furnace slag). This is considered likely to be the vanadium source (particularly vanadium dicalcium silicate phases), with vanadium leaching out into surface waters, as the slag weathers. Vanadium concentrations were noted to be particularly elevated in surface water samples recovered from position R4C, and to extent in R1C. Vanadium concentrations appear to become more diluted/attenuated as surface water drains towards Surface Water Pumping Station No. 2. However it appears that the vanadium precipitates out, as pH values tend to lower (become more neutral) and some incorporation with iron oxyhydroxides (particularly goethite) which are another slag weathering by-product takes place.

There appears to be no obvious increase or decrease in recorded concentrations of metal determinands within upstream reens and positions downstream within the Kings Wall Reen. However, cyanide concentrations appear to increase downstream within the reen system, possibly as leached contributions are made from deposited wastes associated with the former coking works located within the northern central section of the site. However, there is evidence for decrease again in cyanide concentrations, further downstream, potentially due to complexation with metals such as iron and nickel, particularly in the higher pH conditions which are likely to prevail. There is also noted to be evidence of a possible contribution here from ammoniacal liquors associated with the former coking works.

When iron concentrations are compared, it may be noted that in post 2017 samples analysed, only 0.5% of the samples exceeded WQS values for filtered samples whilst 22% exceeded the WQS in unfiltered samples. This suggests that iron is flocculating/precipitating out as the leached solution becomes more oxygenated. Within the reens, this iron precipitation as an oxi-hydroxide is likely to take place contemporaneously with the dissolved vanadium.

When compared with earlier results obtained by Atkins prior to 2017, the number of WQS exceedance for concentrations of ammoniacal nitrogen remain largely unchanged (63% exceeding WQS) in post-2017 data, although some concentration values were found to be more elevated in recently obtained surface water samples.

The number of WQS exceedances for cyanide in post-2017 data appear comparable to those obtained by Atkins pre-2017.

4.5.1.2 Organics

Although there are a slightly higher proportion of surface water samples recovered from across the site, more generally, that exceed the WQS for PAH concentration (over 90.58% exceed the WQS for fluoranthene), it is also noted that for water samples recovered from the Monks' Ditch, which is understood to be hydraulically isolated from the Glan Llyn Llanwern site, PAH (again; fluoranthene) exceedance of the WQS in up to 88.0% of the samples (Monks' Ditch North MD-N) and 82.6% of samples (Monks' Ditch South MD-S) was noted. The source of these slightly elevated PAH concentrations determined in the Monks' Ditch is unclear, although again, it suggests the presence of an upstream off-site contributing source.

There appears to be no discernible reduction in PAH concentrations generally when comparing the earlier and post-2017 surface water analytical results.

TPH concentrations were exceeded in 4.3% of surface water samples recovered from across the site. These findings are considered to be consistent with TPH impact from isolated hotspots within the Made Ground.

4.5.2 Groundwaters

4.5.2.1 Inorganics

The following discussion is largely taken from the Atkins 2017 CWDQRA Report and updated, as considered appropriate. Consistent with soil leachate samples, elevations of pH are greatest in the shallow groundwater, with an average of 9.6, and 49% of samples greater than the WQS range of 6-9. In comparison pH values in the deep groundwater are lower; the reported average is 8, and less than 9% of samples are in exceedance. The elevated pH in shallow groundwater samples as compared to deep groundwater samples is likely to be attributable to impacts from weathering of BOF slag, whilst the pH of deeper groundwater samples can be influenced by oxidation of sulphidic minerals which will lower the pH of groundwater in contact with these minerals. However, in this case where an average pH of 8 is reported, the findings would suggest an absence of evidence for impact from weathering BOF slag or significant impact from sulphide oxidation.

Copper, lead, nickel and selenium are present at higher concentrations and produce more exceedances of the WQS within the shallow groundwater. Concentrations of vanadium are also found to be much greater in shallow groundwater; the maximum shallow groundwater value is 485 mg/l (WQS exceedance in 28% of samples) in comparison to the deep groundwater maximum of 157 mg/l (WQS exceedance in 7% of samples). Again, the elevated vanadium concentrations are likely to be attributable to weathering of the BOF slag, which may also be impacting on concentrations of copper, lead, nickel and selenium in shallow groundwater, as compared to the deeper groundwater samples recovered where slag weathering by-products are less likely to impact.

Concentrations of ammoniacal nitrogen are reduced by half in the shallow groundwater in comparison to the deep. Atkins (2015a) suggested that the lower ammoniacal nitrogen concentrations present in the shallow groundwater are the result of upward leakage and that the direction of the groundwater flow from the north west indicates that the elevated concentrations of ammoniacal nitrogen are more likely to be from an off-site diffuse source, such as from infiltrated runoff from agricultural activities.

Maximum and average concentrations of dissolved arsenic are considerably higher in the deep groundwater (220 µg/l and 32.1 µg/l respectively) than in the shallow (40.5 µg/l and 9.2 µg/l respectively). Similarly for total arsenic, 13% of the deep samples but only 3% of shallow samples are in exceedance of the WQS (50 µg/l). Concentrations of iron, cadmium, chromium, manganese are also elevated within the deep groundwater in comparison to the

shallow. The lower concentrations of these metals determined in surface water samples as compared to deeper samples may be due in part to greater dilution of the surface groundwaters, as the results of soil leachate analyses suggests that Made Ground across the site are likely to contain significant leachable concentrations of these metals.

4.5.2.2 Organics

The majority of TPH samples in both shallow and deep groundwater are reported below the LoD, however a few boreholes are proven to be hot spots for TPH contamination. Maximum concentrations of TPH are up to two orders of magnitude greater in shallow groundwater in comparison to deep groundwater. In shallow groundwater, TPH in exceedance of the WQS are limited to less than 15% of the total sample population for each exceeding contaminant. The samples reported in exceedance during the May 2016 sampling round are distributed across nine locations, however samples in the June and July rounds exceeding for three or more contaminants are limited to locations CWWS-04, CWWS-19 and CWWS-11.

In deep groundwater, TPH in exceedance of the WQS are limited to less than 5% of the total sample population for each exceeding contaminant with the exception of aromatic >EC21-EC35 (16.7%). Sample locations with exceedances of two or more TPH in a single sample are locations CBBH04, CBBH05, CWCP- 04, CWCP-19 and CWCP-11.

PAHs are present in both the shallow and deep groundwater; concentrations of contaminants and frequency of exceedances are greater in the shallow groundwater. As for TPH, maximum concentrations within the shallow groundwater are up to two orders of magnitude larger than in the deep. Exceedances are widespread within the shallow groundwater, with a percentage of samples exceeding up to 69%; within deep groundwater exceedances are limited to 14%, with the exception of fluoranthene (29%) and benzo(a)pyrene (28%).

Exceedances of SVOCs and VOCs above the LoD are limited, and remain below 9% of the shallow groundwater and 2.2% of the deep groundwater total sample population for each contaminant.

A wide range of contaminants are found to exceed the WQS in both the shallow and deep groundwater. However, the chemical signatures of each aquifer unit are distinct and the greatest concentrations and percentages of exceedances are not simply attributed to the shallow groundwater. It is possible that due to the fluctuating upwards and downwards gradients across the site as presented in Section 2.4.2 (Table 2-4) groundwater from either unit may be influencing the other. For example, where deep groundwater levels are lower than shallow, downward migration of water into the Tidal Flat Deposits is possible. Atkins (2015a) calculated that the un-retarded breakthrough of shallow groundwater through the Tidal Flat Deposits is likely to be 9 years. Taking into account conservative partition coefficients for naphthalene (a mobile PAH) and cadmium, the retarded breakthrough of naphthalene and cadmium is likely to be 644 and 1,435 years, respectively. Considering this,

it is unlikely that the contamination identified within the deep groundwater originated within the made ground.

5.0 Detailed Quantitative Risk Assessment and Re-use Assessment

5.1. Overview

It was indicated in the earlier Atkins 2017 CWDQRA Report, that the purpose of this assessment was to define, for a set of potential contaminants, the maximum concentration in the soil that does not pose a risk to the Controlled Waters receptor (re-use criteria). Where site soil concentrations, for one or more contaminants are greater than the re-use criteria, then in the absence of soil remediation or water treatment prior to discharge, a risk to Controlled Waters may exist.

5.1.1. Contaminants of Concern

Based on the site contamination status and known contaminants associated with steelworks (DoE, 1995), calculation of re-use criteria are to be undertaken for the Contaminants of Concern (CoCs) outlined in below. The current contamination status of the site is outlined above in Section 4; the assessment highlighted several metals, TPH and PAH that exceed the appropriate criteria. This essentially remains unchanged for the updated assessment.

Table 5-1: Contaminents of Concern (COCs)

Compound Type	Compounds
Heavy Metals/Metalloids	Arsenic, cadmium, chromium, copper, iron, lead, vanadium, manganese, mercury, nickel, selenium, zinc.
Other Inorganics	Ammoniacal nitrogen, cyanide.
Organics	Ethylbenzene, xylene, PCB, phenol.
TPH Bands	TPH aliphatic >C5-C6, TPH aliphatic >C6-C8, TPH aliphatic >C8-C10, TPH aliphatic >C10-C12, TPH aliphatic >C12-C16, TPH aliphatic >C16-C21, TPH aliphatic >C21-C35, TPH aliphatic >C35-C44, TPH aromatic >C5-C7 (Benzene), TPH aromatic >C7-C8 (Toluene), TPH aromatic >C8-C10, TPH aromatic >C10-C12, TPH aromatic >C12-C16, TPH aromatic >C16-C21, TPH aromatic >C21-C35, TPH aromatic >C35-C44, TPH Aromatic >C40-C44.
PAHs	Acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, di-benz(a,h)anthracene, indeno(1,2,3-cd)pyrene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene.

5.1.2. Compliance Point

In order to be protective of the Controlled Waters receptor outlined in Section 4.5, determination of the site specific compliance point has been undertaken in general accordance with the RTM (Environment Agency, 2006). The compliance point has been assigned to the point of discharge into the receptor (Monks' Ditch). Consistent with the contamination data assessment (Section 4), the WQS (Water Quality Standards) have been

set at the EQS in order to be protective of the principal Controlled Waters receptor (Section 4.1).

5.2. Dilution Assessment

5.2.1. Rationale

It was previously indicated that in order to maintain discharge of EQS compliant waters into the Controlled Waters receptor (Monks' Ditch), concentrations within the reens must be retained at or below the EQS. Due to the anthropogenic controls on discharges of water from the on-site reens to Monks' Ditch, in order to calculate the maximum concentration allowable for each contaminant within the excavated and re-compacted Made Ground (re-use criteria) the average annual water balance for the entire site is applied. This is considered appropriate given that EQS values are in relation to the annual average concentration.

Shallow groundwater is known to originate from infiltrating precipitation only, as the Made Ground of the site is hydraulically contained (Section 2.4.2). The remainder of the precipitation is either lost to evapotranspiration/evaporation or constitutes surface water runoff, and is diverted directly to the onsite drainage reens by SuDS (Section 2.5.1). Therefore, contaminant concentrations present in the shallow groundwater within the Made Ground are subject to dilution within the reens by clean SuDS drainage. As outlined in Section 2.3.3, the proportion of proposed impermeable to permeable surface area differs between the residential area and the Celtic Business Park commercial area. Resultantly, individual re-use criteria values were previously produced for each contaminant (Table 5-4 of Atkins 2017 CWDQRA Report), within each development area due to the differing volumes of water available for dilution.

As indicated in the current Introduction, the earlier CWDQRA prepared by Atkins (Version: 3 and dated February 2017), was issued with the intention that, as further site specific information was collected, the assessment would be reviewed and updated. It was described as the starting point and that the re-use criteria generated were understood to be conservative. An assumption was also made that 100% of the infiltrated rainwater percolated through the construction material and in to the Made Ground.

Since preparation of the Atkins 2017 CWDQRA Report, further consideration has been given (Rodgers Leask Environmental Ltd - Reclamation Performance Specification A – Turnover – Technical Note, dated 14/12/18, Ref: 17480-RLE-18-XX-RP-O-1016), to the pre-construction reclamation methodology to be employed across the site. The particle size distribution of the Made Ground is known to be well graded, and when compacted, the permeability is assessed as having poor drainage potential, with when appropriately placed, expected values in the region of 10^{-7}m/s.

Consideration has also been given to the application of differing standards of compaction of the Made Ground, and as a result, alteration of the rates of incident water infiltration. In order to consider the impacts of reducing infiltration rates into the Made Ground (impacts of which are likely to be greatest in areas of the site proposed for residential reusage where greater areas of soft landscaping will be present), two modelling scenarios have been considered in comparison with the Atkins previously assumed 100% infiltration into the underlying Made Ground. These models assume a greater proportion of incident rainwater

being directed laterally within the clean surface soils and 6F2 granular blanket, towards the reens. On this basis, the assumption is made that these redirected waters remain uncontaminated and provide further dilution of the waters passing through the Made Ground and ultimately discharging into the reens. In order to provide values which are likely to be 'typical' and 'potentially achievable', the following scenarios (details of which are outlined in Section 1.2 above), have been considered:

1. A 40% infiltration rate into underlying Made Ground which should be easily achievable;
2. A 5% infiltration rate into underlying Made Ground which, it is considered may be potentially achievable.

5.2.2. Methodology

The methodology employed in the current updated CWDQRA is that utilised previously by Atkins in their 2017 CWDQRA. The maximum (annual average) contaminant concentration possible within the perched groundwater in the Made Ground is calculated using dilution within the reens onsite as per Equations 3 to 7 below, whilst retaining concentrations at the EQS. Again, no allowance has been made for dilution of discharged water within Monks' Ditch as part of this calculation, as this being the receptor, it is proposed that the WSQ in this Controlled Water be maintained (as far as possible) at EQS values.

A summary of the methodology is provided below:

$$EQS = (Cgw + Qgw)/Qr \quad \text{Equation 3}$$

$$Cgw = (EQS \times Qr)/Qgw \quad \text{Equation 4}$$

- Where:
  - EQS (mg/l) = Environmental Quality Standard
  - C_{gw} (mg/l) = annual average groundwater contaminant concentration
  - Q_{gw} (m^3/a) = groundwater flow
  - Q_r (m^3/a) = reen flow

$$Qr = Qgw + Qol + (RO \times permeable\ surface\ area) \quad \text{Equation 5}$$

$$Qgw = (R - ET - RO) \times permeable\ surface\ area \quad \text{Equation 6}$$

$$Qol = (R - E) \times impermeable\ surface\ area \quad \text{Equation 7}$$

- Where:
  - R (mm/a) = total annual rainfall
  - E (mm/a) = evaporation
  - RO (mm/a) = runoff

The calculated annual average groundwater contaminant concentration Cgw (mg/l) values have been converted to Made Ground solid Cmg (mg/kg) values using Equation 8.

$$Cmg = Cgw \times ((Kd + (\theta w + \theta a \times H))/Pc) \quad \text{Equation 8}$$

- Where:
  - C_{mg} (mg/kg) = annual average Made Ground (solid) concentration
  - Kd (l/kg) = contaminant partition coefficient
  - Θw (-) = water filled porosity
  - Θa (-) = air filled porosity
  - H (-) = Henry's law constant
  - Pc (g/cm^3) = soil bulk density

5.2.3. Parameterisation

A summary of key input parameters is presented in Table 5-2 and Table 5-3 below. The full chemical input parameters and justifications are included in **Appendix I** of the current Report.

Table 5-2: Physical Parameters

Parameter	Unit	Value	Comment/Justification/Source
Average Annual Rainfall	mm/a	953	MAFF, 1976
Evapotranspiration	mm/a	416	MAFF, 1976. Applicable to permeable areas
Evaporation	%	10	Grimmond & Oke, 1999. Evaporation from impermeable surface area as a percentage of total rainfall.
Runoff coefficient	%	55	National Coal Board, 1982 (See Figure E-1)
Residential Permeable Area	m^2	676,000	Rodgers Leask, 2016
Residential Impermeable Area	m^2	1,014,000	Rodgers Leask, 2016
Commercial Permeable Area	m^2	45,000	Rodgers Leask, 2016
Commercial Impermeable Area	m^2	405,000	Rodgers Leask, 2016

Table 5-3 Chemical Parameters

Parameter	Abbreviation	Unit	Value	Comment/Justification/Source
Fraction of Organic Carbon	foc	fraction	0.024	Site specific value - average foc from 243 samples of Made Ground
Air Filled Porosity	θa	fraction	0.0037	Site specific value – average θa from 3 samples of Made Ground
Water Filled Porosity	θw	fraction	0.5	Site specific value – average θw from 3 samples of Made Ground
Dry Bulk Density	Pc	g/cm^3	1.36	Site specific value – average Pc from 3 samples of Made Ground

5.2.4. Assumptions and Limitations

The following assumptions and limitations are inherent within the modelling undertaken:

- Dilution calculations produce maximum likely average concentrations of contaminants (re-use criteria) within the Made Ground;
- Dilution methodology does not account for any dilution within Monks' Ditch at the point of discharge;
- Incident infiltrating rainwater is considered to flow laterally through the capping drainage layer, with varying proportions entering the underlying Made Ground. A 5% infiltration and a 40% infiltration rate into the underlying Made Ground have been modelled;
- No infiltration is assumed to occur within the impermeable area;
- Limited retardation (degradation and/or sorption) of contaminants within the Made Ground is considered given the extensive area of potential source materials across the site:
- Dilution calculations assume simultaneous discharge of the annual volume of surface water runoff and infiltrated water, providing a worst case volume of potentially contaminated shallow groundwater;

- No allowance has been made for additional dilution as a result of inflows to the reen system from the land to the north, as it is understood that these flows are minimal;
- The site geology and hydrogeology are assumed to be homogeneous, and parameter values and contaminant concentrations used are based on site-specific data, where available;
- Where no site-specific data are available, literature sources have been used to develop suitable parameters considered likely to reflect site conditions;
- Made Ground geology by its very nature is likely to be both laterally and vertically variable following finalisation of site development;
- Data presented by third parties has been incorporated into this report. These data have been assumed to be correct for the purposes of this assessment; and
- This assessment has been made considerate of the proposed post-development ground conditions and cover. Should this change, then the site may require re-assessment.
- It should be noted that the assessment undertaken herein and re-use criteria is for protection of Controlled Waters only. The re-use criteria derived are not necessarily protective of risk to Human Health. Re-used materials must also be geotechnically suitable, however this has not been considered as part of this assessment.

5.2.5. Material Re-use Criteria

The calculated maximum concentration of each PCOC (Re-use Criteria) in Made Ground (mg/kg) based upon the two scenarios of a 40% infiltration rate into underlying Made Ground and a 5% infiltration rate into underlying Made Ground are presented in Table 5.4 (**Appendix J**) of the current Report.

The updated results have been formatted to allow direct comparison with the earlier derived Atkins re-use criteria where 100% infiltration rate into underlying Made Ground has been assumed.

The calculated re-use criteria specified are intended to be protective of the Controlled Waters receptor with regard to the post-development site, and will, compared to earlier derived values, facilitate the greater re-use of existing on-site Made Ground in general accordance with a Remediation Strategy (Section 6.2). As previously indicated, it should be noted that re-use criteria do not apply where there is evidence of contamination in soil or Made Ground in excess of solubility (i.e. free phase product)

5.3 Contaminant Attenuation Assessment

It may be noted from Table 5.4 **(Appendix J**) that assuming only a 5% infiltration of incident rainwater into reengineered Made Ground, there remain exceedances of the respective re-use criteria in both residential and commercial redevelopment scenarios, for manganese (within a residential area reusage only) but particularly for a number of PAH species within both commercial and residential reusage areas.

Given that it is proposed within the reengineered Made Ground, to achieve a permeability of approximately $1x10^{-7}$ m/s, then it is considered that, particularly where organic CoC are considered (such as PAHs), that there is a potential for consideration of attenuation through processes of degradation/biodegradation of these leached species within the Made Ground

in view of their likely significant residence time prior to discharge into a local surface water reen.

However, given that the extent of these residual contaminant sources are likely to be of widespread (albeit variable contribution) presence within the reengineered Made Ground, then the potential for attenuation of these contaminants within the Made Ground between their source and the designated receptor (surface water reen) will be compromised. This needs to be appreciated within the further assessment undertaken, as outlined below:

5.3.1 EA Remedial Target Worksheet (Level 3 Groundwater) Assessment

In order to further consider the potential for attenuation of the residual contaminants within the Made Ground, this has been undertaken using the Environment Agency calculations provided in their Remedial Target Worksheet (Level 3 Groundwater) using, where possible, site specific data, as indicated below:

Table 5.3.1: Site Specific Data Sources Utilised in RT Worksheet Level 3 Groundwater Assessment

Variable	Value Utilised	Data Source
Width of aquifer at source	500m	Site measurements and likely width of each separate redevelopment perpendicular to directed perched groundwater flow towards appropriate reen.
Plume thickness at source	2.0m	Based upon proposed thickness of reengineered Made Ground and assumption that full thickness of Made Ground represents potential contaminant source
Saturated aquifer thickness	1.5m	Based upon typical likely groundwater levels in reengineered Made Ground.
Bulk Density of aquifer materials	1.36g/cm^3	Site specific test data
Effective Porosity of aquifer	0.08	Site specific test data
Hydraulic Gradient	0.0133	Estimation - also based upon earlier estimation used by Atkins
Hydraulic Conductivity of aquifer	8.64E-03m/d (1.0E-7m/s)	Based upon proposed permeability to be achieved following turning and reengineering of Made Ground
Distance to Compliance Point	20m	Assumed to be typical distance to surface water reen. However further dilution of contaminants will take place in reens from uncontaminated runoff from redevelopment

Using site-derived soil analyses concentration data for a range of determinands taken from 2017 onwards, maximum derived concentrations (mg/kg) in each case were then utilised for the modelled determinands. These data were then input into the equation presented in the EA Table 5.2 – soil-water partitioning of the EA Remedial Targets Methodology Guidance (2006) and a pore-water concentration Cp was determined. Soil/water partition coefficient (Kd) values utilised were site specific, and derived from those generated by Atkins (Table E4 of the Llanwern Controlled Waters Detailed Quantitative Risk Assessment Version 3.0 (February 2017)).

Consideration has also been given as to the application in the Level 3 Groundwater Remedial Target Calculation of applying 'degradation of organics in all phases' or whether a 'dissolved

pollutants only' variable should be applied. It is considered that there are likely to be different degradation rates for dissolved phase and free product. Evidence for choosing an 'all phases' variable was based upon:

- Site observations made on 09/05/19, where it was noted that hydrocarbon free-product was also present on water surface within some of the recent excavations, albeit mainly as surface iridescence, (together with probable dissolved phase). Therefore, there was considered to be evidence for the presence in site soils of hydrocarbons in both dissolved (laboratory evidence) and free-phase (site observations).

- Given in this instance that the scenario being considered is near surface degradation and biodegradation, then oxidation and volatilisation are likely to be fairly important means of loss of both free-product and dissolved phase, and will probably encourage a faster rate of degradation than would be likely at greater depth within a more anaerobic/less oxygenated environment. However, it has been noted that 'applying degradation rate to dissolved pollutants only' appears to add more conservativity to the model, so it has been proposed to utilise this variable.

The calculated pore-water value was then considered to be representative of the initial contaminant concentration in groundwater at the plume core, and utilised in the Level 3 Groundwater Remedial Target Calculation, as provided in the Excel Worksheets accompanying the current CWDQRA Report revision Draft.

The selected determinands chosen for modelling were from within (but not all) of those where soil concentrations were found from chemical analyses carried out to continue to exceed the calculated 5% and 40% infiltration scenarios reuse criteria. These determinands included metals: iron, manganese and vanadium and PAHs, benzo(a)pyrene, benzo(b)fluoranthene and naphthalene.

In the case of the Remedial Target modelling carried out to date, no specific consideration of 5% and 40% infiltration scenarios has taken place, and the assessment was carried out essentially to gauge the potential extent of attenuation of these specific determinands within the ground where these soils may be placed, with receiving surface waters being assumed to be existing reens, which have been taken as the Compliance Points. For initial calculation purposes, it has been assumed that compliant material proposed to be reused, would be placed no nearer than 20m from these reens.

It is proposed that the calculations may be revisited and updated, should it be considered appropriate, as more detailed information becomes available on the proposed site redevelopment layout.

Calculated values for Contaminants of Concern (CoC), as derived using the Level 3 Groundwater Excel Worksheets, are provided in **Appendix K** to the current Report. Where determined maximum soil concentrations exceed the calculated 40% and 5% infiltration reusage criteria, the initial contaminant porewater concentration in groundwater is

calculated based upon the maximum soil concentration recorded for each determinand, utilising the Equation provided in Table 5.2 of the EA Remedial Targets Methodology Guidance. In order to consider the impact of different concentrations of the above determinands, these scenarios have also been modelled using average porewater concentrations (calculated from average soil concentrations) utilising the Equation provided in Table 5.2 of the EA Remedial Targets Methodology Guidance. Copies of the associated Excel spreadsheets modelled for these same determinands and based upon average porewater concentrations are also provided in **Appendix K**.

As indicated above, in selecting the specific determinands for modelling, Level 3 Groundwater calculations have been carried out for a representative range of PAHs and metals, as actual concentrations of these have been found from analyses of site soils to exceed the calculated 40% and 5% infiltration reusage criteria, rather than only considering contaminants currently determined in the reens which are found to exceed the proposed EQS Values. The reasoning for this is based upon the rationale that existing water quality within the reens may not necessarily be representative of the water quality following excavation and replacement of this Made Ground prior to redevelopment. However existing surface water quality has been considered when assessing which determinands to model, and it was not considered appropriate to model ammoniacal nitrogen attenuation, as in a number of cases, exceedances were noted for this determinand in incoming off-site surface waters (as indicated above). It also appeared that cyanide concentrations deplete during flow through the reens, potentially due to complexation with metals such as iron and nickel, particularly in the higher pH conditions which are likely to prevail initially.

For this exercise, the modelling has therefore included the following determinands, with iron, manganese and vanadium being considered representative of metal behaviour and benzo(a)pyrene, benzo(b)fluoranthene and naphthalene of PAHs :

- Benzo(a)pyrene –
- Benzo(b)fluoranthene
- Naphthalene
- Iron
- Manganese
- Vanadium

Discussion of Findings

PAHs

As indicated above, the PAHs modelled have included benzo(a)pyrene, benzo(b)fluoranthene and naphthalene.

Although naphthalene concentrations in some site soils were found to be elevated in concentration, this PAH is readily attenuated, probably mostly through processes of volatilisation and aerobic biodegradation as indicated in the Level 3 Groundwater Excel Worksheets, (**Appendix K)** to the current Report.

It may be noted that the PAHs determined in surface water and shallow groundwater samples recovered, which were found to be most significantly elevated, have included fluoranthene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, Benzo(g,h,i)perylene and Indeno(1,2,3-cd)pyrene, this is consistent with many of the PAH

determinands found to exceed the calculated reuse criteria. This suggests that significant leaching of these PAHs into the perched groundwater and subsequently into the receiving surface water reens is currently taking place across the site, and from consideration of the Level 3 Groundwater Excel Worksheets, is likely to continue from re-engineered Made Ground assuming that all of the PAH concentrations determined in shallow groundwaters are dissolved rather than being present in all phases. Where the Level 3 Groundwater Excel Worksheets are modelled to 'apply the degradation rate to all phases', then there is significant attenuation of these PAHs, thereby suggesting that re-engineered Made Ground containing concentrations of these PAHs in excess (up to the maximum determined|) of the soil reuse criteria (**Appendix J**) may be utilised. In reality, it is considered likely (as indicated above) that although attenuation is taking place, and some processes of volatilisation and aerobic oxidation are likely to be experienced, these processes are not significant enough to enable placement of soils with PAH concentrations in excess of the calculated reusage criteria (in 40% and 5% infiltrations scenarios) very close to the surface water reens.

Metals

It may be noted that based upon scenarios where the maximum iron (2390000mg/kg), manganese (408000mg/kg) and vanadium (2880mg/kg) concentrations determined in samples of Made Ground at the site are present, then soils of this concentration and assuming a 5% and more especially a 40% infiltration of surface water following re-engineering and placement of this material show a potential to impact on the quality of a Compliance Point (taken as the nearest reen) located at a distance of approximately 20m away. Where these scenarios have also been modelled using average porewater concentrations (calculated from average soil concentrations for iron, manganese, vanadium), utilising the Equation provided in Table 5.2 of the EA Remedial Targets Methodology Guidance, it is noted that these soils also show, a potential to impact on the quality of a Compliance Point located at a distance of approximately 20m away.

5.4. DQRA Results

The re-use criteria presented in Table 5-4 (**Appendix J**) are compared to maximum and average concentrations of each determinand as recorded from the 1806 (No.) samples of Made Ground..

Earlier Atkins re-use criteria were calculated based upon the assumption that 100% of the rainwater incident upon areas of the site utilised for soft landscaping for both residential and commercial development penetrates into the underlying re-engineered Made Ground. As indicated above, re-use criteria have now been recalculated assuming a 5% and 40% rainwater infiltration into the re-engineering Made Ground. It is considered that these two infiltration values are likely to be more realistic of the redeveloped site following the undertaking of the Made Ground re-engineering works and the incorporation of measures to encourage infiltrating water to move laterally to the reens through a near-surface drainage blanket comprising clean materials.

In comparison with the calculated re-use criteria, the maximum soil sample concentrations continue to exhibit some exceedances (shown as highlighted, cells in Table 5-4 (**Appendix J**)), which are discussed below.

The calculated re-use criteria for the commercial area are greater than for the residential area as a result of the smaller infiltration to runoff ratio.

Inorganics

With reference to the Soil Re-use Criteria presented in Table 5.4, **(Appendix J)** it may be noted that:

Based upon an assumption of a 40% infiltration scenario:

Compared to calculated re-use criteria, exceedances for samples of Made Ground potentially for re-use in a residential scenario were determined for iron, manganese and vanadium, where maximum concentrations of these metals are considered. However, where average concentrations are considered, it may be noted that these values are found to be significantly lower than their respective calculated re-use criteria.

For a commercial re-use scenario, concentration exceedances for iron and manganese were determined. Where average concentrations are considered, it may be noted that all of these values are found to be significantly lower than their respective calculated re-use criteria.

Compared to calculated re-use criteria, significant exceedances were also noted for ammoniacal nitrogen and cyanide for a 40% infiltration in both residential and commercial materials reuse scenarios.

Based upon an assumption of a 5% infiltration scenario:

Compared to calculated re-use criteria, exceedances for samples of Made Ground potentially for re-use in a residential scenario were determined for manganese only, where maximum concentration of this metal are considered. Where average concentrations are considered, it may be noted that the average manganese soil concentration is significantly lower than the calculated re-use criteria for this metal.

For a commercial re-use scenario, with the exception of cyanide, no concentration exceedances were determined.

Compared to calculated re-use criteria, significant exceedances were noted for ammoniacal nitrogen and cyanide for a 5% infiltration in residential and cyanide only in commercial materials reuse scenarios.

Comparison with the more conservative 40% infiltration scenario for ammoniacal nitrogen Cgw for the commercial (510.69.75 mg/l) and residential areas (129.25 mg/l) with the maximum previously reported shallow groundwater concentration (66.1 mg/l) and more recently reported (post 2017) maximum surface water concentration (18.6mg/l) suggests however that these soils represent a low risk to the quality of Controlled Waters in terms of ammoniacal nitrogen contribution. Similarly with 40% infiltration scenario for iron and manganese, the maximum previously reported shallow groundwater concentrations (92 mg/l and 12 mg/l respectively) are lower than the Cgw for the commercial (1702.33mg/land 209.39mg/l) and residential (430.85 mg/l and 52.99 mg/l) areas, again suggesting that these soils represent a low risk to the quality of Controlled Waters. For cyanide, a comparison (40% infiltration scenario) of the maximum previously reported shallow groundwater concentration (1.4 mg/l) with Cgw for the commercial (1.70.64 mg/l) and residential areas (0.43 mg/l) indicates an exceedance. However, average shallow groundwater concentrations (0.13 mg/l) are lower than the Cgw for both commercial and residential areas. The maximum surface water cyanide concentration recorded post-2017 was 0.28mg/l.

Organics

PAHs:

In the case of the highlighted PAH concentrations a selection of which have been further modelled using the EA RT Level 3 Groundwater Worksheets, it may be noted that the levels of exceedance (based upon maximum determined soil concentrations of these specific PAHs, in both 5% and 40% infiltration scenarios), are likely to impact on the quality of water within the Compliance Point (nearest reen), assuming that this reen is at a distance of 20m from Made Ground. However, this modelling does not take account of processes of volatilisation, which may cause some further depletion in the leached PAH concentrations prior to discharge in surface water reens.

Phenols:

Compared to calculated re-use criteria for both 5% and 40% infiltration scenarios, no exceedances for phenols were determined. In addition, the maximum phenol concentration previously reported in shallow groundwater (0.83 mg/l) is compliant with the 5% and more conservative 40% infiltration scenarios Cgw for the commercial (13.10 mg/l) and residential areas (3.32.25 mg/l). As further comparison, a maximum phenol concentration of 0.04mg/l was determined in surface water samples recovered, post 2017.

Petroleum Hydrocarbons based upon an assumption of 40% infiltration scenario:

Exceedances of the re-use criteria are present for several TPH species with respect to the maximum soil concentration within the aromatic C_{10}-C_{21} range for residential reusage and C_{12}-C_{21} range for commercial reusage. However, where average concentrations are considered, it may be noted that these values are all found to be significantly lower than their respective calculated re-use criteria.

Petroleum Hydrocarbons based upon an assumption of 5% infiltration scenario:

No exceedances of the re-use criteria are determined for TPH species under a 5% infiltration scenario.

5.4.1. DQRA Discussion

The previous re-use criteria produced by Atkins and provided in their 2017 CWDQRA Report (Version: 3 and dated February 2017) were purposely presented as conservative values. A principal conservativity was indicated to be the dilution assessment assumption of a simultaneous discharge of the annual volume of surface water runoff and infiltrated water (Section 5.4). It was indicated that in actual fact, the infiltrated water is subject to storage within the Made Ground and travel times are anticipated to be elongated. Applying Darcy's Law (Darcy flux (q) = Ki where K = hydraulic conductivity (m/s) and i = hydraulic gradient (-) (change in groundwater level/travel distance) and using a hydraulic conductivity $1x10^{-7}$ m/s, travel distance of 10 m and hydraulic gradient of 0.013 (assuming 2 m thick Made Ground is fully saturated), the un-retarded travel time within the Western Sub-Area is likely to be 238 years (at a flux of 0.04 m/year). With the current CWDQRA Revision, and additional assessment using EA P20 Level 3 Groundwater RT Worksheet modelling, these parameters have been incorporated and the re-engineered Made Ground has been predicted as presenting a hydraulic conductivity of $1x10^{-7}$ m/s.

The earlier assumption which has been shown to have significant impact on the value of the re-use criteria, has been the degree of infiltration of the incident water into the re-engineered Made Ground. The earlier Atkins assessment assumed that 100% of this water would penetrate into the Made Ground. However, given the proposed hydraulic conductivity ($1x10^{-7}$ m/s) of this re-engineered material, and the introduction of an overlying 6F2 piling mat/drainage blanket (estimated permeability of $1x10^{-3}$ m/s) beneath clean imported topsoils and subsoils, then a significant proportion of this infiltrating water is considered unlikely to penetrate the re-engineered Made Ground. In order to further encourage lateral movement of this incident water toward the nearest reens prior to penetration into the underlying Made Ground, it has been proposed to create a shallow gradient across the surface of the Made Ground within the development plots sloping downwards towards the reens. On this basis, it has been estimated that water infiltration, rates, provided Made Ground re-engineering works are suitably undertaken, may potentially be reduced to 5% penetration.

It was previously indicated in the Atkins 2017 CWDQRA Report that maximum contaminant soil concentrations were present up to two orders of magnitude larger than the commercial area re-use criteria for several TPH and PAH. In view of this, it was proposed that the poorest quality Made Ground material would be relocated to beneath the commercial area, where infiltration is lowest. It was also indicated that where onsite concentrations are greater than the re-use criteria, remediation or disposal of material offsite may be required. The current revision of the re-use criteria has indicated that provided this material is appropriately re-engineered, then a greater proportion of existing Made Ground may potentially be re-used beneath sections of the site proposed for residential redevelopment. The results of additional EA P20 Level 3 Groundwater RT Worksheet modelling, has also suggested that material which contains concentrations of PAHs in excess of the re-use criteria (Table 5.4 (**Appendix J**)), may also (subject to verification) be suitable for placement across most areas of the site provided that a suitably thick buffer zone of uncontaminated materials is placed between the redeveloped plots and the surface water receptors (reens and ponds). Based upon EA P20 Level 3 Groundwater RT Worksheet modelling, it would appear necessary that the width of this buffer zone between this material and existing surface water reens, will need to be in excess of 20m and potentially closer to 200m. The nature of materials utilised in these buffer zones will need further consideration, in order to optimise the potential for biodegradation of organic contaminants, attenuation of dissolved metals and lowering of pH values prior to discharge of these waters into the reens, within which it is proposed to further encourage fauna and flora colonisation.

It was previously considered by Atkins that reported exceedances of the EQS in the onsite surface water samples are a reflection of the current site condition. This is considered to remain an important point with post-development conditions significantly reducing surface water infiltration by reducing the permeability of the Made Ground and increasing the impermeable surface area across the site, causing increased surface water runoff and subsequently, dilution within the reens. Concentrations of ammoniacal nitrogen released from Made Ground are considered likely to deplete over time in surface waters across the site as this component is leached from the residual sources associated with the former coking works. However, there are known to be other potential off-site sources (mainly agriculturally related), which will continue to impact on the quality particularly of the Monks' Ditch. However, surface water reens across the site which are hydraulically isolated from the main river Monk's Ditch but receive inflow from upstream off-site, surface waters

including agricultural land, may also be impacted by atmospheric contribution of ammoniacal nitrogen, again largely from agriculturally related sources.

As indicated above, fluids passing through the weathering BOF (basic oxygen furnace slag) which will be incorporated within the re-engineered Made Ground will potentially provide an ongoing source of dissolved metals and high pH discharge into the surface water reens. However, reducing the permeability of this Made Ground by reengineering, and placement of a greater proportion of impermeable surface cover following redevelopment should reduce contributions from the present (likely) worst case levels.

6. Conclusions and Recommendations

6.1. Conclusions

Rodgers Leask Environmental Ltd (RLE) has been commissioned by St Modwen Developments Ltd (St Modwen) to update and further develop a Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) of the potential risk to Controlled Waters for the Glan Llyn development at Llanwern, Newport. A Conceptual Site Model (CSM) for the site has been further developed and updated based on the contamination data assessment. Screening analysis of recent soil, soil leachate, groundwater and surface water data (revealed potential moderate to low levels of inorganic and organic contamination present onsite in line with contaminants associated with former steelworks sites (DoE, 1995). Made Ground constituting clayey sandy gravels with local slag, burnt shale, tarmac, concrete, brick and mudstone was found to be a potential source of contamination. Contaminants in the unsaturated zone and shallow groundwater attenuate along the transport pathway, including within the onsite drainage ditches (reens), where groundwater seepage combines with onsite water from the SuDS system before being discharged to the Controlled Waters receptor (Monks' Ditch).

There appears to be no obvious increase or decrease in recorded concentrations of metal determinands within upstream reens and positions downstream within the Kings Wall Reen. However, cyanide concentrations appear to increase downstream within the reen system, possibly as leached contributions are made from deposited wastes associated with the former coking works located within the northern central section of the site. However, there is evidence for decrease again in cyanide concentrations, further downstream, potentially due to complexation with metals such as iron and nickel, particularly in the higher pH (alkaline) conditions which are likely to prevail. There is also noted to be evidence of a possible contribution here from ammoniacal liquors associated with the former coking works, although pervasive slightly elevated concentrations of ammoniacal nitrogen have been recorded in surface waters more widely across the site, and from what appear to be sources upstream of the study site.

It is considered that following the undertaking specific remedial works within the area of the site previously occupied by the coking works, then this should have a positive impact on the reduction of ammoniacal and cyanide leachates which appear to be currently entering the surface water reen drainage system.

Calculation of conservative re-use criteria was undertaken using a dilution assessment methodology based on the site-wide water balance and has now incorporated permeability and infiltration parameters which it is considered are more representative of the redeveloped site. Comparison of re-use criteria against available information regarding the current composition of the Made Ground established that the much of Made Ground is likely to be suitable for re-use onsite, however localised source materials containing high concentration material (particularly elevated concentrations of iron, manganese and vanadium), and ammoniacal and cyanide components, may require remediation, or offsite disposal.

Where materials contain PAH concentrations in excess of the calculated reuse criteria for 40% and 5% infiltrations scenarios are to be used within areas of the site proposed for

residential and commercial reusage, then it concluded that this material should, as a precaution, be placed no closer than 150m-200m from the surface water reens into which infiltrated waters are likely to discharge and materials placed within the 'buffer zone' be engineered to provide a dissolved hydrocarbons and metals (principally iron and manganese), attenuating capability.

6.2. Recommendations

The following recommendations are proposed based on the outcomes of the assessment:

- The current programme of long-term monthly surface water monitoring should be continued at the established current sampling locations to monitor the quality of the reen system during and post-development until it is established that water quality is stable and compliant;
- Discharges into Monks' Ditch from the reens onsite are not to occur until specified quality criteria and quality control systems have been established and are met; and
- The sitewide MMP sets out the overall approach to materials management within the development and is a live document to be updated as the development progresses. In order to appropriately mitigate the risk to Controlled Waters, it is proposed that a remediation strategy be produced in conjunction with updates to the Materials Management Plan (MMP), as required, on a phase by phase basis, to regulate the application of the re-use criteria and establish remediation requirements for any localised source zones.

7. References

Atkins Limited (on behalf of St. Modwen Developments Ltd), 2015a. Controlled Waters Position Statement and Local Centre DQRA. Technical Note 197

Atkins Limited (on behalf of St. Modwen Developments Ltd), 2015b. Glan Llyn Local Centre, Llanwern. GeoEnvironmental Interpretive Report. *5111373-LLA-OUT-135.*

Atkins Limited (on behalf of St. Modwen Developments Ltd), 2015c. Glan Llyn Primary School, Llanwern.

Geo Environmental Interpretive Report. *5111373-LLA-OUT-0183.*

Atkins Limited (on behalf of St. Modwen Developments Ltd), 2015d. Glan Llyn Phases 2a & 2e, Llanwern.

Geo Environmental Interpretive Report. *5111373/Geo Environmental Interpretive Report.*

Atkins Limited (on behalf of St. Modwen Developments Ltd) 2016a. Glan Llyn, Llanwern Long-term Monitoring Strategy Report. 511373-LLA-OUT-0223

Atkins, 2016b. Glan Llyn Newport – Engineering Measures to Reduce Permeability and Infiltration Technical Note 256. 5111373-LLA-OUT-0256.

Barnes, G.E. 2010. *Soil Mechanics Principles and Practise*. 3rd Edition. Palgrave Macmillan, Hampshire.

British Geological Survey, 2016a. GeoIndex [online]. Available at: http://www.bgs.ac.uk/geoindex/ (Accessed 10th October 2016).

British Geological Survey, 2016b. Lexicon of Named Rock Units [online]. Available at: http://www.bgs.ac.uk/lexicon/ (Accessed 10th October 2016).

British Standards Institute, 2002. BS EN 12457-1. Characterisation of waste: Leaching-compliance test for leaching of granular waste materials and sludges. London British Standards Institute.

Building Research Establishment (BRE), 2007. *Digest 365 – Soakaway Design (revised)*. London: BRE Bookshop.

Council Directive 76/464/EEC of 5 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (Dangerous Substances Directive) List I Substances.

Council Directive 76/464/EEC of 5 May 1976 on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (Dangerous Substances Directive) List II Substances.

Council Directive 2000/60/EC of 22 December 2000 (as amended) on establishing a framework for Community action in the field of water policy (Water Framework Directive).

Department of the Environment, 1995. Metal manufacturing, refining and finishing works – iron and steelworks. ISBN 1 85112280 X.

DEFRA/Welsh Ministers, 2015. The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015. London

Environment Agency, 2006. Remedial Target Methodology. Hydrogeological Risk Assessment of Land Contamination.

Environment Agency, 2013. Groundwater Protection: Principals and Practice (GP3). Version 1.1.

Environment Agency, 2016. Catchment Data Explorer Available at: http://environment.data.gov.uk/catchment-planning/WaterBody/GB109056026850 (Accessed 12th December 2016).

Freeze, R.A., and Cherry, J.J., 1979. *Groundwater*. New Jersey: Prentice-Hall

Grimmond, C.,S., B., and Oke, T.,R, 1999. Evapotranspiration rates in urban areas. *Impacts of Urban Growth of Surface Water and Groundwater Quality* (Proceedings of IUGG 99 Symposium HS5, Birmingham, July 1999). IAHS Publication No. 259

HMSO, 2010. Water Supply (Water Quality) Regulations 2000 as amended 2010.

Ian Farmer Associates, 2016. Llanwern Site Wide CWRA and Phase 2d Rotary Core Drilling Logs.

Ministry of Agriculture, Fisheries and Food, 1976. *The Agricultural Climate of England and Wales – Technical Bulletin 35*. Her Majesty's Stationary Office, London.

National Coal Board, 1982. *Technical Management of Water in the Coal Mining Industry*. National Coal Board, London.

Rodgers Leask (on behalf of St. Modwen Development Ltd), 2016. Glan Llyn Site Wide Surface Water Drainage Strategy Addendum. D12/084.

The Wildlife Trust, 2016. Gwent Levels. Available at: http://www.wildlifetrusts.org/living-landscape/livinglandscape-schemes/scheme-directory/gwent-levels (Accessed 12th December 2016).

Water Supply (Water Quality) Regulations 1989 (as amended). SI 1989/1147.

Water Supply (Water Quality) Regulations 2000 (as amended). SI 2000/3184

Drawings

GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT RCHITECTS AND ENGINEER'S DRAWINGS

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY

Key

Redline boundary



RLRE

CLIENT

ST. MODWEN DEVELOPMENTS

PROJECT

LLANWERN SITE LOCATION PLAN

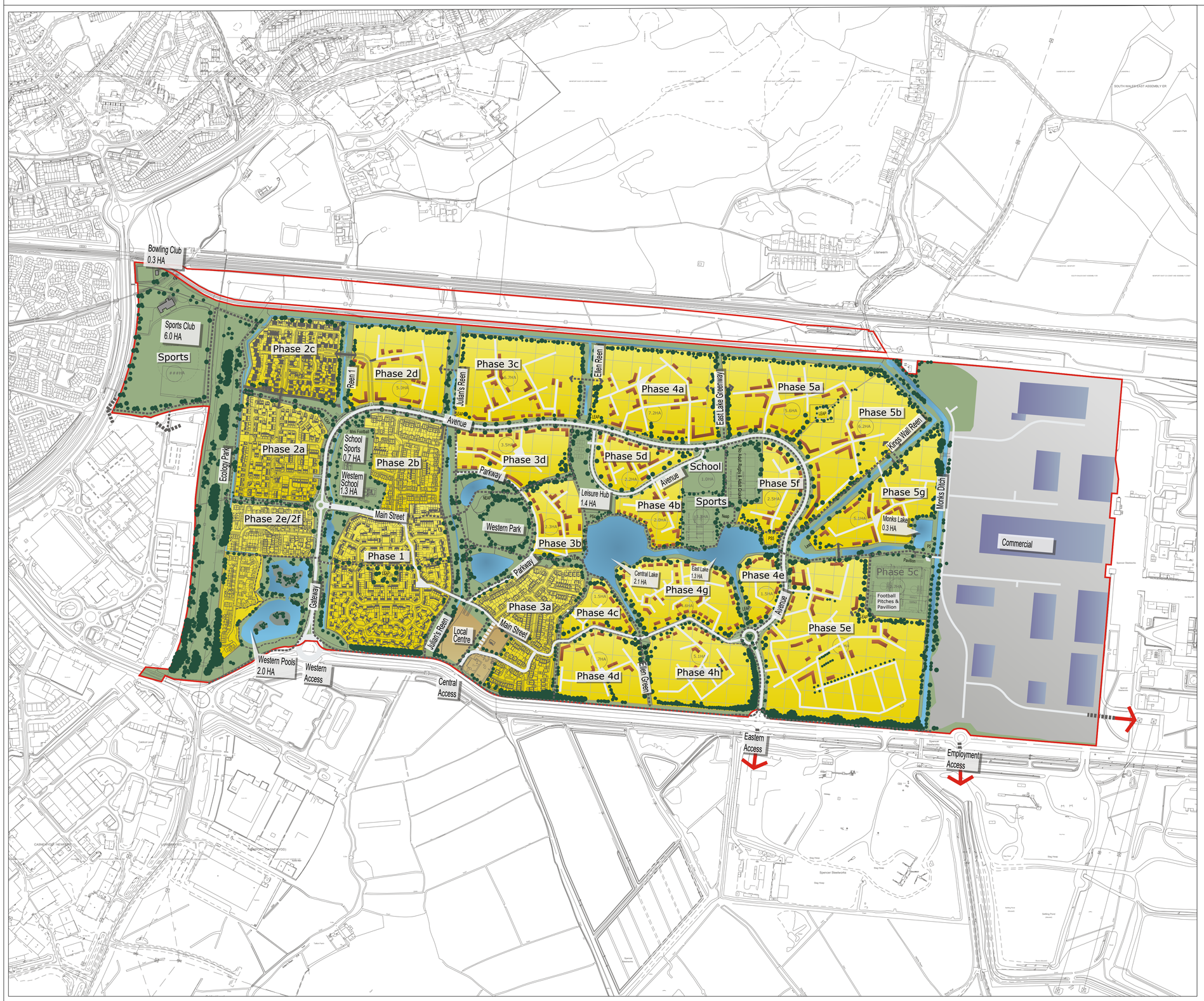
STATUS

FOR INFORMATION

DRAWN	CHECKED	DATE
ET	CW	19/08/2019

PROJECT NUMBER	DRAWING NUMBER	REV.
P18-669	18669-RLE-19-XX-DR-O-0004	

Glan Llyn -ESAMP Indicative Masterplan



Glan Llyn Residential Numbers (based on existing masterplan)					
Phase/Plot	Outlet	Area (HA)	Area (Acres)	Density (HA)	Total Units
1	Persimmon	**9.77**	**24.15**	31.4	307
2/a	Bellway	5.20	12.84	35	182
2/b	SMH	4.06	10.02	35	142
2/c	Bellway	4.30	10.62	35.3	152
2/d	Persimmon	4.98	12.30	35	174
2/e&f	SMH	5.10	12.61	29.8	152
1 and 2/Total		**33.40**	**82.54**		**1109**
3a		5.86	14.49	35	205
3b		2.32	5.74	35	81
3c		6.72	16.60	38.1	256
3d		3.45	8.53	35	121
3 Total		18.36	45.36		663
4a		7.19	17.78	34.8	250
4b		2.04	5.04	35	71
4c		1.53	3.78	35	54
4d		3.65	9.03	35	128
4e		1.49	3.68	35	52
4f		-	-	-	-
4g		4.64	11.46	35	162
4h		5.15	12.73	35	180
5a		5.65	13.95	35	198
5b		6.23	15.41	35	218
5c	Sports	2.67	6.60	35	93
5d		2.24	5.53	35	78
5e		13.72	33.90	35	480
5f		2.49	6.15	35	87
5g		5.06	12.50	35	177
4 and 5/Total		**63.75**	**157.53**		**2230**
1,2,3,4,5 Total		**115.51**	**285.44**		**4002**

NOTE: Areas and housing numbers assume that plot 5c sports is moved to CBP and converted to resi

SGP
Architects + Masterplanners

Waterfront House,
2a Smith Way, Grove Park,
Enderby, Leicester,
LE19 1SX
t: +44 (0)116 247 0557
www.stephengeorge.co.uk

SGP File Ref:	8111-08-A011	**Drawing No:**	8111-08-A011
Project No:	8111-08	**Rev:**	**Rev P09**
Drawn By:	NV	**Scale:**	1:5000 @A1
Date:	10/04/2019		

Notes:
Residential areas quoted are approximate gross site areas and include Leaps, Laps and on plot road infrastructure

Notes:
Residential areas quoted are approximate gross site areas and include Leaps, Laps and on plot road infrastructlayture

0 50 100 200 250 300 400 500
Metres at scale 1:5000

ST.MODWEN

This drawing, the works and concepts depicted are copyright of Stephen George + Partners LLP and may not be reproduced or made use of, either directly or indirectly without express written consent. Do not scale off this drawing. All heights, levels, sizes and dimentions to be checked on site before any work is put to hand.

ATKINS

5111373-LLA-DWG-EG-0295

KE□□

- S□ALL□W A□D DEEP M□□□□□□G WELL
- S□ALL□W □□L□ M□□□□□□G WELL
- E□S□□G B□□E□□LE

REVISIONS	Drawn By	Checked By	Date

PURPOSE OF ISSUE	Rev.	Authorised for Issue	Date

Atkins Ltd
Consulting Engineers
The Axis, 10 Holliday Street
Birmingham West Midlands B1 1TF
Tel 0121 483 5000
Fax 0121 483 5252

©
THIS DRAWING IS NOT TO BE SCALED

CLIENT

ST.MODWEN

PROJECT

Llanwern

DRAWING TITLE

CW□A B□□E□□LE L□CA□□□ PLA□

Scales	DRAWN	CHECKED	CO-ORD CHECK
1 : 5000	KM	CW	□
	DATE 1□05/201□	DATE --/--/1□	DATE □
0		SHEET A1	PLOT DATE 02/03/1□

DRAWING NO	REV
5111373-LLA-DWG-EG-0295	B

DO NOT SCALE

Millimetres 0 10 100

KEY:

- SURFACE WATER MONITORING LOCATION
- SURFACE WATER
- FLOW DIRECTION

DO-N/R1-W, R1-C, R1-E, R2-W, R2-C, R2-E, R3-W, R3-C, R3-E, R4-W, R4-C, R4-E, R5-W, R5-C, R5-E, KW-N, KW-CN, D1-N, D2-N, D3-N, D5-N4, D5-N3, D5-N1, D5-N2, MD-N, D5-C1, KW-S, D5-C2, D5-S1, D5-S2, D5-S3, D5-S4, MD-S, D0-C, D1-C, D2-C, D0-S, D1-S, D2-S, D3-S

REEN 1

REEN 0

JULIAN'S REEN

EXISTING DRAIN 3

INDICATIVE LOCATION OF REEN 4

KING'S WALL REEN

MONK'S DITCH

SURFACE WATER PUMPING STATION NO.1

SURFACE WATER PUMPING STATION NO.2

Rev.	Date	Description	By	Chk'd	App'd

Drawing Status: FOR INFORMATION

Suitability: S2

ATKINS
The Axis
10 Holliday Street
Birmingham
B1 1TF

Tel: +44 (0)1214 835000
Fax: +44 (0)1214 835252
www.atkinsglobal.com

Copyright © Atkins Limited (2018)

Client: ST.MODWEN

Project Title: LLANWERN

Drawing Title: NORTHERN EAST WEST REEN MONITORING

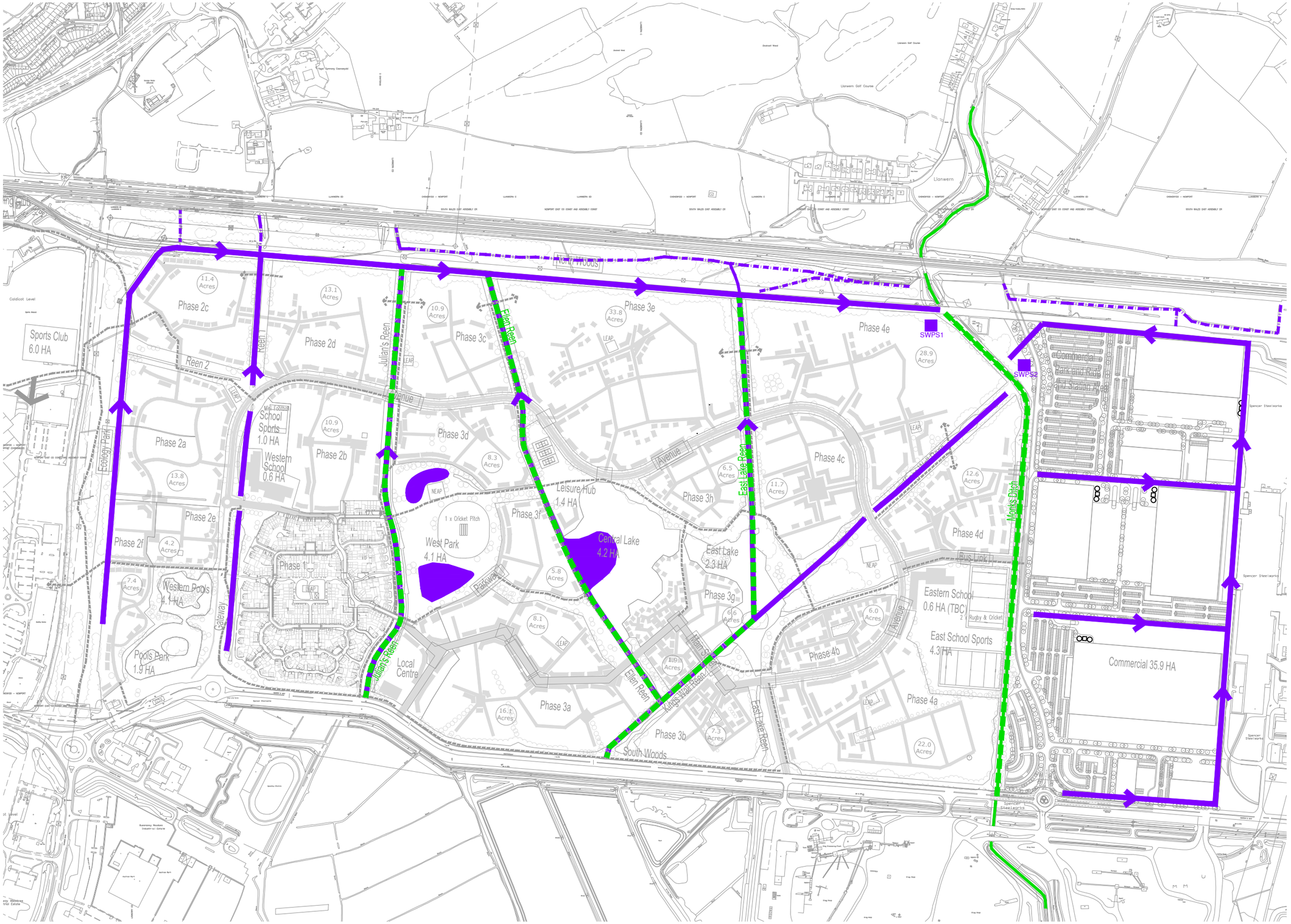
Scale	Designed	Drawn	Checked	Authorised
1:5000	JF	RJ	JF	DW
Original Size: A1	Date: 25/05/18	Date: 25/05/18	Date: 25/05/18	Date: 25/05/18

Drawing Number: 5111373-LLA-DWG-EG-0408

Revision: P 1

USER: FG577548 Date: 29/6/18 16:13:51 Filename: P:\GBMAN\EZ\Docs\5051151\373 - Llanwern (MP)\4 Drawings\Working\0408 - Northern East West Reen Monitoring Plan.dwg

A3



Notes:

- Monks Ditch
- Existing Reen/Ditch
- New/Upgrade on Site Reen
- Existing off site Reen

Rev.	Date	Amendments	By	Chk

RODGERS LEASK
Consulting Civil & Structural Engineers

Client
St Modwen

Project
Llanwern

Drawing Title
Overall Surface Water Drainage Strategy

Status
Information

Scale	Drawn	Checked	Date
A3@ 1:7500	CB	AC	11/03/15

Project No.	Drawing No.	Rev.
D12-084	512	

File Path:
*

Copyright © Rodgers Leask Limited

Longbridge Innovation Centre - 1 Devon Way - Birmingham - B31 2TS - Tel: 0121 222 5317 - www.rodgersleask.co.uk

Appendices

Appendix A: RLEs Reclamation Performance Specification.

Technical Note

Project:	Glan Llyn
Subject:	Reclamation Performance Specification A Turnover - Final
Document Reference:	17480-RLE-18-XX-RP-O-1016
Date:	14/12/2018
Prepared by:	Howel Morris - *Associate* BSc (Hons), MSc, CGeol
Reviewed by:	Neil Fraser - Principal Geotechnical Engineer BSc (Hons) MSc FICE

1. Introduction

Rodgers Leask Environmental Ltd (RLE) has been asked by St. Modwen Developments Ltd to prepare a Reclamation Performance Specification for the turnover to reclaim the reens, 15 acres of the Business Park, the proposed Marshalls factory footprint and thirteen residential phases (3b, 3c, 3d, 4a, 4b, 4c, 4e, 4g, 5a, 5b, 5c, 5d, 5g) of the Glan Llyn development.

This specification is intended to develop reclaimed plots that maintain surface compliant water quality, can satisfy the requirements of the contaminated land planning conditions and provide a stable reengineered platform with an accurate record of retained features to support, as far as practical, a site suitable for the proposed development.

2. Reclamation Strategy

The key points of the strategy for reclaiming the site are listed as follows:

- Pre sample each phase of site,
- Review and update site specific Controlled Waters Risk Assessment criteria,
- Designate areas to receive unsuitable material (both chemically and geotechnically unsuitable) – estimated to be 10% of the volume (eg 200,000m^3 for 2 million m^3 turnover) comprising park & ride plots, business park, sport pitches and noise bunds,
- Designate phases where engineering (small 1m clay bunds to promote protection of primary water routes by increasing residency within plots and reducing contamination loading near to site discharge) is required to further protect surface water,
- Sequence turnover and placement to suit direct placement approach to support chemical and geotechnical compliance,
- Agree proposed placement with Monitoring Engineer
- Turnover of the ground to natural deposits and reengineer the site to a minimum of 5.7mAOD (600mm below the minimum flood level),
- Compact material in accordance with the backfill specification to reduce permeability to limit infiltration and air voids to reduce leachability and conditions for potential expansion of Made Ground containing slag,

- Prepare geotechnical and chemical validation report for each phase.

3. Pre Reclamation Sampling

Prior to the commencement of reclamation works each phase will be trial pitted on a 25m grid sampled in accordance with the following:

- One composite chemical sample every exploratory hole to represent how it will be excavated and placed, (current testing is 1 per metre depth for each trial pit location)
- One composite geotechnical sample every exploratory hole and,
- One composite BRE expansion test (at least one per 2000m3).

The sequencing of the reclamation will need to follow the sampling programme. Pre validated material within stockpiles may require some testing to improve frequency to the required ratio.

The Contractor needs to allow in the programme sufficient time for the receipt and assessment of the contamination results and the slag expansion tests which require a 28-day test but there may be limited capacity. Areas where the Made Ground contains high proportions of slag may be reused in the designated open space or commercial areas rather than reuse within the residential phases.

4. Material Suitability – Chemical

The risk driver for the remediation of site is the controlled waters (water quality within site reens prior to discharge into Monk's Ditch). Therefore compliance with the Environmental Quality Standards (EQS) in the surface waters on site is the primary objective. The soil material placed within the plots will be assessed against the site specific criteria derived within the Controlled Waters Risk Assessment for the site and will use these criteria as guideline for compliance. Initial work will be undertaken to review the CWRA criteria to see if improvements are appropriate based on more recent site specific monitoring data and these will be submitted to the NRW for approval.

It is anticipated that the provision of clean cover will be sufficiently protective of human health providing the retained material complies with CWRA criteria.

In addition to chemical compliance reasonable engineering methods (creation of clay bunds below ground level) shall be employed to lengthen the contaminant travel time and direct the perched water discharge to a suitable point within the surface water system on site. This approach shall aim to use of cleaner material nearer the points of discharge.

Material with exceedances of the CWRA criteria may be retained within the plot if the overall profile of the placed material is assessed to be sufficiently protective of the water quality and human health (with the use of clean cover).

Material not suitable for reuse within the residential phases but suitable for public open space or commercial use shall be reused within commercial plots, park and ride areas, sports pitches and noise bunds.

Material assessed as requiring treatment will be investigated to delineate extent of contamination, excavated for treatment as required to permit reuse within one of the designated areas for lower threshold material. This is likely to apply to areas of gross contamination including but not limited to the coking works and the bitmac plant.

A programme of water quality monitoring shall be undertaken, either an existing agreed monitoring regime and/ or a dynamic monitoring programme to support the reclamation works, for the duration of the reclamation works to assess the developing water quality.

A mechanical method (scrubbing) and/ or natural method (reed beds) of water quality improvement may be deployed as mitigation prior to discharge into Monk's Ditch in the event of non-compliance of the EQS. This action shall be supported by monitored natural improvement in water quality within the reens as the development progresses so that mechanical improvement is a short term measure to mitigate the interim state of a reclaimed site without the rainfall interception of the full redevelopment.

The Contractor's method of working in close proximity of to the reen shall protect the watercourse. This shall also include potential run off from surface water or perched water levels. Chemical testing in accordance with EQS at a frequency approved by Natural Resources Wales. It is anticipated that an approach for monitoring the on site surface waters has been developed by Atkins and agreed with NRW.

The Contractor will manage the perched water as required and will provide compliant test results prior to discharge into the surface water course.

5. Material Suitability – Geotechnical

The following material types or physical properties shall be regarded as suitable for immediate placement with appropriate testing:

- Made Ground containing slag,
- Natural strata
- Crushed concrete
- The above materials, less than 300mm in size

The following material types or physical properties shall be regarded as unsuitable for immediate placement and should be deposited within the one the defined areas for unsuitable material:

- Colliery spoil and / or burnt shale
- Pure slag
- Material with obvious evidence visual & olfactory contamination
- Oversize material

- Scrap metals
- Organic material
- Plastics
- Voided areas
- Alluvium

The material visually regarded as not suitable for immediate reuse within the Site may either be retained until test results confirm the suitability for reuse or moved to one of the designated areas.

6. Formation Embankment Details

Where it is necessary to form an embankment an assessment will be undertaken to assess a minimum factor of stability for the slope. The assessment will take into account available land, characteristics of the material to be used and potential for post construction works to maintain stability. In the absence of detail reen volume/ layout/ profile requirements a minimum slope of 1:2 shall be assumed.

7. Levels

The phases within the site, following turn over to natural geology, will be backfilled with site won material to a minimum level of 5.7mAOD.

8. Turnover & Backfill

Within the boundaries of the site, the property will undergo reclamation to a depth where the natural underlying Tidal Flat Deposits can be confirmed. Known obstructions shall be removed, where they are unsuitable for retention within a normal piling layout, to a depth of 2m below minimum ground level in accordance with the flood mitigation requirements. Material within the site will undergo chemical and geotechnical testing.

Reclamation and subsequent backfill will be undertaken in accordance with the 600 Series (Earthworks) of the Specification for Highway Work (SHW) and each phase-specific Reclamation and Backfill Specification. The location and level of identified obstructions remaining in situ shall be accurately surveyed to the base of excavation and the positions recorded on a drawing.

In situ compaction testing of the placed layers shall be undertaken in compliance with the requirements of the 600 Series (Earthworks) of the Specification for Highway Work (SHW) and results provided to the developer. The backfilled material shall be reengineered to a target of 95% compaction. It will be at the discretion of the monitoring engineer to accept results below 95% to a minimum of 90%. The surface of each compacted layer shall be tested to ensure it meets the requirements of the SHW and a minimum CBR value of 2.5% at the surface.

9. Removal of Obstructions in Site Excavation Area

Shallow foundations and other man made obstructions encountered within the Made Ground and above the level of the underlying natural strata shall be entirely removed. Where isolated structures are encountered below 4.3mAOD that extend into the natural strata and measure less than 2.5m by 2.5m these may be retained on agreement with the engineer to reduce unnecessary excavation and support a nominal 3m grid for future piles. Where other obstructions are encountered which extend below the level of the underlying natural strata (e.g. slag in slag pits) these shall be removed unless otherwise agreed in writing by the Engineer.

Where redundant foundation piles or sheet piles are encountered these shall be cut down to the level of 4.3mAOD, and their location accurately surveyed for a future developer.

10. Grading

Fill material shall satisfy grading requirements for SHW Class 1 or Class 2 material except that a maximum particle size of 300mm shall apply and the maximum particle thickness shall not exceed two thirds of proposed compaction layer thickness.

Oversized material shall be removed, during the process of direct turnover, by visual assessment during excavation of existing ground and during the blade placement, by bulldozer, of the excavated ground prior to compaction. Removed oversize material not viable for crushing may be used in the sports pitches or park and ride areas, stored for an alternative suitable use or processed and tested to confirm material acceptability.

Incidental break up of material during the excavation and reengineering process is acceptable. Under no circumstances shall the crushing, as a specific operation, of slag bearing fill to achieve the required grading be permitted.

11. Reuse of Made Ground Containing Slag

Using the pre testing information the average risk of expansion will be managed as the layers of material are placed. Following the reclamation, surface monitoring points will be installed to monitor and validate stability of the reclaimed plot over a defined period to confirm the plot is within expansion tolerance prior to construction. BRE test results will be used to assess the suitability of material for reuse. A target expansion average for the accumulated material within the plot of 2.5% with a maximum of 5% being adopted. This may be amended based on practical mitigation measures and the proposed criteria will be subject to approval by the NHBC.

Where used as a reengineered material, Made Ground containing slag will be placed at a likely average thickness of 2m. A piled foundation solution with incorporated void (nominally 100mm, beam and block) would mitigate the risk of expansion to the building and the reengineered material is unlikely to cause unstable conditions for roads, services and gardens as the reclaimed plot will comprise weathered, well graded and well mixed layers.

Where there are areas of very slag rich made ground, with a potential for substantial expansion (as measured by the slag expansion results), the Contractor will have to regard this material as suitable for use in a public open space area.

12. Settlement & Stability Monitoring

Existing ground levels, on average, are within 300mm of the minimum ground level for flood requirements, therefore the increase in ground loading is not anticipated to be greater than 1m from the existing ground levels to incorporate an appropriate drainage system. Assuming a piled foundation solution, primary consolidation settlement from an increase in ground levels of 1m is likely to be acceptable for the stability of roads, services and gardens without surcharge given the time between reclamation and final development. An appropriate number of floor level monitoring points will be installed on pads of suitable material (5m x 5m) at the likely finished floor level, approximately 600mm above the reclaimed level, to reasonably replicate the final ground loading.

The floor level monitoring points will be monitored for a period to confirm stability of the site with regard to primary consolidation settlement but will also provide information relating heave stability prior to construction.

13. Land Quality Statement

A Land Quality Statement (LQS) will be prepared by St. Modwen Developments' Environmental Consultant which shall include a factual description of the site and its environs, the geo-environmental works carried out and describe the geo-environmental condition of the site following the completion of the agreed works. The LQS will provide a statement by the Environmental Consultant that planning conditions PC27 and PC28 of outline planning permission 06/0471 have been discharged by Newport City Council prior to final construction for the proposed residential end use. Amendments to existing CWRA criteria, which are relevant to the contaminated land planning conditions, will require approval by the NRW and local authority.

14. Notes for Intended Use

The developers and occupiers of the residential phases and reens, where this specification shall be applied, should consider the following:

- The site is underlain by soft organic rich Tidal Flat Deposits which according to historical information have been in part loaded by the former processes on the site. The site will continue to undergo unavoidable long-term creep settlement; this is normal for such sites.
- The buildings with piled foundations will not undergo creep settlement and therefore maintenance may be required where piled buildings meet ground bearing external areas due to the potential for differential settlement. Consideration should be given to boundary fences rather than brick walls. Extensions/ conservatories will require separate assessment to ensure settlement is considered prior to design of foundations.

- The storm water drainage of shall be constructed appropriately so that it does not leak into the underlying Made Ground. Poorly constructed drainage with headwalls into surface water features have the potential to generate leachate through infiltration into the Made Ground and then provide a pathway directly into the surface water.
- The external areas (roads, pavements, open space) have not been designed for the prolonged parking of HGVs, storage of materials, new buildings etc as these activities have the potential to cause settlement.
- The external areas may require maintenance due to creep settlement in the underlying Tidal Deposits.
- Flexible connections should be considered for services entering the piled buildings.
- Dewatering may result in localised reduction in groundwater level, which would induce localised consolidation settlement.

Appendix B: Atkins Permeability Technical Note

Technical Note

ATKINS

Subject:	Glan Llyn, Newport - Engineering Measures to Reduce Permeability & Infiltration		
Reference:	5111373-LLA-OUT-0256	**Revision:**	-
Author:	Howel Morris	**Checker:**	Chris Wilson
Issued to:	Craig Tidyman (Prosurv)	**Reviewer:**	Mark Williams
Date:	15th December 2016	**Authoriser:**	Howel Morris

Introduction

The Made Ground within the Glan Llyn site is generally compliant with residential, open space and commercial human health soil screening criteria. It is recognised that human health criteria is not intended to protect controlled waters but this note has been prepared to support the re-engineering of the onsite Made Ground material as a remediation measure in order to support parameters adopted within the Controlled Water Risk Assessment (Ref.1 5111373-OUT-RPT-0275). This is to be achieved by reducing the permeability of the shallow Made Ground soils by excavation and re-compaction, and providing a fall across its upper surface; as well as the placement of an overlying granular material to create a preferential pathway to minimise the potential for infiltration of precipitation into the underlying re-engineered Made Ground. The reduction in the permeability of the re-engineered Made Ground will attenuate the flow of precipitation through the Made Ground. This will have the intended benefit of increasing the volume intercepted rainwater against water infiltrating through the Made Ground within the surface water drainage system. Thus improving the surface water quality within the reens at the perimeters of the development plots.

It is worth noting that the re-use criteria developed within the CWRA report are protective of the surface water quality in the event that the full annual amount of water infiltrated and intercepted by the site be discharged to the reen system instantaneously. This technical note has been prepared to record the rationale of the chosen values for the permeability parameters used within the Controlled Waters Risk Assessment.

Site Permeability

The interception rates (where precipitation is intercepted by various development surfaces and flows into the surface water drainage system) and infiltration rates (where precipitation infiltrates through permeable gardens or landscaped areas into the underlying material) have been based on the figures provided in the drainage strategy prepared by Rodgers Leask (Rodgers Leask, 2016. Site Wide Surface Water Drainage Strategy Addendum for St Modwen Ltd. Rev 4 D12/084). The report provides figures for impermeable areas within the residential land and when this is compared with the total residential area a ratio of 60:40 is produced in favour of interception. The residential area includes all ancillary land including roads, landscaping features, drainage features, gardens and parks. The commercial area produces a ratio of 90:10 in favour of interception. The ratio provided within the drainage strategy does not account for the permeability of the percentage listed as permeable.

The respective adopted permeable values of 40% and 10% assume free draining material where the precipitation may freely percolate through the underlying materials. However, there are a number of factors resulting from the re-engineering of the development plots that significantly reduce the potential for infiltration of precipitation into the underlying Made Ground. The specification for the re-engineering of the Made Ground (Ref.2 5111373-LLA-OUT-225 Guidance for the Reuse of Made Ground Containing Slag, Dec 2016) requires compaction to a minimum 95% of maximum dry density and a minimum 5% CBR at finished levels to be achieved. The re-engineering of the plots into a stable platform with a fall from the centre to the periphery, and the materials used, will produce a preferential pathway. Based on soakaway tests carried out in the re-engineered Made Ground, and the results of Particle Size Distribution (PSD) laboratory tests carried out on the material, the site won re-engineered Made Ground within the plots is assessed as having a permeability of approximately 1 x 10^{-7} m/s (i.e. poor permeability). The properties of the re-engineered Made Ground are shown in Table 1 below.

Table 1: Properties of the Re-engineered Made Ground

Made Ground	PSD No./ Average	BRE Soakaway Test Result	Adopted Permeability(k)
Test 1	102 No./ 11% fines, 22% sand, 62% gravel, 5% cobbles	Fell 4mm in 3hrs	1 x 10^{-7} m/s
Test 2		Fell 20mm in 2hrs	1 x 10^{-7} m/s

* Unable to calculate an infiltration rate as the amount of infiltration was minimal during the test period indicating low permeability.

The PSD test samples were taken from existing stockpiles of site-won material. The soakaway tests were carried out on a re-engineered development plot within the site using typical stockpiled site-won Made Ground. The permeability of the re-engineered Made Ground was based on the values included within Soil Mechanics Principles & Practice, 3rd Edition, Table 3.3 (Ref.3) for a material with poor drainage characteristics.

The overlying gravel layer to be placed above the re-engineered Made Ground is expected to have a permeability of 1 x10^{-3} m/s (good) based on the values for a material on the boundary between a clean gravel and a clean sand provided in Soil Mechanics Principles & Practice, 3rd Edition, Table 3.3 (Ref.3).

The permeability will be validated on a plot by plot basis by undertaking soakaway tests. The designed fall at the top of the re-engineered Made Ground will promote flow within the more permeable granular layer and the infiltrated water will seek the course of least resistance, potentially flowing within the layer until it daylights at the reens at the periphery of the plot.

Landscaping/ Drainage & Public Open Space

The green areas of the site (including landscaped areas, parks & gardens) have been included within the permeable ratio for the residential areas. The green areas will have a minimum subsoil thickness of 450mm and in this region of south Wales red marl is a readily available subsoil which has already been used in some areas of the Glan Llyn development and which has a low permeability. The reduced permeability of areas assumed to allow free downward migration of rain water will further reduce the volume of rainwater able to infiltrate the re-engineered Made Ground. It is considered that a placed / un-compacted marl will have a permeability of 1 x 10^{-8} m/s, consistent with a stratified clay material (Ref.3). The reduced permeability of the green areas will also help improve the water quality within the drainage system.

Conclusion

The reduction in the permeability of the re-engineered Made Ground is intended to further improve surface water quality by attenuating the flow of infiltrated precipitation through the material. The reduced permeability of the Made Ground dramatically increases the transport time of the rainwater through the material, in contrast, a large volume of intercepted rainwater is able to reach the surface water reen system rapidly via the storm water drainage system. Therefore it is anticipated that the composition of surface waters will be dominated by intercepted clean rainwater. In reality, the large volume of intercepted precipitation and contrasting low volume of infiltrated seepage entering the reens annually will contribute to further improving water quality in a system already designed to maintain a compliant water quality within the surface water reens of the development.

References

1. 5111373-LLA-OUT- 0275, Glan Llyn, Site Wide Controlled Water Risk Assessment Atkins, December 2016.
2. 5111373-LLA-OUT-225 Guidance for the Reuse of Made Ground Containing Slag, Atkins, December 2016.
3. Soil Mechanics Principles & Practice, 3rd Edition, September 2010 (by G.E.Barnes).

Appendix C: Groundwater Levels Monitoring

Table A-1 Summary of 2016 Deep Monitored Groundwater Levels (mAOD)

Borehole	Easting	Northing	Ground Level (mAOD)	Count	Min (mAOD)	Max (mAOD)	Range (m)	Screened Unit*
2DBH-01	335405	187196	5.56	7	4.03	5.05	1.02	MMG
2DBH-02	335331	187310	5.94	7	4.58	5.20	0.62	MMG
2DCP-01	335475	187320	5.555	7	4.65	5.09	0.44	MMG
2DWS-05	335330	187336	5.957	7	3.76	5.60	1.84	TFD (BS)
CBP BH03	337064	186432	5.275	7	3.69	4.38	0.69	TFD (BS)
CBP BH04	337138	186342	4.833	7	4.15	4.63	0.48	TFD (BS)
CBP BH05	337014	186536	5.767	7	3.97	4.60	0.63	TFD (BS)
CBP BH06	336792	186392	5.081	7	4.18	4.70	0.52	TFD (BS)
CL2CB	335141	187332	6.008	5	4.32	4.81	0.49	Unknown
CWCP-01	335335	187278	5.65	7	4.20	4.89	0.69	MMG
CWCP-02	335279	187202	6.014	7	3.34	4.75	1.41	MMG
CWCP-03	334877	187364	6.159	6	4.87	5.49	0.62	MMG
CWCP-04	335186	187385	6.925	7	4.53	5.28	0.75	TFD (BS)
CWCP-05	335177	187153	5.877	7	4.16	5.20	1.04	TFD (BS)
CWCP-06	335381	187371	6.729	7	4.70	5.28	0.58	TFD (BS)
CWCP-07	335670	187347	6.759	7	4.52	6.16	1.64	TFD (BS)
CWCP-08	335941	187323	6.771	7	4.54	5.09	0.55	MMG
CWCP-09	336187	187302	5.699	7	3.65	4.86	1.21	TFD (BS)
CWCP-10	336505	187260	5.523	7	4.30	4.65	0.35	TFD(BS)/MMG
CWCP-11	336961	187241	6.26	7	4.37	4.64	0.27	TFD (BS)
CWCP-12	337225	187195	6.193	6	4.02	4.24	0.22	TFD (BS)
CWCP-13	336734	186782	7.15	7	4.22	4.60	0.38	TFD(BS)/MMG
CWCP-14	337203	186849	4.636	7	4.14	4.40	0.26	MMG
CWCP-15	337152	186553	4.014	7	3.68	4.01	0.33	TFD (BS)
CWCP-18	336343	186382	6.478	7	3.92	4.67	0.75	MMG
CWCP-19	336080	186401	6.5	7	4.59	4.90	0.31	TFD (BS)
CWCP-20	335760	186426	6.357	7	4.10	5.20	1.1	TFD(BS)/MMG
CWCP-21	334931	186510	5.945	6	4.12	5.26	1.14	TFD (BS)
CWCP-22	334919	186641	6.046	7	4.11	4.79	0.68	MMG
CWCP-23	334975	187134	6.335	7	4.72	5.21	0.49	TFD (BS)
CWCP-24	334857	187224	5.951	6	4.81	5.56	0.75	TFD (BS)
CWCP-25	335044	186908	7.288	7	4.35	5.03	0.68	TFD (BS)
CWCP-26-e	336825	187078	6.065	7	4.11	4.71	0.6	TFD(BS)/MMG
CWCP-26-w	335815	187129	6.084	7	4.22	4.96	0.74	TFD(BS)/MMG
CWCP-27	335732	186807	6.185	7	4.39	4.85	0.46	TFD (BS)
CWCP-28	335967	186642	6.452	7	4.68	4.99	0.31	TFD(BS)/MMG
CWCP-29	336132	186981	6.115	7	4.40	5.63	1.23	MMG
CWCP-30	336402	187007	6.068	7	4.42	4.77	0.35	MMG
CWCP-31	336299	186602	5.913	7	3.46	4.78	1.32	MMG
CWCP-32	336512	187099	5.583	7	4.29	4.68	0.39	MMG
CWCP-35	336969	186980	6.5	7	4.21	5.22	1.01	MMG
CWCP-36	337032	186762	5.321	7	4.06	4.34	0.28	TFD (BS)

LCBH2	335618	186555	5.729	7	4.63	4.79	0.16	TFD (BS)

*MMG – Mercia Mudstone Group, TFD (BS) – Tidal Flat Deposit Basal Sands

Table A-2 Summary of 2016 Shallow Monitored Groundwater Levels (mAOD)

Borehole	Easting	Northing	Ground Level (mAOD)	Count	Min (mAOD)	Max (mAOD)	Range (m)	Screened Unit
2DWS-01	335460	187331	5.471	7	3.44	5.37	1.93	TFD
2DWS-02	335453	187179	5.455	7	3.56	4.96	1.4	TFD
2DWS-03	335402	187253	5.619	6	5.12	5.47	0.35	TFD
2DWS-04	335288	187235	6.106	7	5.04	5.31	0.27	MG/TFD
CWWS-03	334876	187368	6.134	6	4.98	5.36	0.38	TFD
CWWS-04	335184	187384	6.969	6	5.13	5.54	0.41	Unknown
CWWS-05	335176	187152	5.936	6	4.98	5.49	0.51	MG
CWWS-06	335382	187372	6.665	2	5.23	5.95	0.72	MG
CWWS-07	335670	187348	6.791	0	Dry	Dry	n/a	MG
CWWS-08	335940	187325	6.784	0	Dry	Dry	n/a	MG
CWWS-09	336187	187301	5.601	6	4.08	5.60	1.52	MG
CWWS-10	336506	187260	5.522	5	4.69	4.86	0.17	MG/TFD
CWWS-11	336962	187240	6.262	7	3.66	4.62	0.96	MG
CWWS-13	336735	186782	7.194	7	5.09	5.46	0.37	MG
CWWS-14	337197	186847	4.708	7	4.14	4.42	0.28	MG
CWWS-15	337134	186552	4.976	7	3.35	4.05	0.7	MG/TFD
CWWS-16	337162	186301	5.021	4	4.24	4.80	0.56	Unknown
CWWS-17	336709	186340	6.982	4	5.35	5.51	0.16	MG
CWWS-19	336080	186398	6.672	7	4.77	4.98	0.21	MG
CWWS-20	335760	186423	6.247	0	Dry	Dry	n/a	MG
CWWS-21	334915	186527	5.805	7	4.92	5.39	0.47	TFD
CWWS-22	334927	186756	5.734	7	4.06	5.40	1.34	MG/TFD
CWWS-23	334957	187010	5.589	7	3.92	4.89	0.97	TFD
CWWS-24	334856	187228	5.904	6	4.78	5.06	0.28	TFD
CWWS-25	335049	186908	6.735	7	4.18	5.65	1.47	MG/TFD
CWWS-26-	336824	187074	6.151	7	4.31	5.90	1.59	MG
CWWS-26-	335817	187135	5.279	7	3.55	4.88	1.33	MG
CWWS-27	335731	186807	6.225	6	4.67	4.92	0.25	TFD
CWWS-28	335967	186643	6.473	7	4.67	4.86	0.19	MG
CWWS-29	336131	186980	6.128	7	4.88	5.14	0.26	MG/TFD
CWWS-30	336402	187010	6.068	7	4.29	5.44	1.15	MG
CWWS-31	336296	186605	6.031	6	4.55	5.08	0.53	MG
CWWS-32	336512	187099	5.585	7	4.94	5.25	0.31	MG
CWWS-33	336612	186991	6.48	7	4.99	5.34	0.35	TFD
CWWS-34	336656	186622	6.148	2	5.41	5.47	0.06	MG
CWWS-35	336968	186977	6.46	7	4.62	4.91	0.29	MG
CWWS-36	337027	186755	5.806	3	4.46	4.50	0.04	MG

*TFD – Tidal Flat Deposits (Clay), MG – Made Ground

Table A-3 Groundwater Level Data

Borehole	Deep/Shallow	Easting	Northing	Ground Level (mAOD)	Count	Min (mAOD)	Max (mAOD)	Range (m)	Depth of Base (mAOD)	10/05/2016	06/06/2016	07/07/2016	02/08/2016	01/09/2016	05/10/2016	03/11/2016
2DBH-01	Deep	335405	187196	5.56	7	4.03	5.05	1.02	-13.14	5.05	4.76	4.88	4.78	4.65	4.81	4.03
2DBH-02	Deep	335331	187310	5.94	7	4.58	5.20	0.62	-12.69	5.2	4.91	5.09	4.92	4.72	4.87	4.58
2DCP-01	Deep	335475	187320	5.555	7	4.65	5.09	0.44	-3.375	5.085	4.795	4.915	4.785	4.755	4.805	4.645
2DWS-05	Deep	335330	187336	5.957	7	3.76	5.60	1.84	2.997	4.017	3.757	4.767	4.727	5.387	5.597	5.557
CBP BH03	Deep	337064	186432	5.275	7	3.69	4.38	0.69	-5.495	4.375	4.295	4.195	4.155	4.115	4.145	3.685
CBP BH04	Deep	337138	186342	4.833	7	4.15	4.63	0.48	-2.057	4.633	4.153	4.413	4.193	4.303	4.493	4.513
CBP BH05	Deep	337014	186536	5.767	7	3.97	4.60	0.63	-4.323	4.357	4.237	4.257	4.597	3.967	4.177	4.057
CBP BH06	Deep	336792	186392	5.081	7	4.18	4.70	0.52	-4.159	4.701	4.601	4.621	4.181	4.201	4.701	4.531
CL2B	Deep	335141	187332	6.008	5	4.32	4.81	0.49	-4.892	-	4.678	4.808	4.668	4.508	-	4.318
CWCP-01	Deep	335335	187278	5.65	7	4.20	4.89	0.69	-3.25	4.89	4.41	4.81	4.71	4.48	4.63	4.2
CWCP-02	Deep	335279	187202	6.014	7	3.34	4.75	1.41	-3.136	4.714	4.134	4.754	3.684	3.564	3.634	3.344
CWCP-03	Deep	334877	187364	6.159	6	4.87	5.49	0.62	-2.951	5.489	5.159	5.219	5.049	4.959	-	4.869
CWCP-04	Deep	335186	187385	6.925	7	4.53	5.28	0.75	-2.485	5.275	4.685	4.815	4.545	4.725	4.785	4.525
CWCP-05	Deep	335177	187153	5.877	7	4.16	5.20	1.04	4.687	5.197	4.157	4.757	4.827	4.717	4.717	4.377
CWCP-06	Deep	335381	187371	6.729	7	4.70	5.28	0.58	-2.521	5.279	4.909	5.009	4.889	4.699	4.909	4.759

CWCP-07	Deep	335670	187347	6.759	7	4.52	6.16	1.64	-2.501	5.029	4.719	4.749	4.659	4.519	6.159	4.859
CWCP-08	Deep	335941	187323	6.771	7	4.54	5.09	0.55	-2.079	5.091	4.811	4.671	4.571	4.541	4.771	4.771
CWCP-09	Deep	336187	187302	5.699	7	3.65	4.86	1.21	-1.641	4.859	4.639	4.619	4.579	4.429	4.439	3.649
CWCP-10	Deep	336505	187260	5.523	7	4.30	4.65	0.35	-3.477	4.653	4.533	4.473	4.423	4.303	4.463	4.373
CWCP-11	Deep	336961	187241	6.26	7	4.37	4.64	0.27	0.33	4.57	4.64	4.59	4.37	4.48	4.63	4.45
CWCP-12	Deep	337225	187195	6.193	6	4.02	4.24	0.22	Unknown	-	4.143	4.243	4.083	4.023	4.133	4.093
CWCP-13	Deep	336734	186782	7.15	7	4.22	4.60	0.38	-4.76	4.56	4.6	4.41	4.31	4.22	4.33	4.23
CWCP-14	Deep	337203	186849	4.636	7	4.14	4.40	0.26	-4.904	4.396	4.366	4.306	4.186	4.136	4.206	4.136
CWCP-15	Deep	337152	186553	4.014	7	3.68	4.01	0.33	-5.116	4.014	4.014	4.014	4.014	4.014	3.684	4.014
CWCP-18	Deep	336343	186382	6.478	7	3.92	4.67	0.75	-5.442	4.668	4.518	4.408	4.578	4.188	3.918	4.168
CWCP-19	Deep	336080	186401	6.5	7	4.59	4.90	0.31	-2.51	4.82	4.9	4.75	4.75	4.59	4.69	4.7
CWCP-20	Deep	335760	186426	6.357	7	4.10	5.20	1.1	-5.513	4.707	4.777	4.247	5.197	4.097	4.177	5.067
CWCP-21	Deep	334931	186510	5.945	6	4.12	5.26	1.14	-4.635	4.455	4.425	4.295	5.255	4.115	4.125	-
CWCP-22	Deep	334919	186641	6.046	7	4.11	4.79	0.68	-5.554	4.586	4.526	4.356	4.786	4.296	4.246	4.106
CWCP-23	Deep	334975	187134	6.335	7	4.72	5.21	0.49	-3.895	5.205	4.865	4.775	4.715	4.785	4.925	4.715
CWCP-24	Deep	334857	187224	5.951	6	4.81	5.56	0.75	-3.509	5.561	5.061	5.131	5.011	4.911	-	4.811
CWCP-25	Deep	335044	186908	7.288	7	4.35	5.03	0.68	-4.532	5.028	4.738	4.778	4.688	4.638	4.728	4.348
CWCP-26-e	Deep	336825	187078	6.065	7	4.11	4.71	0.6	-4.345	4.475	4.525	4.395	4.325	4.155	4.705	4.105
CWCP-26-w	Deep	335815	187129	6.084	7	4.22	4.96	0.74	-4.276	4.964	4.784	4.794	4.744	4.604	4.224	4.574

CWCP-27	Deep	335732	186807	6.185	7	4.39	4.85	0.46	-5.325	4.845	4.665	4.665	4.555	4.515	4.605	4.385
CWCP-28	Deep	335967	186642	6.452	7	4.68	4.99	0.31	-5.308	4.992	4.892	4.862	4.682	4.902	4.932	4.892
CWCP-29	Deep	336132	186981	6.115	7	4.40	5.63	1.23	-4.585	4.945	4.725	4.725	4.615	4.525	5.625	4.395
CWCP-30	Deep	336402	187007	6.068	7	4.42	4.77	0.35	-5.372	4.768	4.638	4.528	4.528	4.438	4.518	4.418
CWCP-31	Deep	336299	186602	5.913	7	3.46	4.78	1.32	-4.247	4.783	4.663	4.623	4.603	3.463	4.563	4.313
CWCP-32	Deep	336512	187099	5.583	7	4.29	4.68	0.39	-4.637	4.683	4.593	4.503	4.373	4.293	4.483	4.383
CWCP-35	Deep	336969	186980	6.5	7	4.21	5.22	1.01	-5.54	4.52	4.44	4.39	4.32	5.22	4.33	4.21
CWCP-36	Deep	337032	186762	5.321	7	4.06	4.34	0.28	-3.889	4.341	4.331	4.191	4.141	4.071	4.151	4.061
LCBH2	Deep	335618	186555	5.729	7	4.63	4.79	0.16	-4.251	4.629	4.709	4.689	4.789	4.689	4.639	4.629
2DWS-01	Shallow	335460	187331	5.471	7	3.44	5.37	1.93	2.491	3.441	3.761	4.801	4.681	5.231	5.371	5.181
2DWS-02	Shallow	335453	187179	5.455	7	3.56	4.96	1.4	2.435	3.555	4.835	4.895	4.775	4.905	4.955	4.685
2DWS-03	Shallow	335402	187253	5.619	6	5.12	5.47	0.35	2.729	5.119	5.219	5.349	5.369	5.179	5.469	-
2DWS-04	Shallow	335288	187235	6.106	7	5.04	5.31	0.27	3.476	5.186	5.036	5.096	5.126	5.146	5.306	5.056
CWWS-03	Shallow	334876	187368	6.134	6	4.98	5.36	0.38	3.204	5.294	5.154	5.364	5.014	4.984	-	5.174
CWWS-04	Shallow	335184	187384	6.969	6	5.13	5.54	0.41	4.439	5.539	5.449	5.479	5.129	5.269	Dry	5.299
CWWS-05	Shallow	335176	187152	5.936	6	4.98	5.49	0.51	-3.244	5.016	4.976	Dry	5.256	5.376	5.486	5.446
CWWS-06	Shallow	335382	187372	6.665	2	5.23	5.95	0.72	Unknown	Dry	Dry	Dry	5.225	Dry	-	5.945
CWWS-07	Shallow	335670	187348	6.791	0	0.00	0.00	0	Unknown	Dry	Dry	Dry	Dry	Dry	Dry	Dry
CWWS-08	Shallow	335940	187325	6.784	0	0.00	0.00	0	Unknown	Dry	Dry	Dry	Dry	Dry	-	-

CWWS-09	Shallow	336187	187301	5.601	6	4.08	5.60	1.52	4.431	4.841	5.321	5.601	4.511	4.591	4.561	4.081
CWWS-10	Shallow	336506	187260	5.522	5	4.69	4.86	0.17	4.402	4.742	Dry	Dry	4.702	4.692	4.862	4.792
CWWS-11	Shallow	336962	187240	6.262	7	3.66	4.62	0.96	3.252	4.522	4.622	4.602	4.462	4.462	3.662	4.462
CWWS-13	Shallow	336735	186782	7.194	7	5.09	5.46	0.37	4.454	5.464	5.434	5.394	5.154	5.114	5.104	5.094
CWWS-14	Shallow	337197	186847	4.708	7	4.14	4.42	0.28	3.228	4.388	4.288	4.328	4.298	4.138	4.418	4.268
CWWS-15	Shallow	337134	186552	4.976	7	3.35	4.05	0.7	2.396	3.936	3.896	3.346	4.046	3.836	3.926	3.906
CWWS-16	Shallow	337162	186301	5.021	4	4.24	4.80	0.56	4.191	4.331	4.241	4.801	Dry	Dry	4.661	Dry
CWWS-17	Shallow	336709	186340	6.982	4	5.35	5.51	0.16	5.282	5.352	5.392	5.492	Dry	Dry	5.512	Dry
CWWS-19	Shallow	336080	186398	6.672	7	4.77	4.98	0.21	3.932	4.932	4.972	4.982	4.832	4.772	4.942	4.812
CWWS-20	Shallow	335760	186423	6.247	0	0.00	0.00	0	5.287	Dry	Dry	Dry	Dry	Dry	Dry	Dry
CWWS-21	Shallow	334915	186527	5.805	7	4.92	5.39	0.47	4.515	5.385	5.195	5.355	4.915	4.935	5.305	5.205
CWWS-22	Shallow	334927	186756	5.734	7	4.06	5.40	1.34	4.294	5.404	4.374	4.354	4.104	4.064	4.334	4.154
CWWS-23	Shallow	334957	187010	5.589	7	3.92	4.89	0.97	3.569	4.679	4.269	3.919	4.569	4.749	4.889	4.689
CWWS-24	Shallow	334856	187228	5.904	6	4.78	5.06	0.28	2.994	4.954	4.934	5.014	5.024	4.784	-	5.064
CWWS-25	Shallow	335049	186908	6.735	7	4.18	5.65	1.47	4.095	5.645	4.995	5.025	5.085	4.975	4.175	4.985
CWWS-26-e	Shallow	336824	187074	6.151	7	4.31	5.90	1.59	3.411	4.481	4.511	4.591	4.441	4.311	5.901	4.311
CWWS-26-w	Shallow	335817	187135	5.279	7	3.55	4.88	1.33	3.689	4.439	4.419	4.449	4.419	4.449	3.549	4.879
CWWS-27	Shallow	335731	186807	6.225	6	4.67	4.92	0.25	4.475	Dry	4.755	4.765	4.725	4.665	4.915	4.745
CWWS-28	Shallow	335967	186643	6.473	7	4.67	4.86	0.19	3.573	4.803	4.823	4.823	4.703	4.723	4.863	4.673

CWWS-29	Shallow	336131	186980	6.128	7	4.88	5.14	0.26	3.528	5.138	5.088	5.138	4.878	4.908	5.138	4.948
CWWS-30	Shallow	336402	187010	6.068	7	4.29	5.44	1.15	3.758	4.388	4.468	4.378	4.328	5.438	4.518	4.288
CWWS-31	Shallow	336296	186605	6.031	6	4.55	5.08	0.53	4.111	5.081	4.991	5.021	Dry	4.551	4.951	4.821
CWWS-32	Shallow	336512	187099	5.585	7	4.94	5.25	0.31	4.085	5.245	5.045	5.055	5.075	4.995	5.045	4.935
CWWS-33	Shallow	336612	186991	6.48	7	4.99	5.34	0.35	4.53	5.34	5.27	5.24	5.07	4.99	5.19	5.08
CWWS-34	Shallow	336656	186622	6.148	2	5.41	5.47	0.06		Dry	Dry	5.408	Dry	Dry	5.468	Dry
CWWS-35	Shallow	336968	186977	6.46	7	4.62	4.91	0.29	2.82	4.79	4.91	4.86	4.68	4.62	4.84	4.65
CWWS-36	Shallow	337027	186755	5.806	3	4.46	4.50	0.04	4.386	Dry	4.496	4.486	Dry	4.456	Dry	Dry

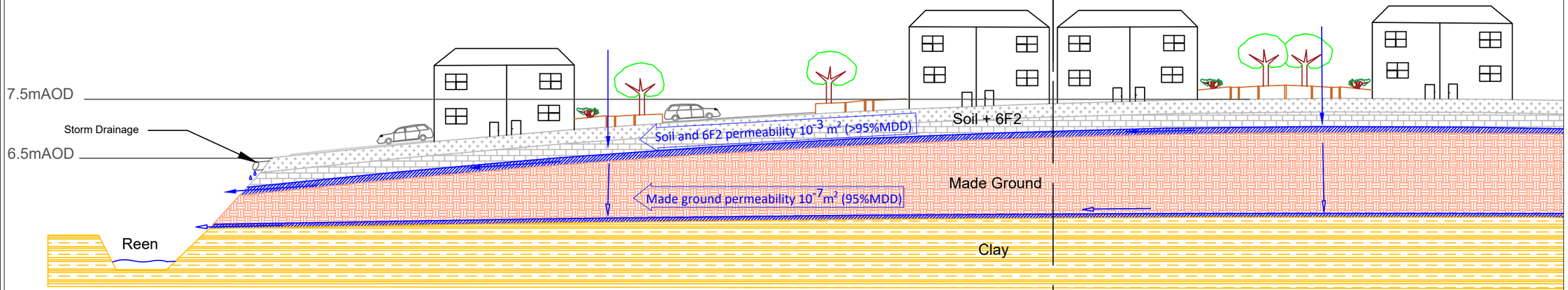
Appendix D: Glan Llyn Diagrammatic CSM



Area covered by landscaping = 23.8%

40% Infiltration into made ground

5% Infiltration
Increased distance from surface water



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY

Water movement within Soil and 6F2

Water movement within Made ground

Rev	Date	Amendments	By	Chk

St Modwen

Project
Llanwern

Drawing Title
Glan Llyn Diagrammatic CSM

Status
Information

Drawn	Checked	Date
ET	CW	05.07.19

Drawing Ref. Rev
18669-RLE-19-XX-DR-O-0005

Copyright © Rodgers Leask Limited

Stevin House - 19 High Street - Longbridge - Birmingham - B31 2UQ - Tel: 0121 475 8426 - www.rodgersleask.co.uk

Appendix E: Soils Analysis

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	3ATPGR02	3ATPGR03	3ATPGR03	3ATPGR04	3ATPGR04	3ATPGR02 CL	3ATPGR03 CL	TP3AA5V	TP3AB4V	TP3AB5V	TP3AC401	TP3AC402	TP3AC501	TP3AC502	TP3AC503
Depth	1.2	0.7	1.2	0.4	1.3	2.2	2.7	0	0	0	0.5	1.5	0.5	1	1.5
Sampled Date	03/01/2018	03/01/2018	03/01/2018	03/01/2018	03/01/2018	03/01/2018	03/01/2018	04/01/2018	05/01/2018	05/01/2018	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017
Carbon															
Soil Organic Matter (SOM)	1.72	0.536	2.93	0.507	0.35	5.1	1.16	1.56	1.13	10.4	20.7	10.4	10.3	1.84	8.33
Metals (Solids)															
Arsenic	9.42	3.34	6	2.51	6	14.7	11.4	13.1	15.8	32.3	5.86	9.74	10.9	7.89	6
Cadmium	1.64	0.27	0.2	0.289	0.2	0.478	0.02	0.0899	0.02	0.841	0.02	0.869	0.265	0.2	0.2
Chromium	358	9.41	695	4.87	1030	30.3	18.1	32	19.2	42.8	4.22	53.7	27	260	9
Copper	36.4	7.32	24.6	7.82	14.9	18.2	10.8	11.1	9.55	19.1	20.1	49.4	31.3	19	15.5
Lead	208	11.3	24.4	11.1	16.5	49.2	26.4	24.7	21.9	52.5	91.1	184	97.5	24.6	83.9
Mercury	1.4	0.14	1.4	0.14	1.4	1.4	0.918	0.14	0.386	0.14	1.05	1.98	1.4	1.4	1.82
Nickel	23.9	6.55	18.8	2.69	4.67	35.1	38.2	40.9	33.9	27	15.1	40.4	24.9	24.8	34.3
Selenium	14.4	1	19.9	1	22.4	10	1.47	1	1.98	1	2.03	10	10	10	10
Vanadium	302	8	442	3.8	578	59	60.4	54.7	49.8	71.7	33.1	101	47.9	274	56.8
Zinc	1030	28.4	70.5	35	25.6	160	151	118	98.5	160	351	652	187	105	296
TPH Criteria Working Group (TPH CWG)															
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.002	0.008	0.0151	0.008	0.0173	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.003	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.0598	0.0564	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.0571	0.0506	0.392	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.0622	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	3.03	0.1	6.01	0.1	0.714	0.1	0.1	0.1	0.1	0.1	2.74	1.79	3.34	0.1	2.03
Aliphatics >C16-C21	21.3	1.3	29.4	0.526	2.83	1.12	0.1	0.1	0.1	0.1	23	14.9	13.8	0.1	11.6
Aliphatics >C21-C35	90.5	7.16	154	2.9	23.8	9.7	4.4	0.524	0.1	12.1	115	64.1	70.1	3.47	74.1
Aliphatics >C35-C44	14.7	0.928	49	0.926	3.76	1.39	0.1	0.1	0.1	0.1	33.5	19	29.7	0.1	33.2
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.061	0.284	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.0403	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	1.04	0.1	2.26	0.1	0.1	0.727	0.1	0.1	0.1	0.1	2.25	1.89	2.41	0.1	2.08
Aromatics >EC16-EC21	6.01	0.1	20	0.1	0.846	1.87	0.774	0.1	0.1	1.59	13.2	12.9	15.3	1.12	13.4
Aromatics >EC21-EC35	26.4	1.28	107	0.1	8.02	25	10.6	2.66	0.748	49.7	72.6	63.7	86.3	7.04	68.5
Aromatics >EC35-EC44	8.73	0.1	48.6	0.1	3.81	7.63	5.5	0.969	0.92	9.91	40.8	31.1	53.7	0.727	40.2
Aromatics >EC40-EC44	3.67	0.1	19	0.1	1.46	3.15	2.03	0.1	0.1	3.71	16.6	11.4	22.6	0.1	15.7
Polyaromatic Hydrocarbons (PAHs)															
Acenaphthylene	30.3	12	12	12	12	12	12	12	12	12	119	121	152	22.6	152
Acenaphthene	8	8	262	8	8	8	8	8	8	8	48.5	40.2	65.4	8	98.4
Anthracene	37.9	16	304	16	16	16	16	16	16	16	287	330	320	79.2	322
Benz(a)anthracene	125	14	2920	14	14	51.4	14	14	14	87.9	1190	835	1100	169	926
Benzo(a)pyrene	118	18.2	3610	19.2	20.1	56.6	15	15	15	65.9	1250	732	1110	120	799
Benzo(b)fluoranthene	235	23.8	5000	29.7	36.5	105	15	15	15	152	1860	976	1540	177	1220
Benzo(k)fluoranthene	91.5	14	1910	14	17.5	37.4	14	14	14	35.3	660	509	662	78	497
Benzo(g,h,i)perylene	171	24	2670	24	24	61.1	24	24	24	53.1	1050	678	934	81.2	703
Chrysene	148	13.3	2640	23.8	18.2	68.7	10	10	10	80.5	1310	901	1210	124	1020
Dibenzo(a,h)anthracene	0.023	0.023	732	0.023	0.023	0.023	0.023	0.023	0.023	0.023	277	177	263	0.023	210
Indeno(1,2,3-cd)pyrene	133	0.018	2420	0.018	0.018	46.2	0.018	0.018	0.018	46.5	877	530	784	73.8	582
Fluoranthene	197	22.4	3730	31.4	43	172	0.017	0.017	0.017	173	2160	1790	2140	342	2060
Fluorene	10	10	96	10	10	10	10	10	10	10	104	137	136	25.3	237
Naphthalene	95.4	12.4	233	13.8	11	19	9	9	9	28.6	397	291	404	25.7	963
Phenanthrene	145	27.2	2110	29.1	33.6	166	15	15	15	111	1090	1090	1130	191	1660
Pyrene															
PAH, Total Detected USEPA 16	1.7	0.137	31.8	0.174	0.214	0.913	0.118	0.118	0.118	0.955	14.4	10.5	13.6	1.76	13
Naphthalene-d8 % recovery**	101	98.9	98.1	98.6	101	125	85	93.8	108	105	107	94.3	104	95.2	105
Acenaphthene-d10 % recovery**	98.2	96.6	97.1	96.3	97.1	123	79.4	86.3	106	100	105	91.2	101	90.2	102
Phenanthrene-d10 % recovery**	98.4	96.9	99.2	96.1	96.6	121	75.9	79.2	104	95.9	104	91.1	101	86.1	102
Chrysene-d12 % recovery**	96.9	92.8	107	90.1	93.1	117	68.3	83.6	94.6	85.3	103	88.1	99.5	87	98.5
Perylene-d12 % recovery**	95.7	100	121	90.5	91.2	121	69.4	85.9	94.8	86.4	107	87.2	104	91.3	99.1
Total Aliphatics >C12-C44	130	9.39	239	4.35	31.1	12.2	4.4	0.524	0.1	12.1	174	99.8	117	3.47	121
Total Aromatics >EC12-EC44	42.2	1.28	178	0.1	12.7	35.2	16.9	3.63	1.67	61.2	129	110	158	8.88	124
Total Aliphatics & Aromatics >C5-C44															
Metals - (Solid)															
Iron	149000	7870	170000	3220	149000	40000	45500	40300	35300	28600	53000	131000	65100	135000	153000
Manganese	19700	376	29500	140	35700	609	698	583	1320	231	2660	7720	2220	17100	3660
Metals - (Liquid)															
Calcium	224000	396000	236000	398000	343000	-	-	-	-	-	156000	135000	77700	137000	77700
Magnesium	28900	3100	13800	1990	14300	-	-	-	-	-	24900	21400	15800	13600	7340
Phenols															
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.011	0.01	0.0112	0.01	0.01	0.01	0.01	0.01	0.01	0.0168	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics															
Soluble Sulphate 2:1 extract as SO4 BRE	0.0901	-	0.004	0.0694	-	-	-	-	-	-	0.17	0.117	0.0663	-	0.0946
pH	12.3	10.6	12.4	8.88	12.7	7.73	8.09	7.33	8.23	7.11	11	11.1	10.5	9.07	10.8
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.12	-	0.0407	0.0712	-	-	-	-	-	-	0.375	0.237	0.115	-	0.138
Sulphate, Total potential	0.36	-	0.122	0.214	-	-	-	-	-	-	1.13	0.711	0.345	-	0.414
Sulphate, acid soluble (total)	0.215	-	0.325	0.0987	-	-	-	-	-	-	0.533	0.417	0.123	-	0.138
Cyanide, Total	2.62	1	1	1	1	1	1	1	1	1	1.23	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	276	176	147	97.1	184	12	12	12	12	12
Asbestos															
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	0.0052	-	-	-	0.001
Date of Analysis	05/01/2018	05/01/2018	-	-	05/01/2018	-	-	-	-	-	04/01/2018	04/01/2018	03/01/2018	23/12/2017	04/01/2018
Analysed By	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	-	-	Barbara Urbanek-Walsh	-	-	-	-	-	Barbara Urbanek-Walsh	Neville Mann	James Richards	Neville Mann	Marcin Magdziarek
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	0.001
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	Chrysotile	-	-	-	None
Analysts Comments	-	-	-	-	-	-	-	-	-	-	Loose fibres in soil	-	-	-	N/A
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	0.0052	-	-	-	0.001
Chrysotile (White) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Detected
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Detected
Comments	0	0	-	-	0	-	-	-	-	-	Fibre bundles in soil.	--	0	0	Loose fibres in soil
Volatile Organic Compounds (VOCs)															
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	-	-	-	-	-	0.13	0.13	0.157	0.13	0.313
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics															
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AC601	TP3AC602	TP3AC603	TP3AC4V	TP3AC5V	TP3AC6V	TP3AD10	TP3AD10	TP3AD11	TP3AD11	TP3AD13	TP3AD13	TP3AD301	TP3AD501	TP3AD502
Depth	0.5	1	2	2.1	2.1	2.4	0.5	1.5	1	2	0.5	1	0.7	0.3	1
Sampled Date	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	19/01/2018	19/01/2018	19/01/2018	19/01/2018	19/01/2018	19/01/2018	26/09/2017	26/09/2017	26/09/2017
Carbon															
Soil Organic Matter (SOM)	3.72	6.03	8.91	2.12	0.765	1.07	1.9	2.62	0.995	1.53	3.72	3.62	11.2	22.8	5.14
Metals (Solids)															
Arsenic	6	6	9.82	20.2	9.9	11.4	13.7	7.35	6	6	10.3	12.9	11.4	7.12	12.3
Cadmium	0.792	2.01	0.838	0.02	0.162	0.02	0.194	0.2	0.2	0.2	1.07	0.545	0.321	0.17	0.74
Chromium	104	318	138	10.9	19.3	24.3	24.9	179	116	50.9	49.2	142	40.1	13.3	7.24
Copper	14	14	20.9	12.7	10.7	12.2	19.1	28.8	14	16.4	22.6	27	16.5	5.49	33.9
Lead	71.8	229	125	19	22.9	28	57	159	34.6	83	190	151	53.1	17.4	52.6
Mercury	1.4	1.4	1.4	0.752	0.654	0.72	0.14	1.4	1.4	1.4	1.4	1.4	0.384	0.509	0.398
Nickel	15.4	13.8	26.1	27	28.4	33.2	32.7	24.4	13.6	13.3	16	24.9	11.5	10.4	19.2
Selenium	10	10	10	1.27	1.22	1.25	1.41	10	10	10	10	10	1	1.13	1
Vanadium	123	250	291	41.1	44	51.2	44.9	203	412	92.7	38.1	96.3	36.1	31.9	26.9
Zinc	225	869	348	100	113	114	169	450	97.8	104	491	466	155	63.4	136
TPH Criteria Working Group (TPH CWG)															
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.00875	0.00944	0.0092	0.008	0.0633	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.0172	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.113	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.124	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0464	0.0697	0.0534
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0712	0.0697	0.058
Aliphatics >C12-C16	1.2	2.5	3.71	0.14	0.1	0.1	0.1	4.94	3.43	3.18	4.65	4.48	3.44	4.14	1.19
Aliphatics >C16-C21	6.74	11.3	12	4.53	0.1	0.1	0.1	15.3	13.1	14.1	14.2	13.6	10.9	21	6.38
Aliphatics >C21-C35	53.9	170	64.1	18.6	0.1	1.73	2.33	57.5	51.6	55.8	52.5	49	54.7	112	21.2
Aliphatics >C35-C44	29	99.7	24.4	1.32	0.1	0.822	0.1	19.5	24.7	19.3	17.2	14.8	21.5	40.6	5.92
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0633	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0421	0.176	0.0452
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0475	0.0461	0.04
Aromatics >EC12-EC16	2.16	3.33	3.94	1.29	0.1	0.1	0.1	1.71	1.84	2.86	1.94	1.53	2.85	6.63	1.49
Aromatics >EC16-EC21	24.2	27.5	18.6	7.03	0.1	0.1	0.952	6.74	15.2	18.2	9.54	8.31	15.8	40.6	12
Aromatics >EC21-EC35	88	193	83.4	40.4	5.54	2.03	6.36	37.7	50.5	64.1	44.8	40.2	77.5	123	51.2
Aromatics >EC35-EC44	49	122	42.4	14.1	1.27	1.33	1.51	22.3	19.6	26.9	22.2	19.7	40	42.2	19.2
Aromatics >EC40-EC44	19.1	43.4	16.5	4.69	0.1	0.1	0.1	9.3	7.43	9.73	8.75	7.77	17	15.1	7.72
Polyaromatic Hydrocarbons (PAHs)															
Acenaphthylene	190	334	150	12	12	12	12	38.9	98.5	522	106	98.4	99.5	492	107
Acenaphthene	27.2	32	22.3	52.5	8	8	21.5	38.5	42.7	67.2	53.7	30.6	106	77.5	109
Anthracene	292	792	231	80	16	16	52.7	104	203	1230	289	195	269	1510	284
Benz(a)anthracene	1560	2560	1240	234	14	42.8	282	324	817	3190	880	768	602	4900	1580
Benzo(a)pyrene	1610	2470	1290	182	15	31.5	243	312	730	2500	862	792	613	4610	1550
Benzo(b)fluoranthene	2330	3670	1800	246	15	47.6	433	492	1220	3740	1350	1310	881	5930	2730
Benzo(k)fluoranthene	749	1530	682	110	14	21.4	160	181	506	1420	496	437	358	2690	801
Benzo(g,h,i)perylene	1170	1840	831	160	24	24	180	276	594	1610	626	609	532	4150	1120
Chrysene	1100	2810	827	237	10	35.1	302	367	1000	3050	817	739	745	4670	1500
Dibenzo(a,h)anthracene	351	529	268	44.6	0.023	0.023	60.3	66.8	154	477	180	176	132	965	354
Indeno(1,2,3-cd)pyrene	1150	1680	824	121	0.018	0.018	153	216	511	1600	527	516	396	3250	905
Fluoranthene	1760	4890	1390	479	0.017	64.7	419	625	1470	7760	1860	1330	1340	11200	2340
Fluorene	96.8	146	74.9	45.7	10	10	24.2	38.5	78	772	102	107	172	516	136
Naphthalene	616	533	259	79	9	16.3	33.3	205	282	620	257	496	376	2140	304
Phenanthrene	896	1650	694	313	15	55.5	185	389	893	6040	1090	806	914	8060	854
Pyrene															
PAH, Total Detected USEPA 16	15.4	29.3	11.7	2.8	0.118	0.368	2.85	4.18	9.7	39.4	11.1	9.53	8.63	63.8	16.5
Naphthalene-d8 % recovery**	93.6	104	94	113	111	109	96.1	108	100	92.9	92	113	107	109	103
Acenaphthene-d10 % recovery**	91.8	101	92.6	108	111	106	87.9	103	94.7	87.9	88.8	109	93.6	101	98.3
Phenanthrene-d10 % recovery**	86.5	99.1	86.7	104	103	102	83.7	103	94.3	88.6	88.1	107	93.2	102	95
Chrysene-d12 % recovery**	97.4	100	95.6	94.4	106	91.8	80	107	94.7	94.5	89.4	108	84.6	108	97.3
Perylene-d12 % recovery**	111	103	110	92	115	85.2	83.5	115	97.2	97.4	97.5	117	78.3	104	99.4
Total Aliphatics >C12-C44	90.9	284	104	24.6	0.1	2.55	2.33	97.1	92.8	92.4	88.5	81.9	90.5	178	34.7
Total Aromatics >EC12-EC44	163	345	148	62.8	6.8	3.37	8.81	68.4	87.1	112	78.5	69.8	136	212	83.9
Total Aliphatics & Aromatics >C5-C44															
Metals - (Solid)															
Iron	65800	119000	95600	43200	35500	37400	37100	195000	86800	141000	87200	137000	23400	28600	26500
Manganese	8100	16300	7510	941	966	384	2470	8820	9810	5990	4210	4370	2160	2760	1610
Metals - (Liquid)															
Calcium	146000	161000	83300	57300	49700	4950	22300	116000	171000	127000	110000	94800	119000	146000	57700
Magnesium	18300	17000	10500	10700	10200	10100	7250	12100	27700	23700	28400	15900	17900	19100	21100
Phenols															
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0761	0.109	0.0118	0.01	0.01	0.0107	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0109	0.0109	0.0236	0.0115	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.087	0.12	0.035	0.035	0.035	0.035	0.035
Inorganics															
Soluble Sulphate 2:1 extract as SO4 BRE	0.221	-	0.0996	-	-	-	-	0.205	0.004	-	0.136	-	0.0882	0.103	0.0534
pH	10.2	10.9	10.5	8.69	8.17	8.27	10.5	11.4	11.4	11.9	10.7	10.7	10.5	11.1	8.45
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	9500	7110	800
Sulphur, Total	0.352	-	0.137	-	-	-	-	0.314	0.23	-	0.178	-	-	-	-
Sulphate, Total potential	1.06	-	0.411	-	-	-	-	0.942	0.69	-	0.534	-	-	-	-
Sulphate, acid soluble (total)	0.934	-	0.199	-	-	-	-	0.552	0.439	-	0.139	-	0.95	0.711	0.08
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1.15	1
Exchangeable Ammonia as N	12	12	12	23.1	28	12	12	12	12	12	12	21.4	12	12	18.5
Asbestos															
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	03/01/2018	04/01/2018	23/12/2017	-	-	-	-	23/01/2018	-	23/01/2018	23/01/2018	-	06/10/2017	06/10/17	-
Analysed By	Renata Bozhkov	Renata Bozhkov	Neville Mann	-	-	-	-	Eva Guerra	-	Christian Hallam	Christian Hallam	-	Neville Mann	Christian Hallam	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Comments	0	0	0	-	-	-	-	0	-	0	0	-	0	0	-
Volatile Organic Compounds (VOCs)															
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	0.13	0.13	-	-	-	0.13	0.13	0.0555	0.13	0.13	0.13	-	-	-
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics															
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AD601	TP3AD602	TP3AD603	TP3AD701	TP3AD702	TP3AD703	TP3AD704	TP3AD13V	TP3AD14V	TP3AD3V	TP3AD3V	TP3AD4V	TP3AD5V	TP3AD5V
Depth	0.5	1	2	0.5	1	2	3	0	0	0	1.8	0	0	1.4
Sampled Date	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	26/02/2018	26/02/2018	12/01/2018	26/09/2017	12/01/2018	12/01/2018	26/09/2017
Carbon														
Soil Organic Matter (SOM)	9.95	5.52	13.2	2.5	2.6	1.32	3.29	3.4	1.7	2.59	2.12	0.974	3.21	1.08
Metals (Solids)														
Arsenic	7.09	13.8	11.7	8.88	11.4	7.85	9.78	13.8	16.8	9.86	9.44	14.6	11.6	11.8
Cadmium	0.2	0.456	0.204	1.64	1.14	1.22	1.47	0.02	0.02	0.02	0.241	0.02	0.145	0.161
Chromium	15.1	16.8	0.9	37.9	237	15.6	89	30.4	31.1	28	28.1	18.2	30.4	22.9
Copper	17.8	28.5	34.8	23.3	28	18.8	15	12.6	11.7	14.5	12	8.45	14.8	8.72
Lead	46.5	78.2	320	544	103	100	122	34.3	28.7	25.8	28.8	19	32.7	21.8
Mercury	0.622	0.528	0.706	1.4	1.4	0.532	1.4	0.14	0.14	0.14	0.676	0.14	0.14	0.634
Nickel	14.7	18	15.8	29.2	28.2	16.6	28.4	32	40.6	38.5	34.3	30.2	28.4	30.9
Selenium	1.03	1.21	1.71	10	10	2.79	10	1	1	1.14	1	1.44	1	1
Vanadium	24.4	28.4	25.7	86.5	292	80.1	118	58.9	55.8	52.1	57.2	42	49	49.6
Zinc	136	158	136	308	224	152	280	117	108	112	118	89.6	120	94.8
TPH Criteria Working Group (TPH CWG)														
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.00912	0.008	0.00831	0.008	0.008	0.0153	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1.94	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0966	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	2.24	2.26	3.16	1.8	1.63	1.58	1.27	0.747	0.1	0.1	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	14.8	9.5	13.2	6.21	4.54	3.5	7.6	1.43	0.1	0.1	0.252	0.1	0.1	0.1
Aliphatics >C21-C35	64.6	47.1	99.1	32.4	24.3	14.1	37.1	18.3	1.42	1.42	2.89	0.956	0.1	1.91
Aliphatics >C35-C44	24.8	17.1	52.1	7.13	2.84	2.63	7.68	3.16	0.1	0.1	0.281	0.1	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1.29	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0649	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	4.64	2.77	4.45	1.98	1.53	1.46	2.35	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	29.7	15.9	24.5	8.55	6.68	4.58	12.8	4.94	0.1	0.1	0.1	0.605	0.1	0.1
Aromatics >EC21-EC35	102	76.9	148	34.6	25.7	17.6	41.4	19.1	2.15	4.17	4.14	2.78	4.52	1.7
Aromatics >EC35-EC44	47	38.5	89.1	13.5	8.39	6.29	16.8	12.1	0.771	1.21	1.3	0.684	3.45	0.933
Aromatics >EC40-EC44	16.7	14.2	34.2	4.69	2.81	2.31	6.09	3.91	0.1	0.1	0.233	0.1	1.75	0.1
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	591	215	123	62.9	58.1	19	165	12	12	12	12	12	12	12
Acenaphthene	104	124	77.5	32.5	41.1	19.5	36.5	8	8	8	8	8	8	8
Anthracene	1870	557	330	140	155	45.9	270	16	16	16	16	16	16	16
Benz(a)anthracene	3860	3210	1170	492	475	103	824	14	14	14	14	14	14	14
Benzo(a)pyrene	3460	2890	1090	438	397	77.3	739	29.7	15	15	15	15	15	15
Benzo(b)fluoranthene	4650	4010	1720	663	647	130	1260	45.2	15	15	15	15	15	15
Benzo(k)fluoranthene	2010	1490	638	240	217	56	452	14	14	14	14	14	14	14
Benzo(g,h,i)perylene	2530	1900	824	294	275	76.4	515	43.2	24	24	24	24	24	24
Chrysene	3830	3130	809	344	364	133	756	37.5	10	10	10	10	10	10
Dibenzo(a,h)anthracene	761	686	255	98.6	86.4	24.2	134	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	2320	1680	758	287	262	53.5	458	28.9	0.018	0.018	0.018	0.018	0.018	0.018
Fluoranthene	8640	5580	1500	574	680	199	1640	53.9	0.017	0.017	0.017	0.017	0.017	0.017
Fluorene	1110	250	217	56.9	90.6	28.7	98.7	10	10	10	10	10	10	10
Naphthalene	1320	496	425	186	215	99.2	518	9	9	9	9	9	9	9
Phenanthrene	6350	1760	1220	473	613	272	1190	38.2	15	15	15	15	15	15
Pyrene														
PAH, Total Detected USEPA 16	49.5	32.2	12.3	4.81	5.07	1.49	10.3	0.313	0.118	0.118	0.118	0.118	0.118	0.118
Naphthalene-d8 % recovery**	103	110	85	92.6	91.9	99.2	99.9	99.9	93.7	98.5	108	94.9	107	114
Acenaphthene-d10 % recovery**	100	107	81.6	91.9	89.4	95.2	95.9	99.5	93.9	92.1	104	90.5	103	105
Phenanthrene-d10 % recovery**	100	105	76.7	87.1	84.2	93.8	95.3	90.2	85.4	90.9	99.9	88.1	98.8	103
Chrysene-d12 % recovery**	103	108	84.9	96.4	90.9	86.7	99.2	91	84.8	86.4	94.9	84	100	97.5
Perylene-d12 % recovery**	107	113	92.3	111	98.1	84.7	103	87.9	77.3	90.9	96.7	86.7	94.1	92.3
Total Aliphatics >C12-C44	106	76	168	47.5	33.3	21.8	53.7	23.7	1.42	1.42	3.42	0.956	0.1	1.91
Total Aromatics >EC12-EC44	183	134	266	58.6	42.3	29.9	73.4	36.2	2.93	5.37	5.44	4.06	7.98	2.64
Total Aliphatics & Aromatics >C5-C44														
Metals - (Solid)														
Iron	38300	34100	46300	61200	67600	51000	88700	35800	34200	34000	39800	33900	37200	35700
Manganese	1370	1410	1580	3250	6010	3240	6650	1300	329	1500	538	2400	969	683
Metals - (Liquid)														
Calcium	115000	87300	61100	86500	91000	93800	93300	-	-	-	-	-	-	-
Magnesium	7600	23500	6950	13900	16600	22600	15300	-	-	-	-	-	-	-
Phenols														
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE	0.134	-	0.113	0.261	-	0.116	0.214	-	-	-	-	-	-	-
pH	9.67	9.36	9.78	10.2	10.4	9.3	10.7	7.65	7.4	7.49	7.64	8.28	7.4	8.47
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.174	-	0.195	0.158	-	0.116	0.175	-	-	-	-	-	-	-
Sulphate, Total potential	0.522	-	0.585	0.474	-	0.348	0.525	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	0.127	-	0.253	0.194	-	0.155	0.256	-	-	-	-	-	-	-
Cyanide, Total	1.1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	175	47.1	145	213	78.3	237	65.6
Asbestos														
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	03/01/2018	03/01/2018	03/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	-	-	-	-	-	-	-
Analysed By	Marcin Magdziarek	Marcin Magdziarek	Renata Bozhkov	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	Marcin Magdziarek	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-
Comments	0	0	0	0	0	n	0	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.294	0.13	0.13	0.13	0.13	0.13	0.201	-	-	-	-	-	-	-
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Glan Lyn Commercial Soils Data

												Sample ID	40AF28	40AF28	40AF28	40AF28	40AF28V	40AG28	40AG28	40AH28	40AI28	40AI28	40AI28	40AI28	40AJ28	40AJ28	40AK28	40AK28	40ATP01	40ATP01	40ATP01	40ATP01
												Depth	0.500.50	1.001.00	1.501.50	2.002.00	2.602.60	0.500.50	0.900.90	0.500.50	0.500.50	1.001.00	1.501.50	2.202.20	0.700.70	1.201.20	0.700.70	1.101.10	0.500.50	1.001.00	1.501.50	3.003.00
												Sampled Date	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**WQS**	**Percentage of exceedances**																					
Carbon																																
Soil Organic Matter (SOM)	TM132	%	0.35	430	429	0	0.35	81	7		0.00		73.4	9.48	48.4	29	6.36	5.14	6.86	7.55	7.33	2.95	11.4	35.9	2.59	2.67	7.79	4.83	3.79	5.34	12	3.91	10.4
Metals (Solids)																																
Arsenic	TM181	mg/kg	<0.6	430	430	329	0.60	276	12	6.74	76.51		2.08	2.47	17.6	20	13.4	8.28	8.8	13	10.1	6	16.8	6.7	20.7	4.07	7.51	21.2	17.9	3.98	8.94	5.63	6.6
Cadmium	TM181	mg/kg	<0.02	430	430	341	0.02	9	1	0.19	79.30		0.112	0.401	1.89	1.62	0.499	0.768	2.08	3.87	1.2	1	0.966	0.374	0.689	0.326	0.811	0.849	0.961	0.21	0.243	0.23	0.978
Chromium	TM181	mg/kg	<0.9	430	430	293	0.90	876	73	25.08	68.14		5.44	62.5	9	9	26.1	35.3	10.8	24.5	15.8	454	76.9	166	109	50.3	74.5	46.5	121	5.66	11.2	6.66	160
Copper	TM181	mg/kg	<1.4	430	430	430	1.40	318	27	1.20	100.00		4.9	5.63	30.3	39.6	19.1	23.6	22.4	46.7	22.8	17.9	26.6	21.5	24.6	12.4	40.9	17.8	43.2	6.75	42.6	18	18.2
Lead	TM181	mg/kg	<0.7	430	430	186	0.70	787	61	41.85	43.26		13.4	23.8	125	144	38.7	70.8	153	363	202	51.4	62.5	30.1	73.8	23.2	144	130	24.2	21.9	31.3	21.8	104
Mercury	TM181	mg/kg	<0.14	430	430	84	0.14	14	0	0.35	19.53		0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.396	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.02
Nickel	TM181	mg/kg	<0.2	430	430	112	0.76	169	23	30.61	26.05		4.25	9.87	25.1	37.6	29.7	17.4	14.4	28.4	15.6	9.9	24.7	12.2	19.7	9.35	33.9	26	28.7	4.23	26.8	19.4	9.78
Selenium	TM181	mg/kg	<1	430	430	257	1.00	40	4	1.87	59.77		2.13	4.07	10	10	1.26	3.53	2.35	1.1	2.41	13.3	10	5.7	5.71	4.46	2.73	5.26	3.93	1	1.88	1	3.86
Vanadium	TM181	mg/kg	<0.2	430	430	430	6.56	1790	121	4.27	100.00		20.8	92.7	60.5	86.5	45.7	140	58.3	72.6	40.4	1120	331	589	193	175	345	156	130	6.56	29.9	24.2	173
Zinc	TM181	mg/kg	<1.9	430	430	58	9.10	3690	248	365.79	13.49		49.8	113	239	250	130	432	1170	3260	888	141	162	146	1060	395	825	1240	129	65.7	71.5	74.3	436
TPH Criteria Working Group (TPH CWG)																																
Benzene	TM089	mg/kg	<0.01	15	15	15	0.04	0	0	0.01	100.00																						
Toluene	TM089	mg/kg	<0.002	15	15	0	0.01	0	0	0.32	0.00																						
Ethylbenzene	TM089	mg/kg	<0.003	15	15	0	0.01	0	0	0.21	0.00																						
sum of detected mpo xylene by GC	TM089	µg/kg	9	15	15	0	0.01	0	0	0.19	0.00																						
Aliphatics >C5-C6	TM089	mg/kg	<0.01	430	430	0	0.01	0	0	311.47	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	430	430	0	0.01	4	0	1134.98	0.00		0.04	0.0424	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0746	0.0938	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0516
Aliphatics >C8-C10	TM089	mg/kg	<0.01	430	430	0	0.01	26	0	7844.34	0.00		0.04	0.0532	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.105	0.04	0.04	0.04	0.04	0.04	0.04	0.0896	0.04	1
Aliphatics >C10-C12	TM089	mg/kg	<0.01	430	430	0	0.01	29	0	60406.47	0.00		0.0844	0.253	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0531	0.106	0.04	0.04	0.04	0.04	0.0672	0.04	0.244	0.04	29.2
Aliphatics >C12-C16	TM173	mg/kg	<0.1	430	430	0	0.10	1330	14	1198346.52	0.00		10.2	3.37	0.595	0.1	0.1	1.59	1.16	2.17	1.92	2.84	1.28	0.1	1.19	0.1	1.47	0.909	11.2	0.216	1.34	2.57	198
Aliphatics >C16-C21	TM173	mg/kg	<0.1	430	430	0	0.10	1100	24	150639254.34	0.00		41.8	15.3	8.52	4.97	0.1	8.82	7.37	24.1	21.3	21.5	5.91	2.94	9.22	5.5	15.2	8.83	33.1	1.88	3.64	9.28	64.3
Aliphatics >C21-C35	TM173	mg/kg	<0.1	430	430	0	0.10	3580	104	150639254.34	0.00		747	201	24.7	52.6	8.05	105	86.5	247	474	253	43.6	47.2	97.7	72.2	198	145	195	41.5	22.9	45.2	269
Aliphatics >C35-C44	TM173	mg/kg	<0.1	430	430	0	0.10	1380	36	150639254.34	0.00		836	224	6.09	30.7	0.1	46.1	33.5	82.5	244	109	18.8	20.6	25.4	17.4	69.1	31	227	37.3	18.4	26.4	65.9
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	430	430	0	0.01	1	0	19.81	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0417
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	430	430	0	0.01	0	0	451.11	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	430	430	0	0.01	17	0	380.12	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0554	0.085	0.04	0.04	0.04	0.04	0.04	0.04	0.0739	0.04	0.711
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	430	430	0	0.01	19	0	600.15	0.00		0.0563	0.168	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0713	0.04	0.04	0.04	0.04	0.0448	0.04	0.162	0.04	19.4
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	430	430	0	0.10	507	5	1196.62	0.00		5.5	2.54	0.2	0.626	3.83	0.709	0.1	2.59	1.8	1.03	1.75	0.1	0.841	0.1	1.66	0.1	4.96	0.616	4.48	2.6	131
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	430	430	0	0.10	1360	15	3783.48	0.00		29.6	11.4	2.45	2.56	7.62	3.5	2.77	15.2	15.7	6.75	2.9	2.1	5.67	3.3	26.6	2.83	15.3	2.19	13.4	7.7	39.5
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	430	430	0	0.10	4070	85	30052.88	0.00		1150	243	12.3	56.4	35.8	58.7	34.4	88.3	289	124	31.3	33.8	54.1	40.2	184	27.6	193	52.1	37.8	46.6	116
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	1250	38	30052.88	0.00		1120	342	6.48	63.6	4.94	47.8	25.3	46.3	292	121	23	26.5	21.5	16.4	59.8	11.9	265	50.3	27.2	33	61.4
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	532	16	30052.88	0.00		506	165	2.36	27.6	0.1	19.7	10.7	17.8	121	52.1	9.59	11.1	7.84	6.04	22.5	4.44	128	22.7	11.7	13.9	24.2
Polyaromatic Hydrocarbons (PAHs)																																
Acenaphthylene	TM218	µg/kg	<0.012	430	430	62	12.00	1620	30	44.45	14.42		120	60	12	60	12	15.8	12	80	120	12	120	12	12	12	56	12	60	68	12	60	165
Acenaphthene	TM218	µg/kg	<0.008	430	430	47	8.00	6190	79	79.05	10.93		629	299	8	40	8	48.8	32.1	889	80	10.6	80	8	45.9	10.1	60	20.8	66.5	60.2	119	71.2	92.6
Anthracene	TM218	µg/kg	<0.016	430	430	94	16.00	3990	103	90.76	21.86		160	80	16	80	16	50.2	39.4	187	160	23.1	160	16	46.4	28	156	40.8	80	92.7	43.5	80	139
Benz(a)anthracene	TM218	µg/kg	<0.014	430	430	11	0.03	15900	334	1613.93	2.56		224	122	30.2	70	33.7	472	174	839	644	320	233	88.2	443	373	1660	284	113	100	31.3	70	296
Benzo(a)pyrene	TM218	µg/kg	<0.015	430	430	197	15.00	10500	309	91.65	45.81		496	155	21.7	75	34	524	180	674	595	157	199	90.4	470	334	1690	269	120	91.5	15	75	337
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	430	430	429	3.00	27000	476	9.09	99.77		808	253	42.5	75	57.5	948	374	1320	1100	734	386	215	924	706	3190	585	217	129	36.7	107	548
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	430	430	429	0.03	8650	173	13.44	99.77		256	77.7	16	70	14	309	125	474	330	215	140	65.9	260	204	961	187	70	70	14	70	210
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	430	429	254	<0.024	9800	253	35.35	59.07		407	153	24	120	24	505	201	565	487	312	0.24	93.7	458	328	1320	276	120	120	24	120	382
Chrysene	TM218	µg/kg	<0.01	430	430	12	0.02	19400	380	1651.53	2.79		519	161	34.7	50	39.5	580	218	795	843	511	314	145	759	569	2760	417	146	93.8	60.1	67.2	396
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	430	430	1	0.02	3260	51	2227.85	0.23		0.23	0.115	0.023	0.115	0.023	122	44.9	135	0.23	70.6	0.23	0.023	113	62.5	326	61.5	0.115	0.115	0.023	0.115	0.115
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	430	430	208	0.02	10100	225	67.35	48.37		378	134	0.018	90	0.018	449	167	550	443	287	180	88.1	399	293	1130	257	90	90	0.018	90	323
Fluoranthene	TM218	µg/kg	<0.017	430	430	345	0.02	17900	545	17.67	80.23		522	300	60.6	0.085	84.3	463	294	1610	941	454	530	128	385	387	1400	374	264	301	96.1	131	738
Fluorene	TM218	µg/kg	<0.01	430	430	52	0.02	9160	89	72.09	12.09		180	93.8	10	50	10	18.1	14.7	127	0.1	10	0.1	20.8	34.1	10	72.7	17.8	50	84.7	102	65.8	162
Naphthalene	TM218	µg/kg	<0.009	430	430	114	0.02	38100	206	72.28	26.51		669	359	13.7	45	9	37.3	61.7	113	90	22.8	90	25.8	16.3	9	172	19.4	154	249	318	247	5540
Phenanthrene	TM218	µg/kg	<0.015	430	430	269	3.00	11600	385	72.09	62.56		473	287	70.5	75	27.1	218	163	818	326	132	215	106	201	99.2	613	232	238	412	484	263	535
Pyrene	TM218	µg/kg	15	347	347	0	0.02	18	1	203.18	0.00																						
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	430	430	0	0.12	169	4		0.00		6.4	2.77	0.347	0.59	0.352	5.33	2.41	10.8	6.67	3.85	2.38	1.21	5.12	3.9	17.7	3.42	1.53	1.94	1.37	1.15	10.6
Naphthalene-d8 % recovery**	TM218	%		430	430	0	32.20	120	92		0.00		78.6	88.4	87.2	88.4	88.5	91.1	93.4	92.6	75.1	92.2	77.9	78.4	80.1	80.4	82	79.9	94.2	104	79.3	88	97.4
Acenaphthene-d10 % recovery**	TM218	%		430	430	0	31.10	127	91		0.00		88.8	85.2	87.9	84.6	93.6	94.5	93.5	93.5	82.6	102	84.8	82.4	83.7	84.4	86.2	83.3	91.9	102	84.3	84.9	90.3
Phenanthrene-d10 % recovery**	TM218	%		430	430	0	29.50	121	94		0.00		82.1	98.9	77.8	77.4	97.1	101	94.3	96.6	81.7	112	74.9	82	83.3	88.2	87.4	85.2	92.6	98.9	90.4	84.5	93.3
Chrysene-d12 % recovery**	TM218	%		430	430	0	25.30	116	87		0.00		77	89.7	45.2	73.1	101	96.7	76.6	79	78.7	98.4	74.2	83.4	83.9	91.1	90.1	83.6	90.7	101	82.8	83.6	78.1
Perylene-d12 % recovery**	TM218	%		430	430	0	16.60	125	86		0.00		73.2	87.5	29.6	71.1	98.7	95	72.3	70	74.7	93	72.8	84.4	85.8	90.7	89.6	77.2	90.2	109	71.3	77.4	66
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	430	430	0	0.10	6880	178		0.00		1630	444	39.9	88.3	8.05	161	129	356	741	387	69.6	70.8	133	95.1	283	186	467	80.9	46.3	83.4	598
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	430	430	0	0.10	7180	143		0.00		2310	599	21.4	123	52.2	111	62.5	152	598	253	59	62.4	82.1	59.9	273	42.4	478	105	82.9	89.9	347
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	347	347	0	0.10	14100	309		0.00																						
Metals - (Solid)																																
Iron	TM224	mg/kg	<1000	430	415	0	<1000	443000	56863				13100	52100	312000	178000	33400	49900	67700	154000	83600	141000	128000	55000	97100	46500	93000	69600	208000	8480	16700	19700	121000
Manganese	TM224	mg/kg	<0.13	430	415	0	<0.13	140000	5731				1710	7220	4750	3410	729	4150	3610	4790	4180	24800	8150	10300	10800	6340	5630	7670	14800	793	326	496	9280
Metals - (Liquid)																																
Calcium	TM224	mg/kg	<21	429	176	0	<21	284000	136192				216000	-	29500	-	-	126000	-	125000	168000	-	124000	-	183000	-	135000	-	149000	212000	9810	-	161000
Magnesium	TM224	mg/kg	<8	429	176	0	<8	106000	19369				34300	-	5890	-	-	17300	-	14600	19200	-	8440	-	31700	-	14600	-	36900	106000	3070	-	15000
Phenols																																
Phenol	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	1	0	0.00	100.00		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	430	430	430	0.01	0	0	0.00	100.00		0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	430	430	430	0.02	0	0	0.00	100.00		0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	430	430	430	0.04	1	0	0.00	100.00		0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	83	32	32	<0.004	2	0	0.00	38.55		1.91	-	0.14	-	-	0.878	-	0.283	0.27	-	0.216	-	1.13	-	0.618	-	0.296	0.0664	0.0578	-	0.115
pH	TM133	pH Units	<1	83	68	68	<1	12	10	0.00	81.93		9.45	10	9.21	9.33	7.39	10.3	11	11.1	11.2	11.8	11.6	11.3	10.9	11	10.3	10.9	11.7	9.79	8.49	8.26	9.24
Sulphate, Total	TM221	mg/kg	<48	83	0	0	<48	<48		0.00			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	TM132	%	<0.02	83	32	32	<0.02	1	0	0.00	38.55		1.26	-	0.191	-	-	0.381	-	0.199	0.419	-	0.38	-	0.465	-	0.36	-	0.258	0.164	0.16	-	0.279
Sulphate, Total potential	TM132	%	<0.06	83	32	32	<0.06	4	1	0.00	38.55		3.78	-	0.573	-	-	1.14	-	0.597	1.26	-	1.14	-	1.4	-	1.08	-	0.774	0.492	0.48	-	0.837
Sulphate, acid soluble (total)	TM221	%	<0.02	83	32	32	<0.02	2	0	0.00	38.55		2.16	-	0.0478	-	-	0.595	-	0.407	1.03	-	1.03	-	0.891	-	0.647	-	0.323	0.184	0.0935	-	0.235
Cyanide, Total	TM153	mg/kg	<1	83	83	83	1.00	197	5	0.00	100.00		1	1	1	1.47	1	1	23	2.98	2.74	4.62	1.51	2.01	1	1	1	1	1	1	2.26	1	26.5
Exchangeable Ammonia as N	TM024	mg/kg	<12	83	83	83	12.00	458	78	0.00	100.00		12	12	12	12	122	12	12	12	12	12	12	12	12	12	12	12	12	12	73.7	18.4	29
Asbestos																																
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	430	22	22	<0.001	0	0	0.00			-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	0.001	-	-	-	-	-	0.001
Date of Analysis	TM048	No units		430	0	0				0.00			05/06/2018	-	05/06/2018	-	-	05/06/2018	-	05/06/2018	05/06/2018	-	05/06/2018	-	05/06/2018	-	05/06/2018	-	31/05/2018	31/05/2018	31/05/2018	-	31/05/2018
Analysed By	TM048	No units		430	0	0				0.00			Marcin Magdziarek	-	Marcin Magdziarek	-	-	Andrzej Ferfecki	-	Marcin Magdziarek	Lucy Caroe	-	Andrzej Ferfecki	-	Marcin Magdziarek	-	Lucy Caroe	-	Andrzej Ferfecki	Andrzej Ferfecki	James Richards	-	Andrzej Ferfecki
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	430	22	22	<0.001	0	0	0.00			-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	0.001	-	-	-	-	-	0.001
Additional Asbestos Components (Using TM048)	TM304	No units		83	0	0				0.00			-	-	-	-	-	-	-	None	None	-	-	-	-	-	None	-	-	-	-	-	None
Analysts Comments	TM304	No units		83	0	0				0.00			-	-	-	-	-	-	-	N/C	N/C	-	-	-	-	-	N/C	-	-	-	-	-	N/C
Asbestos Quantification - Total - %	TM304	%	<0.001	430	22	22	<0.001	0	0	0.00			-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	0.001	-	-	-	-	-	0.0013
Chrysotile (White) Asbestos	TM048	No units		430	0	0				0.00			Not Detected	-	Not Detected	-	-	Not Detected	-	Detected	Detected	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	TM048	No units		430	0	0				0.00			Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected	Not Detected	Not Detected	-	Detected
Crocidolite (Blue) Asbestos	TM048	No units		430	0	0				0.00			Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected
Fibrous Anthophyllite	TM048	No units		430	0	0				0.00			Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected
Fibrous Tremolite	TM048	No units		430	0	0				0.00			Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected
Fibrous Actinolite	TM048	No units		430	0	0				0.00			Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected
Non-Asbestos Fibre	TM048	No units		430	0	0				0.00			Not Detected	-	Not Detected	-	-	Trace	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Detected	Trace	Not Detected	-	Detected
Comments	TM048	No units		430	0	0			0	0.00			0	-	0	-	-	0	-	Bundle of fibres in soil	Soil containing ACM debris	-	0	-	0	-	Fibre bundles in soil	-	0	0	0	-	loose fibres in soil
Volatile Organic Compounds (VOCs)																																
Dibromofluoromethane**	TM116	%		430	415	415		138	107	0.00			112	110	108	106	105	106	115	111	118	108	108	109	114	111	108	109	104	102	98.7	104	104
Toluene-d8**	TM116	%		430	415	415		106	97	0.00			91.8	95.8	99.9	98.5	99.1	98.8	98.2	97.6	95.9	96.7	97.2	98.3	98.8	99.8	97.3	98.1	97.7	101	100	101	99.9
4-Bromofluorobenzene**	TM116	%		430	415	415		114	92	0.00			86.8	93.5	95.7	96.8	94.1	98.5	98.1	91.9	96.9	99.3	92.3	96.2	97.7	101	93.1	98.9	95.1	96.9	87.9	96.6	92.9
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0	0.00			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	430	415	415	<0.09	2	0	0.00			0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	430	415	415	<0.07	1	0	0.00			0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	430	415	415	<0.04	1	0	0.00			0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0	0.00			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	430	415	415	<0.1	2	0	0.00			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	430	415	415	<0.13	37	0	0.00			0.615	0.539	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.144	0.13	0.149	0.13	0.15	0.13	0.912
Sum of BTEX	TM116	mg/kg	<0.4	430	415	415	<0.4	8	0	0.00			0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	1	0.00			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	430	40	40	<0.5	3	1	0.00			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	430	40	40	<0.5	6	1	0.00			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	430	40	40	<0.5	1	1	0.00			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	430	40	40	<0.5	3	1	0.00			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	430	40	40	<0.5	58	17	0.00			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	430	40	40	<0.5	60	18	0.00			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

40ATP02	40ATP02	40ATP02	40ATP02	40ATP03	40ATP03	40ATP03	40ATP04	40ATP04	40ATP04	40ATP05	40ATP06	40ATP06	40ATP07	40ATP07	40ATP07	40ATP08	40ATP08	40ATP08	40ATP09	40ATP09	40ATP09	40ATP10	40ATP11	40ATP11	40ATP11	40ATP12	40ATP12	40ATP14
0.500.50	1.001.00	2.002.00	3.003.00	0.500.50	1.001.00	2.202.20	0.500.50	1.001.00	1.501.50	0.500.50	0.500.50	0.900.90	1.001.00	1.501.50	2.002.00	0.500.50	1.001.00	1.701.70	1.001.00	1.401.40	1.601.60	0.300.30	0.500.50	1.001.00	1.501.50	0.500.50	0.800.80	0.500.50
23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018
6.53	2.17	4.19	1.69	1.41	13.4	12	14.5	1.56	6.72	5.55	7.26	4.41	51.4	8.69	22.1	10.4	4.71	3.57	6.93	7.95	3.88	4.47	3.45	3.22	0.909	2.98	1.34	4.88
8.78	5.28	10	4.98	9.06	4.13	26	26.3	5.49	6.11	11.4	12.3	5.53	6.59	10.6	11.5	6.96	6.14	8.11	7.58	10.3	12.6	5.86	9.89	9.43	8.09	4.81	13.8	11.1
0.348	0.158	0.298	0.442	0.508	0.306	1.92	9.23	2.08	0.319	0.377	0.02	0.221	0.225	0.269	1.57	1.03	0.615	0.711	0.818	2.39	0.412	0.178	0.179	0.201	0.177	0.199	0.646	0.403
8.93	10.1	9.33	104	43.8	14.9	103	876	96.7	7.64	14.1	19.8	142	24.1	18.2	14	340	87.1	33.1	38.7	9	354	0.9	283	171	39.1	46.4	21.3	323
23.2	52.6	30	13.7	20.6	12.4	133	131	25.3	27.3	23.1	28.3	15.9	59.3	13.7	26.3	22.1	17.2	26.2	32.5	15.1	34.1	39.9	150	26.7	8.76	17.4	19	25.4
30.8	17.3	21.6	14.7	22.4	19.2	96	351	90	30.8	19.6	19.6	27.1	26.2	20.3	285	110	70.6	111	64.8	37	40.4	28.8	29	27.8	13	15.2	30.2	35
0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.07	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
18.9	12.9	27.9	6.76	18.9	10.7	30.9	35.2	11.8	18.9	24.9	34.4	11.6	33.8	16.4	25.5	17.5	20.3	15.3	19.2	38.2	24.1	20.5	16.8	15	10.5	12.7	15.3	23.6
1.2	1	1.04	5.98	3.55	1.7	2.27	10.5	1.5	1	1	1.17	5.66	2.16	1.47	2.38	6.32	4.49	3.61	3.01	10	5.06	2.87	4.59	5	2.45	4.53	1.09	4.91
30.1	21.4	29.7	184	77.1	45.3	67.8	652	68.3	17	32.2	26.4	222	67.1	52	106	331	184	89.1	113	67.8	266	73.2	453	345	59.4	84.1	30.9	445
100	49	72.9	79.9	146	60.2	326	1950	563	66.8	72.4	69.3	193	92.2	74.7	1260	468	268	488	763	270	358	109	120	144	43	84.4	114	108
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.078	0.0661	0.0677	0.04	0.04	0.04	0.0426	0.0644	0.04	0.0762	0.0513	0.0921	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.636	1.06	0.603	0.04	0.04	0.04	0.04	0.04	0.04	0.287	0.122	1.21	0.04	0.04	0.04	0.0406	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
12.1	12.6	4.74	0.04	0.04	0.04	0.04	0.04	0.04	1.67	0.166	13.4	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0943	0.04	0.04	0.04	0.04
47	0.1	4.51	1.23	0.424	0.614	5.45	3.11	0.1	4.29	342	1330	2.14	1.53	0.868	3.54	3.76	1.58	1.59	3.89	4.91	1.82	2.54	3.16	4.72	2.15	2.7	1.3	0.89
26.3	0.1	7.12	5.87	1.41	4.66	9.46	8.02	0.1	8.45	313	940	17.2	14.9	4.68	40.9	15.7	14.5	14.6	25.1	34.6	6.55	7.48	4.55	6.36	4.76	13.5	4.17	1.34
55.1	0.1	21.5	62.3	0.1	38.8	40.2	26.9	0.1	27.1	282	1230	262	45.4	19.1	182	88	142	175	203	200	56.8	42	13.3	7.1	24.2	138	29.2	14.6
8.17	0.1	1.38	15	0.1	7.78	15.7	2.93	0.1	3.61	44.5	175	127	15.6	5.23	56.3	49.3	41	44.9	69.7	51.4	18.7	12.2	1.47	1.02	7.36	38.3	18.6	7.62
0.163	0.211	0.238	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.0644	0.047	0.0444	0.04	0.04	0.04	0.04	0.0441	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.485	0.803	0.496	0.04	0.04	0.04	0.04	0.0746	0.0414	0.196	0.0923	0.809	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
8.1	8.41	3.16	0.04	0.04	0.04	0.04	0.04	0.04	1.11	0.111	8.91	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0633	0.04	0.04	0.04	0.04
35.4	2.24	14.3	0.1	0.77	1.21	9.39	7.49	0.1	2.5	62	239	0.719	0.1	0.415	2.62	0.979	0.768	1.46	5.83	3.7	0.601	0.683	1.14	1.82	0.1	0.824	1.1	0.1
18.1	0.1	5.38	3.11	2.12	4.3	16.6	22.3	1.34	5.85	78.3	276	6.66	3.69	2.36	19.2	6.63	6.66	12.1	34.4	20.5	3.2	3.84	3.28	4.18	0.1	5.53	2.75	2.44
39.7	0.1	17.3	20.2	6.94	21.3	60.4	68.8	9.86	18.3	98.6	315	219	57.9	16.6	125	67.8	89.7	119	216	108	42	31	14.7	12.1	3.64	75.4	26.7	20.3
15.8	0.1	3.36	8.37	1.46	7.17	31.6	18.9	2.39	7.66	28.2	72.1	226	61.3	8.73	95.1	68.2	54.2	44.2	85.2	34	22.6	17.7	4.13	4.15	0.1	44.6	23.5	12.2
6.09	0.1	0.831	2.8	0.449	2.19	13.3	6.49	0.1	3	8.14	15.8	99	27	3.53	42.4	32.7	23.3	16.9	37.1	12.4	8.96	7.18	1.32	1.52	0.1	18	10.1	5.16
71.2	18.6	32.8	12	12	12	15.6	77.1	21.4	12	12	146	60	60	12	60	208	60	73.8	14.7	12	12	12	12	12	12	86.8	12	12
98.9	15.5	30.4	9.02	8	8	37.3	95.8	16.2	8	8	294	40	40	8	40	5530	40	437	70.3	57.7	8	32.3	15.4	13.1	8	14.1	20.2	8
47.4	16	16	21.5	16	19.9	112	326	42.1	16	45.2	193	80	80	16	80	1700	80	2070	119	67.3	21.5	49.4	18.8	16	16	548	16	19.1
81.6	14	44	150	14	66.1	381	744	127	18.6	21.5	14	321	70	31.9	380	6080	389	15900	1380	584	139	636	60.8	37	36.7	1150	35.2	125
89.4	15	39.6	146	15	49.8	314	555	112	15	18.6	15	422	75	35.8	405	6210	387	10500	1570	567	153	1020	48.6	27.6	42	735	26	98.8
148	15	58.8	296	31.6	111	483	861	149	37.5	34.7	18.1	641	75	62.9	888	10600	660	27000	2970	1130	222	1220	73.5	49	66.2	1170	45.9	181
49.7	14	21.2	83.2	14	39	162	349	66.9	14	14	14	242	70	17.1	298	3670	237	8650	818	333	77.9	457	25.8	14	21.1	343	14.8	47.9
92.1	24	29	159	24	54.1	250	359	89.2	24	24	24	360	120	46.7	465	4610	439	9800	1670	572	139	878	42.8	24	49.2	405	33.7	77.8
122	16.4	58.6	166	19.4	86.8	322	842	126	21	28.9	15.3	386	50	39.8	566	7430	427	19400	2030	821	152	662	78.7	44.3	46.9	1040	31.9	150
0.023	0.023	0.023	27.1	0.023	0.023	80.8	118	0.023	0.023	0.023	0.023	0.115	0.115	0.023	0.115	1500	0.115	3260	402	133	37.3	162	0.023	0.023	0.023	145	0.023	0.023
86.7	0.018	27.5	99.5	0.018	46.1	206	385	85.2	0.018	0.018	0.018	370	90	35.8	455	3890	341	10100	1460	519	144	887	38.2	21.8	44.1	425	27.2	71.7
208	33.8	92.1	280	28.3	159	708	1590	260	25.9	47.1	32	413	0.085	41.6	512	8220	390	17900	1270	623	192	764	163	80.9	70.3	1910	85.5	131
100	16.5	33.1	10	10	10	63.5	227	27.8	10	53.7	300	50	50	10	50	9160	50	323	46	34	12.7	19.6	28.8	14.8	10	91.8	13.4	10
892	2270	1360	18.3	30.3	48.5	179	496	24.3	33.4	39.3	186	45	45	26.2	112	180	47.2	99.9	73.9	42.2	63.1	36	42.3	24.8	16.4	29	13.6	24.5
162	35.7	61.2	127	30.8	158	445	1350	135	39.9	126	171	152	75	58.8	280	9380	157	10200	722	360	100	290	143	76.2	41.5	851	66	113
2.42	2.43	1.97	1.85	0.167	0.986	4.29	9.44	1.5	0.199	0.46	1.4	3.69	0.59	0.429	4.89	85.2	3.87	169	16.4	6.65	1.62	7.89	0.901	0.454	0.497	10.3	0.486	1.16
87	88	88.5	103	94.9	81.9	101	96.3	106	95.3	91.1	78.4	93.6	69	94.7	79	94.2	98.4	92.4	108	98.9	99.6	99	95.4	93.2	95.1	96.1	95.4	93.4
89.1	87.4	92.2	97.4	90.3	86.8	97.9	95.3	101	93	94.2	127	96.6	76.7	94.8	81.8	95.4	93.7	72.8	106	94.8	96.2	95.2	91.2	96.3	92.3	97.1	92.4	98.3
95.3	93.8	99.2	95	89.5	92.1	96.7	99.9	102	88.7	92.8	90.3	92.9	62.5	95.4	74.8	97.7	92.3	92.8	108	97	95.7	95.8	91.3	99.6	93.2	96.9	93	97.2
79.4	78.2	88.1	89.6	83.6	72	95.9	92.5	96.1	86.8	82.6	78.1	91.5	54.9	92.9	61.7	103	114	96.3	108	97.7	94.3	94.7	86.3	99.6	90.6	100	90.7	94.5
62.3	53.2	74.1	83.8	73.8	58	86.9	83.8	89	88.9	72.5	70.7	92.3	43.5	92.2	62	104	88.9	103	112	98.2	95.3	96.8	84.1	99.9	92.3	100	91.2	93.2
137	0.1	34.5	84.4	1.84	51.9	70.8	40.9	0.1	43.4	981	3670	408	77.5	29.9	283	157	199	236	301	291	83.9	64.3	22.5	19.2	38.5	192	53.2	24.4
109	2.24	40.4	31.7	11.3	34	118	118	13.6	34.3	267	902	452	123	28.1	242	144	151	177	341	167	68.4	53.3	23.3	22.3	3.64	126	54	35
30200	9900	24400	70300	25900	24100	25900	131000	21800	15300	21700	21000	84200	24700	23000	125000	85200	53400	88800	80300	352000	53900	75800	42100	34100	21400	36400	20800	61400
1300	484	907	13200	4090	2160	2350	21700	3050	208	598	475	12400	2310	2000	4860	14400	9650	4240	4550	5430	8310	3180	8410	8070	2750	6930	994	9180
-	64500	-	259000	-	144000	165000	-	277000	17000	49000	-	191000	-	68700	-	186000	-	143000	-	124000	121000	109000	-	110000	66800	-	213090	-
-	3910	-	54200	-	47700	18700	-	45200	1700	2860	-	23700	-	11400	-	13200	-	26000	-	20200	28300	13800	-	18800	5130	-	12200	-
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
-	0.0534	-	0.116	-	0.15	0.135	-	0.0718	0.221	0.0951	-	0.135	-	0.0606	-	0.091	-	0.207	-	0.463	0.278	0.0929	-	0.15	0.0668	-	0.322	-
10.1	9.28	8.84	11.6	8.88	10.8	10	10.2	9.49	8.24	9.43	8.86	8.97	8.18	9.54	10.1	10.2	10.7	10	10.9	11.3	7.92	8.8	9.37	9.32	9.29	9.18	10	9.03
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	0.202	-	0.29	-	0.288	0.405	-	0.155	0.177	0.27	-	0.263	-	0.0945	-	0.217	-	0.247	-	0.384	0.293	0.302	-	0.372	0.0965	-	0.134	-
-	0.606	-	0.87	-	0.864	1.22	-	0.465	0.531	0.81	-	0.789	-	0.284	-	0.651	-	0.741	-	1.15	0.879	0.906	-	1.12	0.29	-	0.402	-
-	0.211	-	0.438	-	0.404	0.275	-	0.134	0.151	0.349	-	0.24	-	0.0806	-	0.202	-	0.209	-	0.579	0.241	0.299	-	0.396	0.138	-	0.315	-
10.8	33.3	23.7	1	1	1	1.96	1.31	1.56	1	1	1	1	1	1	197	9.23	1	1.34	3.72	1	1	1	1	1	1	1	1	1
87.9	191	293	12	12	12	12	12	12	12	12	39.9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
-	-	-	0.001	-	-	0.0011	-	-	-	-	-	0.001	-	-	-	0.0045	-	0.0033	-	-	-	0.001	-	-	-	-	-	-
-	31/05/2018	-	31/05/2018	-	31/05/2018	31/05/2018	-	31/05/2018	31/05/2018	31/05/2018	-	04/06/2018	-	04/06/2018	-	04/06/2018	-	04/06/2018	-	04/06/2018	04/06/2018	04/06/2018	-	04/06/2018	04/06/2018	-	04/06/2018	-
-	James Richards	-	James Richards	-	James Richards	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	Renata Bozhkov	Renata Bozhkov	-	Lucy Caroe	-	Lucy Caroe	-	Marcin Magdziarek	-	Marcin Magdziarek	-	Marcin Magdziarek	Andrzej Ferlecki	Marcin Magdziarek	-	Marcin Magdziarek	Renata Bozhkov	-	Andrzej Ferlecki	-
-	-	-	0.0014	-	-	0.001	-	-	-	-	-	0.001	-	-	-	0.001	-	0.001	-	-	-	0.0011	-	-	-	-	-	-
-	-	-	PCOM showed signs of Amphibole fibres.	-	-	None	-	-	-	-	-	None	-	-	-	None	-	None	-	-	-	None	-	-	-	-	-	-
-	-	-	N/C	-	-	N/C	-	-	-	-	-	N/A	-	-	-	N/A	-	N/C	-	-	-	N/C	-	-	-	-	-	-
-	-	-	0.0016	-	-	0.0011	-	-	-	-	-	0.001	-	-	-	0.0045	-	0.0033	-	-	-	0.0016	-	-	-	-	-	-
-	Not Detected	-	Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected	-	Not Detected	Not Detected	Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Trace	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	0	-	Fibre bundles in soil	-	0	Loose fibres in soil.	-	0	0	0	-	Fibre bundles in soil	-	0	-	Loose fibres in soil	-	Bundle of fibres in soil	-	0	0	Loose fibres in soil	-	0	0	-	0	-
101	102	105	103	103	99.1	99	79	99.9	108	102	104	105	116	104	106	104	106	106	107	107	109	105	112	105	104	104	112	102
98.6	99.5	99.4	99.2	100	98.5	98.9	96.7	101	100	98.6	94.8	95.7	97	97.4	94.5	96.9	97.4	97	96	97.4	95.9	97.9	99.3	99.5	97.9	98.7	97.5	96.9
90.2	95.7	92.1	94.9	97	85.9	88.9	80	97.5	95	90.4	84.2	90.3	81.3	93.3	82.7	92.1	90.1	90.7	89.4	94.1	89.7	92	91.4	97.5	96.5	96.8	90	88.6
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.166	0.265	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.13	2.5	2.49	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

40ATP14	40ATP14	40ATP14	40ATP15	40ATP15	40ATP15	40ATP01V	40ATP02V	40ATP15	40ATP03V	40ATP04V	40ATP05V	40ATP06V	40ATP08V	40ATP10V	40ATP11V	40ATP12V	40ATP14V	40ATP15V	40AD11	40AD11	40AD12	40AD12	40AD15	40AD15	40AD15	40AD21	40AD21	40AD21	40AD21	40AD22	40AD22	40AD22	40AD22
1.001.00	1.701.70	2.502.50	0.500.50	0.700.70	1.001.00	3.603.60	4.004.00	1.201.20	2.602.60	2.102.10	0.800.80	1.201.20	3.003.00	0.500.50	2.002.00	1.101.10	3.003.00	1.301.30	0.500.50	2.602.60	0.500.50	1.001.00	0.800.80	1.301.30	2.002.00	0.500.50	1.001.00	2.002.00	3.003.00	0.400.40	0.900.90	2.002.00	2.502.50
24/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	23/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2018	24/05/2019	28/06/2018	28/06/2018	19/06/2018	19/06/2018	19/06/2018	19/06/2018	19/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018
18.4	27.1	1.43	2.57	2.93	3.52	29.3	2.34	1.76	3.36	61	11.3	1.54	4.5	2.24	6.83	1.11	2.12	8.98	2.48	1.55	1.47	1.47	2.12	5.1	7.62	8.46	1.54	3.74	1.78	4.71	7.46	1.84	4.09
20.2	25.8	8.01	9.84	10.4	9.37	11.1	5.56	10.5	9.33	5.02	20.7	12.1	10.2	12.7	14.4	6.34	7.57	13.6	8.79	17.3	7.04	7.35	276	182	6.87	2.68	11.8	8.58	36.2	24	18.2	22.6	9.27
0.586	0.543	1.77	1.32	0.456	0.381	0.0557	0.744	0.02	0.271	0.119	0.981	0.171	0.153	0.221	0.423	0.125	0.217	0.642	0.634	1.7	0.884	0.477	1.2	1.17	1.03	0.519	0.27	0.502	1.25	1.98	3.75	1.48	0.622
53.5	18.8	34.7	37.2	12.4	35.1	17.2	20.4	34.6	34.7	7.12	32.5	30	36.8	35.8	35.5	27.5	32.6	26.6	123	166	47.2	47.7	337	190	9	5.74	46.8	18.1	9	9.02	19.6	9	18.3
49.1	43.1	72.9	34	23.2	29.2	20.7	17.4	14	21.6	14.8	30.3	13.1	27.3	20.3	25.5	10.8	15.4	24	15.1	54.4	13.4	10.1	315	243	83.3	8.39	14	23.1	17.9	40.4	29	22.8	16.6
52.6	60.9	126	109	31.6	23.1	15.4	28.9	25.3	24.6	4.2	61.1	26.5	23.8	23.4	38.1	23.4	27.8	103	52.8	157	75.6	24.8	151	99.2	75.6	46.1	15.5	33.6	60.7	187	78.5	75.8	59
0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.148	0.147	1.4	0.14	1.4	0.14	1.4	1.4	2.57	1.4	1.4
24.4	33.4	12.6	17.3	16.2	33	28.8	11.9	36.1	34.7	13.7	28	37.2	37	36.8	28.2	32.7	37.3	15.3	12.9	17.6	10.2	5.86	12	13.1	18.5	6.2	12.5	15.9	43.3	48.2	34	27.9	13.6
2.6	3.19	2.55	1.99	1.14	1	1.97	3.34	1	1.02	2.27	1	1.06	1.14	1.11	1.28	1	1	1.83	3.28	3.88	1.72	5.89	3.54	2.73	10	2.71	10	3.58	10	10	10	10	10
74.9	35.6	57.4	44.7	22.9	51.9	32.9	46.6	54.4	56.6	13.9	51	59.8	59.9	61.1	55.1	51.8	55.4	60.5	307	111	44.5	81.5	110	81.3	43.6	32.8	132	63.3	189	145	56.5	116	63.9
212	213	622	425	96.1	143	81.6	89.5	101	108	44.9	192	120	113	115	148	110	121	277	121	291	141	1950	3690	1700	304	193	45.6	80.6	136	435	229	336	139
0.04	0.04	0.04	0.04	0.04	0.04	0.0442	0.04	0.04	0.01	0.04	0.0524	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.104	0.04	0.04	0.01	0.04	0.0823	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.121	0.04	0.04	0.04	0.0512	0.04
0.04	0.04	0.04	0.04	0.0631	0.04	0.122	0.04	0.04	0.01	0.04	0.146	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0559	0.04	0.04	0.04	0.403	0.04	0.04	0.04	0.139	0.04
0.04	0.04	0.04	0.04	0.337	0.04	0.0884	0.04	0.04	0.01	0.04	0.198	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0724	0.04	0.04	0.04	2.84	0.04	0.04	0.04	0.168	0.04
1.68	0.1	0.1	0.455	26.2	0.1	0.1	0.1	0.1	0.1	2.56	3.68	1.45	0.1	8.02	0.1	0.1	0.1	1.43	0.351	0.1	0.1	1.18	0.363	12.9	2.34	1.68	1.15	92.4	0.1	3.5	3.42	4.69	19.7
3.59	0.1	4.48	7.92	73.8	0.1	0.1	0.1	0.1	0.1	8.12	0.1	4.7	0.1	5.29	0.1	0.1	0.1	16.1	4.24	0.807	1.15	9.11	6.64	31	5.99	15.2	6.31	94.8	0.1	15	10.2	13.8	34.4
23	0.1	22.1	47.2	391	0.1	0.1	0.1	0.1	0.1	467	6.89	41.6	2.86	7.28	3.43	0.1	0.1	54.1	12.2	10.3	8.85	54.6	57.3	107	16.3	261	18.1	38.3	7.02	57.5	33.2	20.3	133
9.09	0.1	7.75	16.7	149	0.1	0.1	0.1	0.1	0.1	3.36	0.1	13.9	0.1	0.79	0.1	0.1	0.1	12.8	3.62	2	0.1	18.8	22.8	33.5	3.99	205	5.45	11	1	18.6	8.91	2.66	72.9
0.04	0.04	0.04	0.04	0.04	0.04	0.51	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0516	0.04	0.04	0.04	0.04	0.04	0.04	0.0542	0.04	0.129
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.0492	0.04	0.231	0.04	0.04	0.01	0.04	0.0972	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0516	0.04	0.04	0.04	0.269	0.04	0.04	0.04	0.0952	0.04
0.04	0.04	0.04	0.04	0.224	0.04	0.0598	0.04	0.04	0.01	0.04	0.133	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0483	0.04	0.04	0.04	1.89	0.04	0.04	0.04	0.112	0.04
1.53	1.9	1.17	0.937	5.61	0.1	0.1	1.59	0.1	0.1	2.37	1.97	1.3	0.1	0.1	0.1	0.1	0.1	5.06	0.712	0.1	0.552	0.908	0.812	4.34	0.1	1.86	0.256	11.2	0.1	0.1	1.25	0.1	4.21
4.37	5.06	2.26	4.81	42.3	0.531	3.34	7.59	0.1	0.1	12.9	4.5	3.67	0.1	0.1	1.02	0.1	0.771	44.1	5.3	2.48	3.03	3.91	4.73	15	4.11	6.56	3.3	21.3	0.362	3.86	4.51	4.14	22.7
36.6	19.3	14.9	37.8	312	13.7	146	6.57	0.1	3.89	2870	94.3	25.4	6.58	10.7	29	2.19	7.53	103	22.1	14	14.2	32	46.7	51.1	34.2	239	16.9	25.6	5.76	29.5	18.1	9.19	167
17.6	9.74	6.43	20.1	137	1.44	10.6	0.1	0.1	0.1	79.3	13.3	14.2	1.08	5.84	2.77	0.1	1.51	27.3	11.7	6.2	7.64	20.5	37.4	24.1	30.6	272	8.55	13.8	1.03	17	7.85	1.88	117
7.71	3.67	2.5	8.64	51.4	0.273	1.05	0.1	0.1	0.1	12.2	4.05	5.67	0.1	2.09	0.1	0.1	0.1	8.94	5.33	2.27	3.2	8.96	15.7	9.25	12.8	120	3.28	6.29	0.1	6.52	3.05	0.1	49.7
12	17.4	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	279	60	29.4	26.3	13.8	12	12	12	120	12	12	12	17.3	12	12	60
11.1	13.8	24.7	113	76.5	8	8	37.8	8	8	8	8	54.1	8	8	8	8	8	41.6	40	8	8.75	11.7	8	8	8	80	8	8	8	8	21.1	8	40
34	75.6	31.3	113	65	16	16	103	16	16	16	16	16	16	16	16	16	16	663	143	34.2	54.5	37.3	22.2	22.2	16	160	35.3	16	16	30	19.4	16	80
135	294	152	132	122	14	14	98.5	14	37.6	14	98.8	45.1	14	14	35.7	14	14	1560	320	198	166	197	66	90.5	37	140	131	45.6	14	106	38.9	14	70
111	189	122	101	99.6	15	15	73.7	15	36.1	15	96.8	50.4	15	15	32.9	15	15	1200	247	140	117	215	65.5	92.9	39.4	150	112	43.6	15	119	38.7	15	75
169	365	188	157	190	15	15	120	15	41.3	15	161	75.9	15	15	77.5	15	15	2050	421	275	223	381	124	114	54.2	169	156	67.9	22.7	141	60.8	24.2	75
57.2	114	66.7	57.1	56	14	14	40.5	14	19.8	14	55.8	24.7	14	14	14	14	14	774	221	89.7	78.1	125	45.1	46	22.6	140	66.8	24	14	69.9	17.7	14	70
79.8	113	99.9	96.1	90.3	24	24	61.1	24	24	24	72.7	41.8	24	24	24	24	24	884	189	98.7	105	198	62.9	84.9	50.2	0.24	87.1	32.2	24	162	43.1	24	120
165	292	163	152	117	10	10	105	10	29	10	122	50.9	10	10	40.2	10	10	1500	343	202	171	193	82.7	97.3	37.5	103	127	44.6	15.5	113	49.5	17.5	50
0.023	49.2	0.023	0.023	32.3	0.023	0.023	0.023	0.023	0.023	191	0.023	0.023	0.023	0.023	0.023	0.023	0.023	240	0.115	31.5	29.8	46	0.023	0.023	0.023	0.23	0.023	0.023	0.023	26.6	0.023	0.023	0.115
80.6	103	102	87.7	86.3	0.018	0.018	56.2	0.018	0.018	260	75.3	38.3	0.018	0.018	0.018	0.018	0.018	852	171	111	102	142	41	96.5	40.5	182	103	31.5	0.018	166	34.4	0.018	90
276	478	306	356	265	0.017	0.017	285	0.017	46.6	0.017	247	63.6	0.017	0.017	81.2	0.017	0.017	3030	677	374	425	363	131	172	66.8	181	252	67	23	175	89	33	0.085
43.7	67.2	25.4	60.8	92.2	10	10	36	10	10	10	10	21.4	10	10	10	10	10	190	50	13.9	23.1	10	10	12.1	10.5	0.1	14.7	10	10	10	22.6	10	50
52.2	103	50.9	52.2	60.6	9	41.4	39.9	9	9	9	9	42.9	9	9	9	9	9	467	103	26.7	78.4	55.4	62.3	113	16.2	90	39	21.1	32	55.9	95.5	94.2	163
178	328	218	974	290	15	15	345	15	15	15	106	60.1	15	15	41.6	15	15	1610	344	170	241	155	81.2	98.6	73.3	150	135	48	34.4	118	166	44.2	75
																		2.41	0.541	0.228	0.282	0.35	0.131	0.179	0.0713	0.179	0.19	0.0578	0.0236	0.166	0.0728	0.0324	0.075
1.64	3.03	1.82	2.74	1.87	0.118	0.118	1.62	0.118	0.254	0.45	1.23	0.632	0.118	0.118	0.372	0.118	0.118	17.8	3.72	2.02	2.13	2.48	0.915	1.22	0.52	1.18	1.45	0.483	0.151	1.46	0.77	0.245	0.59
86.5	89.7	96.6	98.8	98.5	90.7	104	99.5	103	98.9	98.4	95.6	90.7	91.9	86.4	92.9	91.9	83.3	106	104	91.9	92.8	103	99.9	93.5	88.4	82	85.5	98.5	91.4	87.2	83.6	85.9	98.5
81.3	90	94.7	94.6	96.2	88.4	102	94.5	98.1	98.6	95.1	97.4	89.6	92	86	93.1	94.8	85.2	111	106	89.7	86.2	111	96.3	98.7	92.4	83.5	88.5	94	90.6	92.8	83.8	89.9	95.5
84.1	91	96	96.2	98.9	89.5	103	94.3	96.6	102	94.5	101	98	90.6	84.9	94.9	97.6	86.5	113	114	88.4	90.8	121	99.7	97.1	98.4	86.5	91.5	91.6	91.3	95.2	83.5	90.6	88.4
77.9	91.1	98.5	98	98.1	88.4	95.2	92.5	88.5	96.9	99.5	99.1	102	90.5	82.6	96.2	97.7	86.9	87	87.3	84	80.1	101	81.7	78.6	79	71.8	76.5	94.4	78.1	71.8	62.8	71.7	99.4
78.2	84.8	99.4	102	98.7	82.7	87.5	94.4	86.4	91.7	94.5	94.2	102	91.2	88.3	96.2	104	88.1	84.4	85.4	82.3	79.6	102	78.8	76.7	78.3	70	75.3	97	74	70.4	54.4	70.6	99.9
37.4	0.1	34.3	72.3	640	0.1	0.1	0.1	0.1	0.1	481	10.6	61.7	2.86	21.4	3.43	0.1	0.1	84.5	20.4	13.1	10	83.7	87.1	184	28.7	483	31	237	8.03	94.5	55.7	41.5	260
60	36	24.8	63.7	497	15.6	160	15.8	0.1	3.89	2970	114	44.6	7.66	16.5	32.8	2.19	9.81	179	39.8	22.7	25.5	57.3	89.7	94.5	68.9	519	29	71.9	7.15	50.3	31.7	15.2	311
																		264	60.2	35.8	35.5	141	177	279	97.5	1000	60.1	314	15.2	145	87.4	57.3	571
18900	31400	28800	23300	19500	26700	29300	19300	24900	31300	12200	22200	41800	32000	31000	28400	21200	30400	55700	38800	32800	26500	32100	71300	45500	76300	30900	56200	20400	443000	340000	95100	385000	60600
1350	1480	3200	1960	1330	402	451	3600	381	772	274	270	862	215	503	262	670	513	3510	7490	5790	2800	7500	6130	4770	1940	3660	6170	3480	4530	9240	3180	10600	3310
45800	-	187000	-	162000	-	-	-	-	-	-	-	-	-	-	-	-	-	76000	-	65600	101000	-	27900	-	-	-	-	85900	-	113000	-	218000	-
8780	-	25500	-	59300	-	-	-	-	-	-	-	-	-	-	-	-	-	12300	-	8920	12000	-	7930	-	-	-	-	18500	-	13900	-	8150	-
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0113	0.01	0.0111	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.054	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0111	0.01	0.01	0.018	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
0.223	-	0.436	-	0.116	-	-	-	-	-	-	-	-	-	-	-	-	-																
8.37	9.01	11.3	11.3	9.09	6.76	8.23	10.5	7.73	7.37	7.94	7.66	9.8	7.02	7.19	7.09	9.18	7.78																
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																
0.385	-	0.204	-	0.166	-	-	-	-	-	-	-	-	-	-	-	-	-																
1.16	-	0.612	-	0.498	-	-	-	-	-	-	-	-	-	-	-	-	-																
0.24	-	0.563	-	0.22	-	-	-	-	-	-	-	-	-	-	-	-	-																
1	6.12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																
12	12	12	12	25.7	398	424	12	197	405	145	293	256	272	261	218	33.2	151																
0.001	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
04/06/2018	-	04/06/2018	-	04/06/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	14/06/2018	-	14/06/2018	13/06/2018	-	13/06/2018	-	-	-	-	27/06/2018	-	27/06/2018	-	13/06/2018	-
Barbara Urbanek-Walsh	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	-	-	-	-	-	-	-	-	-	-	-	-	-	Andrzej Ferfecki	-	Andrzej Ferfecki	James Richards	-	James Richards	-	-	-	-	James Richards	-	James Richards	-	Andrzej Ferfecki	-
0.001	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
None	-	None	-	None	-	-	-	-	-	-	-	-	-	-	-	-	-																
N/C	-	N/A	-	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-																
0.001	-	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Detected	-	Not Detected	-	Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-
Not Detected	-	Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-
Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-
Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-
Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-
Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-
Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Detected	-	Not Detected	-
Loose fibres in soil.	-	soil containing material typical of asbestos cement	-	Loose fibres in soil.	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	0	-	0	-	-	-	-	0	-	0	-	0	-
99.9	95.5	102	104	100	102	100	106	109	121	103	94.4	105	108	104	106	107	104	104	101	105	110	106	106	107	112	103	104	103	106	106	105	106	105
94.9	92.3	97.8	97.9	97.6	100	97.2	99.4	99.1	98.3	93.7	93.8	99.3	97.1	98.5	96.6	92.9	98.8	96.9	96.2	98.2	97.4	98.3	97.5	94.2	98.6	98	99	91.2	96	95.9	96.4	97.3	96.6
86.7	79	96.2	90.9	96.7	98.2	85.9	92.1	101	99.4	77.9	74.7	96.1	94.1	95.7	92.8	83.1	92.6	95.4	80	100	92.5	97.4	96	97.5	89.5	99.1	98.8	73.8	87.6	88.6	80.6	93.2	91.7
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.09	0.09	0.09	0.09	0.09	0.333	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.502	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.23	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.42	0.1	0.1
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.934	0.425	0.13	0.13	0.13	0.13	0.13	0.161	0.13	0.13	27.7	0.13	0.13
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	4.15	0.4	0.4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

40AD24	40AD24	40AD24	40AD11V	40AD12V	40AD22V	40AD24V	40AE16	40AE16	40AE16	40AE16	40AE25	40AE25	40AE25	40AE25	40AE26	40AE26	40AE27	40AE27	40AE27	40AE16V	40AE25V	40AE26V	40AE27V	40AF10	40AF10	40AF10	40AF10	40AF12	40AF12	40AF12	40AF13	40AF14	40AF14	40AF14	40AF16	40AF16	40AF16	40AF19
0.500.50	1.001.00	2.002.00	0.000.00	1.501.50	3.003.00	2.402.40	0.400.40	1.001.00	1.501.50	2.002.00	0.500.50	1.001.00	1.401.40	2.002.00	0.5	1.5	0.5	1	1.5	2.802.80	2.802.80	2.5	2.3	0.400.40	0.800.80	1.201.20	1.401.40	0.500.50	1.001.00	2.302.30	0.800.80	0.300.30	0.700.70	1.201.20	0.600.60	1.601.60	2.002.00	1.001.00
05/06/2018	05/06/2018	05/06/2018	28/06/2018	19/06/2018	05/06/2018	05/06/2018	20/06/2018	20/06/2018	20/06/2018	20/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	30/05/2018	30/05/2018	30/05/2018	30/05/2018	30/05/2018	20/06/2018	05/06/2018	30/05/2018	30/05/2018	19/06/2018	19/06/2018	19/06/2018	19/06/2018	28/06/2018	28/06/2018	28/06/2018	19/06/2018	19/06/2018	19/06/2018	19/06/2018	20/06/2018	20/06/2018	20/06/2018	03/07/2018
9.36	1.67	8.45	5.4	1.81	1.17	4.43	2.29	5.91	8.1	4.6	6.1	8.15	5.28	2.97	3.59	4.47	3.33	4.6	1.03	1.53	0.965	1.32	2.19	1.47	1.12	1.26	3.55	2.26	14.2	2.91	10.8	17.6	7.34	1.29	3.17	4.1	5.69	2.59
9.5	12.9	18.3	11.2	17.6	15.3	7.55	9.81	10.7	11.8	7.16	6.92	14.8	7.72	4.65	7.84	7.41	8.01	10.4	17.4	12.8	10.3	14.3	9.95	9.83	9.69	6.15	7.04	24.9	14.7	8.66	13.8	10.2	9.09	8.58	9.31	10.5	13	5.47
0.415	0.332	0.21	0.273	6.42	0.0366	1.49	0.376	0.723	0.263	2.53	1.04	1.68	0.404	1.09	2.26	1.49	1.02	0.988	0.323	0.0661	0.208	0.298	0.935	0.269	0.277	0.191	0.2	0.02	0.2	0.679	5.38	6.58	1.13	1.28	0.666	2.95	0.742	0.02
14.4	32.3	38.4	42	31.2	25.4	37.8	17.8	14.8	6.82	472	255	141	8.46	323	281	176	250	61.8	28	30.4	26.6	39.1	23.7	40.9	41.3	20.7	229	66.7	9	16.5	514	415	100	3.59	9.81	13.8	13.1	81.5
28.6	14	28.4	37.4	29.4	11.7	112	19.9	27.8	14.8	19.5	18.5	33	21.8	25.5	27.2	18.7	52	25.7	10.5	14.5	10.5	12.1	15	9.72	15.4	12.4	26.2	12.2	22.1	11.5	14.5	14	25.1	6.84	21.4	24.9	35	1.4
32.5	53.7	44.7	14.4	89.5	28.6	187	26.1	59.1	16.7	124	98.4	284	20.8	63.5	265	217	86.7	93.6	23.3	27.5	28.8	31.7	31.1	22.7	19.9	8	86.2	37	231	60.4	559	512	113	93.5	56.1	154	78.3	6.39
0.14	1.4	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	1.4	0.14	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14
41.8	33.6	26.9	43.5	45.2	37	105	13.9	24.1	16.4	14.5	9.53	17.6	24.8	9.42	19.6	11.1	14.4	16.6	38.5	38.2	27.3	35.3	21.1	12.5	18.4	13.9	17.4	12.4	20.5	13.3	18.6	21.5	20.6	8.85	18.1	29.3	28	32.9
1.94	10	1	2.05	10	1	10	3.95	3.3	1	11.1	10	10	1.13	7.33	10	5.77	6.77	4.28	1	1	1	1.15	10	4.91	4.1	5.11	10	3	10	1.09	10.1	10	2.7	1	1	1.32	1	1.34
40.2	59.7	54.2	62.9	57.4	51.8	92.8	53.9	39.2	15.8	381	233	185	20.8	318	303	279	333	133	53.6	55	52.2	72.9	67.4	112	253	39.5	140	143	84.9	26.6	392	345	101	13.2	24.4	28.7	50.4	184
91.5	129	148	107	403	105	616	103	209	58.9	252	296	681	53	256	640	784	201	313	109	104	105	132	87.9	110	64.5	43.7	207	121	449	229	1730	2130	418	90.9	341	201	416	65.5
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0978	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.049	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0409	0.04	0.04	0.04	0.04	0.04	0.04	0.429	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0663
0.0533	0.04	0.04	0.0887	0.04	0.04	0.04	0.0833	0.04	15.9	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	3.31	0.04	0.04	0.0585	0.04	0.04	0.04	0.158	0.04	0.04	0.04	0.04	0.04	0.062	0.04	0.04	0.0477	0.0413	0.04	0.716
0.287	0.078	0.04	0.0734	0.04	0.04	0.04	0.942	0.04	23	0.0842	0.0464	0.0912	0.04	0.04	0.228	0.04	0.04	0.04	3.58	0.04	0.04	0.14	0.04	0.04	0.0425	0.16	0.04	0.04	0.0441	0.04	0.04	0.122	0.04	0.0516	0.0758	0.0588	0.04	0.762
2.74	6.16	0.441	0.1	0.1	0.1	4.53	92.6	40.1	20.2	3.74	5.37	1.77	6.02	11	5.57	4.44	16.4	21.6	0.1	0.1	0.606	0.791	5.11	1.11	2.9	2.15	4.1	12.2	15.3	1.53	4.12	3.33	0.412	2.58	9.6	3.18	5.53	5.01
7.37	10.9	0.1	0.1	0.1	0.1	20.2	136	68.9	30.4	47.7	24.2	9.4	16.4	29.9	21.2	18	44	47.1	0.1	0.1	1.45	3.02	15.4	2.28	6.34	6.04	29.6	37.9	52.5	4.82	23.7	23.2	3.5	5.22	16.1	6.02	18.5	7.83
19.7	8.96	1.9	0.1	0.1	0.1	113	42.8	48.5	51.2	52.6	84.1	30.7	57	157	473	132	209	235	7.21	0.1	9.2	12.4	49	12	20.5	30	287	78.9	141	27.6	83.7	77.7	18.1	10.9	25.5	10.8	38	8.87
2.75	1.58	5.9	0.1	0.1	0.1	53.7	11.6	11	10.3	12.9	20.8	7.89	9.83	46.5	214	55.7	63	89.8	2.56	0.1	1.47	4.25	15.3	12.7	3.7	10.6	318	23	50.6	11.2	10	8.67	4.5	3.19	6.29	1.65	7.27	1.24
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.184	0.826	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.108	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.052	0.04	0.04	0.0597	0.04	0.04	0.04	0.0655	0.04	13.5	0.04	0.04	0.0424	0.0565	0.04	0.04	0.04	0.04	0.04	2.93	0.04	0.04	0.0505	0.04	0.04	0.04	0.328	0.04	0.04	0.04	0.04	0.04	0.0573	0.04	0.04	0.052	0.066	0.04	6.37
0.192	0.052	0.04	0.049	0.04	0.04	0.04	0.628	0.04	15.3	0.0557	0.04	0.0608	0.04	0.04	0.151	0.04	0.04	0.04	2.39	0.04	0.04	0.0931	0.04	0.04	0.04	0.107	0.04	0.04	0.04	0.04	0.04	0.0807	0.04	0.04	0.0509	0.04	0.04	0.508
2.71	1.24	0.637	0.1	0.1	0.1	1.95	9.17	6.39	6.85	1.8	2.7	1.95	1.42	0.1	3.64	1.65	0.1	1.86	0.1	0.1	0.1	0.1	1.87	1.21	3.01	0.1	3.99	2.87	5.2	1.67	4.78	4.38	1.12	0.752	2.72	1.5	2.05	4.25
3.98	3.49	3.67	0.1	1.13	0.1	10.3	49.8	25.9	33.8	21.4	14.8	7.63	6.04	5.94	15	10.3	5.01	14.9	0.1	0.1	0.1	1.34	6.27	2.72	3.75	0.1	22.1	12.7	19.7	5.19	21.9	20.9	3.31	1.98	5.57	3.87	9.5	6.03
24.4	8.48	68.7	7.17	3.23	0.1	112	35.8	37.4	71.5	138	93.5	24.8	21.4	40	135	80.1	38.1	208	0.884	1.73	3.92	8.67	22.7	13.6	9.37	5.72	598	36.7	57.5	28.1	43.6	37.2	14.2	5.83	12.8	11.8	30.8	4.86
7.14	5.55	9.39	5.01	6.87	0.1	113	18	17.2	32.4	39.8	48.8	7.4	2.84	7.11	77.5	43.4	8.85	94.8	0.1	0.675	1.17	6.1	18	24.2	0.1	0.848	754	21.1	57.8	16.1	8.85	5.53	7.37	1.41	2.81	1.44	17.3	1.28
2.23	2.21	1.32	2.35	3.75	0.1	46.9	7	6.41	7.52	13.8	20.3	2.6	0.283	1.27	30.1	17.6	2.33	38.6	0.1	0.1	0.1	2.76	8.33	12.2	0.1	0.1	324	8.6	28.4	6.78	3.2	2	2.69	0.1	0.1	0.1	7.13	0.1
45.2	18.3	12	12	12	12	60	12	33.1	12	22.5	52.7	41.9	12	45.1	22.2	60	28.7	28	12	12	12	12	12	12	12	12	60	12	12	12	23.1	14.3	12	12	12	12	24	12
16.6	8	31.6	8	8	8	40	18.9	28.1	15.3	96.9	49.8	23.1	8	129	178	40	107	25.9	8	8	8	19.9	8	8	8	8	96.8	36.7	796	8	37.5	32.9	8	8	8	8	20.7	49.9
16	16	16	16	16	16	186	16	96.6	16	178	139	89.6	71.7	461	127	80	457	55.6	16	16	16	38.1	16	16	16	19.3	80	28.9	218	25.2	194	161	23.1	16	18.1	16	95	36.5
14	19.9	30.7	14	14	14	271	49.8	226	27	1420	732	241	14	1520	284	405	933	445	14	14	18.5	105	63.9	35.3	38.6	86.7	288	39.5	65.8	36.1	171	173	30.6	14	42	19.7	266	14
15	15	32.4	15	15	15	243	45.5	203	17.9	1880	1100	1950	15	1270	306	439	757	490	15	15	15	101	71.4	28	35.5	79.2	298	30.2	41.7	31.2	79	58.9	15	15	38.7	23.9	208	15
15	24.2	51.9	15	15	15	406	78.8	317	15	2150	1350	2180	18.6	1930	433	499	1090	703	15	15	27.6	133	140	49.3	47.4	148	433	61.6	88.4	66.7	262	190	41.6	15	88.5	35	329	15
14	14	14	14	14	14	172	29.3	121	14	694	477	814	14	835	173	237	399	295	14	14	14	45.8	36.7	20.7	16	56.6	165	22.1	25.8	20.3	88	42.9	17.8	14	23.9	14	125	14
24	24	24	24	24	24	284	55.1	122	24	1480	1200	1490	24	1040	260	376	456	364	24	24	24	72.9	73.7	33.1	31.3	84.2	256	32	41.4	31.9	60.3	43.3	24	24	47.4	25.3	149	24
10	16.8	36.3	10	10	10	261	56	181	35.9	1380	793	488	21.2	1380	320	468	951	534	10	10	22.3	111	82.8	41.8	48.1	112	336	64.5	97.4	61.1	279	184	40.8	10	47	27.8	253	10
0.023	0.023	0.023	0.023	0.023	0.023	0.115	0.023	39.5	0.023	282	191	257	0.023	225	57.1	0.115	108	77.3	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.115	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.046	0.023
0.018	0.018	41.1	0.018	0.018	0.018	250	45.5	118	0.018	1660	1280	1630	0.018	952	275	326	465	362	0.018	0.018	0.018	64.8	89.2	26	28.9	64.4	214	27.8	28.9	0.018	34.7	0.018	0.018	0.018	51.1	0.018	124	0.018
30.1	46.4	62.2	0.017	0.017	0.017	678	122	390	99.3	2190	1110	376	30.6	3110	640	754	2110	673	0.017	0.017	36.1	219	153	78.5	74	182	473	114	430	99	994	959	105	0.017	86.5	41.6	781	49.3
38	41	10	10	10	10	50	10	50	28.7	48.3	51.9	43	10	87	144	50	131	30.9	10	10	10	21.1	10	10	10	21.1	53.9	33.5	527	10	104	95.1	12.7	10	17.4	10	0.02	59.5
1450	187	9	9	9	9	157	166	551	6970	215	239	958	182	226	203	213	123	87.6	414	9	9	32	34.5	89	53.1	72.9	124	75.1	250	58.6	300	253	40.8	9	105	32.9	72.5	169
55.9	129	37	15	15	15	368	31.7	282	123	768	540	177	75.3	2780	540	353	1330	294	15	15	27.1	139	112	86.6	66.2	159	307	144	1080	152	1200	995	131	27.3	147	101	324	105
0.0299	0.0597	0.0504	0.015	0.015	0.015	0.547	0.107	0.338	0.0677	2.3	1.12	0.608	0.0301	2.88	0.595	0.833	1.9	0.676	0.015	0.015	0.0339	0.206	0.14	0.063	0.0608	0.157	0.389	0.112	0.367	0.0844	0.805	0.81	0.0928	0.015	0.0695	0.0445	0.701	0.0365
1.67	0.542	0.374	0.118	0.118	0.118	3.82	0.806	3.1	7.39	16.8	10.4	11.4	0.43	18.9	4.56	4.91	11.3	5.14	0.414	0.118	0.166	1.31	0.998	0.551	0.5	1.24	3.43	0.822	4.05	0.666	4.64	4.01	0.536	0.118	0.782	0.352	3.45	0.506
91.6	83	100	88.6	89.9	85.2	93.7	94.9	92.4	91	87.8	87.5	32.2	95.1	90.9	88.8	104	89.5	89.1	87.9	78	79.4	81.7	89.8	95.7	89.1	99.6	110	102	98.3	103	98	105	90.2	93	92.7	87.1	90.8	89.3
93.7	87.3	93.3	85.7	90.6	87.9	93.8	89.6	88	95.9	91.7	96.3	31.1	92.8	98.1	92	93.1	84.5	92.6	79.8	78.4	74.5	85	91.2	86.9	87	95	106	100	100	108	102	109	78.1	97.9	100	92.3	86.2	91.1
96.2	93.2	95.9	91.2	95.1	93.3	99.4	86.6	89.3	84.4	98.3	103	29.5	86.9	108	93.6	99.9	95.3	99.1	82	82.9	76.2	87.5	91.1	90.1	85.4	102	100	105	94.9	114	97.2	103	88.9	102	98.3	92	97.6	97.1
77.5	76.3	96.2	79.4	88.5	77.9	87.4	71.8	70	43.6	85.8	83.2	25.3	46.1	108	77.5	95.3	106	109	75.8	72.6	79.5	77	81.5	77.9	78.9	91.8	93.4	87.3	69.8	102	49.1	58.4	70.1	95.2	86.2	76.2	90.1	89.8
73.2	76.2	101	84.2	91.5	76.4	89.4	72.3	68.9	25	85.1	81.8	23.6	26.8	102	74.4	86.9	96.5	102	78.3	70.5	71.7	77	85	77.3	75.2	90.7	91.2	78.3	58.6	92.4	27.8	30.6	57.7	99.6	75.7	74.2	86.6	87.7
32.6	27.6	8.23	0.1	0.1	0.1	191	283	169	112	117	135	49.7	89.3	245	714	210	332	393	9.77	0.1	12.7	20.4	84.9	28.1	33.4	48.9	638	152	259	45.1	122	113	26.5	21.9	57.4	21.7	69.4	22.9
38.2	18.8	82.4	12.2	11.2	0.1	237	113	86.9	145	201	160	41.7	31.7	53	231	135	52	320	0.884	2.41	5.09	16.1	48.9	41.7	16.1	6.57	1380	73.4	140	51.1	79.1	67.9	26	9.97	23.9	18.6	59.6	16.4
71.3	46.5	90.6	12.5	11.2	0.1	428	397	255	324	318	294	91.8	122	298	945	346	384	713	22.9	2.41	17.8	36.9	134	69.8	49.6	56.8	2020	226	399	96.2	201	181	52.6	31.9	81.5	40.4	129	47.8
19700	50300	22700	32600	49300	27900	47100	33700	23300	14500	166000	105000	211000	22100	106000	107000	111000	113000	75000	33600	27900	30300	44100	78800	24500	31800	22100	88100	38900	207000	20000	187000	204000	61600	23600	21700	23900	63300	44900
409	1300	182	547	390	291	3690	3010	3050	499	30900	13400	14500	375	21700	15300	15300	20000	9610	448	351	1660	1540	4250	5060	6500	3940	7300	6170	5310	1360	18100	16900	4490	1200	632	803	2130	3520
145000	-	-	159000	174000	-	118000	-	-	-	-	89100	-	111000	-	-	138000	100000	154000	171000	-	51500	153000	-	67300	77900	-	-	101000	8570	-	-	-	-	-	-	-	-	163000
9440	-	-	17900	29800	-	19300	-	-	-	-	11300	-	24400	-	-	16700	14000	10200	30500	-	8920	74400	-	6450	15100	-	-	9670	3700	-	-	-	-	-	-	-	-	23000
0.0109	0.0113	0.088	0.0113	0.0112	0.179	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0105	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.15
0.0109	0.158	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.023	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0167	0.018	0.01	0.01	0.01	0.01	0.0107
0.015	0.113	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
0.035	0.283	0.088	0.035	0.035	0.19	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.16
-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
14/06/2018	-	-	-	-	-	-	-	-	-	-	27/06/2018	-	28/06/2018	-	-	04/07/2018	03/07/2018	28/06/2018	27/06/2018	-	27/06/2018	28/06/2018	-	28/06/2018	10/07/2018	-	-	-	10/07/2018	-	-	-	-	-	-	-	-	04/07/2018
Andrzej Ferfecki	-	-	-	-	-	-	-	-	-	-	Andrzej Ferfecki	-	Andrzej Ferfecki	-	-	Lucy Caroe	James Richards	Andrzej Ferfecki	Andrzej Ferfecki	-	Lucy Caroe	Marcin Magdziarek	-	Lucy Caroe	Lucy Caroe	-	-	-	Lucy Caroe	-	-	-	-	-	-	-	-	Renata Bozhkov
-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected
Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected
Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected
Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected
Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected
Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected
Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Trace	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected
0	-	-	-	-	-	-	-	-	-	-	0	-	0	-	-	0	0	0	0	-	0	0	-	0	0	-	-	-	0	-	-	-	-	-	-	-	-	0
105	105	109	105	105	108	110	106	103	108	108	109	109	110	105	103	113	112	109	106	106	109	106	101	110	104	104	108	104	113	110	98.3	105	106	112	110	106	106	117
99.3	98.1	98.4	98.2	99.4	100	96.3	98.9	97.7	98.5	98	98.4	97.5	100	98.6	94.1	98.5	98.3	96.3	95.2	90.2	98.5	99.4	95.7	96.3	92.9	95.1	97.7	99.2	94.8	99.8	94.9	101	96	98.3	101	98.4	88.2	97.1
97.2	89.4	97.5	90.8	93	102	92.9	90	96.8	100	97.4	91.6	87.2	92.3	89.6	93.7	87.6	83.7	88.6	85.3	74.7	90.6	94.4	85.5	82.4	102	108	91.1	91.4	110	92.3	110	80.4	102	94.9	83.6	98.1	90.7	84.7
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.572	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.126	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.175	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.212	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.509	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.181	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.23	0.16	0.13	0.928	0.13	0.13	0.13	1.25	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.4	0.572	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.865	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.28	1.87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.12	1.56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.18	1.77	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.74	1.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.23	1.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.5	15.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.6	16.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

40AF19	40AF26	40AF26	40AFG18	40AFG18	40AFG18V	40AF10V	40AF12V	40AF13V	40AF14V	40AF16V	40AF19V	40AG12	40AG15	40AG15	40AG16	40AG16	40AG17	40AG17	40AG19	40AG19	40AG19	40AG22	40AG22	40AG22	40AG22	40AG25	40AG25	40AG25	40AG25	40AG26	40AG27	40AG27	40AG27	40AG15V
2.002.00	0.7	1.3	1.001.00	2.002.00	2.902.90	2.202.20	1.701.70	1.501.50	1.901.90	2.302.30	4.604.60	1.001.00	0.700.70	1.701.70	0.500.50	2.002.00	0.500.50	3.303.30	0.500.50	1.501.50	2.002.00	0.400.40	1.001.00	2.002.00	3.003.00	0.500.50	1.201.20	2.002.00	3.003.00	0.5	0.4	1	2.5	3.203.20
03/07/2018	30/05/2018	30/05/2018	03/07/2018	03/07/2018	03/07/2018	19/06/2018	28/06/2018	19/06/2018	19/06/2018	20/06/2018	03/07/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018	03/07/2018	03/07/2018	03/07/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	05/06/2018	30/05/2018	30/05/2018	30/05/2018	30/05/2018	28/06/2018
2.69	19.1	2.64	9.02	3.72	8.19	12.7	1.42	2.31	1.76	51	3.62	3.03	2.71	7.46	3.65	2.22	1.79	3.34	5.05	1.38	6.05	22.2	4.17	4.05	4.86	48.6	8.33	8.33	1.67	4.67	0.821	11.7	11.2	7.91
1.79	11.5	17.5	14	12.5	14.2	20	15	11.5	12.8	9.93	15.3	7.27	5.48	13	9.92	5.96	6.16	11.5	14	7.79	14.2	15.6	17.5	12.4	4.48	5.59	1.85	6.65	4.15	6.61	0.6	7.45	17.6	18.1
0.199	1.22	0.0848	0.2	0.02	0.732	0.575	0.148	0.198	0.146	0.02	0.2	0.0465	0.0283	0.0736	0.0259	0.182	0.02	0.2	0.2	0.02	1.34	1.39	0.02	1.98	0.553	0.296	0.345	0.315	0.371	1.25	0.0516	3.09	0.415	0.0501
16.4	43	12	28.7	29.5	41.3	37.7	35.3	39.6	35.1	3.77	73.1	10.3	6.13	4.54	7.94	4.66	4.27	9	9	1.23	9	9	10.5	9	41.2	17.9	92	12.6	259	77.3	29.4	6.84	36.4	35.6
6.1	23.9	24.3	30.8	13.3	34.7	29.6	13.7	14.1	16	11.7	34.4	22.6	10.4	22.6	22.5	17	16.4	19.4	28.1	20.1	17.7	18.2	32.9	46	15.4	31.4	9.14	25.2	9.65	42.9	1.4	15.8	28.7	28.2
12.9	131	23	48.8	26.4	54.3	50.9	25.9	31.4	26.7	8.28	54.5	19.5	15.1	24	33.1	17.7	14.7	31.1	185	22.9	47.8	35.3	22.9	92.5	54.9	39.8	16.8	31.1	23.2	118	0.7	354	43	37.6
0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	1.4	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
4.35	13.4	41.5	37.8	34.4	34.7	29.3	41.9	37.7	43	23	22.7	23.8	11.6	18.2	28.5	14.5	13.8	16.7	33.9	24.3	34	34.3	46.9	20.5	10.9	27.1	6.33	23.5	5.74	16.1	0.986	10.3	28	29.5
4.84	4.16	1	10	1	1.85	1	1	1.54	1	1.56	10	1	1	1	1	1	1	31.7	10	7.85	10	10	1.09	10	3.46	1.59	6.91	1.8	11.4	3.39	2.75	2.02	1	1
64.7	275	35.2	108	50.3	61.3	63.4	61.5	68.3	62.3	21.1	74.7	20.4	15.9	16.3	27.5	13.7	19	79.3	55.5	57.7	112	104	45	35.3	43	98.2	125	37.2	1560	106	29.6	39.7	57.9	55.1
84.8	285	101	176	90.9	188	166	118	105	122	35.7	208	73.7	59.4	77	93.9	49.4	39.9	71.4	399	66.7	171	114	62.9	355	163	66.4	74.7	100	71.4	499	38.9	1730	151	132
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.0504	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.0638	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.226	0.04	0.04	0.04	0.04	0.176	0.04	0.04	0.04	0.04	0.04
0.736	4.6	0.1	2.01	0.1	0.1	0.29	0.1	0.1	0.1	1.17	5.2	9.72	0.875	2.48	0.1	0.1	0.1	0.393	0.363	0.366	0.154	0.926	2.64	13.5	0.561	2.33	2.6	2.39	40.2	1.66	0.25	3	1.04	0.1
5.52	24.6	0.893	8.93	1.58	0.1	1.01	0.1	0.1	0.1	4.29	29.8	68.4	3.53	4.18	0.843	3.86	9.7	3.47	3.3	4.66	2.7	4.26	17.6	14.7	8.48	9.7	13.9	6.2	59.7	10.7	2.8	13.6	1.54	0.1
66.7	124	15.1	79.2	1.81	6.17	16.7	0.1	0.1	0.1	20	217	92.6	18.1	11.8	7.45	3.54	5.58	9.4	24.3	13.6	19.4	15.4	127	156	46.8	61.3	60.8	21.4	62.1	86.8	91.6	115	12.7	4.84
35.9	38.9	2.02	14	0.1	0.1	0.1	0.1	0.1	0.1	0.456	33.3	3.05	3.37	2.09	1.44	0.584	0.1	0.82	3.91	1.78	2.48	2.23	49	41.1	6.79	20.9	13.9	7.01	26.9	37.3	147	56.9	0.385	0.1
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.0467	0.04	0.04	0.04	0.057	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.15	0.04	0.04	0.04	0.04	0.118	0.04	0.04	0.04	0.04	0.04
0.1	1.57	0.713	2.23	0.1	0.16	0.1	0.1	0.1	0.211	1.72	3.79	0.717	0.561	1.87	0.1	0.487	0.645	0.124	0.588	0.1	0.507	1.42	0.1	3.86	1.61	0.875	1.09	0.1	7.57	0.63	0.1	0.1	3.78	0.175
3.82	11.3	1.8	7.62	0.1	1.2	1.22	0.652	0.1	0.469	6.55	17.5	6.88	4.72	5.29	0.1	1.74	2.12	0.988	4.02	0.915	3.32	11.8	3.49	6.46	9.06	3.87	4.77	0.1	26.4	4.05	1.77	3.73	2.74	0.724
64.2	87.1	7.6	44.4	7.87	47.4	117	2.14	1.45	3.89	162	81.4	19.2	15.4	10.1	0.1	4.86	6.09	4.43	24.5	5.37	14.1	23.3	17.2	41.4	38.4	26.7	26.7	0.978	55.5	46	84.9	66.6	84.9	40.5
65.1	42	1.72	18.3	1.26	6.57	12.5	0.534	0.1	5.09	14.6	27.8	0.777	0.867	1.13	0.1	5.99	5.47	0.754	10.4	0.698	4.99	7.21	14.7	16.5	20.3	13.9	10.9	0.1	35.8	49	232	81.9	8.52	5.36
28.4	16	0.1	6.84	0.1	1.68	3.58	0.1	0.1	2.89	3.69	11	0.1	0.1	0.1	0.1	3.23	2.91	0.1	4.06	0.1	1.85	2.9	6.61	4.27	8.11	5.29	3.9	0.1	15.1	23.3	120	39.6	2.48	1.34
32	13.9	12	12	12	12	12	12	12	12	12	16.8	12	12	12	12	12	12	12	15.1	12	12	12	12	12	31.3	12	12	12	12	60	12	60	12	12
39.8	32.7	8	8	8	8	8	8	8	8	8	21.1	8	25.7	8	8	8	8	8	8	8	18.2	9.15	8	8	30.8	8	30	12.4	21.4	40	8	40	596	8
73.9	56.4	16	38.5	16	16	16	16	16	16	16	82.8	16	16	30.8	16	16	16	16	32.5	16	16	60.1	16	16	68.6	16	32.7	16	32	80	16	80	31.5	16
682	474	18.8	90.4	14	14	45.5	14	14	14	14	134	18.6	17.4	41.6	14	14	14	18.5	124	26.1	37.7	64.2	14	24	225	27.2	137	34.3	198	294	42.2	70	28.2	14
976	551	15	94	15	15	48.1	15	15	15	15	97.2	15	15	15	15	15	15	15	107	25.5	26.4	35.7	15	17.3	252	22.4	151	30.3	250	291	34.4	75	29	15
1230	1260	26.5	142	15	36.8	105	15	15	15	15	229	36.8	21.4	53.2	22.2	17.1	15	38.1	255	39.6	44.6	63.6	15	38	310	48.5	234	57.9	343	462	50.8	155	43.8	34.5
427	414	14	58	14	14	28	14	14	14	14	79.9	14	14	18.2	14	14	14	14	73	18.7	19	16.8	14	14	135	14	83.5	20.3	135	164	19.9	70	14	14
759	685	24	84.2	24	24	51	24	24	24	24	98.1	24	24	24	24	24	24	24	117	26.9	28.3	28.4	24	24	205	24	122	27.5	207	284	31.9	120	24	24
754	675	23.2	114	10	26.9	75.7	10	10	10	10	192	46.6	34.3	88.7	24.2	19.8	15.4	29.8	161	37.9	41.1	73.8	10	31.2	256	56.4	188	56.9	241	355	39.1	104	44.3	21.9
131	87	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	25.1	0.023	0.023	0.023	0.023	0.023	0.023	0.023	29	0.023	0.023	0.023	0.023	0.023	45	0.023	0.023	0.023	36.2	0.115	0.023	0.115	0.023	0.023
732	602	0.018	61.5	0.018	0.018	64.5	0.018	0.018	0.018	0.018	73.3	0.018	0.018	0.018	0.018	0.018	0.018	21.9	131	0.018	24.9	22.3	0.018	0.018	179	0.018	139	26.2	171	279	23.7	90	0.018	0.018
1050	802	47.5	210	0.017	43.4	112	0.017	0.017	0.017	0.017	368	40.2	65	144	27.2	24.6	24.6	38.7	202	53.2	56.3	99.4	0.017	63.3	407	50.8	198	55.3	322	539	69.1	123	108	39.1
20.4	27.9	10	11.9	10	10	10	10	10	10	10	59.5	10	12.5	18.1	10	10	10	10	12	10	15.2	62.5	10	10	41.4	16.3	33.3	14.5	27.2	50	10	50	376	10
34.4	76.9	11.8	40.6	9	9	17	9	9	9	9	131	34.1	14.4	117	36.6	14.7	9	11.7	49.4	20.9	39.9	40.9	12.5	16.3	74.7	30.4	57.9	42.8	34.6	45	9	45	308	9
356	330	21.3	158	15	15	71.2	15	15	15	15	424	99.8	67.5	364	52.4	37.3	21.2	52.4	144	69.9	62.6	347	39.5	67.3	274	87.7	191	73.3	199	267	27.6	75	237	28.2
1.07	0.811	0.0455	0.197	0.015	0.0348	0.0862	0.015	0.015	0.015	0.015	0.307	0.0375	0.054	0.0945	0.0208	0.0197	0.0213	0.0332	0.182	0.0453	0.0626	0.105	0.015	0.051	0.375	0.0474	0.204	0.048	0.319	0.494	0.0622	0.112	0.0788	0.0305
8.37	6.9	0.195	1.3	0.118	0.142	0.704	0.118	0.118	0.118	0.118	2.34	0.314	0.312	0.97	0.183	0.133	0.118	0.244	1.63	0.364	0.477	1.03	0.118	0.308	2.91	0.387	1.8	0.5	2.54	3.43	0.401	0.59	1.88	0.154
89.9	85.5	88.7	94.1	86.4	94.8	102	96.9	81.6	82.7	96.5	103	87.3	96.9	101	103	105	103	98.9	99.3	105	98.9	89.8	88.1	82.7	91.6	68.3	94.9	72.4	90.2	104	90.7	88.9	102	95.7
93.1	88.3	86.4	92	84.1	97.7	95.2	100	89.2	87.2	94.5	106	84.3	82.3	104	96.1	89	97.7	95.6	94.7	104	92.8	89.3	89	83.4	94.4	72.5	95.1	77.7	89.2	91.6	92.8	85.6	97	89.8
98.6	94.6	95.3	101	97.7	100	99.3	103	96.9	92.4	107	102	83.7	93.7	106	98.2	101	93.9	94.9	94.3	109	90.1	84.3	87.9	84.8	94.9	60.9	96.6	74.1	92.8	99.4	96.7	85.8	93.8	91.9
113	84.8	92.7	90.3	93.4	94.4	102	104	95.7	90.9	103	78.1	74.8	83.6	78.6	88.5	83.8	83.9	84.9	82.3	102	88.6	50.6	71	77.4	80.1	45.1	95.9	70	93.7	97	101	61.4	92.8	90
107	75	93.2	81.9	94.1	100	106	99.3	93.8	94.3	102	73.1	66	86.5	73	81.4	87.7	88.5	82.1	74.2	95.2	81.3	38.4	65.9	72.4	75.1	32.2	91.4	66	87	83	97.6	57.2	92.6	93.3
109	192	18	104	3.39	6.17	18	0.1	0.1	0.1	25.9	286	174	25.9	20.5	9.74	7.99	15.3	14.1	31.9	20.5	24.7	22.8	196	225	62.6	94.2	91.3	37	189	136	242	188	15.7	4.84
133	142	11.8	72.5	9.14	55.3	131	3.32	1.45	9.66	185	131	27.5	21.5	18.4	0.1	13.1	14.3	6.29	39.4	6.98	22.9	43.7	35.4	68.2	69.3	45.3	43.5	0.978	125	99.7	318	152	100	46.7
242	334	29.9	177	12.5	61.5	149	3.32	1.45	9.66	211	416	201	47.4	38.9	9.74	21.1	29.6	20.4	71.3	27.4	47.7	66.5	232	294	132	140	135	38.1	314	236	560	340	116	51.6
28600	243000	30600	123000	29300	25900	23500	39100	26000	38900	23500	106000	22200	16500	19500	22100	23300	30500	78700	172000	53700	374000	298000	41500	43100	24400	22900	38000	22400	88100	53700	9440	52900	23300	25700
5250	14300	580	3810	305	498	313	492	225	637	336	6600	412	1120	771	994	500	667	6600	3680	1530	3750	2430	622	2490	4560	1220	11800	1680	32800	5360	3950	2530	239	161
-	178000	64000	-	-	31300	-	118000	-	-	18400	-	82400	163000	-	176000	-	257000	-	207000	-	-	-	-	-	-	-	-	136000	-	149000	136000	-	96400	115000
-	18200	12500	-	-	4230	-	14700	-	-	2380	-	15700	30200	-	27400	-	20100	-	27900	-	-	-	-	-	-	-	-	15900	-	10900	14800	-	7360	17100
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0114	0.01
0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	03/07/2018	04/07/2018	-	-	04/07/2018	-	10/07/2018	-	-	13/06/2018	-	13/06/2018	18/06/2018	-	18/06/2018	-	-	-	-	-	-	-	-	-	-	-	-	02/07/2018	-	29/06/2018	04/07/2018	-	10/07/2018	10/07/2018
-	Renata Bozhkov	Barbara Urbanek-Walsh	-	-	Marcin Magdziarek	-	Andrzej Ferfecki	-	-	Andrzej Ferfecki	-	Andrzej Ferfecki	James Richards	-	James Richards	-	-	-	-	-	-	-	-	-	-	-	-	Lucy Caroe	-	Lucy Caroe	Renata Bozhkov	-	Andrzej Ferfecki	Andrzej Ferfecki
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected
-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Detected	Not Detected
-	0	0	-	-	0	-	0	-	-	0	-	0	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	Soil containing material typical of AIB	-	0	0	-	0	0
101	115	105	112	106	118	105	105	108	105	104	108	105	110	108	108	110	109	106	109	115	118	116	116	112	102	104	109	111	111	110	114	115	107	104
96.7	98.6	97.8	100	99.2	98	94.4	94.9	94.3	98.7	97.2	98.2	97.8	96.1	92.7	95.5	92	99.7	97.8	99.6	98.5	96	96.3	98.7	92.9	97.9	96.8	98.6	98.7	97.9	98.2	97	98.5	94.2	94.2
92.2	82	93.4	100	99.2	84.6	110	106	108	96.9	90	93.7	95.3	90.4	74	89.9	75.2	95.5	93.1	94.1	92.3	83.7	94	87.3	104	96.4	96.7	102	90.6	92.3	86.1	82.5	90.2	103	104
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.9	2.33	0.71	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.64	7.21	8.28	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.49	9.38	8.93	-	-	-	-

<u>Glan Lyn Commercial Soils Data</u>

40AG16V	40AG17V	40AG19V	40AG22V	40AG25V	40AG27V	40AH10	40AH10	40AH10	40AH14	40AH14	40AH16	40AH19	40AH19	40AH19	40AH21	40AH26	40AH26	40AH27	40AH27	40AH10V	40AH14V	40AH16V	40AH19V	40AH21V	40AI11	40AI11	40AI11	40AI13	40AI13	40AI13	40AI15	40AI15	40AI16	40AI17	40AI18
0.900.90	1.001.00	3.503.50	3.203.20	3.103.10	3.3	0.400.40	1.001.00	2.002.00	0.500.50	1.001.00	0.500.50	0.500.50	1.001.00	1.601.60	1.001.00	0.5	1.2	0.5	1	3.303.30	1.301.30	1.001.00	3.803.80	1.401.40	0.500.50	1.201.20	1.801.80	0.500.50	1.001.00	1.501.50	1.501.50	2.702.70	0.500.50	1.001.00	2.002.00
28/06/2018	28/06/2018	03/07/2018	05/06/2018	05/06/2018	30/05/2018	22/06/2018	22/06/2018	22/06/2018	28/06/2018	28/06/2018	03/07/2018	03/07/2018	03/07/2018	03/07/2018	07/06/2018	30/05/2018	30/05/2018	30/05/2018	30/05/2018	22/06/2018	28/06/2018	03/07/2018	03/07/2018	07/06/2018	27/06/2018	27/06/2018	27/06/2018	27/06/2018	27/06/2018	27/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018	28/06/2018
4.03	7.31	4.22	3.52	2.98	2.55	0.683	4.69	7.34	0.679	9.81	4.59	1.22	0.931	9.36	1.76	49.7	3.59	4.64	23.4	5.09	1.29	6.05	3.41	3.45	0.379	1.13	2.05	0.35	0.945	5.41	4.12	2.93	1.74	2.88	0.607
11	16.2	10.6	11	12.8	6	7.58	8.16	17.6	13.1	23.5	15.8	5.39	5.44	10.2	4	6.32	6.56	4.87	14.8	12.7	10	12.4	7.96	7.3	2.4	4.39	7.36	6	4.7	10.8	9.79	9.16	7.24	9.79	7.17
0.02	0.31	0.259	0.382	0.399	5.74	0.802	0.218	1.24	0.101	1.61	0.2	0.02	0.02	0.547	1.2	0.441	0.869	0.706	0.255	0.02	0.02	0.22	0.254	0.12	0.02	0.02	0.2	0.2	0.02	0.146	0.164	0.282	0.0692	0.02	0.02
38.7	32.1	32.2	34.9	32	185	268	41.1	77	5.24	15.1	88.2	26.4	21.3	84.3	197	101	49.6	40.5	31.6	39.4	26.7	34.5	38.5	95.5	4.04	44.4	442	423	118	6.69	11	12.8	6.19	16	0.9
28.2	32.8	23.5	25	16.8	21.7	18.8	14.2	37	14.1	45	57.6	1.4	1.4	25.1	19.9	26.2	18	11.7	28.4	31.8	10.1	31.5	21.2	8.35	14	4.45	14	14	7.01	20.2	14.7	15.8	9	22.6	7.81
23	39	27	37	26.4	58.7	27.4	11.6	360	24.7	631	106	23.2	30.9	50.6	77.9	52.3	85.8	56.4	27.5	22.2	25.6	37.4	23.8	135	0.7	35.7	90.4	13.1	33.7	88.5	30.1	47	9.67	25.2	5.81
0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	14	0.14	0.335	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14
40.9	28.2	36.5	31.6	31.7	16.8	9.45	15.3	29.9	21.7	22.9	42.1	4.34	4.65	24.8	11.3	16.1	13.8	8.93	30.4	42.7	34.3	30.2	41.4	11.2	0.777	3.62	9.12	3.88	3.43	17.1	17	15.1	9.88	19.8	6.83
1	1	1	1.22	1.15	10.5	13.8	4.01	10	1	1	10	5.96	5.71	3.5	6.65	5.26	3.65	2.85	1.71	1	1	1	1.29	2.76	9.41	4.83	10	10	2.42	1	1.3	1.01	1	1.38	4.73
58.1	49.4	50.8	54.5	51.1	283	430	83	90.4	19.4	27.9	95.5	32	23	203	207	157	96.2	57	48.1	57.2	50.4	52.3	57.7	86.1	14.5	49	297	261	81.3	25.9	31.2	54.1	15.2	34.2	21.3
112	136	109	129	132	126	55.5	64.7	2070	97.2	2450	434	282	368	190	209	84.9	343	310	91.6	102	108	137	91.4	989	23.4	214	424	196	332	337	177	267	46	76.1	104
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0416	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.325	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.66	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0723	0.04	0.04	0.04	0.04
0.1	1.14	0.1	0.1	0.19	0.364	0.307	0.102	5.3	0.1	1.71	3.34	0.1	0.297	0.1	2.09	0.1	3.49	2.28	1.99	0.228	0.1	0.1	0.1	1.69	1.7	2.56	15	8	8.45	3.5	9.75	0.67	0.851	2.94	0.633
0.1	1.45	0.1	0.1	0.1	6.04	1.75	0.894	23.3	0.1	10.8	8.8	2.2	0.921	1.06	13.6	5.28	18.8	12.4	4.54	0.131	0.1	0.1	0.1	18.1	7.34	8.19	49.4	30.3	34.9	11.7	30.8	4.02	2.16	8.51	0.951
0.902	9.11	0.1	1.25	2.28	49.4	16.4	9.39	81.3	1.96	75.6	39.5	15.3	9.26	28.6	158	44.2	186	118	58.7	0.915	0.369	7.97	0.1	181	18.8	24.4	247	154	170	46	40.8	24.9	11.5	28.1	5.02
0.1	0.1	0.1	0.1	3.32	24.2	6.86	5.91	21.7	0.1	16.2	4.31	1.47	0.782	3.38	80.2	12.1	81.7	42.9	1.18	0.1	0.1	0.1	0.1	123	6.83	6.6	34.8	17.2	26.1	12.2	7.98	4.97	2.46	6.28	0.1
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.217	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.44	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0482	0.04	0.04	0.04	0.04
0.295	0.1	0.1	0.1	0.1	0.1	0.1	0.208	1.17	0.1	3.19	2.63	0.244	0.174	2	1.53	0.939	1	0.719	1.97	0.1	0.1	0.1	0.1	0.225	0.1	0.1	4.1	1.48	1.92	0.791	1.15	1.13	0.1	0.841	9.51
0.1	1.21	1.26	0.1	0.1	3.67	2.9	1.87	11.1	1.67	9	6.34	1.25	0.652	6.84	7.62	3.67	8.41	4.85	7.84	0.1	0.1	1.75	0.1	7.23	1.26	1.64	13.8	8.15	8.05	6.83	11.9	6.34	1.02	6.16	44.3
9.09	46.3	9.09	0.112	2.58	89.3	31.7	16	40.1	0.1	62.6	36.1	9.62	7.02	63.4	119	24.1	105	46.1	225	1.91	1.51	26.2	3.71	158	9.65	9.57	59.7	43.9	40.1	44.8	32.8	40.1	7.6	46.2	101
3.58	4.73	9.74	0.549	5.57	31	13.1	12.8	14.2	0.1	32.3	10.8	2.96	1.29	17.7	139	11.1	77.6	35.1	33.8	0.1	0.1	9.83	1.01	167	12.4	6.72	19.5	9.85	14.1	18	8.21	18.3	0.737	31	35.7
1.67	0.1	4.87	0.1	2.83	10.1	4.79	5.77	4.78	0.1	12.7	4.03	0.994	0.1	6.81	60	4.27	32.3	15.3	9.55	0.1	0.1	2.89	0.1	73.8	5.96	2.58	7.36	3.56	5.52	6.35	2.56	8.11	0.1	13.5	15.1
12	12	12	12	12	12	12	12	14.7	12	12	12	12	12	67.4	60	12	16.6	12	12	12	12	12	12	12	12	12	12	12	12	16.3	12	12	12	12	12
8	8	8	8	8	47.2	9.44	12.1	8	8	13.5	8	8	8	18.8	122	16.1	14.7	9.02	8	8	8	8	8	8	8	8	8	8	8	39.9	13	8	8	14.6	8
16	16	16	16	16	166	32.6	45.2	57	16	47.2	16	16	16	119	88.7	28.8	41.1	25	16	16	16	16	16	35.4	16	16	16	16	16	84.8	28.9	26.8	16	19.7	16
14	14	14	14	14	1530	428	133	158	14	97.4	73.4	31	16.6	428	380	192	202	145	14	14	14	14	14	181	14	49.9	46.1	33	48.7	795	180	223	26.5	51.6	14
15	15	15	15	15	2090	551	159	135	15	107	78.4	49.3	19.8	367	375	243	266	138	15	15	15	15	15	194	15	41.9	40.8	27.3	39.3	1120	216	281	23.8	60.6	15
15	15	15	15	15	2670	747	262	262	15	249	92.8	53.2	30.3	663	534	305	373	216	39.1	15	15	15	15	335	15	83.3	110	60.9	85.9	1300	340	401	36.7	104	15
14	14	14	14	14	1060	302	80.1	78.5	14	82.1	40.4	27.5	14	206	185	125	139	68.6	14	14	14	14	14	120	14	28.1	33.2	17.8	30.8	517	117	152	14	34.4	14
24	24	24	24	24	1950	501	141	114	24	128	116	56.4	33	270	321	184	232	137	24	24	24	24	24	223	24	46.8	51.6	31.2	41.7	835	175	225	24	61	24
10	10	10	10	10	1460	475	163	218	10	165	90.9	36.5	25.2	442	387	209	253	169	26.7	10	10	10	10	176	10	52.7	79.9	58.1	77.3	741	220	233	27.3	65.7	10
0.023	0.023	0.023	0.023	0.023	357	86.5	0.023	29	0.023	30.9	0.023	0.023	0.023	67.4	0.115	39.4	57.5	31.4	0.023	0.023	0.023	0.023	0.023	59.4	0.023	0.023	0.023	0.023	0.023	193	45	55.8	0.023	0.023	0.023
0.018	0.018	0.018	0.018	0.018	1620	441	160	119	0.018	145	77.9	36.3	0.018	301	331	188	239	128	0.018	0.018	0.018	0.018	0.018	188	0.018	44.7	47	30.2	38.7	688	175	244	21.6	44	0.018
0.017	0.017	0.017	0.017	0.017	2080	575	324	441	0.017	186	107	45.1	32.6	757	677	267	354	236	0.017	0.017	0.017	0.017	0.017	289	0.017	132	113	71.6	115	1030	253	296	50.8	91.8	0.017
10	10	10	10	10	15.1	10	19.7	19.3	10	30.9	10	10	10	75	66.9	19.5	11.8	10	10	10	10	10	10	11.9	10	10	10	10	10	28.2	17.6	11.7	10	15.9	10
9	9	9	9	9	40.8	14.9	83.8	94.5	9	107	26.3	9	9	268	80.4	49.7	37.7	24.5	9	9	9	9	9	53.6	9	9	17.1	9	16.4	42.9	40.3	37.3	29.5	22.7	9
15	15	15	15	15	612	140	301	241	15	255	67.3	26.1	22.4	451	319	155	150	117	15	15	15	15	15	130	15	73.3	66.9	38.4	44.9	346	114	81.1	49.8	89.4	15
0.015	0.015	0.015	0.015	0.015	2.27	0.611	0.275	0.381	0.015	0.164	0.125	0.0525	0.0366	0.592	0.593	0.294	0.406	0.265	0.015	0.015	0.015	0.015	0.015	0.275	0.015	0.11	0.1	0.0658	0.114	1.07	0.257	0.284	0.0425	0.0775	0.015
0.118	0.118	0.118	0.118	0.118	18	4.92	2.16	2.36	0.118	1.81	0.895	0.414	0.216	5.09	4.46	2.31	2.79	1.71	0.118	0.118	0.118	0.118	0.118	2.27	0.118	0.663	0.706	0.434	0.652	8.86	2.19	2.55	0.309	0.753	0.118
91.3	85.1	90.3	91.1	92.3	85.9	93	90.6	88.3	94.8	88	89.6	93.3	89.6	103	90.9	78.8	93.1	99.8	94	91.8	90.3	89.2	92.5	91.2	98.1	98.4	93.6	89.6	96.5	98.6	90.7	90.6	95	98	90.1
93	82.8	86.5	87.9	85.5	86.7	84.8	97	83.5	92.1	87.4	83.1	87.7	86.4	93.2	83.6	75.3	93.1	98	94.2	90.7	87.8	88.3	91.2	96.6	93.6	92.2	81.2	80.2	90.4	94	85.6	76	96	101	85.9
92.8	94.2	85.6	91.7	88.3	96.6	96.1	97.6	84.5	92.8	86.3	81.8	99.4	93.9	96	93.1	58.3	89.1	101	96	90.8	95.1	99.5	88.1	96.1	89.9	85.6	96.4	90.4	92.9	90.5	90.5	87.7	99.8	106	96.1
88.4	88.2	81.6	98	94.8	82.5	90.4	80.9	68.6	89.3	75.3	80.3	94.2	90.5	98.6	89.5	38.7	75.7	91.1	85	86.3	92.9	97.9	79.8	84.7	84.3	82.3	83.3	87.7	79.3	84.5	77.6	85.4	89.9	83.6	92.1
89.6	89.5	91.5	107	89	86.2	89.9	78.4	62.5	94	70.3	79	94.5	91.1	97.8	84.3	30.6	77.8	90	88	89.1	93.5	101	81.8	74.8	91.7	83.3	81.4	89.2	79.7	80.5	75.5	80.1	90.5	81.2	92.2
0.902	11.7	0.1	1.25	5.8	80	25.3	16.3	132	1.96	104	56	18.9	11.3	33	253	61.5	290	176	66.4	1.27	0.369	7.97	0.1	323	34.6	41.7	347	210	240	73.4	89.3	34.6	17	45.9	6.61
13	52.2	20.1	0.661	8.15	124	47.7	30.9	66.6	1.67	107	55.8	14.1	9.14	90	268	39.8	192	86.8	268	1.91	1.51	37.7	4.72	333	23.3	17.9	97.2	63.4	64.2	70.3	54.1	65.9	9.36	84.2	190
13.9	63.9	20.1	1.91	13.9	204	74.6	47.2	198	3.63	211	112	33	20.4	123	521	101	482	262	335	3.18	1.87	45.7	4.72	656	57.9	59.6	444	273	304	144	144	100	26.3	130	197
24400	25600	31400	31100	35300	99800	139000	30900	145000	24400	50900	133000	20500	18400	61200	115000	72900	62300	48300	21600	21500	39900	30100	30100	59200	4700	30400	166000	139000	70000	35400	26500	18400	12000	29100	38500
280	210	580	506	1280	15900	24100	4500	4970	823	971	9040	7170	4310	7260	15800	13500	6790	4670	396	368	737	308	440	8080	5540	6200	21700	17400	8300	1100	2140	1950	414	1720	3790
-	224000	-	-	118000	152000	-	-	-	-	-	-	181000	-	216000	189000	-	184000	73600	58200	117000	216000	74800	-	147000	-	-	42800	-	73100	130000	-	-	-	-	-
-	31100	-	-	9720	23300	-	-	-	-	-	-	26300	-	31800	25200	-	30200	7090	7180	13100	11800	16100	-	25900	-	-	12500	-	8220	19200	-	-	-	-	-
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0163	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.375	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.01	0.01	0.01	0.0119	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.107
0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.114	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.068	0.015	0.015	0.138
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.505	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.245
-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	-	-	-	-	-	-
-	10/07/2018	-	-	-	-	-	-	-	-	-	-	04/07/2018	-	04/07/2018	04/07/2018	-	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	-	10/07/2018	-	-	15/06/2018	-	-	-	-	-	-	-	-
-	Barbara Urbanek-Walsh	-	-	-	-	-	-	-	-	-	-	Barbara Urbanek-Walsh	-	Andrzej Ferfecki	Marcin Magdziarek	-	Marcin Magdziarek	Renata Bozhkov	Renata Bozhkov	Marcin Magdziarek	Marcin Magdziarek	Marcin Magdziarek	-	Lucy Caroe	-	-	James Richards	-	-	-	-	-	-	-	-
-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-
-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	-	-	-	-	-	-
-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
-	Not Detected	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-	-	-	-
-	0	-	-	-	-	-	-	-	-	-	-	0	-	0	0	-	0	0	0	Bundle of fibres in soil	0	0	-	0	-	-	0	-	-	-	-	-	-	-	-
104	108	105	107	111	109	109	111	119	98	110	105	111	110	109	116	110	110	116	117	110	118	116	104	105	105	105	106	115	106	112	114	110	114	107	99.3
94.9	94.8	90.9	98.2	98.3	97.3	97.8	96.1	95.7	94	93.2	96	95.6	99.8	97.4	98	98.7	106	96.9	97.6	99.7	96.9	92.7	95	94.8	95.5	95.5	96.5	94.2	99.8	99.1	94.4	89.5	99.7	96	93.1
110	109	78.4	89.5	86.8	94.8	99.8	90.1	85	109	114	98.7	80.4	91.8	92.9	87	94.4	84.1	79.1	83.3	82	84.1	79.1	109	110	109	91.5	88.1	94	86.1	91.3	89.8	70.9	88.1	98	109
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	2.06	0.13	0.13	0.13	0.13
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
-	-	-	-	-	-	-	6.31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	2.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	5.83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	0.98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	3.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	58.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	59.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

40AI19	40AI19	40AI19	40AI25	40AI25	40AI26	40AI26	40AI27	40AI27	40AI11V	40AI15V	40AI16V	40AI19V	40AI25V	40AI26V	40AJ10	40AJ10	40AJ10	40AJ12	40AJ12	40AJ12	40AJ14	40AJ14	40AJ23	40AJ23	40AJ23	40AJ26	40AJ27	40AJ27	40AJK16	40AJK16V
0.500.50	1.301.30	2.002.00	0.500.50	0.900.90	0.5	1.2	0.7	1.5	4.954.95	0.400.40	1.001.00	4.304.30	1.001.00	2.6	0.500.50	1.001.00	1.501.50	0.500.50	1.001.00	2.002.00	0.500.50	1.001.00	0.700.70	1.601.60	2.002.00	1.5	0.7	1.5	0.500.50	1.501.50
03/07/2018	03/07/2018	03/07/2018	07/06/2018	07/06/2018	30/05/2018	30/05/2018	30/05/2018	30/05/2018	27/06/2018	28/06/2018	28/06/2018	03/07/2018	07/06/2018	30/05/2018	22/06/2018	22/06/2018	22/06/2018	27/06/2018	27/06/2018	27/06/2018	28/06/2018	28/06/2018	07/06/2018	07/06/2018	07/06/2018	30/05/2018	30/05/2018	30/05/2018	28/06/2018	28/06/2018
0.728	0.374	2.84	6.98	4.17	7.24	6.33	4.91	76.5	6.12	1.69	4.22	2.31	6.86	1.93	2.78	2.65	1.83	2.9	3.34	2.19	7.21	1.7	4.14	2.07	1.71	3.9	1.81	4.19	8.07	12.7
3.95	2.85	14.7	7.48	7.3	7.03	8.11	5.46	45.8	14.6	11.5	10.4	9.26	12.8	8.32	5.36	7.15	7.34	16.7	7.95	29.8	8.73	11.7	4.12	9.28	5.18	6.98	6.22	7.36	16.6	12.7
0.02	0.02	1.31	0.444	0.658	0.276	0.887	0.812	0.02	0.02	0.02	0.02	0.286	0.65	0.565	0.431	0.847	0.279	0.509	0.02	0.02	0.0817	0.28	0.205	0.418	0.187	0.805	1.74	0.228	0.362	0.174
2.13	1.52	26.8	11	85.1	119	68.2	79.4	7.25	39.2	35.2	34	34.6	42.5	65.4	51.3	33.8	30.4	100	64.6	24.3	14.2	10.8	6.02	22.7	12.9	138	144	15.3	34.6	38.7
1.4	1.4	38.4	21.2	22.8	24.1	23.7	16.5	13.4	29.9	16.5	16.3	23.7	28.8	20.6	7.74	16.1	33	64.9	26.5	37.4	29.3	33	6.8	24.3	19.5	53.6	16.6	16.3	25.9	26.2
12.2	7.44	378	33.5	59.7	21.2	121	66.6	3.55	26.6	25.9	27.6	25.6	41.6	32.6	23.4	57.6	38.1	74.2	40.9	40.1	21.4	37.3	8.03	25.8	25.3	56.2	115	31.6	35.8	39.1
0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.38	0.14	0.14	0.14
4.29	2	73.3	23.9	18	19.8	15.6	10.4	11.8	33.4	40.4	33.1	36.8	28.5	16.6	8.07	11.8	7.91	18.9	20.4	14.3	23.8	24.5	7.16	24.9	16.7	13.1	14	13.4	34.2	36
6.23	8.26	1.32	1.26	4.74	4.09	3.55	3.24	2.61	1	1	1	1.15	1.37	5.31	5.16	6.03	3.32	1.65	4.43	2.98	10	1.3	1	1.38	1.21	3.94	4.21	2.54	1	1
23.3	15.6	480	34.1	165	88.1	107	111	18.9	60.9	57.7	59.8	54.7	54.1	94.3	119	77.1	63.2	94	116	50.4	30.1	40.2	13.7	40.9	21.7	161	133	38.3	55.1	54.6
153	113	551	86	260	67.3	305	204	38.8	110	109	107	116	148	336	101	206	179	331	202	197	91.8	128	27.7	104	80.7	258	613	126	150	123
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.112	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.0982	0.04	0.04	0.04	0.04	0.248	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.364	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.0805	0.04	0.04	0.04	0.977	0.0836	0.04	0.04	0.04	3.9	0.04	0.0584
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0851	0.524	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.23	0.04	0.04	0.04	2.78	0.602	0.04	0.04	0.106	10.1	0.04	0.0917
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.571	0.139	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.57	0.04	0.0655	0.04	4.61	2.06	0.04	0.04	0.141	16.1	0.04	0.04
0.1	0.507	2.06	1.34	1.45	1.16	1.97	10.3	0.1	0.676	0.308	0.254	0.428	1.04	0.1	2.36	2.45	0.854	0.616	13.3	2.38	4.93	21.2	256	30	0.149	0.816	16	816	0.1	4.47
0.488	2.61	11.8	2.73	14.4	3.35	17.1	27.9	0.1	0.1	0.1	0.479	0.1	2.2	2.67	13	8.73	9.06	7.35	30.8	8.57	9.92	69.7	626	44.4	19.7	12.9	106	1100	0.1	4.91
3.33	9.33	123	12.5	94.7	15.4	160	345	136	2.28	1.18	3.83	0.218	13.6	19.5	35.3	44.1	46.3	65.1	137	89.7	222	253	1800	112	61.6	251	431	3580	7.38	20.9
0.1	0.1	40.3	1.82	64.1	5.84	41.5	237	0.1	0.1	0.1	0.1	0.21	1.33	4.46	6.2	15.6	13.8	24.9	57.1	16.4	20.1	107	830	53.2	8.15	85.3	128	1380	0.1	0.1
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0672	0.35	0.04	0.04	0.0428	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.158	0.04	0.04	0.04	1.85	0.415	0.04	0.04	0.148	6.7	0.04	0.0605
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.381	0.0918	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.381	0.04	0.0429	0.04	3.08	1.37	0.04	0.04	0.095	10.7	0.04	0.04
0.1	0.1	1.3	1.38	0.664	1.74	0.194	13.4	3.2	0.18	0.1	0.383	0.1	0.1	0.542	0.1	1.08	2.2	1.37	3.97	0.732	7.02	9.68	282	14.7	0.1	3.06	16.1	507	0.1	9.01
0.1	0.648	6.55	4.25	10.1	4.65	4.56	34.6	8.17	0.1	0.1	0.901	0.1	0.1	3.33	0.1	5.23	5.71	9.27	15.4	4.2	17.9	63.4	790	34.4	0.1	49.4	75.1	1360	0.1	13.4
1.49	4.25	70.7	13.9	104	12.3	51.8	561	944	10.3	2.98	12.4	4.6	37.3	30.8	3.73	42.5	17.9	103	99.1	31.9	74.4	335	2240	99	9.46	162	226	4070	35.3	74.4
0.1	1.07	44.7	4.48	92.1	5.42	34.6	453	24.4	0.1	0.1	1.14	0.711	10.9	16.5	0.1	24.9	9.66	22.2	72	16.9	17.1	157	880	46.7	8	59.6	79.5	1250	6	16.7
0.1	0.1	18.2	1.4	41.7	2.27	14.2	198	3.51	0.1	0.1	0.1	0.1	3.54	6.17	0.1	9.82	4.22	23.1	30.9	7.56	6.78	67.3	372	19.3	3.39	22.5	33	532	1.62	4.59
12	12	60	12	24	12	12	60	12	12	12	12	12	12	12	12	12	40.9	35.4	12	12	12	60	372	60	12	60	43.9	1040	12	12
8	8	40	8	16	8	12.8	2660	178	8	8	8	8	8	11.9	8.75	12.8	45.2	61.2	60.2	10.6	94.8	40	2420	128	8	124	263	6190	8	54.2
16	16	80	16	56.7	16	21	622	182	16	16	16	16	16	32.6	23.3	36.9	163	224	60.1	20.4	20.6	80	1670	115	16	607	506	3990	16	105
14	14	436	41.3	706	14	97.6	274	216	14	14	14	14	46	253	169	248	616	585	239	75.7	51.3	94.2	2050	161	16.7	2520	986	7500	14	77.9
15	15	480	33.9	904	15	90.1	187	158	15	15	15	15	43.7	285	252	327	593	590	295	85.6	50.1	117	1200	101	15	1650	624	5080	15	107
17.7	15	671	58.7	1120	15	134	406	273	15	15	15	15	96	494	393	498	851	989	491	127	81.5	102	937	103	26.9	2500	890	2800	25.8	226
14	14	255	24	379	14	63.7	126	126	14	14	14	14	28.9	154	134	160	303	300	159	43.3	26.3	70	195	70	14	806	322	862	14	68.5
24	24	458	27.5	754	24	102	158	145	24	24	24	24	24	315	286	313	453	503	303	73	48.4	229	688	120	24	1000	433	2340	24	129
10	14.6	572	53.9	771	10	106	276	256	10	10	10	10	72.7	233	187	253	631	634	292	91.8	83.6	146	4740	264	20	2390	1130	12600	10	163
0.023	0.023	0.115	0.023	125	0.023	0.023	0.115	0.023	0.023	0.023	0.023	0.023	0.023	58.6	49.1	64.2	129	126	59	0.023	0.023	0.115	267	0.115	0.023	256	142	1070	0.023	0.023
0.018	0.018	487	25.9	739	0.018	93.4	118	88	0.018	0.018	0.018	0.018	36.7	224	253	217	392	412	310	65.3	34.9	90	328	90	20.8	1060	387	1060	0.018	103
0.017	0.017	595	64.2	1130	19.8	168	1390	700	0.017	0.017	0.017	0.017	62.6	370	231	360	1200	1130	532	152	104	0.085	1470	184	30.5	5910	1860	6090	28.4	381
10	10	50	14.1	0.02	10	14.2	1700	242	10	10	10	10	10	10	10	10	45.2	73.7	42.2	10	17.6	50	2810	202	10	185	294	6540	10	95.3
9	9	45	12.1	0.018	27.3	24.5	3720	537	9	9	9	9	9	21.4	23	51	89.3	154	74.9	22.3	42.1	45	408	69.5	9	45	215	828	31.5	24.7
15	15	198	69.6	345	27.3	93.7	3760	1030	15	15	15	15	34.3	143	112	171	631	744	237	86	159	75	9540	446	24.7	2440	2400	5300	15	729
0.015	0.0175	0.495	0.0466	1.25	0.015	0.173	1.02	0.628	0.015	0.015	0.015	0.015	0.0484	0.36	0.245	0.371	0.981	0.898	0.496	0.152	0.108	0.184	4.65	0.358	0.0287	4.95	2.15	18.3	0.015	0.256
0.118	0.118	4.65	0.472	8.28	0.118	1.19	16.4	4.76	0.118	0.118	0.118	0.118	0.469	2.96	2.37	3.08	7.16	7.45	3.65	1.01	0.922	0.872	33.7	2.13	0.168	26.4	12.6	81.6	0.118	2.52
92.8	90.1	98.1	85.6	87.9	107	90.8	90.9	92.7	95.7	89.3	84.7	80.2	90.4	90.8	89.9	81.8	105	105	89.2	98.6	99.1	88.5	86.3	92.9	97.7	92.6	91.9	110	85.7	104
91.3	84.2	94	83	91.4	99.8	92	93.5	95.4	98.5	91.5	87	84.5	87.6	84.4	97.6	83.9	99.9	107	85.5	94.6	93.1	85.6	91.9	90.1	91.2	89.5	99.9	115	86.3	102
101	93.8	97.9	79.8	92.9	98.2	92.3	89.3	96	96.1	83.1	96.8	89.3	94.4	94.5	115	94.9	97.9	111	85.6	92.2	89.3	85.6	95.8	90.3	94.8	96.4	97.7	105	85.9	99.5
96	89.6	99.5	84.5	80.2	82.7	72.9	74.9	70.8	91.8	87.9	94.6	72.2	97.1	78.2	99	80.4	94.4	88	82.7	90.5	90.3	76.5	76.3	85.6	82.8	95.9	85.8	99.8	82.1	97
97.7	88.2	102	85.4	80	80.6	68.9	73.6	72.3	93.5	89.7	94.8	70.5	94.6	78.6	96.1	79.2	90.1	87.5	85.2	88.5	83.5	76.7	71.3	83.3	82.6	89.4	84.6	112	84	93.2
3.82	12.4	177	18.4	175	25.8	220	620	136	2.95	1.49	4.56	0.857	18.2	26.6	56.9	70.9	70	98	238	117	257	451	3510	240	89.6	350	681	6880	7.38	30.3
1.49	5.97	123	24	207	24.1	91.2	1060	980	10.5	2.98	14.8	5.31	48.2	51.2	3.73	73.7	35.4	136	190	53.7	116	565	4200	195	17.5	274	397	7180	41.3	113
5.31	18.4	300	42.3	381	49.9	312	1680	1120	13.4	4.47	19.4	6.17	66.4	77.8	60.6	145	105	234	430	171	373	1020	7720	439	107	624	1080	14100	48.7	144
36000	19200	33200	25900	58200	27900	83600	93000	17400	25500	32100	36300	25500	24100	37600	34300	35900	15400	56500	60800	45500	14300	23600	6300	29300	13700	59100	83500	19800	24900	20100
3950	6350	1580	1120	8750	6080	8240	8230	236	260	485	292	425	628	8310	7540	4540	6260	5380	8840	7200	530	1230	418	1460	1170	8110	9720	2870	207	291
-	-	-	157000	-	180000	-	130000	171000	-	63100	248000	-	48500	128000	-	112000	-	-	-	-	-	-	172000	-	141000	-	139000	-	73900	259000
-	-	-	22700	-	51700	-	23400	12000	-	5110	7370	-	8760	17500	-	31400	-	-	-	-	-	-	32600	-	17700	-	21000	-	15700	41500
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0826	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0165	0.01	0.01	0.01	0.0103	0.01	0.01	0.01	0.01	0.01
0.015	0.0486	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0465	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0207	0.015	0.015	0.015	0.015	0.015
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.114	0.035	0.035	0.035	0.035	0.035
-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	02/07/2018	-	04/07/2018	-	04/07/2018	04/07/2018	-	15/06/2018	18/06/2018	-	-	-	-	05/07/2018	-	-	-	-	-	-	-	-	02/07/2018	-	02/07/2018	-	02/07/2018	-
-	-	-	Marcin Magdziarek	-	Lucy Caroe	-	Lucy Caroe	Marcin Magdziarek	-	Renata Bozhkov	Christian Hallam	-	-	-	-	Barbara Urbanek-Walsh	-	-	-	-	-	-	Lucy Caroe	-	Marcin Magdziarek	-	James Richards	-	Lucy Caroe	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	Trace	-	Detected	-	Not Detected	Not Detected	-	Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Detected	-	Detected	-	Not Detected	-	Not Detected	-
-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
-	-	-	Loose fibre in soil	-	Soil containing ACM debris	-	0	0	-	Loose fibres in soil	0	-	-	-	-	0	-	-	-	-	-	-	Soil containing material typical of asbestos rope	-	Soil containing material typical of asbestos cement	-	0	-	0	-
107	105	108	111	106	108	107	109	104	102	119	99.2	110	110	109	112	110	105	110	106	110	108	107	107	108	107	114	111	110	107	94
95	99	98.2	98.1	99.2	96.6	97.6	97.6	98.2	94.5	83.3	96.9	93.1	100	97.7	94.5	90.5	98.9	98.7	99.8	88.6	97.4	100	98.4	97	97.2	92	98.1	98.5	98.2	99.8
94.8	91.2	88.9	88.8	94	86.3	81.7	85.1	100	88	71.2	98.7	81	90.7	93.2	90.7	77.5	104	99.3	88.8	81.2	96	104	94.8	90.2	93.9	80	88.5	87.7	88.1	103
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.04	0.185	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	2.6	0.13	0.13	0.13	0.13	1.1	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
-	-	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-
-	-	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-
-	-	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-
-	-	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-
-	-	0.78	0.96	0.76	-	-	-	-	-	-	-	-	-	-	-	-	-	2.69	-	-	-	-	1.39	1.31	1.21	1.71	1.1	1.31	0.5	-
-	-	9.41	8.79	11.7	-	-	-	-	-	-	-	-	-	-	-	-	-	51.7	-	-	-	-	9.11	10	8.96	6.14	9.67	12.8	8.44	-
-	-	10.1	9.67	12.3	-	-	-	-	-	-	-	-	-	-	-	-	-	53	-	-	-	-	10.4	11.2	10.1	7.74	10.7	13.9	8.44	-

Glan Lyn Commercial Soils Data

40AJ10V	40AJ12V	40AJ14V	40AJ23V	40AJ26V	40AK11	40AK11	40AK11	40AK13	40AK13	40AK13	40AK15	40AK27	40AK27	40AK27	40AK11V	40AK15V	40AL10	40AL10	40AL10	40AL10	40AL12	40AL12	40AL12	40AL15	40AL17	40AL17	40AL20	40AL20	40AL20	40AL28	40AL28	40AL28	40AL28	40AL10V	40AL12V
2.702.70	2.602.60	1.201.20	2.202.20	2.8	0.500.50	1.001.00	2.002.00	0.500.50	1.001.00	2.002.00	0.500.50	0.5	1	1.7	2.902.90	0.900.90	0.500.50	1.001.00	1.501.50	2.002.00	0.500.50	1.501.50	2.502.50	0.500.50	0.700.70	1.701.70	0.500.50	1.001.00	2.502.50	0.500.50	1	1.5	2.5	2.802.80	3.503.50
22/06/2018	27/06/2018	28/06/2018	07/06/2018	30/05/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	30/05/2018	30/05/2018	30/05/2018	22/06/2018	22/06/2018	27/06/2018	27/06/2018	27/06/2018	27/06/2018	27/06/2018	27/06/2018	27/06/2018	28/06/2018	22/06/2018	22/06/2018	05/06/2018	05/06/2018	05/06/2018	29/05/2018	29/05/2018	29/05/2018	29/05/2018	27/06/2018	27/06/2018
1.09	57.6	6.76	1.18	1.18	2.17	1.1	1.93	3	3.4	2.74	0.45	54	12.1	2.93	10.7	2.17	2.33	1.84	1.67	6.55	1.76	3.45	3.05	4.43	1.45	3.07	1.57	3.69	1.98	4.72	>100	21.7	7.19	31.7	2.16
10.1	11.2	15.6	10.4	7.04	7.67	8.03	6.89	9.02	8.06	11.4	1.35	7.81	6.75	16.6	21	30.2	25.7	10.3	7.37	7.42	6.84	5.12	13.2	12.7	13.3	2.45	16	11	4.82	3.88	4.22	5.98	16.8	9.15	10.2
0.02	0.02	0.638	0.187	0.575	0.704	1.7	2.02	0.985	0.821	0.515	0.542	3.37	0.7	0.02	0.579	0.315	0.722	0.2	0.02	0.02	0.128	0.02	0.0366	1.64	1.87	0.449	0.417	0.377	0.664	0.561	0.227	0.509	0.02	0.134	0.02
33	8.88	32.5	28.2	72.5	106	141	434	65.3	72	73.2	397	0.9	72.1	39.3	37	77.6	55.3	101	19.1	118	80.2	80.8	5.64	144	277	12.5	18.5	16.6	180	81.2	21.8	291	37.8	13.8	35.8
12.6	12.7	27.7	12	14.7	19.5	25.4	36.1	24.7	18.7	16.9	1.4	19.3	14.8	23.9	28.1	34.9	34	24.1	13.8	18.7	17.1	15.7	14.7	25.1	34.7	8.2	30.5	24.8	16.8	10.2	63	21.7	25.4	15.6	16.2
29.9	5.23	44.4	25	28.2	73.4	82.4	91.5	64.7	69.6	38.4	11.9	138	57.8	28.3	51.3	161	132	48.8	26.1	21.2	49.8	24.4	31.1	80.7	75.7	28.6	23.3	29.5	25	15.6	20.4	23.9	38.4	15.8	23.7
0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14
39.4	21.5	28.2	37.6	9.07	12	16.7	14.1	22.3	12.9	19.4	1.04	43.4	15.9	39.1	26	13.3	12.8	22	19.4	3.19	11.8	8.74	17	19	20.5	6.74	41.4	34	8.62	7.24	8.01	15.2	31.2	23.7	38.5
1	2.34	1.29	1	5.11	6.94	10	18.1	7.98	4.36	1.95	7.99	1	2.49	1	1	6.21	3.92	10	1	9.2	2.56	3.89	1	10	10.5	2.79	1.36	2.06	5.08	3.59	1.5	7.48	1	1	1
60.2	20.7	51.2	50.1	132	127	193	702	109	125	70.9	274	16.8	59.6	69.6	60.5	128	111	164	37.8	397	108	127	21.7	216	632	38.3	44	35.4	301	172	38.1	714	62.8	27.9	57.5
114	20.6	154	105	106	249	283	120	325	362	129	34.9	727	207	70.3	170	2160	2080	330	140	94.6	266	90.2	55.6	341	318	114	104	106	80.1	73.6	35	76.7	130	69	105
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0598	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0432	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0469	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.048	0.04	0.04
0.04	0.04	0.0512	0.04	0.04	0.04	0.0857	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0511	0.0587	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.048	0.04	0.04
0.1	0.1	0.1	0.1	4.79	3.9	13.5	8.2	23.1	16.7	1.82	0.1	0.1	0.1	0.1	0.1	11.1	8.68	7.22	3.6	1.17	3.87	2.97	5.51	3.89	8.17	4.72	1.32	5.8	2.28	0.1	3.94	10.2	0.1	0.1	0.1
0.1	0.1	0.1	0.1	19.7	11.9	31.5	51.6	59.2	45	5.6	0.653	3.55	4.57	0.1	0.1	38.9	29.9	22.5	9.76	8.32	16.9	15.8	11.8	9.81	19.8	19.1	2.54	6.8	7.11	4.8	25.4	20.6	0.1	1.83	0.1
0.1	71.5	4.89	0.1	116	71.4	114	1000	239	218	22.8	11.6	84.2	56.4	2.55	8.39	221	189	126	57.7	64.8	78.2	126	27.3	34.5	62.1	143	8.97	6.89	48	42.4	363	93	8.22	41.6	2
0.1	0.835	0.1	0.1	39.2	21.4	40.5	948	94.5	108	5.58	0.78	5.13	19.4	0.1	0.1	62.7	56.6	59.6	21.7	27.9	24.6	24.1	6.48	12.1	18.3	41.5	1.87	1.7	21.1	15.8	111	37	0.1	0.1	0.1
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0512	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.0578	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	1.16	1.16	0.1	0.1	0.738	4.06	2.92	31.7	6.45	0.683	0.1	0.1	0.527	0.1	0.524	3.38	2.84	1.69	3.6	0.902	1.74	1.95	2.49	2.15	3.85	2.83	0.1	0.98	0.1	0.1	3.18	1.67	0.1	0.1	0.1
0.1	7.51	2.23	0.1	2.1	4.35	15.9	22.9	0.1	26.3	3.39	0.1	2.38	2.59	0.1	3.59	15.3	14.5	8.86	8.06	23.5	8.37	15.1	6.18	10	14.6	11.9	0.1	3.36	0.1	3.08	19	8.58	1	4.34	0.1
0.314	330	35.6	2.44	17.3	30.3	59.7	245	147	181	17.2	2.3	26	33.7	8.5	82.1	121	95.1	76.8	44.6	91.2	39.9	89.6	21.8	38.3	59.5	65.6	2.54	7.36	20.2	28.2	125	56.6	47.4	131	7.37
0.1	45	6.65	0.1	4.22	18.2	39.5	261	101	145	7.63	0.1	7.85	32.5	1.23	13	66.2	51.5	59.6	29.4	41.5	24.3	35.8	9.33	18.2	28.3	37.6	5.7	6.44	15.9	17.8	88.6	35.4	14	31.5	1.3
0.1	14.1	1.43	0.1	1.13	7.69	17.3	129	41.8	60.8	2.9	0.1	2.51	14.5	0.1	3.95	27.2	20.8	25.5	11.6	16.3	10.4	13.6	3.7	7.41	10.9	15.4	3.21	3.4	6.41	7.45	38.1	14.9	5.49	9.94	0.1
12	12	12	12	12	21.3	12	12	19.9	24	12	12	12	12	12	12	58.5	52.6	12	12	16.6	12	12	12	125	1620	18.8	12	12	12	12	17.2	12	12	12	12
8	8	8	8	8.94	9.2	46.8	71	55.3	189	27.6	8	8	8	8	8	28.9	34.3	17.9	30.1	123	25.3	34.2	8	42.3	192	12.1	8	8	17.9	11.1	22.9	16.8	8	8	8
16	16	16	16	76.4	131	166	653	155	183	51.6	16	16	28.7	16	16	140	171	51.2	39.7	1530	108	378	16	284	2970	129	16	16	39.9	55.1	99.4	52	16	16	16
14	14	14	14	301	379	396	1420	577	445	137	14	19.1	148	14	40.4	1190	626	182	107	6520	417	774	46.7	576	3390	648	26.8	38.4	292	243	288	554	23.7	14	14
15	15	15	15	207	259	323	1270	546	383	106	15	15	158	15	44.1	1160	593	151	87.5	4820	329	566	48.5	490	2600	559	23.2	35.9	371	266	224	587	24	15	15
15	15	15	15	341	416	467	1960	902	615	196	17	28.6	232	15	92.3	1660	826	239	171	7800	532	857	65.2	601	3800	574	33.2	61.6	399	338	403	841	52.9	77.3	15
14	14	14	14	135	135	157	803	343	229	59.3	14	14	84.9	14	38.4	706	318	92.4	55.9	2800	205	359	26.4	248	1210	292	14	18.6	156	123	172	286	14	14	14
24	24	24	24	189	193	239	1200	546	376	86.2	24	24	165	24	45.8	862	474	122	74.2	3070	277	421	49.8	402	1850	378	24	24	311	224	221	378	24	24	24
10	10	10	10	284	332	331	1450	557	445	124	13.7	30.7	188	10	66.2	1070	555	167	142	6410	480	807	51.5	499	2220	679	27.3	66.4	317	261	325	579	38.4	55.7	10
0.023	0.023	0.023	0.023	43.7	52.1	52.7	198	96.1	75	28.6	0.023	0.023	33.7	0.023	0.023	202	109	30.4	0.023	764	58.2	92.8	0.023	98	469	84	0.023	0.023	63.5	44.2	72.2	87.1	0.023	0.023	0.023
0.018	0.018	0.018	0.018	157	155	197	957	472	275	78.5	0.018	0.018	151	0.018	40	844	419	102	74.7	3070	274	429	38.7	339	1710	317	0.018	24	316	242	176	368	0.018	0.018	0.018
0.017	0.017	0.017	0.017	776	723	1090	1990	1210	1060	311	0.017	80.4	221	0.017	121	1760	962	381	234	10600	965	2270	84.5	1480	9940	1850	46.9	65.8	421	411	454	756	60.5	118	0.017
10	10	10	10	10	15.4	35.6	24.2	10	96.7	17.9	10	10	13.6	10	10	46.6	61.4	16.7	36.5	121	17	33.4	10	142	2670	19.7	10	10	10	10	48.6	10	10	10	10
9	9	9	9	41.6	25.1	41.4	22.6	71.1	134	28.6	9	31.9	29.2	9	9	65	79	37.9	94.7	60.2	33	35.7	17.2	827	38100	35.9	9	28.7	20.4	24.7	91	69.1	9	9	9
15	15	15	15	332	283	906	593	802	806	127	15	74.7	155	15	63.5	511	514	211	184	4150	468	1940	62.6	893	11600	607	28.6	121	161	178	385	239	34.2	15	15
0.015	0.015	0.015	0.015	0.752	0.626	0.914	5	1.2	1	0.293	0.015	0.0605	0.208	0.015	0.0944	1.53	0.945	0.322	0.178	13.3	1.2	1.9	0.0801	1.14	6.32	1.41	0.0411	0.0515	0.494	0.441	0.434	0.838	0.046	0.0812	0.015
0.118	0.118	0.118	0.118	3.64	3.76	5.36	17.6	7.55	6.31	1.67	0.118	0.326	1.82	0.118	0.646	11.8	6.74	2.12	1.51	65.1	5.39	10.9	0.571	8.19	90.7	7.61	0.227	0.512	3.38	2.86	3.43	5.65	0.28	0.332	0.118
105	99.2	83.1	85.4	83.3	93.4	86	88.1	91.7	87.2	88.9	91.2	91.9	90.5	95.2	101	94.6	96.6	90.8	87.5	98	96.6	88	97.7	78.5	73.3	91.6	91.9	92.3	91	91	83.4	87.4	89.9	102	82.1
98.9	99.7	83.8	86.1	85.7	101	92.5	96.2	93.5	93.1	96.6	90.7	85.2	94.9	91	105	97.6	101	96.4	74.5	87.4	92.2	89.5	90.7	75.6	85.9	94.5	93.3	84.7	93.7	95	88.7	91.6	87.9	107	80.5
106	102	90.4	89.8	99.5	115	104	103	103	102	107	91.4	69.6	95	89.5	108	95.5	99.5	95.9	87.3	98.1	88.1	91.7	90.3	91.7	95.3	95.3	93	81.4	94.9	98.3	89.2	92.7	91.7	112	80.1
93.4	92.3	89.1	79.8	82.1	97.5	87	71.8	88.7	91.7	81.1	88.2	31.6	72.4	85.5	87.4	77.1	86.2	82.7	76	107	92.5	87.7	88.1	76.1	76.9	85.1	79.9	73.7	80.9	83.6	70.7	93.2	89.4	88.8	79.8
96	92.4	96	79.1	85.4	100	92.1	73.3	89	86.9	81.2	83	16.6	71.3	85.2	88.9	72.2	83.1	80.1	75.5	112	96.2	90.3	86.9	77.3	79.3	83.2	74.1	73.3	79.2	81.2	63.3	79.5	86.5	89.5	82
0.1	72.3	4.89	0.1	180	109	199	2010	416	388	35.7	13.1	92.8	80.3	2.55	8.39	333	284	215	92.8	102	124	169	51	60.2	108	208	14.7	21.2	78.4	63	503	161	8.22	43.5	2
0.314	383	45.6	2.44	23.6	53.6	119	532	280	359	28.9	2.3	36.2	69.3	9.72	99.2	206	164	147	85.8	157	74.2	142	39.8	68.7	106	118	8.24	18.1	36.2	49.1	236	102	62.4	167	8.67
0.314	456	50.6	2.44	204	162	318	2540	696	746	64.7	15.4	129	150	12.3	108	539	448	362	179	259	198	312	90.9	129	215	326	22.9	39.3	115	112	739	263	70.7	211	10.7
44200	19100	22200	35700	63400	69200	78600	158000	83400	59000	39500	151000	239000	50700	32400	22400	63200	51600	133000	25800	78900	47900	37200	18500	91900	130000	35400	33300	31500	85800	48400	19000	116000	32500	22500	29700
492	411	367	379	12400	14200	11000	37600	17600	8990	2920	28300	3230	5520	249	230	18000	11200	8250	1820	29900	6890	10400	619	10700	21800	3310	940	1990	12500	6410	1190	21700	285	170	394
-	92500	-	-	164000	-	168000	-	208000	-	205000	40500	-	198000	243000	-	50500	205000	-	26600	-	-	-	-	-	-	-	69400	113000	-	125000	-	-	160000	-	3490
-	16800	-	-	23200	-	17100	-	26500	-	24100	2370	-	15700	19100	-	7960	16700	-	1760	-	-	-	-	-	-	-	10500	23800	-	15900	-	-	13700	-	1470
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.048	0.01	0.0116	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0182	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.01
0.01	0.01	0.01	0.01	0.01	0.0109	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0182	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.048	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-
-	-	-	-	04/07/2018	-	04/07/2018	-	04/07/2018	-	04/07/2018	04/07/2018	-	02/07/2018	18/06/2018	-	18/06/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	02/07/2018	-	21/06/2018
-	-	-	-	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Lucy Caroe	-	Barbara Urbanek-Walsh	Renata Bozhkov	-	James Richards	Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	James Richards	-	Barbara Urbanek-Walsh
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-
-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
-	-	-	-	Not Detected	-	Not Detected	-	Trace	-	Not Detected	Not Detected	-	Not Detected	Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected
-	-	-	-	0	-	0	-	Loose fibres in soil	-	0	Loose fibres in soil.	-	0	Loose fibres in soil.	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0
108	105	103	109	111	108	110	104	109	109	107	113	110	103	107	106	108	110	112	109	106	111	119	102	105	107	111	113	106	108	107	107	109	114	105	113
98.4	99	98.8	98.6	97.8	98.2	98.4	98.2	97.1	97.5	95.5	99.9	97.6	96.4	97.1	98.2	95.5	99.8	98.5	97.4	98	99.4	89.7	98.8	97.2	95.2	99	95.1	97	98.7	99.1	94.5	97.6	99	97.7	99.7
91.5	95.9	103	99.7	81.9	87.8	85	81.6	88.1	85.2	85.9	81.6	86.2	87.9	91.8	95.5	86	104	92.2	81.5	85.7	86.8	75.2	105	94.6	94	94.2	87.7	92	87.5	90.6	84.1	86.1	88	86.1	94.6
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.56	0.15	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
-	-	0.5	3.64	-	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-	3.79	-	-	-	-	-	-	-	0.5	0.5	0.5	-
-	-	0.5	1.91	-	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-	1.87	-	-	-	-	-	-	-	0.5	0.5	0.5	-
-	-	0.5	3.2	-	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-	3.4	-	-	-	-	-	-	-	0.5	0.5	0.5	-
-	-	0.5	0.59	-	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5	0.5	0.5	-
-	-	1.97	3.37	-	-	-	-	-	-	-	-	1.06	1.11	-	-	-	-	-	-	-	-	-	-	3.2	-	-	-	-	-	-	-	1.02	0.71	0.77	-
-	-	39.8	45.7	-	-	-	-	-	-	-	-	11.3	10.6	-	-	-	-	-	-	-	-	-	-	49.2	-	-	-	-	-	-	-	6.42	9.43	8.64	-
-	-	40.9	47.5	-	-	-	-	-	-	-	-	12.2	11.6	-	-	-	-	-	-	-	-	-	-	50.8	-	-	-	-	-	-	-	7.37	10.1	9.34	-

Glan Lyn Commercial Soils Data

40AL15V	40AL17V	40AL20V	40AL28V	40AM27	40AM28	40AM28	40AM28	40AM27V	40AN11	40AN11	40AN11	40AN13	40AN13	40AN24	40AN24	40AN24	40AN24	40AN26	40AN26	40AN26	40AN26	40AN26	40AN28	40AN28	40AN11V	40AN13V	40AN20V	40AN26V	40AN28V	40AO14	40AO16	40AO16	40AO16
1.001.00	3.203.20	3.503.50	3	1.001.00	0.5	1	2	1.8	0.500.50	1.001.00	1.501.50	0.500.50	1.101.10	0.500.50	1.001.00	1.701.70	2.302.30	0.500.50	1.001.00	1.701.70	2.302.30	0.5	1	2.202.20	1.001.00	0.800.80	2.602.60	1.2	0.500.50	0.500.50	1.001.00	2.002.00
28/06/2018	22/06/2018	05/06/2018	29/05/2018	30/05/2018	29/05/2018	29/05/2018	29/05/2018	30/05/2018	22/06/2018	22/06/2018	22/06/2018	14/06/2018	14/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	29/05/2018	22/06/2018	14/06/2018	14/06/2018	06/06/2018	29/05/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018
15.6	12.5	4.1	18.4	3.57	3.57	1.59	18.8	6.02	7.81	10.7	4.86	6.59	1.78	1.39	1.1	1.42	2.71	1.76	5	3.03	4.57	4.86	2.07	2.57	5.34	1.1	1.78	3.14	3.88	3.15	6.55	5.45
11.8	22.3	10.3	7.67	6.6	9.91	11	9.21	10.4	11.6	9.41	6.42	16.1	5.13	8.26	3.84	4.4	9.54	5.14	8.59	7.14	14.3	24.5	11.5	8.1	13	9.36	13.5	15.9	7.01	6.29	12.1	9.59
0.178	0.931	0.278	0.389	1.69	0.866	0.337	0.314	2.13	2.16	2.51	0.221	0.37	1.58	1.48	0.282	0.943	0.673	0.194	0.383	0.92	0.698	1.04	0.02	0.353	0.381	0.239	0.294	0.767	0.353	1.89	1.1	0.938
32.6	36.3	35.4	12.1	44.7	64.2	88.4	17.7	34.1	117	216	0.9	40.8	23.9	31.8	33.5	19.5	44.7	11.1	9.15	80	162	342	32.8	10.1	39.6	30.6	34.8	14.2	55.5	99.6	78.1	56.1
24.8	31	17	28	19.9	88.5	18.5	16.8	38.8	32.6	29.5	15.9	32.2	27.4	43.3	6.56	14.1	24.9	8.61	12	32.3	73	117	22.9	13	25.9	11.9	12.7	38.9	23.3	24.8	48.1	318
37.9	67	24.3	31.2	47.6	72.8	20.8	20.5	149	135	102	11.3	33.3	78.7	113	12.2	59.9	42.4	11.7	16.2	67.6	71.3	252	23.5	15.9	32.1	28	26.2	74.3	48.1	787	123	69.7
0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.2	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
31.5	27.8	29.6	18.3	14.2	18.2	10.9	21.3	26.3	25.1	30	19.3	36.4	12.6	20.3	4.99	11	25.7	17.6	33.4	17.9	24.8	26.6	36.1	35	37.5	38.7	34.8	25.1	17.4	10.9	19.3	41.8
1	1.42	1	1.76	2.56	3.13	3.6	1.74	10	10	10	1	1.73	1.94	1.43	4.02	3.31	2.52	1	1	3.29	3.56	2.32	1	1.24	1.32	1	1	2.59	2.2	5.95	3.21	2.59
49.9	56.9	55.5	75.6	118	138	85.3	38	58.6	359	160	16.3	64.5	53.2	56.9	84.9	46	80.6	17.4	20.9	168	104	83.2	52.7	25.6	59.5	51.8	58.2	50.7	99.7	185	242	116
134	176	103	140	204	219	105	105	614	468	409	40.7	122	268	298	50.1	86.5	131	48.2	103	202	270	491	90.7	74.2	115	111	116	145	187	165	336	251
0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0472	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0779	0.04	0.04	0.04	0.04	0.04	0.0415	0.04	0.061
0.04	0.0728	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.343	0.54	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1.43	0.04	0.04	0.04	0.04	0.04	0.0501	0.04	1.14
0.04	0.0455	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1.16	2.7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	17.8	0.04	0.04	0.04	0.04	0.04	0.166	0.04	0.306
0.213	0.1	0.1	0.398	5.39	3.89	2.36	0.1	6.17	3.19	2.89	8.28	0.847	20	19	43.5	107	35	1.81	3.06	3.43	3.28	0.73	0.1	997	0.1	0.1	0.1	1.03	6.54	1.79	7.62	5.97
1.24	0.1	0.1	0.559	23.3	16	6.52	5.1	28.2	15	13.9	24	1.22	62.1	116	100	233	41.1	9.98	5.38	16.3	13.7	4.06	0.1	709	0.1	0.157	0.1	4.82	22.2	8.96	32.6	24.8
16.7	2.02	1.02	20.7	189	107	57.2	37.1	104	71.6	74.9	31.9	2.02	216	577	86.5	257	50.6	60.6	21.5	118	88.3	26.7	1.49	176	7.22	1.02	7.71	85.7	115	52.7	171	149
0.469	0.1	0.1	7.9	69.3	31.4	13.8	0.1	24.8	19.7	23.6	3.38	0.1	62.3	178	23	55.8	10	42.8	2.58	30.7	25.5	6.37	0.1	13.2	0.1	0.1	1.33	18.4	70.3	14.4	54.4	45.6
0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.0491	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.229	0.36	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.953	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.764
0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.776	1.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	11.8	0.04	0.04	0.04	0.04	0.04	0.111	0.04	0.203
0.204	2.49	0.1	0.609	2.3	1.39	0.1	0.1	1.64	1.16	2.16	5.17	0.1	3.85	4.74	15.8	41.4	5.29	0.687	1.7	1.09	1.7	0.974	0.1	188	0.1	1.66	0.1	1.49	2.18	1.19	4	3.18
2.77	2.38	0.312	2.03	11.2	7.72	0.1	5.43	9.9	8.46	9.71	13.2	0.203	21.5	49.3	35.1	108	17.4	4.27	6.82	6.41	9.87	4.77	0.1	295	0.1	1.59	0.1	4.28	11.7	4.98	17.3	14.4
97	37.3	11.9	16.4	83.2	47.5	38.2	63.3	50	47.4	53.9	18.2	12.8	97.2	242	39.7	102	34.9	48	17.4	54.8	56.2	23.2	8.52	82	13	3.74	2.6	40.3	72.9	34.7	86.1	92.1
19.4	4.16	2	11	48.6	23	8.69	3.22	22.2	26.2	30	4.16	2.02	73.3	115	26.2	28.7	15.7	62.8	2.96	31	27.1	9.29	3.11	15.8	1.44	0.636	5.21	15.2	87.2	15.5	39	37.9
3.35	0.521	0.491	4.52	20.1	8.81	3.16	0.1	8.8	10.6	11.8	1.14	0.1	32.4	47.5	12.6	9.87	6.29	30.7	0.1	13.2	10.9	3.75	1.13	6.58	0.1	0.1	2.21	5.04	42.1	6.15	15.9	15.6
12	12	12	40.5	69.9	25.4	12	60	17.6	13.8	17.4	12	12	60	60	12	12	12	12	12	60	48	32.1	12	12	12	12	12	12	13.8	12	14.6	12
8	24	8	8	51.7	36.1	8	159	14.5	13	26.1	8	8	40	40	20.9	35.7	8	8	8	40	85.6	76.4	8	8	8	8	8	12.3	22	13.2	79.4	22.7
16	31.3	16	85.9	170	74.8	16	80	55.1	43.6	76.8	16	16	149	80	37.4	30	20.9	17.2	16	80	223	243	16	16	16	16	16	22.7	80.7	53.3	290	81.3
14	146	14	577	526	352	22.7	70	216	190	332	16.6	14	194	70	181	54.9	61.5	82.6	41.2	434	701	1040	14	28.3	14	14	14	86.5	251	185	386	293
15	150	15	803	606	351	15	75	255	202	365	15	15	188	99.6	105	46.3	63.4	95.9	34.2	446	708	932	15	15	15	15	15	74.6	223	170	273	212
61.4	215	15	861	862	572	29.5	75	358	347	576	23.9	15	305	109	135	86.8	105	173	79.3	828	860	1360	15	39.7	15	15	15	162	447	278	529	352
14	77.8	14	359	330	176	14	70	140	105	183	14	14	126	70	65.2	29.6	35.9	57.1	22.2	284	374	461	14	14	14	14	14	58.9	173	89.6	192	99.8
24	107	24	673	537	291	24	120	234	177	286	24	24	231	155	63.5	128	67.3	106	42.7	353	505	571	24	24	24	24	24	75	214	152	230	152
44	185	10	534	500	434	27.4	50	232	197	325	23.1	10	249	75.4	190	61.4	67.8	108	93	512	610	1070	10	36.2	10	10	10	111	281	196	448	301
0.023	0.023	0.023	125	120	56.7	0.023	0.115	51.2	0.023	59.5	0.023	0.023	0.115	0.115	0.023	0.023	0.023	0.023	0.023	0.115	116	132	0.023	0.023	0.023	0.023	0.023	0.023	44.6	33.5	44	40.7
34.5	96.2	0.018	638	521	280	0.018	90	207	194	304	0.018	0.018	169	98.7	49.5	50.8	49.8	110	28.3	386	532	610	0.018	0.018	0.018	0.018	0.018	53.7	161	120	259	144
69.9	402	25.6	1080	995	634	38.3	208	335	320	532	23.2	0.017	313	150	434	132	117	118	75.7	585	1330	1950	0.017	110	0.017	0.017	0.017	146	430	108	1280	498
10	63.4	10	19	85.9	42.6	10	115	17.9	11.1	30.4	17.5	10	50	50	102	153	10	10	10	50	109	101	10	10	10	10	10	19.5	17.9	12.9	50	21.7
9	9	9	30.3	211	89	16.3	45	65.3	78.1	129	32.7	9	45	45	20.8	22.5	17.9	26.2	31.1	45	266	163	9	9	9	9	9	30.2	77.7	48.1	77.4	54
30.7	197	15	287	618	338	39.2	496	196	196	302	67.5	15	184	87.9	236	296	84.1	105	168	258	848	884	15	15	15	15	15	104	238	215	1560	367
0.0524	0.335	0.015	1.07	0.898	0.604	0.0363	0.075	0.327	0.329	0.494	0.0225	0.015	0.308	0.195	0.434	0.166	0.107	0.115	0.0759	0.59	1.11	1.62	0.015	0.0951	0.015	0.015	0.015	0.132	0.392	0.292	1.07	0.437
2.093	2.03	0.118	7.18	7.1	4.36	0.21	0.978	2.72	2.42	4.04	0.227	0.118	2.42	0.97	2.07	1.29	0.797	1.11	0.692	4.68	8.42	11.2	0.118	0.309	0.118	0.118	0.118	1.09	3.07	2.15	6.78	3.08
88.5	92.6	90.1	85.4	93.7	88.3	87.9	91.7	95.2	99.4	95.8	86.7	85.9	88.4	91.2	90.5	95.7	85.1	94	92	85.9	89.6	84.8	91.1	101	101	92.8	76.7	102	104	102	89.1	93.6
89.1	94.7	89.2	85.2	94.1	88.8	86.4	93.9	94.3	100	97.9	86.4	90.4	94	95.3	92.3	104	88.4	91.5	92.6	86.3	89.8	84.9	89.4	104	87.6	88.8	77.6	93.9	94.6	91.5	92.3	95.7
89.5	95.9	85.5	83.1	93	99.2	89.1	93	101	95.8	96.4	83.5	94.5	91.3	97.1	93	102	92.3	91.8	94.4	84.1	96	81.6	90	95	76.2	89.5	84.4	85.8	94.4	84.1	94.8	99.5
88.6	90.4	77.3	68.7	79.4	96.6	84.2	76.5	87.2	84.9	85.3	84.1	78	81.2	80.4	82.2	109	82.5	96.2	77.1	86.1	96.4	82.2	86.6	90.6	98.2	91.4	85.4	97	100	86.9	79.8	107
88.4	86.3	81.3	63.6	86.1	88.3	78.4	75.8	82.2	80.4	84.2	84.2	80.2	80.9	81.1	79.3	113	82.8	96.4	71.6	82.9	92.2	75.3	88.1	97	99.7	94	81.3	98.9	103	87.7	74.2	93.3
18.6	2.02	1.02	29.6	287	159	79.9	42.1	163	109	115	67.6	4.08	360	890	253	652	137	115	32.6	168	131	37.8	1.49	1890	7.22	1.18	9.04	110	214	77.9	266	225
119	46.3	14.2	30	145	79.6	46.8	72	83.7	83.3	95.8	40.8	15	196	412	117	280	73.3	116	28.9	93.3	94.9	38.3	11.6	581	14.5	7.63	7.81	61.2	174	56.4	146	148
138	48.5	15.2	59.6	433	238	127	114	246	193	211	108	19.1	556	1300	372	938	210	231	61.4	261	226	76.1	13.1	2510	21.7	8.82	16.8	171	388	135	412	375
23300	20800	32700	50000	57100	47300	30300	29200	95800	104000	93600	19300	29600	41700	26200	14400	24300	46700	16300	20400	63100	65800	69300	37800	14700	26900	30300	34700	43300	53600	46200	59700	35100
185	272	374	2160	4790	4510	6890	1410	3840	11700	9050	426	243	3330	2980	4350	3350	4100	742	519	8260	8320	4990	465	406	243	414	594	2420	4150	9740	6780	4160
-	-	265000	-	165000	-	74400	-	138000	-	105000	-	-	-	-	-	115000	104000	-	-	94700	176000	-	140000	-	-	161000	-	198000	-	207000	-	100000
-	-	26700	-	35500	-	32600	-	31100	-	18500	-	-	-	-	-	12900	12800	-	-	12200	33200	-	13400	-	-	36300	-	36200	-	28600	-	16800
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.0658	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.16	0.147	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.0162	0.01	0.0105	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0114	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0228	0.0226	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0658	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.194	0.181	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001
-	-	18/06/2018	-	18/06/2018	-	18/06/2018	-	18/06/2018	-	-	-	-	-	-	-	20/06/2018	21/06/2018	-	-	21/06/2018	21/06/2018	-	21/06/2018	-	-	18/06/2018	-	15/06/2018	-	15/06/2018	-	-
-	-	James Richards	-	Andrzej Ferfecki	-	Marcin Magdziarek	-	Andrzej Ferfecki	-	-	-	-	-	-	-	Lucy Caroe	Barbara Urbanek-Walsh	-	-	Andrzej Ferfecki	Lucy Caroe	-	Lucy Caroe	-	-	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001
-	-	Not Detected	-	Not Detected	-	Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Detected	-	-	Not Detected	Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-
-	-	0	-	0	-	Loose fibres in soil	-	0	-	-	-	-	-	-	-	0	Loose fibres in soil.	-	-	0	Soil containing material typical of asbestos cement	-	Soil containing material typical of AIB	-	-	0	-	0	-	0	-	-
121	107	114	114	107	121	105	110	109	106	104	108	112	109	112	109	111	101	105	105	107	105	104	106	106	104	104	111	109	108	103	107	106
99.7	95.3	96.2	97.2	95.4	97.6	98	95.7	96.4	98.3	99.2	97.9	95.9	98.8	97.9	98.6	96.9	97.4	94.7	98.6	93.6	99.9	96.2	95.5	95	97.2	98.2	96.8	95.7	93.2	95.5	97	98.3
95.6	92.6	91	94.1	87.1	96.3	83.9	84.8	89	92.5	96.5	91.4	81	99.7	95.3	94.3	87.5	97.2	93	97	97.7	96.2	95.3	92	93.2	95.1	93.6	94.1	91.4	92.2	94.4	93.4	94.7
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.147	0.13
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	1.68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	30.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	31.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

40AO16	40AO17	40AO17	40AO17	40AO17	40AO23	40AO23	40AO23	40AO25	40AO25	40AO25	40AO25	40AO28	40AO14V	40AO16V	40AO17V	40AO25V	40AO28V	40AP10	40AP10	40AP10	40AP10	40AP11	40AP11	40AP11	40AP11	40AP13	40AP13	40AP15	40AP15	40AP15
3.003.00	0.500.50	1.001.00	2.002.00	3.003.00	0.500.50	1.001.00	1.301.30	0.500.50	1.001.00	2.002.00	2.802.80	0.7	0.700.70	3.603.60	4.004.00	3.003.00	1	0.500.50	1.001.00	1.701.70	2.302.30	0.500.50	1.001.00	1.501.50	2.002.00	0.400.40	1.001.00	1.501.50	0.500.50	1.001.00	2.002.00
14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	30/05/2018	14/06/2018	14/06/2018	14/06/2018	06/06/2018	30/05/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	22/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018
1.97	3.78	2.22	2.64	2.26	4.45	2.17	1.48	0.952	1.09	0.705	3.19	7.29	4.38	64.1	10.8	6.4	5.86	3.43	3.29	2.12	3.72	3.78	1.79	1.17	1.18	1.07	3.83	2.57	12.3	3.83	4.38
10.1	40	7.66	4.39	4.75	7.04	5.34	6	6.22	6	3.35	10	15.5	12.9	5.55	20.9	13.5	9.9	14.8	10.1	11.9	9.67	9.21	8.34	9.62	14.1	8.3	11.2	8.85	10.4	7.48	8.11
0.859	0.875	1.46	0.435	1.62	1.5	1.33	0.796	0.88	0.743	0.447	0.85	0.52	0.466	0.236	0.74	0.451	0.841	1.83	1.02	0.726	2.53	2.03	0.23	0.51	1.15	0.24	0.342	1.09	0.647	0.465	0.528
128	76.5	173	40.4	29.4	31.8	82.5	292	273	155	49.2	52.8	39.9	30.4	15.6	33.8	32.5	48.1	137	66.5	56.1	115	71.5	96.7	127	16.5	3.83	8.37	77.4	54.9	33	24.8
63	37.8	35.9	13	20.1	50.9	19.7	14	40.2	21.5	37.5	40.8	33	17.8	30.9	25.8	17.7	22	28.5	34	29.1	36.4	24.5	17.7	23.3	23.7	8.5	24.9	27.9	31.3	18.2	24.7
112	91.2	76.2	33.9	93.2	120	66	42.7	55	59.7	39.2	94	38.8	29.6	7.14	50.3	38.1	98.1	208	97.8	90.3	110	150	38.5	49.4	95.5	14.4	16.6	67.8	57.2	30.6	45.5
0.171	0.14	1.4	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
12.7	33.7	13.9	9.4	10.7	15.1	14	7.67	11.4	18.7	8.43	16.4	33.2	38	20.4	27.6	25.4	16.2	19.5	16.7	16.5	26.2	18	11.9	17.4	19.2	7.48	19.1	14.8	17	14.3	16.8
3.58	16.1	10	2.17	3.16	3.24	2.74	10	10.4	10	4.13	2.67	1.48	1	2.58	1.29	1	3.28	10	3.15	2.65	10	10	4.03	6.25	2.38	1	1.41	3.4	2.83	1.59	2.57
156	117	305	56.5	77.1	55.6	108	486	537	297	141	105	63.5	51.4	32.1	53.6	51.6	80.9	162	88.4	94.7	163	127	129	102	37.8	8.59	16.9	139	71.2	58.7	48.6
238	225	262	126	253	320	179	149	113	134	100	260	128	117	62.4	154	135	281	296	297	251	467	512	191	265	252	22.3	58.2	470	233	83.4	140
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0459	0.04	0.01	0.04	0.0433	0.04	0.04	0.04	0.04	0.04	0.04	0.0479
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.0515	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0885	0.04	0.01	0.04	0.0682	0.04	0.0547	0.04	0.04	0.04	0.04	0.106
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.196	0.04	0.04	0.04	0.04	0.049	0.04	0.0613	0.04	0.04	0.327	0.04	0.01	0.0515	0.0573	0.0699	0.137	0.0757	0.04	0.0941	0.0888	0.384
4.1	5.36	5.04	4.02	4.14	4.7	2.4	87.9	1.19	7.85	5.17	3.1	0.718	0.1	0.1	0.854	0.1	12	11.5	10.2	21.7	4.96	4.44	4.91	4.81	5.19	1.08	1.41	6.03	6.68	8.37	10.8
19	19.7	23.8	16.7	16.7	17.9	8.71	279	20.8	32.5	6.64	15.9	0.712	0.1	0.1	0.1	0.1	23.5	32.5	31.1	50.1	18.7	17.4	18.8	17.5	14.2	2.52	2.73	35.3	28.9	66.8	107
126	93.4	238	93.5	62.8	79.5	34.7	859	166	199	10.3	82.8	5.04	0.1	78.1	6	9.07	105	134	139	131	91.1	102	93	82.1	66.6	12.7	8.91	106	86.1	1820	3220
45.5	26.7	207	31.8	22.3	47.9	9.45	145	42	58.1	1.4	21.3	0.1	0.1	0.1	0.1	0.1	41.1	32.2	39	28.7	25.1	29.7	23.9	23.9	22.1	3.5	1.19	20.1	12.7	632	841
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.065	0.04	0.01	0.04	0.0509	0.04	0.04	0.04	0.04	0.04	0.04	0.0718
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.13	0.04	0.04	0.04	0.04	0.04	0.04	0.0405	0.04	0.04	0.218	0.04	0.01	0.04	0.04	0.0466	0.0905	0.0509	0.04	0.0627	0.0599	0.256
1.71	0.1	2.3	1.31	1.31	0.1	1.81	8.1	1.41	1.22	1.25	1.24	0.267	0.1	0.1	0.277	0.1	4.1	3.47	0.298	30	1.46	1.95	2.49	1.6	1.02	1.8	2.54	1.15	2.96	6.42	9.3
11.7	0.1	14.5	7.14	5.19	0.1	5.32	48.8	10.3	10.2	3.94	8.34	0.663	0.1	4.12	0.996	1.5	13.8	15.1	8.93	0.1	9.34	11.1	10.4	7.6	4.24	2.69	3.11	9.27	14.1	22.2	32.1
66.8	18.7	162	48.7	31.6	3.69	26.3	192	82.3	103	5.48	48.6	19	11.6	344	30.2	38.4	78.6	65.5	74.4	86	49.4	58.4	43.3	33.5	21.6	10.3	5.05	39.6	54	412	732
39.2	10	156	25	17.4	7.58	13.6	115	42	76	1.87	23.4	3.47	0.1	28.2	3.24	5.86	52.5	35.6	31.9	31.4	23	29.5	22.8	22.7	14.4	4.28	1.21	13.7	19.4	383	239
16	2.72	67.3	9.93	6.93	3.38	5.43	47.9	16.1	29.3	0.1	9.51	0.1	0.1	9.41	0.1	2	21.6	15.1	11.9	13	9.28	11.9	9.58	10.2	6.2	1.5	0.17	4.91	7.29	173	65.8
31.3	60	60	24	12	12	19.7	60	12	60	12	22.1	12	12	12	12	12	17.9	24.7	37.9	18.1	183	26	12	12	12	12	12	13.5	18.8	12	12
28.7	40	47.7	53.8	11.3	8	23.2	40	19.3	55.5	19.8	41.6	8	8	8	8	30.1	60.7	57.1	43.8	51.2	50	26.6	80.4	54.3	8	24.1	8	27.6	20.4	21.7	89.2
104	80	141	87.8	34.9	28.2	110	80	50.8	112	28.8	140	16	16	16	16	16	188	130	158	111	205	93	654	89.7	16	130	16	57.7	50.2	19.5	137
473	111	290	280	163	116	726	230	466	662	101	571	14	14	14	44.4	23.4	650	492	867	378	1450	563	1160	206	23.2	1060	14	284	288	101	396
523	117	249	249	193	122	412	179	531	748	78.6	465	15	15	15	46	15	739	425	769	308	1750	435	736	165	21.2	839	15	295	284	117	330
875	161	459	449	310	237	908	408	894	1270	183	666	15	15	15	111	38.2	1080	738	1300	536	2410	706	939	228	39.3	890	15	484	423	137	407
286	70	153	142	95.3	102	442	137	312	369	50.4	253	14	14	14	29.2	14	335	235	411	165	766	266	395	100	14	455	14	160	134	66.7	180
431	120	226	248	202	142	369	228	487	711	61.1	303	24	24	24	24	24	630	342	676	262	1210	355	457	127	24	431	24	260	229	135	216
519	141	298	313	193	160	934	319	625	816	133	569	10	10	10	72.4	26.9	612	572	790	371	1410	580	1080	216	30.3	865	21.2	300	319	110	388
95	0.115	0.115	0.046	31.7	26.6	78.4	0.115	73.5	0.115	0.023	83.1	0.023	0.023	0.023	0.023	0.023	107	80.8	163	61	223	68.4	117	0.023	0.023	179	0.023	63.5	47	0.023	43.4
333	90	250	165	157	129	388	179	341	535	65.8	324	0.018	0.018	0.018	51	0.018	648	348	501	204	1320	416	570	150	24.1	428	0.018	268	194	104	195
781	228	677	522	302	183	1910	564	1000	1390	239	1020	0.017	0.017	0.017	108	51.7	1110	812	1120	658	1630	672	3030	549	33.5	1100	0.017	488	500	185	857
30.7	50	50	30.3	10	10	13.9	50	10	50	19.5	53	10	10	10	10	10	55.1	45	45.9	38.9	47.2	18.6	142	27	10	41	10	25.2	21.4	29.4	81.2
74.4	45	75.5	72.7	47.2	23.5	37.4	45	18.3	53.4	36.5	79.6	9	9	9	9	39.7	66.5	107	113	105	107	77.1	86.7	74	9	23.9	34.9	80.3	47.2	44.5	65.6
329	130	512	424	172	124	762	207	349	621	152	573	15	15	15	71.5	35.7	607	574	540	498	609	295	2310	470	29	498	93.1	314	266	182	868
0.802	0.246	0.621	0.5	0.299	0.17	1.44	0.516	0.921	1.46	0.21	0.961	0.015	0.015	0.015	0.0862	0.0415	1.16	1.06	1.69	0.997	2.17	1.32	2.37	0.503	0.0356	0.83	0.015	0.564	0.527	0.176	0.751
5.72	1.13	4	3.54	2.21	1.56	8.58	2.97	6.09	8.81	1.38	6.12	0.118	0.118	0.118	0.619	0.287	8.06	6.05	9.23	4.76	15.5	5.91	14.1	2.96	0.236	7.79	0.149	3.68	3.37	1.43	5.01
95.9	89.3	80.8	105	89.3	85.1	88.8	92.2	92.8	93.6	97.2	87.3	102	85.9	106	95.6	89.3	96.7	93.7	86.7	89.2	95.1	98.8	93.5	93.1	88.8	94.8	85.9	86.3	98	89.9	91.5
83.9	82.3	83.9	91.7	89.6	86.6	89.5	93.1	94.6	91.5	93	91.2	92.1	84.8	94.9	88.6	92.1	96.6	105	91.6	99.2	97.8	101	95.4	101	92.4	93.5	84.5	91.5	88.9	90.1	91
87.2	87.2	87.2	87.5	90.7	88.7	86.8	93.7	95.7	92.9	92.6	96.7	85.6	89.9	90.2	91.9	95.2	97	116	105	108	97.8	100	96.6	103	93.4	97.9	83.7	95.7	87.8	85.7	99.5
94.3	77.1	71.4	96.8	82.6	85.3	91.4	84.5	86.5	84.1	96.7	105	97.5	99.7	98.5	92.3	82.1	89.3	101	83.7	86.4	88.9	93.6	91.6	83.8	78	113	72.9	75.3	104	91	108
96.4	76.5	70.7	100	81.8	85	91.6	86	88	78.6	95.3	93.3	104	90.2	102	91.8	82.8	91.5	101	85.9	89.3	88.2	92.6	90.6	82.6	72.6	101	75.1	75	104	94	90.6
195	145	473	146	106	150	55.3	1370	230	297	23.5	123	6.47	0.1	78.1	6.85	9.07	181	210	219	232	140	154	141	128	108	19.8	14.2	167	134	2530	4180
119	28.7	335	82.2	55.5	11.3	47.1	365	136	190	12.5	81.6	23.3	11.6	376	34.7	45.8	149	120	116	147	83.2	101	79	65.5	41.2	19.1	11.9	63.6	90.5	823	1010
314	174	808	228	162	161	102	1740	366	488	36.4	205	29.8	11.6	454	41.6	54.9	330	330	335	380	223	255	220	194	149	39.2	26.3	231	225	3350	5190
55400	55100	70400	24300	36400	43700	22600	144000	148000	98900	37500	48300	26100	33500	9170	18600	28600	53300	88500	57500	89100	91100	108000	69000	67100	54500	6400	16100	48500	28600	24300	21600
8740	43500	12900	3390	4720	4710	6990	21900	28100	15900	6650	4780	351	340	388	356	297	6230	9120	6100	5070	11000	6690	9660	18100	3910	319	484	6810	3040	3810	1990
-	-	-	-	-	116000	-	163000	-	-	141000	-	169000	-	284000	49400	-	91300	145000	-	-	-	-	-	203000	86800	-	151000	161000	-	188000	-
-	-	-	-	-	16200	-	22000	-	-	20700	-	28600	-	5290	16300	-	12100	15600	-	-	-	-	-	12400	11500	-	20600	16800	-	21500	-
0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.0112	0.01	0.01	0.0112	0.0433	0.01	0.01	0.01	0.01	0.01	0.0222	0.0109	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.522	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0116	0.01	0.0232	0.01	0.01	0.01	0.01
0.015	0.015	0.015	0.015	0.015	0.0219	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.186	0.015	0.015	0.015	0.015
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0433	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.731	0.035	0.035	0.035	0.035
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	02/07/2018	-	02/07/2018	-	-	29/06/2018	-	02/07/2018	-	21/06/2018	21/06/2018	-	20/06/2018	21/06/2018	-	-	-	-	-	21/06/2018	21/06/2018	-	15/06/2018	15/06/2018	-	15/06/2018	-
-	-	-	-	-	James Richards	-	James Richards	-	-	Lucy Caroe	-	Marcin Magdziarek	-	James Richards	Marcin Magdziarek	-	Barbara Urbanek-Walsh	Marcin Magdziarek	-	-	-	-	-	James Richards	Andrzej Ferfecki	-	Renata Bozhkov	Renata Bozhkov	-	Renata Bozhkov	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	Detected	-	Not Detected	-	-	Detected	-	Detected	-	Not Detected	Not Detected	-	Detected	Detected	-	-	-	-	-	Detected	Not Detected	-	Trace	Not Detected	-	Not Detected	-
-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
-	-	-	-	-	Fibre bundles in soil	-	0	-	-	Loose fibres in soil	-	Loose fibre in soil	-	0	0	-	Loose fibres in soil.	Loose fibres in soil	-	-	-	-	-	Soil containing material typical of asbestos cement debris	0	-	Loose fibres in soil	0	-	0	-
112	103	108	110	112	109	106	107	111	109	101	104	108	116	117	111	106	118	111	114	108	112	110	115	112	124	108	105	105	105	109	109
98.6	96.1	88.1	94.7	97.2	96.7	97.2	98.3	95.6	98.4	88.2	99.4	100	99.8	99.8	99.1	98.6	97.7	95.3	88.9	96	98.7	88.7	94.3	96.8	96.3	99.5	97.8	96.9	98.2	97.7	97.2
92	96.6	80.5	90.6	99.8	88.1	89.7	90.4	85	95.5	70.1	98.2	95.7	93.7	96.3	92.9	93.9	94.8	88.2	74	87.3	105	75.7	83.8	92.9	93.5	92.9	96.4	94.6	98.8	95	95.9
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	-	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	0.56	1.08	1.22	1.14	1.13	1.09	1.12	1.08	-	-	-	-	-	-	-	1.98	1.52	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	9.24	8.91	8.99	8.46	9.77	9.61	9.79	9.31	-	-	-	-	-	-	-	33.9	33	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	9.75	9.9	10.1	9.5	10.8	10.6	10.8	10.3	-	-	-	-	-	-	-	35.2	34	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

40AP15	40AP10V	40AP11V	40AP13V	40AP15V	40AQ18	40AQ20	40AQ20	40AQ21	40AQ24	40AQ24	40AQ24	40AQ27	40AQ27	40AQ27	40AQ27	40AQ18V	40AQ20V	40AQ21V	40AQ24V	40AQ27V	40AR11	40AR11	40AR11	40AR16	40AR16	40AR21	40AR25	40AR25	40AR11V	40AR13V	40AR16V	40AR21V	40AR25V
3.003.00	2.602.60	2.402.40	2.002.00	4.204.20	0.200.20	0.800.80	1.501.50	1.501.50	0.500.50	1.001.00	2.002.00	0.200.20	0.700.70	1.201.20	1.901.90	0.300.30	1.801.80	3.003.00	2.102.10	2.002.00	0.500.50	1.001.00	1.701.70	0.500.50	1.001.00	0.500.50	0.500.50	1.001.00	2.302.30	0.200.20	1.401.40	0.700.70	1.301.30
14/06/2018	22/06/2018	22/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	07/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	06/06/2018	14/06/2018	14/06/2018	07/06/2018	06/06/2018	06/06/2018	22/06/2018	22/06/2018	22/06/2018	14/06/2018	14/06/2018	07/06/2018	06/06/2018	06/06/2018	22/06/2018	14/06/2018	14/06/2018	07/06/2018	06/06/2018
5.03	5.26	46	58.6	0.469	3.19	2.83	2.74	2.43	1.47	6.36	1.6	0.35	0.35	0.35	3.53	26.4	81.2	1.68	1.41	2.33	1.5	0.379	2.1	2.53	0.893	1.57	0.872	7.48	1.7	50.2	1.11	1.17	4.69
11.5	12.6	31.2	11	6.84	10.6	6.77	10.7	5.97	5.37	8.15	9.48	6	6.7	6	8.79	14.9	3.64	9.48	12.8	7.81	5.9	9.65	6.68	11.3	7.37	8.82	6.74	17.5	8.9	14.2	12.6	9.82	10.2
0.02	0.02	0.58	0.266	0.485	0.384	0.229	0.326	0.448	0.573	0.547	0.732	0.657	0.401	0.443	0.424	0.378	0.0904	0.251	0.208	0.69	0.409	0.322	0.743	1.5	0.471	0.804	0.242	0.02	0.229	0.281	0.21	0.245	0.399
33.3	37.2	13.4	12.7	25.8	27.8	9.45	51	283	155	162	266	416	466	468	60.6	29.6	5.01	43.8	32.8	57	63.6	8.18	91.6	222	36.9	124	52.3	35.8	37.9	11	30.3	31.7	10.7
24.3	26.2	34.1	17.1	10.1	22.2	42	18	17.8	17.6	30.2	18.5	14.9	14	14	54.2	30.9	8.31	15.2	13.6	15.2	6.34	5.73	19.6	75.3	18	49.8	21.2	24.3	15.6	17.5	11.6	12.7	22.9
25.1	30.9	9.86	9.55	21.2	25.9	28.5	19.9	47	34.5	67.7	45.7	14.4	16.1	19.2	42.2	16.7	2.2	30.4	25.6	58.4	20.9	13.1	49.4	91.4	45.9	61.2	17.9	37.3	29.5	6.62	28.4	28.4	25.5
0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14
31	34.6	57.9	26.1	7.78	18.5	33.1	12.9	12.4	10.3	12.4	18.4	5.34	2.99	2	52.8	34.9	9.48	39.7	40.3	16.2	6.99	9.06	12	65.7	12.4	21.4	8.1	29	42	30.7	38.1	37.7	44.6
1	1	3.26	2.91	1	2.46	1.17	2.31	7.35	6.13	6.97	10	12.4	14.2	13.7	1.61	2.74	1.88	1.26	1	3.71	3.53	1.79	5.2	10	1.83	10	4.75	1	1	1.98	1	1.13	1.45
52	55.3	49.1	28.6	43.1	80.9	28	44.5	248	276	237	444	965	929	1020	59.8	49.1	10.4	72.2	57.8	106	137	40	157	329	42.3	183	137	57.6	60.6	28.4	53.2	56.5	35.9
113	115	75.8	27.6	79.7	53.8	102	46.6	238	171	416	131	36.2	24	33.9	1270	53.9	9.1	116	104	236	104	126	170	476	144	116	46.7	136	98.3	21.5	111	108	128
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.103	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0814	0.04	0.04	0.04	0.01	0.217	0.0749	0.04	0.04	0.04	0.0472	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0644	0.04	0.04	0.04	0.04	0.04	0.04	0.0902	0.04	0.04	0.04	0.01	1.19	0.339	0.04	0.04	0.04	0.189	0.04	0.04	0.04	0.04	0.04	0.04	0.0564
0.1	0.1	0.1	0.1	6.19	0.863	0.1	0.1	8.26	8.23	5.08	0.407	10.7	4.53	1.27	0.1	0.873	1.05	0.1	0.166	2.39	28.6	7.37	4.19	6	2.7	39.5	15.3	0.1	0.267	0.296	1.31	1.46	3.71
0.1	0.1	2.56	5.8	23.6	3.58	1.44	4.48	20.8	25.6	17.1	4.81	20.9	13.9	3.01	0.1	2.09	0.952	0.335	0.1	18.9	48.8	23.8	17.2	22.7	10.6	96.7	42.2	0.1	0.355	0.572	1.72	3.33	6.53
11	7.04	133	201	60.9	20.3	1.53	24.4	134	231	146	69	67.1	63.8	29.4	0.1	53	70.5	7.84	0.449	111	74.7	31.7	153	132	99.3	325	200	3.18	1.36	8.84	1.48	17.4	15.5
0.1	0.1	3.4	46.9	9.35	3.25	0.1	2.81	32.2	50.5	35.9	29.8	13.7	9.08	13.8	0.1	0.1	0.353	0.63	0.1	36	26.6	10.9	40.7	41.1	26.4	87.6	27.1	0.1	0.1	5.83	0.1	1.65	4.89
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.055	0.151	0.04	0.04	0.01	0.145	0.0491	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0433	0.04	0.04	0.04	0.04	0.04	0.04	0.0594	0.04	0.04	0.04	0.01	0.79	0.226	0.04	0.04	0.04	0.125	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	2.71	0.1	1.77	1.34	0.1	1.14	1.5	2.36	1.07	0.558	0.1	0.1	0.1	0.1	0.1	0.493	0.1	0.1	0.1	9.08	1.77	2.03	2.68	0.329	0.1	4.11	0.114	0.1	0.188	0.1	0.402	1.77
0.1	0.555	6.96	10.4	7.06	3.11	0.7	3.87	10.7	18	7.21	5.47	3.56	0.814	1.21	0.1	7.02	3.54	0.602	0.1	0.45	20.3	8.69	13.5	19.6	3.46	23.1	18.9	1.2	0.1	4.58	0.425	2.52	4.65
41.4	29.2	304	253	21.4	21.4	0.1	11.1	46.2	92.2	57.9	61.9	5.76	1.36	26.6	0.1	178	445	2.74	1.17	8.04	45.4	22.9	76.9	107	31.4	59.7	60.5	54.8	2.93	127	0.865	11.2	13.6
10.6	8.8	25.8	59.7	5.15	3.61	0.1	1.38	16.3	49.1	29.9	45.9	0.1	0.565	23.2	0.1	19.8	14.1	0.41	0.834	1.37	24.8	14.6	38.4	52.3	17.3	8.16	15.3	17.2	0.677	56.2	5.18	1.95	3.47
3.52	3.31	7.36	23	1.69	0.1	0.1	0.1	6.42	18.9	12.3	17.8	0.1	0.1	9.38	0.1	3.82	0.1	0.1	0.21	1.06	9.9	5.82	15.4	20.2	8.01	1.76	5.63	7.35	0.1	28.5	3.1	0.1	1.18
12	12	12	12	12	12	12	12	12	12	12	13.3	12	12	12	12	12	24	12	12	22.4	12	12	60	21.6	12	12	12	12	12	12	12	12	12
8	8	8	8	8	8	8	11.1	10.8	8	12.6	8	35.2	78.2	8	8	8	16	14.9	8	19.5	13.6	13	62.5	25.2	27.6	138	223	8	8	8	8	23.2	8
16	16	16	16	16	16	16	16	64.3	16	100	51.6	45.7	154	16	16	16	32	29	16	70.3	33.4	23.1	192	150	32.6	225	269	16	16	16	16	30.4	16
14	14	14	14	31.4	14	14	26.1	545	108	342	422	387	322	54.7	14	14	0.028	63.9	14	471	73.8	21.9	758	2110	113	913	1070	14	14	14	14	112	21.1
15	15	15	15	21.6	15	15	20	340	77.6	329	310	178	161	50.9	15	15	1210	55.7	15	421	63.1	15	506	1390	91.5	880	1200	15	15	15	15	106	15
15	15	15	15	35.7	32.7	15	27.6	377	133	453	628	416	267	86	15	15	3	86.5	15	614	120	27.8	878	2740	183	1240	970	31.1	15	15	15	155	31.8
14	14	14	14	14	14	14	14	202	57.1	246	294	178	111	27.7	14	14	0.028	28.9	14	222	36.2	14	342	1040	63.2	420	438	14	14	14	14	47.3	14
24	24	24	24	24	24	24	24	215	69.4	280	291	163	110	48.2	24	24	<0.048	50.2	24	360	61.8	24	419	988	84.1	619	719	24	24	24	24	73.6	24
10	10	10	10	38.1	25.2	20.3	29.6	477	130	360	482	441	283	62.8	10	10	0.02	70.4	10	458	87.4	24	788	2000	146	944	1000	22.7	10	10	10	124	35.2
0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	46.2	0.023	55.7	60.2	38	28.1	0.023	0.023	0.023	0.046	0.023	0.023	81.7	0.023	0.023	0.115	222	0.023	116	156	0.023	0.023	0.023	0.023	0.023	0.023
0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	188	62.3	237	302	187	117	42.6	0.018	0.018	0.036	38	0.018	326	53.5	0.018	450	794	74.1	566	611	0.018	0.018	0.018	0.018	65.7	0.018
0.017	0.017	0.017	0.017	75.6	30.9	29	70.2	1180	131	422	680	830	1070	180	0.017	0.017	0.034	174	0.017	616	141	58.5	2130	1200	264	1570	2160	33.2	0.017	0.017	0.017	201	36.6
10	10	10	10	10	10	14	11.6	11.5	10	15	10	10	13.8	10	10	10	0.02	10	10	22.5	14.8	16.3	50	13.4	12.9	79.8	126	10	10	10	10	14.5	10
9	9	9	9	15.1	13	36.4	15.5	24.9	32.6	44.4	16.5	14.2	49	9	9	24.1	0.018	17.4	19.7	63.6	33.4	10.7	87.7	66.6	22	97.4	143	9	9	9	9	23.2	13.6
15	15	15	15	90.6	53	117	62.7	122	65.9	217	282	525	471	229	15	15	3	143	15	238	89.4	57.5	858	394	217	832	1210	15	15	15	15	135	58.2
0.015	0.015	0.015	0.015	0.0557	0.0275	0.015	0.0639	1.42	0.282	0.6	0.618	0.742	0.883	0.144	0.015	0.015	0.03	0.179	0.015	0.874	0.152	0.0592	2.24	4.65	0.261	1.7	2.01	0.015	0.015	0.015	0.015	0.178	0.0283
0.118	0.118	0.118	0.118	0.364	0.182	0.216	0.338	5.22	1.15	3.71	4.45	4.18	4.12	0.926	0.118	0.118	1.21	0.951	0.118	4.88	0.973	0.312	9.71	17.8	1.59	10.3	12.3	0.118	0.118	0.118	0.118	1.29	0.225
93.7	92.4	92.1	99.7	94.1	83.8	92.9	92	88.3	92.4	91.4	88.2	87.1	90.3	89.8	80.6	97.1	96.8	90.4	87.5	93.1	89.7	98.7	92.2	102	99.1	88.2	89.7	84.2	91.2	99.6	83.8	87.7	89.3
91.1	87.2	95.4	97.3	92.4	88.4	87.3	91.7	86.3	90.8	89.3	89.3	88.1	94.8	93.5	83.2	95.6	97.1	86.6	57.4	102	101	100	77.2	93.4	95.5	95	92.2	81	91.2	91.9	80.5	90.4	91.4
91.4	88.1	100	98	97.3	95.1	89.1	93	92	93.1	91.5	92.2	84.5	99.2	98.2	90.1	94.7	99.5	89.4	94.3	121	111	101	97.1	99.2	97.8	98.2	97.2	84.4	99.2	92.2	86.9	94.6	95.1
91.6	86.4	82.8	97.9	107	78.3	84	89.5	91.5	88.4	86.7	95.3	89.3	94.7	90	89.4	87.8	109	89.3	93.1	99.7	101	97.1	77.4	95.3	101	90.2	86.8	84.9	105	96.3	88.7	92.4	80.4
90.8	85.9	74.6	99.1	94.6	77	82.3	93.7	92.5	93.9	91.1	97.2	93.1	90.5	84.7	92.9	88.1	107	95.4	88.6	95.7	103	100	79.6	94.7	96.5	85.1	89.8	83.6	91.8	100	89.2	87.6	76.3
11	7.04	139	254	100	28	2.96	31.7	196	315	204	104	112	91.3	47.4	0.1	55.9	72.9	8.81	0.615	168	179	73.7	215	202	139	549	284	3.18	1.99	15.5	4.52	23.8	30.6
52.1	38.5	339	323	35.3	29.5	0.7	17.5	74.7	162	96.2	114	9.32	2.74	51	0.1	205	463	3.75	2.01	9.87	99.6	48	131	182	52.5	91	98.8	73.2	3.6	188	6.47	16	23.4
63.1	45.6	478	577	135	57.5	3.66	49.2	270	477	300	218	122	94	98.4	0.1	261	536	12.6	2.62	178	281	122	346	384	191	641	383	76.4	5.59	203	11	39.9	54.1
30700	27600	27800	20300	55000	31000	24000	18100	53300	66100	91600	160000	177000	214000	226000	35900	17300	7950	32300	30600	66900	21500	19200	54600	103000	33500	91300	84900	27200	28700	16100	28100	34900	32100
280	261	390	428	2490	2300	535	4000	19300	15600	18200	25300	37600	39000	14.2	489	180	308	763	697	6750	4660	2000	14100	18200	3540	8530	11600	299	293	230	837	739	1560
252000	-	255000	-	-	-	-	-	155000	-	83400	255000	-	169000	-	161000	-	-	-	-	-	24700	-	144000	-	107000	-	170000	-	-	-	135000	-	114000
6760	-	7470	-	-	-	-	-	17500	-	7980	17700	-	41300	-	12900	-	-	-	-	-	6420	-	17200	-	29600	-	24700	-	-	-	40500	-	27600
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0318	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0264	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0174	0.01	0.01	0.0106	0.01	0.01
0.015	0.015	0.015	0.015	0.176	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
0.035	0.035	0.035	0.035	0.176	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0424	0.035	0.035
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18/06/2018	-	18/06/2018	-	-	-	-	-	29/06/2018	-	29/06/2018	20/06/2018	-	15/06/2018	-	18/06/2018	-	-	-	-	-	21/06/2018	-	21/06/2018	-	21/06/2018	-	18/06/2018	-	-	-	10/08/2018	-	10/08/2018
Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	-	-	-	-	Lucy Caroe	-	Andrzej Ferfecki	Barbara Urbanek-Walsh	-	Renata Bozhkov	-	Barbara Urbanek-Walsh	-	-	-	-	-	Andrzej Ferfecki	-	Andrzej Ferfecki	-	James Richards	-	Marcin Magdziarek	-	-	-	Renata Bozhkov	-	Renata Bozhkov
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Not Detected	-	Not Detected	-	-	-	-	-	Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Detected	-	Detected
Not Detected	-	Not Detected	-	-	-	-	-	Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
0	-	0	-	-	-	-	-	Fibre bundles in soil	-	0	0	-	0	-	0	-	-	-	-	-	0	-	loose fibres in soil	-	0	-	0	-	-	-	Loose fibres in soil.	-	Soil containing ACM debris.
98.9	99.6	8.9	118	107	105	103	108	109	112	107	116	113	113	123	106	110	108	103	110	110	123	109	115	104	114	109	138	110	111	104	99.5	97.3	98.6
97.9	97.8	94.9	100	95.4	92.5	97.2	97.7	98.1	99.2	99.6	98.9	97.4	95.9	97.6	97.1	99.1	99.6	89.9	97	96.8	96.9	99.8	96.3	94.4	100	97.6	98.7	92.1	98.7	97.3	98.7	99.3	97.8
97	97.5	98.7	97	81.7	81.9	98.9	97.2	93.9	93.5	99.7	95.1	92.5	95.5	95	96.2	102	98.7	70.1	96.8	96.5	90.5	94.5	91.5	77.9	95.2	96.2	103	93.8	95.7	95.4	86.1	90.7	88.2
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.266	0.13	0.13
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
-	-	-	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	0.5	0.5	0.5	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	1.05	0.6	0.5	-	-	-	-	-	1.53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	6.72	12.6	15.2	-	-	-	-	-	37.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	7.7	13.2	15.2	-	-	-	-	-	38.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

40AS12	40AS12	40AS18	40AS18	40AS18	40AS27	40AS27	40AS12V	40AS18V	40AS27V	RLS2TP1	RLS2TP10	RLS2TP10	RLS2TP10	RLS2TP11	RLS2TP12	RLS2TP13	RLS2TP13	RLS2TP14	RLS2TP14	RLS2TP14	RLS2TP15	RLS2TP15	RLS2TP15	RLS2TP2	RLS2TP2	RLS2TP3	RLS2TP4	RLS2TP5	RLS2TP5	RLS2TP6	RLS2TP6	RLS2TP6	RLS2TP7
0.500.50	1.001.00	0.500.50	1.001.00	2.002.00	0.200.20	0.700.70	1.801.80	2.302.30	0.800.80	0.200.20	1.001.00	2.002.00	3.003.00	0.500.50	0.500.50	0.200.20	0.500.50	0.800.80	1.501.50	2.002.00	0.500.50	1.001.00	1.501.50	0.300.30	0.700.70	0.500.50	0.200.20	0.300.30	0.800.80	1.001.00	2.002.00	3.003.00	0.800.80
14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	06/06/2018	06/06/2018	14/06/2018	14/06/2018	06/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018
2.21	2.1	3.91	1.18	1.81	1.95	11.2	8.93	3.65	16.8	2.5	3	3.15	5.72	2.59	1.18	17.4	4.22	24.8	2.07	3.1	5.79	2.83	1.17	4.14	1.62	2.34	3.65	2.22	3.72	5.26	1.95	1.37	5.86
6.82	7.27	45.1	15.5	2.74	3.67	18.3	21	12.3	18	6.02	6.65	5.64	24.2	8.16	12.4	16.4	7.12	8.03	4.84	6	8.47	7.29	6.16	11.2	11.2	12.6	8.97	11.6	9.25	8.81	10.3	5.53	9.87
0.336	0.221	1.84	0.998	0.253	0.263	0.757	0.735	0.509	0.641	0.688	1.18	0.579	0.783	0.356	0.76	0.271	0.513	0.553	0.676	0.998	0.867	0.611	0.18	0.246	1.47	0.283	0.493	0.515	1.02	1.45	1.05	0.753	1.16
0.989	35.9	24.2	9	105	50.1	40.9	35.7	26.3	6.89	77.1	116	64.4	206	36	4.03	4.89	326	47.1	31.9	249	89.1	52.6	29.5	12	203	14	0.9	96.7	73.9	148	121	134	318
9.21	23.8	18.5	14	8.66	12.9	29.6	27.7	21.3	49.3	22.1	25.5	16.5	128	15.2	9.35	20.6	36	39.2	14	22	25.9	18.3	14.3	16.7	25.4	19.5	14.7	20.3	29.1	21	24.7	19.8	33.1
13.1	24.9	34.8	40.6	11.7	14.8	49.8	51.5	36.3	57.4	68.3	89.6	51.1	110	24.2	20.2	20.6	47.3	48.8	49	67.9	104	49.1	12.8	19.5	52.4	15.9	16.6	24.9	65.9	49.6	61.6	69.2	118
0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.11	0.14	0.14	0.14	2.69	0.14	0.14	1.4	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14
10.2	13.9	18.3	18.8	7.21	10.9	30.9	30.4	29	53.1	12.2	13.7	10.1	19.1	15.8	14	20.4	11.6	20.4	10.9	13.9	16.2	13.5	17	21.6	25.8	24.4	17.7	17.8	24.9	22.2	18.3	14.2	30
1	5.3	2.53	10	5.06	4.38	1.5	1.4	1.02	1.23	3.65	10	2.19	2.57	1.81	2.22	1	6.33	2.07	4.1	10	3.44	2.01	1.19	1.83	13.8	1	1.19	4.76	10	10	10	4.58	4.14
14.2	108	49.2	16.5	199	171	70	58.3	45.3	37.5	108	123	51.5	98.4	67.6	26.6	17.9	248	82.5	54.8	256	152	71.4	121	35.1	532	24.1	13.1	175	111	157	136	144	128
31.7	49.9	447	75.4	41	54.9	146	159	154	83.7	187	344	207	388	84.4	67.5	42.7	146	109	109	145	353	267	40.2	54.7	156	53.2	58	72.7	290	164	134	206	332
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.223	0.04	0.04	0.04	0.04	0.04	0.04	0.0408	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.244	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0627	2.66	0.04	0.04	0.04	0.04	0.04	0.04	0.0864	0.04	0.04	0.04	0.04	0.0496	0.04	0.04	0.04	0.04	0.04	0.04	0.265	0.187	0.237
0.04	0.04	0.0622	0.04	0.04	0.04	0.04	0.04	0.04	0.0684	0.0414	0.0526	26	0.04	0.04	0.04	0.04	0.04	0.04	0.158	0.04	0.04	0.04	0.04	0.131	0.04	0.04	0.04	0.04	0.04	0.04	0.0414	1.52	1.83
0.04	0.0754	0.106	0.04	0.04	0.04	0.04	0.04	0.04	0.0616	0.132	0.0638	12.9	0.04	0.04	0.04	0.04	0.04	0.04	0.456	0.04	0.04	0.04	0.04	0.133	0.04	0.04	0.04	0.04	0.04	0.04	0.04	3.58	5.33
1.93	6.44	14.1	0.573	1.12	0.793	0.1	3.76	0.1	2.47	20.8	6.86	8.07	0.1	0.1	0.1	1.18	3.15	3.48	23.9	3.22	4.39	4.89	0.1	0.1	1.07	2.32	2.01	0.1	5.57	4.97	9.93	4.08	147
2.42	11.3	22.6	1.63	2.28	1.53	0.1	0.559	0.1	2.49	53.8	30.4	22.3	1.92	0.1	0.1	3.45	13.5	20	34.6	18.5	16.4	22.6	0.1	2.38	4.07	17.3	2.8	3.62	27	20.9	32.4	20.8	270
3.75	62.8	43.5	17.4	15.6	7.8	2.99	8.63	3.34	5.73	195	186	170	29.4	13.9	9.73	8.65	96.6	124	36.3	120	71.9	84.9	8.45	39.4	24.5	34.3	10.8	12.7	166	110	217	87.1	424
0.1	27.9	11.3	3.57	3.05	0.813	0.1	0.1	0.1	0.877	78.5	61.3	42.6	7.75	5.87	2.01	1.88	27.8	28.5	5.5	23.9	12.9	18.9	0.1	7.86	7.67	5.6	1.79	0.1	35.3	24	51	12.2	75.7
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.04	0.04	0.0531	0.04	0.04	0.04	0.04	0.04	0.04	0.0456	0.04	0.04	17.4	0.04	0.04	0.04	0.04	0.04	0.04	0.142	0.04	0.04	0.04	0.04	0.0897	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1.03	1.31
0.04	0.051	0.0712	0.04	0.04	0.04	0.04	0.04	0.04	0.041	0.0885	0.0426	8.57	0.04	0.04	0.04	0.04	0.04	0.04	0.304	0.04	0.04	0.04	0.04	0.0885	0.04	0.04	0.04	0.04	0.04	0.04	0.04	2.39	3.55
0.1	2.55	4.99	0.1	0.461	0.1	0.1	1.43	0.1	1.31	5.16	1.2	3.4	2.23	0.1	0.1	0.47	2.15	3.64	0.1	1.5	1.43	1.62	0.1	1.57	0.1	0.213	1.1	1.08	1.96	1.77	3.23	2.11	64.1
0.1	6.73	10.4	0.466	2.04	0.1	1.22	1.95	1.28	2.45	19.8	12.2	11.3	14.9	2.04	0.1	0.841	11.9	26.4	3.05	8.77	6.73	9.96	0.977	2.66	5.98	6.72	4.39	4.34	14.6	10	19.5	9.95	116
0.1	42.3	26.3	8.56	15.3	4.59	25.7	43	17.8	0.1	106	96.1	97.5	79	20.4	5.83	5.86	79.3	122	1.18	51.9	28.9	42.7	4.64	12.9	23.1	22.5	10.7	7.91	77.5	60	130	45.7	159
0.1	28.1	12.3	3.87	4.34	1.07	2.68	7.39	3.21	0.1	71.5	49.2	24.2	31.8	11.9	1.24	1.8	39.3	33.7	0.217	21.9	8.17	16.7	1.61	2.52	9.6	4.48	3.24	2.35	30.3	25.6	72.3	20.6	50.5
0.1	11.3	4.69	1.31	1.33	0.123	0.1	2.29	0.1	0.1	29.2	20.6	8.33	12.2	5.16	0.1	0.1	14.3	11.9	0.1	8.29	2.66	6.43	0.1	0.1	3.62	1.56	1.13	0.901	12.3	9.92	29.6	7.78	20
12	12	12	12	12	12	12	12	12	12	15.4	24	12	87.4	12	12	12	12	15.9	12	24	12	12	12	12	12	12	12	12	14.1	14	12	24	140
8	13.4	96.7	8	8	8	8	8	8	8	31.7	31.2	33.8	208	8	8	8	155	1170	15.3	40.4	33.2	57.8	8	8	8	8	8	9.11	36.6	25.6	38.5	31.9	220
16	20.2	79.7	16	16	16	16	16	16	16	57.5	78.7	55.9	734	23.7	16	16	220	1440	23.4	160	64.6	97.5	16	16	220	16	18.6	35.8	82.9	104	106	183	385
18.5	59.9	72.8	26.1	56.1	71.9	27.2	33.3	21.2	14	328	387	233	2030	88.5	14	20.7	1450	5960	68.4	812	222	528	14	51.1	1520	14	60.5	67.4	295	368	543	578	545
15	33.8	45.2	21.3	56.5	67.3	28.2	34	21.3	15	322	377	191	1800	87.9	15	15	2070	7860	77.1	630	211	617	15	18.6	743	15	64.1	19.4	279	396	433	475	437
22.7	95.7	101	37.7	101	111	51.9	80.6	45.6	15	626	629	336	3030	134	18.8	39	2030	7540	114	1050	370	876	15	60.8	1800	21.6	122	47.5	550	609	725	781	667
14	30.3	34.6	14	34.4	34.4	14	29.9	14	14	246	221	111	1230	46.1	14	14	866	3900	40.7	339	134	306	14	14	554	14	39.9	14	151	228	282	307	252
24	34	41.8	24	44.1	53.8	24	45.9	24	24	307	320	154	1310	69.5	24	24	1830	5720	64.8	481	193	508	24	24	611	24	53.6	24	245	322	382	385	319
27.9	85.6	97.7	28.1	56.2	75.4	36.3	51.7	28.5	10	420	485	258	2470	92.5	16.4	38.6	1500	5020	69.1	817	234	554	11.3	92.3	1590	16.5	84.2	143	360	442	590	563	626
0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	46.1	64	34.2	327	0.023	0.023	0.023	318	1120	0.023	99.7	46.4	98.3	0.023	0.023	148	0.023	0.023	0.023	41.9	61.6	82.7	92.3	78
0.018	39.4	44.3	0.018	51.7	55.4	0.018	0.018	0.018	0.018	335	277	163	1350	65.2	0.018	0.018	1500	5230	54.9	372	190	491	0.018	0.018	697	0.018	60.6	21	275	313	488	342	304
36.5	146	255	39.8	91.8	120	57.2	59.5	41.1	0.017	448	727	380	3770	145	23.7	51.4	2000	9370	155	1360	502	1030	0.017	38	3280	33.3	103	163	461	607	1030	1200	1300
10	10	96.3	10	10	10	10	10	10	10	31.5	30.8	38.6	255	10	10	21.6	74.9	555	10	0.02	16.9	17.1	10	19	10	10	19	13.5	25.1	19	20.1	58.7	601
32	39.7	119	15.5	9	11	9	9	9	13.5	59	60.1	61.8	181	41.5	13.4	124	170	474	98.3	72.3	68.3	34.8	14.7	29	49.4	20.9	43.4	39.1	107	57.6	34	48.2	234
67.7	128	423	45.8	58.1	64.8	35.3	26.6	23.3	39.9	232	402	265	2520	104	29.4	115	925	5100	119	749	299	398	36.8	72.9	1310	39.2	101	183	424	370	597	1090	1720
0.0278	0.131	0.18	0.0335	0.0797	0.0943	0.0445	0.0502	0.0329	0.015	0.576	0.766	0.356	2.92	0.112	0.0213	0.0393	2.13	9.79	0.148	1.24	0.469	1.07	0.015	0.035	3.38	0.0277	0.0948	0.168	0.47	0.584	0.905	1.16	1.03
0.233	0.858	1.69	0.248	0.63	0.759	0.281	0.412	0.214	0.118	4.08	4.86	2.67	24.2	1.01	0.123	0.45	17.2	70.3	1.05	8.22	3.05	6.68	0.118	0.417	15.9	0.159	0.864	0.909	3.82	4.52	6.26	7.29	8.86
99.7	86.2	84.1	100	92.1	92.2	87.6	105	100	86.8	93.4	97.7	100	87.8	97.3	95.5	99.6	97.9	98.2	87.1	102	86.3	86.2	91.8	98.4	91	91.7	91.4	96.4	89.4	91.5	90.1	93.5	88.2
84.3	88.6	88.1	89.3	89.8	42.4	86.7	90	88.5	88.8	95.5	100	90.3	84.5	90.2	92	85.5	90.1	90.2	85.8	84.7	78.1	74.5	88.1	85.4	94.3	90.5	90.5	94.8	92.3	91.9	86.8	90.3	99.2
80.4	94.3	91.8	87.4	91.3	97.7	86.1	83.6	92.8	83.2	96.3	99.3	92	90.8	91.3	93.2	74.6	91.1	94.4	98	84.7	94.9	93.6	90.9	88.7	98	94.3	89.1	91	93	88.5	92.5	95.2	98.1
92.5	78.3	73.4	103	96.9	93.6	79.1	101	94.8	71.1	102	106	102	88.3	85.4	87.3	78.7	107	108	81.3	99.4	75.5	81.6	91.9	88.5	96.9	90.9	87	83.8	102	92.7	90	104	98.7
92	79.3	71.1	104	95.1	88.3	81.9	104	93.7	65.8	102	101	102	93.4	86.5	87.2	84.4	112	113	84.5	102	73.6	82.9	86.1	86.4	91.6	92.1	90	80.3	102	97.7	93.7	99.8	93.9
8.1	108	91.5	23.2	22	10.9	2.99	12.9	3.34	11.6	348	284	243	39	19.7	11.7	15.2	141	176	100	166	106	131	8.45	49.6	37.4	59.4	17.4	16.3	234	160	311	124	917
0.1	79.7	53.9	12.9	22.1	5.66	29.6	53.8	22.3	3.77	202	159	136	128	34.4	7.07	8.97	133	186	4.45	84.1	45.2	71	7.23	19.7	38.7	33.9	19.4	15.7	124	97.4	225	78.3	390
8.1	188	146	36.1	44.2	16.6	32.6	66.7	25.6	15.5	551	443	448	167	54.1	18.8	24.1	274	362	106	250	151	202	15.7	69.8	76.1	93.4	36.8	32	358	258	536	211	1320
21000	53300	22400	78100	30100	28600	23100	24700	28000	39500	63000	53000	22600	45300	24500	55200	23800	77800	46700	22600	88600	44100	32300	20500	22700	133000	19800	38300	40600	66300	110000	73900	59900	74400
1260	7520	2750	773	7980	6120	228	262	735	685	5860	7310	3130	5600	2630	2690	625	28600	3910	3770	16100	4450	4180	1300	1180	29900	393	846	4370	5560	9910	7360	9430	8890
-	67000	-	117000	-	121000	-	141000	-	-	161000	-	54800	-	128000	-	139000	-	142000	-	163000	-	146000	-	152000	-	189000	-	-	-	-	-	-	-
-	22400	-	11200	-	18100	-	11500	-	-	15800	-	11200	-	4870	-	26100	-	22500	-	23000	-	27600	-	28400	-	19000	-	-	-	-	-	-	-
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.0118	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0109	0.0228	0.151	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.045	0.01	0.01	0.01	0.01	0.01
0.015	0.015	0.015	0.022	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0236	0.015	0.015	0.015	0.015	0.015	0.0565	0.015	0.015	0.015	0.0232	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0565	0.035	0.035	0.035	0.174	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	10/08/2018	-	10/08/2018	-	10/08/2018	-	09/08/2018	-	-	21/06/2018	-	18/06/2018	-	18/06/2018	-	19/06/2018	-	19/06/2018	-	18/06/2018	-	19/06/2018	-	19/06/2018	-	19/06/2018	-	-	-	-	-	-	-
-	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	-	Barbara Urbanek-Walsh	-	Paul Poynton	-	Christian Hallam	-	Christian Hallam	-	Christian Hallam	-	Paul Poynton	-	Christian Hallam	-	Christian Hallam	-	Christian Hallam	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	Not Detected	-	Trace	-	Not Detected	-	Trace	-	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-	-	-	-	-	-	-
-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
-	0	-	Loose fibres in soil.	-	0	-	Loose fibres in soil.	-	-	Fibre bundles in soil.	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	Soil containing material typical of Asbestos Bitumen	-	-	-	-	-	-	-
99.7	99.2	102	94.4	92.7	96.4	107	99	96.3	103	104	109	111	107	105	99.2	103	106	106	111	101	108	102	103	99.2	105	100	105	107	107	104	103	104	104
102	93.7	102	95.9	94.2	97.1	97.1	98	97.6	95	99.9	96.9	94.9	97.2	97.8	96.7	97.5	95.9	97.3	95.9	95.6	94.3	95.3	93.4	91.1	95.6	92.4	97.6	89	99.5	93.2	95.8	92.1	95.6
91.1	77.2	110	83.2	81	88	89	87.9	91.1	92.4	95	93	92.7	98	97.9	92.2	97.2	92.8	95.8	88	85.6	93.4	93	75.7	70.2	94.1	88.7	98.1	72.5	98.4	87.4	95.9	88.8	97.2
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.009	0.009	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.007	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.04	0.004	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.13	0.13	0.13	0.362	0.53	0.302	0.247	0.211	0.245	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.013	0.13	0.13	0.013	0.013	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.04	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Lyn Commercial Soils Data

RLS2TP7	RLS2TP7	RLS2TP8	RLS2TP8	RLS2TP8	RLS2TP9	RLS2TP9	RLS2TP10V	RLS2TP11V	RLS2TP12V	RLS2TP13V	RLS2TP14V	RLS2TP15V	RLS2TP1V	RLS2TP2V	RLS2TP3V	RLS2TP4V	RLS2TP5V	RLS2TP6V	RLS2TP7V	RLS2TP8V	RLS2TP9V	CAFTP10	CAFTP10	CAFTP15	CAFTP15	CAFTP16	CAFTP16	CAFTP16	CAFTP19	CAFTP19	CAFTP20	CAFTP20	CAFTP24	CAFTP24	CAFTP25		
2.002.00	3.103.10	1.001.00	2.202.20	2.802.80	0.500.50	1.001.00	4.004.00	0.800.80	0.700.70	0.650.65	2.252.25	2.302.30	0.400.40	1.201.20	1.101.10	0.450.45	1.301.30	5.305.30	3.803.80	3.203.20	1.601.60	0.000.50	0.002.40	0.000.50	0.002.40	0.000.60	0.001.20	0.002.00	0.000.60	0.002.90	0.000.70	0.002.90	0.001.00	0.002.50	0.000.70		
12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	14/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	12/06/2018	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017	16/05/2017		
3.74	5.03	2.83	5.38	1.32	1.83	55.5	6.72	15.9	7.14	26.5	5.86	1.54	5.83	4.26	4.38	3.97	6.12	1.61	30.7	8.29	1.31	5.97	1.19	8.31	9.57	0.778	5.97	5.64	4.86	8.43	0.915	2.14	1.31	2.09	2.97		
7.28	135	9.19	11.3	7.62	9.23	7.63	16.3	9.36	11.8	11.3	15.5	5.34	5.2	9.65	9.94	11.2	11.2	11.6	27.5	15.9	6	11.5	5.68	14.4	6.45	8.72	15.3	34.4	6.53	12.2	8.83	4.26	11.9	6	8.76		
0.798	0.884	1.26	0.41	1.14	0.492	0.236	0.379	0.269	0.415	0.607	0.438	0.104	0.177	0.289	0.186	0.304	0.346	0.161	0.439	0.567	0.2	0.22	0.02	0.412	0.151	0.02	0.327	0.41	0.127	2.61	0.128	0.616	0.0447	0.2	0.02		
25	98.1	81.7	18.1	200	19.1	16.3	40	32	33.6	30.7	39.2	24	31.2	30.1	22.5	38.9	25.9	33.2	28.5	37	33.1	38	7.78	11	12.8	0.9	45.4	35.9	31.7	61.3	28.1	420	58.4	114	39.5		
22.8	126	26.9	23.6	27.2	28.1	18	34.1	21.8	26.8	37	26.2	10.4	17.3	21.2	10.9	25.5	14.1	12.9	35.6	30.3	14	14.3	1.4	20.3	3.82	22.4	32.7	77.1	20.3	14	25	3.88	12.8	17.6	24.8		
71	81.2	145	131	64.7	17.8	7.5	134	19.3	33.4	21.9	35.3	19.5	20.5	21.7	24.7	26.8	20.1	33.9	19.2	43.5	7	27	0.7	23.6	16.6	3.2	28.8	116	25.9	93.7	18.4	16.6	32	13.1	22.6		
0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.401	0.14	0.52	0.14	1.87	0.748	0.14	0.14	0.14	0.14	1.4	0.712		
17.6	169	20.3	28.2	90.4	26.6	21.3	36.2	29	31.6	36.6	34.1	27.8	29.7	35.7	32.9	42.3	33.1	41.4	39.2	35	4.67	37.3	0.763	35.2	6.38	3.93	33.7	54.8	30.3	47	39.6	7.53	40.7	6.54	35.5		
2.11	40.2	3.82	1.68	4.98	10	3.22	1.66	1.66	1.41	2.86	1.29	1	1.1	1	1	1.68	1	1	3.19	1.37	10	1	8.31	1	6.43	1.65	1.54	1	1	10	1	12.3	1.12	10	1		
39.1	139	117	37.6	269	42.7	22.3	61.2	48.6	53	47.5	64.7	40.9	47.5	49.1	44.6	61.2	41.2	59.7	54.4	62.9	47.2	51.2	21.9	26.4	38.3	16.6	57.7	50.7	60.4	204	35.8	1790	93.9	501	61.7		
169	217	302	79.1	331	67.5	64.6	143	81.3	96.6	79.9	122	74.6	76.6	86.2	96.7	104	111	117	42.1	156	19	102	12.6	128	73.4	19.4	117	331	124	369	71	50.9	115	39.7	126		
																					0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
																					0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008		
																					0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012		
																					0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009		
0.04	0.04	0.0433	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0403	0.04		
0.107	0.0439	0.0888	0.0762	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0421	0.0442	0.04	0.0662	0.04	0.04	0.04	0.04	0.104	0.04		
1.44	0.04	0.135	0.291	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.251	0.0527	0.0758	0.04	0.211	0.263	0.04	0.04	0.04	0.084	0.04		
2.18	0.04	0.379	0.611	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.75	0.123	0.0901	0.04	0.488	0.787	0.04	0.04	0.04	0.0759	0.04		
35.8	4.42	12.7	9.17	6.54	0.1	1.62	0.1	0.1	0.1	3.46	0.102	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.13	0.1	3.08	0.228	0.1	0.1	3.49	4.76	0.1	0.1	1.65	1.97	0.109	0.1	0.1	3.76	0.1		
21.2	20.9	34	9.12	31.4	1.72	4.95	0.1	0.1	0.1	7.54	2.51	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.24	0.1	10.3	0.154	5.96	1.59	11.8	11.3	0.1	3.77	3.36	8.7	0.1	0.85	0.1	17.8	0.1		
59.5	136	146	37.5	207	20.1	231	1.98	15.5	3.88	37.9	5.23	0.1	1.23	0.865	6.64	1.15	2.58	0.1	74.1	0.1	15.7	0.1	77.8	14.9	208	42.9	5.59	33.6	8.12	38.9	0.1	6.96	2.67	90.6	3.7		
6.75	36.2	51.3	10.9	49.6	2.32	3.39	0.1	0.1	0.1	1.37	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.89	0.1	40.7	0.1	99	14.9	0.1	6.64	0.1	7.39	0.1	0.485	0.1	15.4	0.1		
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04		
1.01	0.045	0.105	0.213	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.173	0.0433	0.0569	0.04	0.14	0.181	0.04	0.04	0.04	0.0575	0.04		
1.45	0.04	0.252	0.406	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.5	0.0819	0.06	0.04	0.325	0.524	0.04	0.04	0.04	0.0506	0.04		
5.08	1.68	2.99	2.39	2.4	0.778	0.1	0.1	0.1	0.1	2.23	0.1	0.1	0.1	0.1	0.1	0.304	0.1	0.1	0.1	0.1	1.31	0.1	0.1	4.62	4.67	1.48	1.51	1.95	2.28	2.67	0.1	0.333	0.1	3.22	0.1		
14.8	7.38	12.9	7.05	18.2	3.51	4.52	0.1	2.17	0.1	5.97	0.589	0.1	3.05	0.182	0.1	0.115	0.1	0.1	4.31	2.01	4.33	0.1	0.777	5.17	27.9	4.2	0.803	5.74	2.38	6.91	0.1	6.95	3.33	24.6	0.1		
45.3	51	70.3	31.5	117	15.6	280	7.54	111	21.6	159	17.8	7.46	34.7	5.34	26.5	5.82	7.44	3.8	284	19.3	0.1	0.685	43.6	34.4	180	21.1	18.6	38.1	28.3	24.1	0.1	24.8	6.59	191	10.1		
9.22	29.5	50.6	15.2	53.8	8.42	24.8	0.891	6.33	2.31	27.1	1.88	0.1	4.44	0.139	2.12	1.59	3.41	0.1	25.2	2.37	0.1	0.1	56.1	15.2	153	12.3	2.89	19	2.42	11.5	0.1	6.34	0.84	59.1	1.98		
3.31	12.1	22.8	6.26	20.1	3.55	8.32	0.1	0.1	0.1	9.72	0.1	0.1	0.1	0.1	0.1	0.349	1.34	0.1	7.71	0.1	0.1	0.1	24.9	5.49	62.6	4.65	0.1	7.13	0.1	4.02	0.1	1.37	0.1	20.6	0.1		
12	12	12	12	15	12	60	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	24	12	12	78.5	12	12	12	16.7	12	12	12		
22.2	19.4	10.7	8	20.5	8	40	8	8	8	8	8	8	8	8	8	8	8	8	8	8	12.2	8	8	32.9	294	27.9	8	59.5	8	17.7	8	31.7	8	87	8		
28.6	44.9	25	16	69.9	16	80	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	45.6	129	16	16	185	16	84.1	16	86	16	143	16		
77.3	175	185	24.9	1150	155	70	14	14	14	14	14	14	14	14	14	14	14	14	14	32.4	25.2	32.9	59.3	129	371	48.1	14	653	28.4	186	14	595	14	1440	26.7		
57.2	162	191	21.5	1090	93.5	75	15	15	15	15	15	15	15	15	15	15	15	15	15	25.4	30.2	23	63.2	101	449	26.2	33.5	773	15	139	15	711	15	1740	25		
124	264	315	56.8	1810	182	75	15	15	15	15	35.1	15	15	15	15	15	15	15	15	44.2	50.3	27.6	115	173	778	78.4	48.5	1030	28	214	15	1080	15	2380	34.3		
36.2	101	113	18	711	73.8	70	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	39.2	73.3	242	25.4	22.7	340	14	79.5	14	338	14	822	14		
44	130	172	24	983	72.9	120	24	24	24	24	104	24	24	24	24	24	24	24	24	24	33.5	24	102	107	573	50.6	24	625	24	119	24	589	24	1220	24		
93.1	211	238	30.9	1250	172	50	10	10	20.7	10	20.3	10	10	10	10	10	10	10	10	38.3	15.6	23.9	49.2	148	304	48.9	39.5	595	24	178	10	667	10	1400	23.2		
0.023	30	34.6	0.023	177	0.023	0.115	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	123	0.023	0.023	155	0.023	26.4	0.023	118	0.023	219	0.023		
54.1	125	141	25.8	866	67.2	90	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	23.2	0.018	76.5	87.2	403	38.1	0.018	527	0.018	79.9	0.018	418	0.018	879	0.018		
148	330	275	64	854	136	0.085	0.017	0.017	30.4	0.017	32.4	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	68.3	41.3	35.5	82.2	294	611	84.2	70.8	1020	57.6	294	29.3	925	0.017	2250	32.4		
35.2	13.2	10	10	11.8	10	50	10	10	10	10	10	10	10	10	10	10	10	10	26.1	10	10	10	10	48	129	12.2	10	71.3	16.8	23.6	10	21.2	10	41.4	10		
44.2	28.2	27.2	22.8	60	28.2	45	9	9	9	9	9	9	9	9	9	9	9	9	9	67.4	15.8	43.6	27.9	64.5	253	41.9	18.8	237	9	58.9	9	26.7	9	32.4	9		
139	198	124	57.2	288	116	75	15	15	15	15	15	15	15	15	15	15	15	15	15	107	41.5	105	54.3	246	433	83.1	59.6	572	63.9	398	48.1	383	15	674	15		
0.128	0.342	0.329	0.0522	2.36	0.335	0.075	0.015	0.015	0.015	0.015	0.0275	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0556																	
1.03	2.17	2.18	0.374	11.7	1.43	0.59	0.118	0.118	0.118	0.118	0.219	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.439	0.33	0.321	0.741	1.75	5.61	0.634	0.347	7.7	0.262	2.18	0.118	6.84	0.118	15.5	0.168		
92.8	91.6	91.7	93.2	92	91	86.1	85.9	96.6	96.6	96.6	89.8	82.2	75.9	88	95.3	90.5	88.7	83	97.6	88.1	97.9	104	97.5	114	103	113	104	118	107	105	110	103	98.8	112	120		
95.3	88.4	95.4	96.2	90.3	91.4	81.3	90.5	93.2	91.9	89.6	89.3	81.3	76.5	93	94.7	87.3	86	79.5	97.7	87.4	98.2	100	96	111	99.8	110	102	114	103	101	106	98.7	95.7	109	114		
96.9	91.4	98.4	98.5	97.9	91.1	81.9	101	95	95	92.5	88.1	85.7	85.1	95.6	97.7	89.2	89.6	85	102	93	96.4	95.3	95.7	106	98	107	101	111	101	95.5	104	95.9	93.3	107	108		
94.7	95	103	97.1	106	95.8	86.7	97.9	89	89.7	103	79.8	85.2	83.3	99.9	95.1	90.1	88.7	92.4	90.4	95.6	91.2	96.2	86.4	95.1	101	90.8	94	116	88.7	95.7	104	101	86.5	96	108		
89.8	89.9	100	93.2	107	90.4	79.6	98.9	88.9	87.2	98.4	83.3	85.6	89.7	97.8	95.1	90.8	88.6	87.9	87.6	90.5	89.9	101	80.4	95.9	108	87.7	90.2	125	88.7	98.3	110	108	76.9	96.1	113		
123	197	244	66.7	295	24.2	241	1.98	15.5	3.88	50.2	7.85	0.1	1.23	0.865	6.64	1.15	2.58	0.1	76.5	0.1	33	0.381	124	16.5	323	73.8	5.59	44	13.1	57	0.109	8.29	2.67	128	3.7		
74.3	89.6	137	56.1	192	28.3	309	8.44	120	23.9	194	20.2	7.46	42.2	5.67	28.7	7.83	10.8	3.8	314	23.7	5.64	0.685	100	59.4	366	39.1	23.8	64.7	35.4	45.2	0.1	38.4	10.8	278	12.1		
204	287	382	124	487	52.4	550	10.4	135	27.8	244	28.1	7.46	43.4	6.53	35.3	8.98	13.4	3.8	390	23.7																	
19000	78400	56900	27900	86300	52200	14300	30300	21800	22500	20400	22300	23900	24200	31100	28700	28200	23900	30800	21300	27100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
2180	140000	6350	1050	11200	2110	325	414	164	341	185	240	388	161	326	615	542	405	411	255	277	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	193000	-	-	156000	-	175000	-	217000	-	-	153000	110000	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
-	-	-	-	-	-	-	-	-	18000	-	-	16200	-	26500	-	8890	-	-	13700	22800	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0155	0.01	0.01	0.0222	0.01	0.01	0.01	0.0115	0.0109	0.01	0.01	0.01	0.249	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0155	0.01	0.01	0.0555	0.01	0.01	0.0111	0.046	0.01	0.01	0.01	0.0108	0.01	0.01	0.0128	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01		
0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0555	0.015	0.015	0.015	0.023	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015		
0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.133	0.035	0.035	0.035	0.0805	0.035	0.035	0.035	0.035	0.249	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035		
																					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
																					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
																					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
																					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
																					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
																					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
																					1	1	1	1	1	1	1	1	1	1	1	1.08	1	1	1		
																					12	322	13.9	263	12	12	458	12	228	12	92.8	12	152	12	364		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	03/08/2018	-	-	17/07/2018	-	17/07/2018	-	16/07/2018	-	-	18/07/2018	18/07/2018	-	-	23/05/17	-	23/05/17	-	-	-	-	23/05/17	-	23/05/17	-	-	-		
-	-	-	-	-	-	-	-	-	Lucy Caroe	-	-	Lucy Caroe	-	Andrzej Ferfecki	-	Marcin Magdziarek	-	-	James Richards	Lucy Caroe	-	-	Lauren Sargeant	-	Lauren Sargeant	-	-	-	-	Lauren Sargeant	-	Lauren Sargeant	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
																					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
																					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-		
-	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-		
-	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-		
-	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-		
-	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-		
-	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-		
-	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	-	Detected	-	-	-	-	Not Detected	-	Not Detected	-	-	-		
-	-	-	-	-	-	-	-	-	0	-	-	0	-	0	-	0	-	-	0	Loose fibres in soil	-	-	0	-	0	-	-	-	-	0	-	0	-	-	-		
108	106	109	108	104	110	107	114	104	102	103	102	96.3	93.5	95.3	100	98.8	97.7	99.1	96.4	98.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
97.2	95.1	97.9	98.1	96.5	96.6	96.7	97.9	96.9	96.3	97.4	96.6	98	95.1	93.5	97.3	97.2	96.9	99.5	93.6	95.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
96	89.2	97.8	97	98.2	89.2	97.8	88.7	96.3	91.8	89.8	99	97.8	93.8	88.3	101	102	89.7	107	84.6	90.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.2	2	0.1	0.01	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.18	1.8	0.09	0.009	0.09	0.09	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	0.14	1.4	0.07	0.007	0.07	0.07	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.08	0.8	0.04	0.004	0.04	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.2	2	0.1	0.01	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.2	2	0.1	0.01	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	24.3	0.286	0.76	37.1	22.5	0.786	0.013	0.13	0.355	0.764	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	0.8	8	0.4	0.04	0.4	0.4	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	TP3AF601	TP3AF602	TP3AF603	TP3AF701	TP3AF702	TP3AF703	TP3AF801	TP3AF802	TP3AF803	TP3AF10V	TP3AF11V	TP3AF12V
Depth	0.5	1	1.5	0.5	1	1.5	0.25	0.5	0.75	0	0	0
Sampled Date	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	15/12/2017	05/03/2018	05/03/2018	27/02/2018
Carbon												
Soil Organic Matter (SOM)	2.4	2.97	3.52	4.9	2.6	2.03	1.95	3.95	3.07	1.66	1.51	1.95
Metals (Solids)												
Arsenic	9.47	7.53	7.39	10.5	6.98	14.5	19.1	11.6	9.73	11.9	12.2	14.5
Cadmium	0.995	0.185	0.0301	0.67	0.871	0.848	0.669	0.316	0.209	0.216	0.218	0.02
Chromium	0.9	44	28.5	7.44	25.7	41.1	18.7	9	9	33.5	34	27.7
Copper	16.8	15.4	16.5	20.5	17.3	14.3	64.9	26.3	23.9	11.8	15.8	11.6
Lead	44.2	51	66.2	80.9	77.2	85.1	34.8	62.9	68.6	29.6	29.7	30.2
Mercury	0.804	0.633	0.728	0.605	0.685	0.57	1.4	1.4	1.58	0.14	0.14	0.14
Nickel	20.6	16.3	16.6	20	19.1	18.5	24.9	26.4	24.5	38.4	36.8	33
Selenium	1.05	3.41	2.78	2.36	3.29	2.67	10	10	10	1	1.15	1
Vanadium	25.4	127	170	39.6	67.1	170	92.8	55.6	84.6	60.1	59.7	56.1
Zinc	131	170	144	148	187	155	112	155	173	131	134	111
TPH Criteria Working Group (TPH CWG)												
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.0204	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.0533	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.0403	0.04	0.0666	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.0456	0.04	0.0966	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	0.765	0.624	1.92	1.61	0.83	1.15	2.1	1.01	1.98	0.1	0.1	2.63
Aliphatics >C16-C21	2.18	4.75	4.85	4.57	4.73	3.25	7.68	2.72	8.33	0.1	0.1	0.1
Aliphatics >C21-C35	9.69	38.4	31.5	23.6	25.6	19.6	31	13.2	29.1	0.1	2.59	2.91
Aliphatics >C35-C44	0.1	7.03	7.98	3.64	7.18	10.7	6.34	2.34	8.11	0.1	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.0449	0.0555	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.0644	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	4.7	1.56	0.899	1.64	1.95	0.97	4.21	1.73	1.45	0.1	0.791	0.1
Aromatics >EC16-EC21	29.4	7.33	5.15	5.08	9.33	3.64	16.6	4	6.17	0.1	1.62	0.1
Aromatics >EC21-EC35	60.2	34.5	26.6	19.7	33.1	17.1	52.7	14.7	26.8	8.53	18.6	13.8
Aromatics >EC35-EC44	17.7	12.9	11	8.44	14.7	14.9	23.4	6.36	13.9	2.06	7.66	3.04
Aromatics >EC40-EC44	6.59	5.06	4.05	3.15	6.58	6.38	9.51	2.43	5.59	0.548	3.59	1.26
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	78.1	92.8	59.9	45	56.8	34.1	38.9	22.3	60.4	12	12	12
Acenaphthene	144	38.2	17.1	30.7	30.7	30.9	16.5	8	11.6	8	8	8
Anthracene	259	167	127	112	117	90.1	60.9	63.2	91.3	16	16	16
Benz(a)anthracene	739	642	577	369	453	215	293	167	315	14	14	14
Benzo(a)pyrene	597	544	549	325	379	173	312	127	289	15	15	15
Benzo(b)fluoranthene	1080	1010	761	460	560	297	472	208	449	15	15	15
Benzo(k)fluoranthene	386	324	336	175	188	118	175	83.4	178	14	14	14
Benzo(g,h,i)perylene	383	401	356	212	223	141	212	129	266	24	24	24
Chrysene	680	591	520	262	281	221	200	217	353	10	10	10
Dibenzo(a,h)anthracene	121	103	87.9	66.9	74.2	35.4	64.8	0.023	78.5	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	349	361	304	198	230	114	204	95.3	202	0.018	0.018	0.018
Fluoranthene	1180	934	883	498	554	383	368	321	536	0.017	0.017	0.017
Fluorene	222	88.3	41.1	63.2	66.6	40.9	25.6	16.6	41.4	10	10	10
Naphthalene	172	414	165	164	202	122	92.6	76.9	148	9	9	9
Phenanthrene	973	742	545	435	481	353	235	218	345	15	15	15
Pyrene												
PAH, Total Detected USEPA 16	8.19	7.18	6.07	3.77	4.3	2.67	3.06	1.99	3.77	0.118	0.118	0.118
Naphthalene-d8 % recovery**	101	111	96	93	93.9	97.2	92.7	105	104	102	89	96.8
Acenaphthene-d10 % recovery**	99.6	108	94.1	91.3	91.8	94.7	89.8	102	99.9	111	92.3	101
Phenanthrene-d10 % recovery**	96	105	90.9	85.5	86.6	92.8	84.9	99.7	99	103	87.1	93.6
Chrysene-d12 % recovery**	105	109	96.3	92.6	94.4	94.9	87.1	91.5	93.9	100	88.7	94.9
Perylene-d12 % recovery**	108	117	103	102	107	98.6	99.3	88.6	94.9	86	81.5	90.5
Total Aliphatics >C12-C44	12.6	50.8	46.2	33.4	38.4	34.7	47.1	19.3	47.5	0.1	2.59	5.55
Total Aromatics >EC12-EC44	112	56.2	43.7	34.8	59.1	36.6	96.9	26.8	48.3	10.6	28.7	16.8
Total Aliphatics & Aromatics >C5-C44												
Metals - (Solid)												
Iron	45800	62200	68800	44600	57500	56300	88000	79800	118000	35600	34500	41200
Manganese	2300	7200	6020	1920	3710	4890	3330	2880	3430	740	915	468
Metals - (Liquid)												
Calcium	84100	124000	131000	48100	68400	76600	66400	55400	69900	-	-	-
Magnesium	30100	14600	32900	9940	14500	13000	12400	10400	8670	-	-	-
Phenols												
Phenol	0.01	0.01	0.01	0.0106	0.0102	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	0.268	-	0.114	0.299	-	0.125	0.0444	-	0.11	-	-	-
pH	8.84	9.51	9.1	9.94	10.5	9.83	9.81	9.13	9.62	7.65	7.33	7.27
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.125	-	0.058	0.155	-	0.131	0.118	-	0.284	-	-	-
Sulphate, Total potential	0.375	-	0.174	0.465	-	0.393	0.354	-	0.852	-	-	-
Sulphate, acid soluble (total)	0.242	-	0.238	0.406	-	0.115	0.0969	-	0.244	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	212	238	206
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	0.001	-	-	-	-	-
Date of Analysis	04/01/2018	23/12/2017	04/01/2018	04/01/2018	04/01/2018	04/01/2018	03/01/2018	03/01/2018	04/01/2018	-	-	-
Analysed By	Barbara Urbanek-Walsh	Neville Mann	James Richards	Renata Bozhkov	Barbara Urbanek-Walsh	James Richards	James Richards	Renata Bozhkov	Barbara Urbanek-Walsh	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	0.001	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	None	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	N/C	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	0.001	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Detected	Not Detected	Not Detected	-	-	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Comments	0	0	0	0	0	0	Fibre bundles in soil	0	0	-	-	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-	-	-
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AF14V	TP3AF1V	TP3AF9V	TP3AF5V	TP3AF6V	TP3AF7V	TP3AF8V	TP3AG10	TP3AG10	TP3AG11	TP3AG13	TP3AG13
Depth	0	2.7	0	1.4	2.1	2.5	1	1	1.5	0.8	0.8	1.2
Sampled Date	26/02/2018	26/09/2017	09/03/2018	15/12/2017	15/12/2017	15/12/2017	15/12/2017	19/01/2018	19/01/2018	19/01/2018	19/01/2018	19/01/2018
Carbon												
Soil Organic Matter (SOM)	2	10.5	2.14	2.21	7.98	2.81	8.98	3.36	2.59	1.9	1.67	2.03
Metals (Solids)												
Arsenic	10.8	7.57	13	9.97	32	11.9	33.8	8.08	6	13.4	6	6.31
Cadmium	0.02	0.923	0.362	0.02	0.623	0.02	0.288	0.2	0.2	0.2	0.2	0.2
Chromium	25.7	21.1	36.3	23.6	23.2	21.5	24.4	303	319	380	391	187
Copper	9.85	18.6	12.1	14.4	21.1	12.7	21	45.2	32.7	69.8	14.5	14.8
Lead	27.2	53	30.8	24.7	44.5	25	32.8	28	35.3	35.6	32.5	41.5
Mercury	0.14	0.659	0.14	0.828	0.963	0.729	0.844	1.4	1.4	1.4	1.4	1.4
Nickel	26.5	20.2	39.4	33	30.4	30.8	29.7	39.5	32.9	36.4	11.1	6.8
Selenium	1	4.13	1	1.45	1	1.69	1.11	10	10	12.5	10	10
Vanadium	52.8	44.8	65.8	52.6	53.3	49	61.2	310	370	512	344	223
Zinc	101	156	134	126	183	112	138	116	131	107	87.5	108
TPH Criteria Working Group (TPH CWG)												
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.118	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.0648	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.0473	0.04	0.04	0.04	0.04	0.0418	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.0718	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	0.1	0.1	0.1	0.1	0.1	3.55	0.1	2.96	2.7	2.22	1.57	0.737
Aliphatics >C16-C21	0.1	0.856	0.1	0.1	0.609	10	1.38	23.4	19.5	17.8	11.9	3.52
Aliphatics >C21-C35	1.63	12.7	0.487	0.171	10.7	7.42	11.5	238	184	167	38	24.5
Aliphatics >C35-C44	0.1	0.881	0.1	0.1	0.1	0.1	0.1	81.2	62.1	54.9	7.65	6.41
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.118	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.0648	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.0403	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.0473	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.1	2.03	0.1	0.1	1.26	0.734	0.1	1.13	1.15	1.1	0.463	0.1
Aromatics >EC16-EC21	0.683	4.35	0.1	0.1	3.9	3.84	1.11	5.97	5.47	5.3	6.92	1.71
Aromatics >EC21-EC35	6.64	42.1	1.38	13.3	47.4	13.7	58.6	53.1	45.6	42.8	28.7	11.2
Aromatics >EC35-EC44	2.98	8.08	0.1	1.4	7.69	1.53	6.02	28.2	24.9	22	7.42	3.36
Aromatics >EC40-EC44	1.22	2.38	0.1	0.254	1.44	0.1	1.69	11.7	10.3	8.92	2.61	1.21
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	12	12	12	12	12	12	12	30.6	110	23.6	28.4	44
Acenaphthene	8	161	8	8	8	8	8	14.3	23	13.7	10.5	13.5
Anthracene	16	53.4	16	16	16	16	16	68.4	218	48.8	62.3	68.7
Benz(a)anthracene	14	133	14	14	31.2	14	27.9	262	913	241	271	366
Benzo(a)pyrene	15	142	15	15	61	15	26.4	268	920	266	268	382
Benzo(b)fluoranthene	15	349	15	15	62.8	30.7	51.1	495	1370	507	427	596
Benzo(k)fluoranthene	14	86.8	14	14	39.4	14	14	137	492	218	198	210
Benzo(g,h,i)perylene	24	183	24	24	77.5	24	24	253	658	298	231	295
Chrysene	10	202	10	10	68.8	10	23.7	319	860	327	301	358
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	0.023	59.4	162	67.8	57	81.3
Indeno(1,2,3-cd)pyrene	0.018	130	0.018	0.018	54.7	0.018	0.018	193	572	230	197	256
Fluoranthene	0.017	349	0.017	0.017	107	50	41	479	2000	536	415	609
Fluorene	10	134	10	10	14.5	10	10	20.7	54.7	15.8	21.3	21.7
Naphthalene	9	845	9	9	19.8	20.3	17.1	239	239	149	87.7	81.6
Phenanthrene	15	660	15	15	81.1	59.4	37.5	379	1010	381	239	260
Pyrene												
PAH, Total Detected USEPA 16	0.118	3.65	0.118	0.118	0.7	0.201	0.257	3.6	11.1	3.71	3.14	4.13
Naphthalene-d8 % recovery**	91.7	109	103	125	96.1	104	104	85.1	96.6	103	91	93.3
Acenaphthene-d10 % recovery**	102	104	101	116	90.3	101	104	82.2	92.3	97.2	85.8	90.1
Phenanthrene-d10 % recovery**	91.5	100	96.7	112	88.9	96.7	94.6	81.8	90.5	96.8	85.6	88
Chrysene-d12 % recovery**	83.2	99.2	91.2	110	85.1	97.1	91.4	86.8	95.3	101	86.8	86.9
Perylene-d12 % recovery**	94.1	104	90.8	114	88.9	99.6	88.9	95.8	105	110	91	96.1
Total Aliphatics >C12-C44	1.63	14.4	0.487	0.171	11.3	21	12.9	345	269	241	59.2	35.2
Total Aromatics >EC12-EC44	10.3	56.5	1.38	14.7	60.2	19.8	65.7	88.4	77.2	71.3	43.5	16.2
Total Aliphatics & Aromatics >C5-C44												
Metals - (Solid)												
Iron	41600	26100	36600	41400	36900	42000	27800	197000	234000	173000	229000	180000
Manganese	347	740	513	693	350	1150	205	11800	11200	20100	14700	8370
Metals - (Liquid)												
Calcium	-	-	-	4220	8320	17900	-	123000	146000	146000	139000	75200
Magnesium	-	-	-	8870	7640	9030	-	14100	13100	15100	4970	6880
Phenols												
Phenol	0.01	0.0567	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.0111	0.011
Cresols	0.01	0.0756	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.075	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.132	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	-	-	0.042	0.004	0.004	-
pH	7.2	10.6	7.07	7.32	7.44	7.77	6.88	11.9	12.4	12.6	12.4	12.3
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	-	-	-	-	-	-	-	-	0.208	0.215	0.16	-
Sulphate, Total potential	-	-	-	-	-	-	-	-	0.624	0.645	0.48	-
Sulphate, acid soluble (total)	-	-	-	-	-	-	-	-	0.351	0.35	0.297	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	173	24.7	270	183	150	223	60	12	12	12	12	12
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	-	23/01/2018	-	-	24/01/2018
Analysed By	-	-	-	-	-	-	-	-	Eva Guerra	-	-	Christian Hallam
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected
Fibrous Anthophyllite	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected
Fibrous Tremolite	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected
Fibrous Actinolite	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected
Non-Asbestos Fibre	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected
Comments	-	-	-	-	-	-	-	-	0	-	-	0
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	-	0.13	0.13	0.13	0.13	0.13	0.013
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AG501	TP3AG9	TP3AG901	TP3AG902	TP3AG10V	TP3AG11V	TP3AG12V	TP3AG13V	TP3AG14V	TP3AG1V	TP3AG2V	TP3AG3V
Depth	0.5	1.5	0.3	0.9	0	0	0	0	0	0	0	0
Sampled Date	26/09/2017	19/01/2018	26/09/2017	26/09/2017	05/03/2018	05/03/2018	27/02/2018	27/02/2018	26/02/2018	23/01/2018	23/01/2018	24/01/2018
Carbon												
Soil Organic Matter (SOM)	1.16	3.67	1.68	0.35	2.98	3.1	3.62	2.12	3.03	2.1	1.26	0.841
Metals (Solids)												
Arsenic	6	7.36	6	27.6	13.4	12.3	13.4	15.7	12.8	14.8	13	14.4
Cadmium	0.2	0.2	0.2	0.2	0.313	0.193	0.02	0.02	0.02	0.146	0.2	0.274
Chromium	9	79.6	126	9	34.9	34	30.7	27.1	25.3	36.9	34	26.1
Copper	16.3	20.7	14	14	13.9	11.7	11.4	11.4	10.2	14.1	14	9.99
Lead	17.3	73.4	42.6	11.4	40.2	30.3	33.6	28.5	29.7	23.2	35.5	25.8
Mercury	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14
Nickel	11.2	40.4	9.43	6.85	33.7	27.3	29.6	28.8	24.1	32.2	43.6	37.1
Selenium	10	10	10	22.2	1	1	1	1	1	1	10	1
Vanadium	105	197	173	23.5	62.9	55.5	57.1	55.5	52.3	53.7	57.8	49.8
Zinc	55.6	241	135	36.1	155	120	115	108	102	112	120	104
TPH Criteria Working Group (TPH CWG)												
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	2.81	1.54	1.96	1.34	0.139	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	9.69	11.4	10.8	1.96	0.363	0.1	0.349	0.1	0.1	0.1	0.1	0.1
Aliphatics >C21-C35	52.9	69.5	93.1	3	5.24	7.92	7.58	3.63	2.23	1.29	0.855	0.1
Aliphatics >C35-C44	26.6	33.4	89.6	0.698	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.321	1.05	1.02	0.1	0.767	0.591	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	0.75	6.12	4.57	0.1	2.17	1.58	1.03	0.1	0.1	0.1	0.1	0.1
Aromatics >EC21-EC35	33.2	58	82.4	0.1	33.4	44	32.6	15.1	6.09	2.99	1.48	2.43
Aromatics >EC35-EC44	25.7	49.7	115	0.1	9.04	10.2	10.6	7.63	1.19	3.25	0.341	0.726
Aromatics >EC40-EC44	10	21.6	55	0.1	3.24	3.16	4.1	2.15	0.1	1.99	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	12	101	40.6	12	12	12	12	12	12	12	12	12
Acenaphthene	12	19.2	44.2	8	8	8	8	8	8	8	8	8
Anthracene	39.6	149	69.8	16	16	16	16	16	16	16	16	16
Benz(a)anthracene	359	560	316	40.6	14	14	14	14	14	14	14	14
Benzo(a)pyrene	359	705	208	34.9	15	15	15	15	15	15	15	15
Benzo(b)fluoranthene	679	811	342	65.9	15	15	22.5	15	15	15	15	15
Benzo(k)fluoranthene	236	368	136	18.5	14	14	14	14	14	14	14	14
Benzo(g,h,i)perylene	330	619	171	36.7	24	24	24	24	24	24	24	24
Chrysene	366	587	310	22.1	10	10	10	10	10	10	10	10
Dibenzo(a,h)anthracene	80.4	143	41.8	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	260	499	127	25.3	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
Fluoranthene	492	920	352	68.2	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
Fluorene	10	46.6	27.6	10	10	10	10	10	10	10	10	10
Naphthalene	45.5	356	220	40.3	9	9	9	9	9	9	9	9
Phenanthrene	182	478	220	61.4	15	15	24.6	15	15	15	15	15
Pyrene												
PAH, Total Detected USEPA 16	4	7.22	3.52	0.466	0.118	0.118	0.118	0.118	0.118	0.118	0.118	0.118
Naphthalene-d8 % recovery**	101	95.8	102	94.4	130	95.7	105	101	95	103	107	103
Acenaphthene-d10 % recovery**	96.3	91.8	97.9	89.4	130	94	111	106	108	98.8	102	100
Phenanthrene-d10 % recovery**	95	91.1	96.2	87.1	120	89.5	102	97.9	94.6	96	99.3	95
Chrysene-d12 % recovery**	96.4	91.9	99.1	85.5	120	87.7	105	99.8	86.4	84.4	96.2	110
Perylene-d12 % recovery**	104	101	106	85.8	130	85.4	103	101	93.7	78.7	102	103
Total Aliphatics >C12-C44	92	116	195	7	5.74	7.92	7.93	3.63	2.23	1.29	0.855	0.1
Total Aromatics >EC12-EC44	59.9	115	203	0.1	45.4	56.4	44.2	22.7	7.28	6.24	1.82	3.15
Total Aliphatics & Aromatics >C5-C44												
Metals - (Solid)												
Iron	186000	139000	111000	362000	30100	28100	34600	39300	38300	40500	40500	35000
Manganese	5170	5800	13500	32800	661	207	375	412	268	287	542	961
Metals - (Liquid)												
Calcium	119000	178000	180000	1750	-	-	-	-	-	-	-	-
Magnesium	18200	18600	17700	635	-	-	-	-	-	-	-	-
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.0138	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	0.131	0.109	0.136	0.0676	-	-	-	-	-	-	-	-
pH	11.3	9.93	11.4	10.6	7.52	7.58	7.39	7.59	7.33	8.01	8.24	-
Sulphate, Total	11700	-	6490	518	-	-	-	-	-	-	-	-
Sulphur, Total	-	0.184	-	-	-	-	-	-	-	-	-	-
Sulphate, Total potential	-	0.552	-	-	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	1.17	0.287	0.649	0.0518	-	-	-	-	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	233	225	242	247	172	101	87.5	110
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	06/10/17	-	06/10/17	-	-	-	-	-	-	-	-	-
Analysed By	Christian Hallam	-	Christian Hallam	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-
Comments	0	-	0	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	0.13	-	-	-	-	-	-	-	-	-	-
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3AG4V	TP3AG5V	TP3AG6V	TP3AG7V	TP3AG8V	TP3AG9V	TP3AH10	TP3AH101	TP3AH11	TP3AH9	TP3AH901	TP3AH902
Depth	0	2	0	0	0	0	0.8	0.2	1	1	0.5	1.5
Sampled Date	29/01/2018	26/09/2017	30/01/2018	30/01/2018	30/01/2018	09/03/2018	19/01/2018	26/09/2017	19/01/2018	19/01/2018	07/12/2017	07/12/2017
Carbon												
Soil Organic Matter (SOM)	1.02	1.91	0.852	4.83	1.34	2.34	3.38	2.47	0.722	1.83	1.43	0.548
Metals (Solids)												
Arsenic	15.9	10.6	11.4	13.5	15	12.6	9.96	9.28	6	8.53	6	12.4
Cadmium	0.122	0.18	0.02	0.186	0.0415	0.021	0.2	0.2	0.2	0.2	2.43	4.21
Chromium	31.8	28.3	32.3	33.5	31	30.3	709	54.4	773	377	348	9
Copper	10.6	10.8	8.78	12.9	10	11	77.2	56.8	31.3	41.9	35	14
Lead	28.8	28.1	28	34.3	27.9	29.3	34.3	51.8	21.1	39.2	35.8	8.42
Mercury	0.14	0.694	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	1.88
Nickel	40.6	37.6	38	24.2	39	35.1	48.8	24.3	22.4	29.9	22.6	2
Selenium	1.11	1	1	1	1	1	12.5	10	17.4	10.6	10	10
Vanadium	59.8	65.5	58.5	53.3	57.3	60.1	587	230	616	309	279	46.9
Zinc	124	109	122	118	114	126	85.7	149	41.5	100	104	19
TPH Criteria Working Group (TPH CWG)												
Benzene	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.008	0.008	0.008	0.002	0.0113	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.003	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.0584	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.0949	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	0.1	1.56	0.1	0.1	0.242	0.1	2.19	0.849	0.1	10.7	5.66	12.3
Aliphatics >C16-C21	0.1	2.74	0.1	1.24	0.1	0.1	12.1	6.25	3.07	23.8	17.5	19.3
Aliphatics >C21-C35	1.09	3.57	0.1	3.74	1.47	0.1	72.8	49.4	23.7	69.2	73.6	85.5
Aliphatics >C35-C44	0.1	0.1	12.9	0.1	0.1	0.1	18.3	24.6	5.25	42.5	40.7	8.95
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.0642	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.01	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.1	0.37	1.24	0.1	0.1	0.409	1	1.73	0.439	3.08	1.3	3.6
Aromatics >EC16-EC21	0.1	0.1	0.63	0.393	0.1	0.656	4.32	8.05	2.89	10.6	6.35	8.88
Aromatics >EC21-EC35	1.36	0.1	0.1	10.3	2.94	10.9	22.4	35.1	13.9	51.8	55	44.4
Aromatics >EC35-EC44	1.33	0.481	17.9	2.39	1.23	19.3	10	18	5.98	51.1	65.6	13.7
Aromatics >EC40-EC44	0.627	0.1	11.6	0.477	0.1	9.63	4.01	7.22	2.34	24.1	29.3	5.8
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	12	12	12	12	12	12	30.1	41.1	57.7	34.1	12	12
Acenaphthene	8	8	8	8	8	8	10.6	82.1	16.9	39.4	10.3	23.2
Anthracene	16	16	16	16	16	16	56.9	163	97.2	58.5	16	16
Benz(a)anthracene	14	24	14	32.6	14	14	165	604	333	287	119	67.6
Benzo(a)pyrene	15	26.4	15	15	15	15	151	650	286	321	104	49.1
Benzo(b)fluoranthene	15	43.2	15	15	15	15	266	1100	525	540	250	71.6
Benzo(k)fluoranthene	14	14	14	14	14	14	112	378	164	200	94	24.6
Benzo(g,h,i)perylene	24	24	24	24	24	24	147	581	218	294	145	44.6
Chrysene	10	16.6	10	10	10	10	216	590	378	352	164	45.2
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	36.4	131	60.6	72.7	38.5	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	0.018	0.018	0.018	114	422	186	232	128	30.2
Fluoranthene	0.017	37.8	0.017	0.017	0.017	0.017	403	918	609	535	177	81.5
Fluorene	10	10	10	10	10	10	34.4	55.4	54.6	30.4	10	16.4
Naphthalene	9	9	9	9	9	9	210	441	667	126	30.5	35.8
Phenanthrene	15	23.1	15	15	15	15	357	685	361	242	86.8	80.5
Pyrene												
PAH, Total Detected USEPA 16	0.118	0.22	0.118	0.118	0.118	0.118	2.6	7.7	4.48	3.91	1.51	0.642
Naphthalene-d8 % recovery**	97.9	106	106	110	105	88	86.4	101	106	91.9	94.5	95.2
Acenaphthene-d10 % recovery**	93.4	102	99.9	97.7	98.9	94.5	81.7	96	100	88.9	91.2	92.5
Phenanthrene-d10 % recovery**	90.9	99.8	95.3	81.5	95	82.9	81.7	95.2	99.7	88.7	89.1	91
Chrysene-d12 % recovery**	90.4	98.1	91.2	72.8	90.5	80.7	84.6	99.3	98.3	93	98.3	92.8
Perylene-d12 % recovery**	91.5	103	93.3	73.9	92.7	80.2	89.1	106	102	102	106	94.7
Total Aliphatics >C12-C44	1.09	7.87	12.9	4.99	1.71	0.1	105	81	32	146	138	126
Total Aromatics >EC12-EC44	2.69	0.851	19.8	13	4.17	31.3	37.8	62.9	23.2	117	128	70.6
Total Aliphatics & Aromatics >C5-C44												
Metals - (Solid)												
Iron	34200	49800	32800	30100	36900	41000	198000	135000	224000	213000	189000	315000
Manganese	451	1310	439	220	395	500	17500	7030	22900	12600	17000	8630
Metals - (Liquid)												
Calcium	-	-	-	-	-	-	211000	82500	212000	130000	195000	40000
Magnesium	-	-	-	-	-	-	22200	11700	13500	12100	14500	3320
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.0222
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	0.004	0.136	0.0352	0.164	-	-
pH	-	7.86	-	-	-	7.16	12.7	11	12.6	11.6	11.9	11.4
Sulphate, Total	-	-	-	-	-	-	-	2180	-	-	-	-
Sulphur, Total	-	-	-	-	-	-	0.213	-	0.242	0.257	-	-
Sulphate, Total potential	-	-	-	-	-	-	0.639	-	0.726	0.771	-	-
Sulphate, acid soluble (total)	-	-	-	-	-	-	0.302	0.218	0.393	0.478	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	71.1	123	121	260	188	277	12	12	12	12	12	12
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	0.0294	-	-
Date of Analysis	-	-	-	-	-	-	-	06/10/2017	23/01/2018	23/01/2018	19/12/2017	19/12/2017
Analysed By	-	-	-	-	-	-	-	Neville Mann	Paul Poynton	Christian Hallam	James Richards	Renata Bozhkov
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	0.001	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	None	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	N/A	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	0.0294	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	Not Detected	Not Detected	Detected	Not Detected	Not Detected
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Comments	-	-	-	-	-	-	-	0	0	Soil containing material typical of AC	0	0
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	-	0.13	-	0.335	0.13	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	TP3AH1001	TP3AH1002	TP3AH1003	TP3AH1101	TP3AH1102	TP3AH1103	TP3AH1201	TP3AH1202	TP3AH1203	TP3AH11V	TP3AH13V	TP3AH14V	TP3AH1V	TP3AH2V	TP3AH3V	TP3AH4V	TP3AH5V	TP3AH6V	TP3AH7V	TP3AH8V	TP3AH9V	TP3AH12V	TP3AI10	TP3AI11	TP3AI11	TP3AI301	TP3AI601	TP3AI901	TP3AI902	TP3AI1001	TP3AI1002	TP3AI1101	TP3AI1102	TP3AI13V	TP3AI14V	TP3AI1V	TP3AI2V	TP3AI3V	TP3AI3V	TP3AI4V	TP3AI5V	TP3AI6V	TP3AI7V	TP3AI8V	TP3AI9V	TP3AI10V	TP3AI11V	TP3AJ101	TP3AJ1V	TP3AJ2V	TP3AJ3V	TP3AJ4V	TP3AJ5V
											Depth	0.3	1	2	0.5	1.5	2.5	0.5	1	1.6	0	0	0	1.05	0	0	0	0	0	0	0	2	1.8	1	0.5	1.5	0.3	0.5	0.3	0.8	0.4	1.5	1	2	0	0	0	0	0	1.5	0	0	0	0	0	1.1	2.4	2.6	0.2	1.6	0	0	0	0
											Sampled Date	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	26/03/2018	26/03/2018	26/03/2018	26/09/2017	23/01/2018	24/01/2018	29/01/2018	29/01/2018	30/01/2018	30/01/2018	30/01/2018	07/12/2017	07/12/2017	19/01/2018	19/01/2018	19/01/2018	26/09/2017	26/09/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	07/12/2017	26/03/2018	26/03/2018	23/01/2018	23/01/2018	24/01/2018	26/09/2017	29/01/2018	29/01/2018	30/01/2018	30/01/2018	30/01/2018	07/12/2017	07/12/2017	07/12/2017	26/09/2017	26/09/2017	23/01/2018	24/01/2018	29/01/2018	29/01/2018
Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances																																																						
Carbon																																																																
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	1.09	0.35	0.35	3.05	1.14	0.35	0.988	1.11	1.93	0.967	4.24	6.95	3.12	1.08	4.86	1	0.952	2.84	1.95	1.72	3.29	6.02	1.11	0.602	0.484	3.05	0.662	3.15	1.37	1.72	1.3	1.53	0.35	7.83	2.88	2.17	1.01	0.952	1.36	2.67	2.34	0.772	1.52	1.49	8.4	2.59	2.53	7.28	3.43	1.02	2.45	6.05	12.8
Metals (Solids)																																																																
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	6	6	19	6	6.59	32	6	6	8.08	19.8	13.9	15	10.1	12.1	10.7	15.1	13.1	14.6	13.4	11.6	10.4	14.9	6	6	6.06	6	6	6	6	8.68	17.3	23.4	6.33	13.8	12.6	11	16.6	12.8	9.76	13.4	12.7	14.4	12.6	15	14.4	13.7	12.2	12.6	10.7	13.9	10.9	15.3	35.7
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	2.49	0.304	3.66	1.91	2.46	5.05	1.84	1.98	1.88	0.02	0.0955	0.293	0.208	0.2	0.732	0.137	0.151	0.0844	0.0756	0.02	0.616	0.83	0.2	0.2	0.2	0.726	0.2	2.34	2.04	2.66	4.17	2.01	1.77	0.323	0.0374	0.879	0.0609	0.201	0.179	0.203	0.148	0.051	0.0281	0.0632	0.77	0.489	0.418	0.2	0.299	0.02	0.188	0.341	0.683
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	600	12.9	9	1120	73.2	9	1260	984	143	31.9	35.3	36.4	32.8	32.9	5.63	31.3	34.8	30.4	32.1	34.4	61.9	36.6	742	739	308	55	9	9	70.3	89.4	9	796	566	35.2	33	32.1	30	26.7	33.6	33.7	36	25.2	30	36.1	22.7	24.6	25.6	80.2	30.5	31	34.7	36.7	31.2
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	20.6	14	14	14	14	14	14	43.9	14	11.8	13.6	14.7	13.9	14	530	12.1	10.9	12.3	11	10.3	17.8	15.9	56.6	25.3	24.4	17.2	33.4	14	24.9	14	19.5	29.9	14	13.8	11.4	14.7	10.1	9.31	11	13.5	13.2	10.5	11.2	13.1	17.8	11.1	11.2	37.4	14.3	8.98	12.1	16.8	19.2
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	46.1	7	11.2	19.4	18.8	12.8	17.8	43.1	46.5	29	35.8	42.5	27.8	31.9	238	28.3	29	35.1	30.2	25.3	33.5	49.5	37.6	16.5	18.9	28.5	11.8	55.5	24.2	26.9	19.6	28	15.4	40.4	29.9	103	27.4	24	33.5	35.6	27.6	24.4	25.4	31.4	42.7	26.7	27.2	239	31.5	32.3	28.2	43.8	49.8
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	1.4	1.4	1.43	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.676	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.741	0.14	0.14	0.14	0.14	0.14	0.725	0.865	0.905	1.4	0.713	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	12.1	2	2	8.08	8.06	2.42	3.23	30.2	11.9	45.6	26.5	25.5	26.2	43.2	15.7	37.5	38	27.4	31.5	32.5	35.7	29.9	31.3	13.8	15.1	15.5	8.59	30.7	20.1	19.5	10.9	58.8	12.4	23.3	29	30.9	38.5	34.1	38.2	32.9	38.1	31.2	36.7	39.4	25.7	30.8	30.5	29.6	32.4	38.8	36.8	26.6	25.7
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	13.5	10	10	19.2	10	20.1	22	15.7	10	1	1	1	1	10	1	1	1	1	1	1	10	10	15.7	13.8	10	10	10	10	10	10	14.4	15.5	12.3	1	1	1	1.05	1	1	1	1	1	1	1	1	1	1	10	1	1	1	1	1
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	567	28.5	129	706	174	39.1	923	571	170	-	-	-	54.6	54.6	42.1	54.4	58.8	56.5	59.4	56.7	65.9	61.6	627	551	269	186	115	190	155	172	297	635	503	-	-	45.5	60.2	49.1	61.6	61.3	60	46.3	55.5	55.5	49.8	60.9	59.8	224	57	55.4	55.8	58	53.5
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	94.2	19	19	44	30.5	34.4	291	107	82.8	123	125	132	119	98.6	265	140	128	118	117	113	107	145	87.3	28.9	23.5	75.5	45.5	181	62.3	63.5	40	78	34.3	127	117	253	117	102	128	125	115	102	114	113	171	115	116	711	116	122	109	135	152
TPH Criteria Working Group (TPH CWG)																																																																
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.0176	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.0111	0.0123	0.013	0.008	0.008	0.008
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.124	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0816	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.128	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.04	0.04	0.04	0.0488	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.251	0.04	0.04	0.04	0.04	0.04	0.0402	0.04	0.115	0.04	0.04	0.04	0.04	0.04	0.04	0.0561	0.04	0.04	0.04	0.04	0.04	0.0403	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.04	0.04	0.04	0.0933	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.217	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0702	0.04	0.04	0.04	0.04	0.04	0.04	0.105	0.04	0.04	0.0577	0.04	0.04	0.0587	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.225
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	2.57	0.612	0.516	0.1	2.79	0.1	0.1	1.77	0.1	0.1	0.1	2.41	0.1	0.563	0.1	0.1	0.1	0.1	0.1	0.1	19.4	0.1	1.27	1.51	1.31	2.29	6.92	1.2	2	25.9	8.77	1.75	0.972	20.1	1.06	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.74	0.759	0.1	1.24	0.211	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	11.8	3.03	2.4	2.4	7.66	1.1	4.14	9.95	3.63	0.1	1.33	3.46	0.1	0.715	0.1	0.1	0.1	0.1	0.1	0.1	31.9	0.1	10.2	14.6	11.7	21.1	22.1	12.3	15.3	59.5	17.5	15	4.47	12.7	0.665	1.68	1.17	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.06	1.23	0.453	8.05	0.484	0.1	0.1	0.1	0.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	91.4	25.2	15.5	42	22.6	7.94	63.5	83.1	23.5	0.1	7.86	10.5	1.14	0.211	1.49	1.09	1.56	3.74	3.45	0.1	30.4	2.47	81.7	155	120	247	84	116	122	130	33	141	48.6	0.1	6.32	7.03	0.952	1.72	0.1	1.05	0.1	1.1	2.59	2.65	8.8	10.5	2.96	48.8	7.07	0.1	0.1	4.78	7.3
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	26	2.2	2.13	8.82	5.73	0.842	20.9	25.2	3.44	0.1	2.26	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	4	0.1	31.5	52.7	42.1	76.6	18	65.9	86.8	24.6	7.45	39.5	8.9	6.13	5.25	1.12	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.802	0.1	13.2	0.47	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.168	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0837	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.074
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.04	0.04	0.04	0.0618	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.144	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0473	0.04	0.04	0.04	0.04	0.04	0.04	0.0693	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.15
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	1.13	0.1	0.1	1.1	1.1	0.1	0.1	0.964	0.1	0.1	0.1	2.74	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	6.44	0.1	1.88	0.1	0.1	1.37	0.862	1.01	1.63	3.77	2.89	0.88	0.32	8.09	0.237	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.253	1.35	0.263	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	6.24	0.599	1.57	4.72	4.94	1.15	0.1	5.09	1.57	0.1	1.38	3.13	0.1	0.1	0.1	0.133	0.1	0.621	0.1	0.2	15	0.1	5.57	3.44	2.37	9.43	5.02	10.1	10.6	13.8	9.56	5.69	1.32	0.1	0.1	0.533	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.5	0.442	0.1	8.79	0.607	0.446	0.1	0.1	0.85
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	36.8	7.84	16	33.6	29.3	11	17.6	31.3	21.3	0.241	29.8	53.6	5.87	2.14	1.1	1.9	1.66	5.2	4.55	1.95	33.1	31.4	29.7	36.4	27.1	98.4	23.9	103	103	38.5	36.3	50.2	14.4	0.1	15.8	3.52	1.21	0.449	0.1	2.35	0.578	0.717	2.45	1.79	58.2	46.4	10.1	35.1	24	1.78	0.1	31.7	47.9
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	14.4	3.58	3.23	29.5	10.6	0.76	6.56	15.8	3.54	0.353	10.3	8.32	2.77	0.1	0.128	0.1	0.392	1.34	0.1	0.1	8.3	3.64	17.8	20.5	15.7	59	12.5	78.9	109	17	15.1	23.6	4.03	0.1	7.93	0.83	0.517	0.578	0.1	0.406	0.904	0.195	0.4	0.1	5.88	7.88	1.25	13.9	5.82	5.51	0.1	5.73	9.09
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	5.2	1.46	0.1	13.6	3.71	0.1	1.64	6.58	0.1	0.1	4.39	2.66	0.929	0.1	0.1	0.1	0.1	0.367	0.1	0.1	2.68	0.1	7.91	8.49	6.53	24.3	5.36	32.7	50.6	6.49	5.49	8.98	1.43	0.1	3	0.1	0.1	0.1	0.1	0.1	0.502	0.1	0.1	0.1	0.1	2.59	0.1	5.15	1.88	3.33	0.1	2.37	3.45
Polyaromatic Hydrocarbons (PAHs)																																																																
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	12	12	12	34.2	17.1	12	12	19.1	12	12	12	12	12	12	12	12	12	12	12	12	12	12	36	12	15.9	97.3	12	138	35.5	23.1	13.9	12	12	12	12	12	12	12	12	12	12	12	12	12	32	12	12	391	19.2	12	12	12	12
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	37.5	8	9.37	9.74	27.6	8	8	39.3	12.2	8	8	8	8	8	8	8	8	8	8	8	97.1	8	94.8	8	11.9	18.1	8	48.2	18.9	21	27.5	30.3	8	8	8	8	8	8	8	8	8	8	8	8	40.2	8	8	56.9	26.8	8	8	8	8
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	59.9	16	16	58.9	48.9	16	16	53.6	16	16	16	16	16	16	16	16	16	16	16	16	71.5	16	167	16	36.6	174	16	262	61.8	42.7	53.2	36.5	16	16	16	16	16	16	16	16	16	16	16	16	84.4	16	16	625	16	16	16	16	16
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	590	57.9	124	240	348	37.4	32.7	399	33.8	14	14	14	14	14	14	14	14	47	14	14	30	37.8	942	36.9	206	688	25.1	921	325	163	500	349	168	14	14	14	14	14	14	24.4	14	14	14	14	248	20.5	14	1910	42.6	14	14	14	97.7
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	665	49.8	148	257	357	36.5	37.8	406	38.4	15	15	15	15	15	15	15	15	15	15	15	15	51.5	1070	52	200	712	40.6	878	326	133	567	327	176	15	15	15	15	15	15	27.4	15	15	15	15	214	34.1	15	1860	59	15	15	15	61
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	1070	68.3	157	455	550	44.4	53	668	46.5	15	29.4	39.8	15	15	15	15	15	15	15	15	34.6	88.3	1670	105	312	1190	62.4	904	497	272	742	605	277	15	15	15	15	15	15	28.6	15	15	15	15	318	43.1	15	3050	109	15	15	15	129
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	407	34.3	71	174	182	21.5	31.4	254	24.3	14	14	14	14	14	14	14	14	14	14	14	14	29.1	625	42.6	116	401	20.3	562	204	123	290	213	83.7	14	14	14	14	14	14	14	14	14	14	14	135	24.5	14	970	32.9	14	14	14	54.2
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	531	48.8	109	273	264	32.6	39.4	341	42.1	24	24	24	24	24	24	24	24	24	24	24	24	65.2	835	51.5	165	578	38.5	682	347	175	501	290	204	24	24	24	24	24	24	24	24	24	24	24	169	45.6	24	1420	55.4	24	24	24	73.3
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	676	45.3	129	232	324	35.8	39	353	45.1	10	20	23.3	10	10	10	10	10	17.9	10	10	37.3	74.6	1160	52.3	203	639	31	838	327	204	428	332	158	10	10	10	10	10	10	18.5	10	10	10	10	287	29.1	10	1620	52.2	10	10	10	82.4
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	127	0.023	0.023	65.3	63	0.023	0.023	84.7	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	211	0.023	45.3	135	0.023	169	69.4	40.1	82.3	72.6	41	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	58.3	0.023	0.023	360	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	429	34.9	81.6	221	213	26.8	31.6	285	29.7	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	41.4	691	42.6	135	445	26.1	570	259	134	360	244	142	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	152	31.9	0.018	1130	44.7	0.018	0.018	0.018	62
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	1010	72.4	173	309	513	69.5	86.9	604	83.2	0.017	33.8	41.4	0.017	0.017	0.017	0.017	0.017	31.6	0.017	0.017	159	91.1	1670	104	306	1030	57.4	1530	449	287	631	570	214	0.017	0.017	0.017	0.017	0.017	0.017	36.1	0.017	0.017	0.017	0.017	408	52	0.017	3390	92.7	0.017	0.017	0.017	117
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	18.1	10	10	16.1	18.3	10	10	25.3	11.7	10	10	10	10	10	10	10	10	10	10	10	135	10	68.7	10	21.2	55.2	10	139	28.6	22.4	16.7	15.1	10	10	10	10	10	10	10	10	10	10	10	10	52.5	10	10	213	25.2	10	10	10	10
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	49.9	9	9	102	34.4	29.8	9	98.7	44.7	9	9	9	9	9	9	9	9	32.8	9	9	226	31	242	39.3	117	201	29.3	490	137	165	83.4	64.8	18.7	9	9	9	9	9	9	9	9	9	9	9	50.6	54.8	9	1130	115	9	9	9	9
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	551	39.8	75.4	219	372	60.7	73	415	87.4	15	22.9	31.6	15	15	15	15	15	45.9	15	15	381	83.8	1010	98	200	428	45.5	884	237	205	304	340	103	15	15	15	15	15	15	26	15	15	15	15	255	53.7	15	1840	74.6	15	15	15	83.7
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09																																																							
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	7.08	0.521	1.24	2.96	3.8	0.458	0.486	4.52	0.564	0.118	0.132	0.168	0.118	0.118	0.118	0.118	0.118	0.2	0.118	0.118	1.29	0.664	11.9	0.698	2.33	7.81	0.422	10.4	3.88	2.24	5.16	3.93	1.78	0.118	0.118	0.118	0.118	0.118	0.118	0.19	0.118	0.118	0.118	0.118	2.87	0.431	0.118	22.6	0.816	0.118	0.118	0.118	0.845
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	100	90.3	89.7	93.6	100	90.8	88.2	100	95.9	102	94.9	90.7	106	116	109	101	106	114	99.5	97.9	101	117	101	95.6	92.3	100	95.2	89.9	92.9	93.3	99.4	97	106	102	100	91.1	98.6	104	115	100	102	111	102	104	98.4	111	99.1	100	120	101	105	101	114
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	95.9	88.8	88.3	90.5	97.4	89.5	86.5	95.7	95.5	105	93.3	91.9	102	105	105	92.1	102	108	95.5	96.1	98	113	96.5	91.7	87.1	94.9	90.5	87.9	89.5	90.9	101	92.9	103	107	100	82.1	93.4	99.1	112	87.6	93.9	105	101	99	98.4	107	94.2	96.5	118	94.1	102	95.9	109
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	94.8	87.2	87.4	87.9	96.4	87.7	85.8	94.3	94.2	107	94.8	99.2	98.4	101	101	85.6	98.7	103	91.7	95.5	94.7	110	96.5	90.7	87.4	94.5	90.1	87.6	87.1	87.5	96	91.4	99.7	114	105	76.2	90.5	96.6	108	80.2	88.4	100	102	94.9	96.9	97.2	92.3	94.6	115	91.1	96.3	95.3	106
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	99.7	91.4	93.6	92.9	99.3	92.1	92.6	98.2	98.2	105	87.2	97.9	94.5	99.7	110	89.4	98.2	102	95.7	88.2	99	110	103	91.4	90.9	100	90.4	95.5	94.2	92.6	97.6	95.5	107	104	99.2	71.2	76.8	110	104	91.2	84.3	95.1	97.7	92.7	104	81	86.5	97.2	114	92.1	108	92.3	110
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	102	99	102	100	100	98.6	99.4	101	106	107	102	104	96.9	105	94.8	79.3	98.5	107	95.8	87.2	107	118	111	99.3	98.2	109	94.7	103	101	101	108	98	115	116	102	70.2	70.1	98.5	108	82.3	84.9	97.1	98.6	94.8	114	88.8	82.7	103	125	93.7	102	91.2	115
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	132	31	20.6	53.2	38.7	9.88	88.5	120	30.6	0.1	11.4	16.3	1.14	1.49	1.49	1.09	1.56	3.74	3.45	0.1	85.8	2.47	125	224	175	347	131	195	226	240	66.7	197	62.9	38.9	13.3	9.83	2.13	1.72	0.1	1.05	0.1	1.1	2.59	2.65	11.6	13.3	3.41	71.3	8.24	0.1	0.1	4.78	7.3
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	58.6	12	20.8	68.9	46	12.9	24.2	53.2	26.4	0.595	41.4	67.7	8.64	2.14	1.23	2.03	2.05	7.17	4.55	2.15	62.8	35.1	55	60.4	45.2	168	42.3	193	225	73.1	63.8	80.3	20	8.09	23.9	4.88	1.73	1.03	0.1	2.75	1.48	0.912	2.85	1.79	67.6	54.7	11.6	59.1	30.7	7.74	0.1	37.4	57.8
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00																																																						
Metals - (Solid)																																																																
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			199000	31100	290000	179000	206000	374000	190000	187000	139000	37600	26300	23900	33700	38100	27800	32800	19400	41000	39200	29800	34000	33000	162000	191000	167000	108000	128000	171000	170000	218000	325000	181000	167000	24200	42500	34600	44600	33400	37400	27300	31900	36900	31700	33100	32200	41100	38300	244000	34800	40800	30400	26500	23200
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			25800	5240	10800	40800	10600	31200	46500	33400	10200	298	251	282	393	738	902	451	219	430	369	489	540	245	22700	19700	10100	9730	5330	5800	11000	20500	18500	30500	27500	157	306	312	372	880	305	441	242	970	358	324	696	916	456	11100	352	247	420	207	187
Metals - (Liquid)																																																																
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			247000	325000	58900	266000	163000	3940	330000	255000	147000	-	-	-	-	-	-	-	-	-	-	-	16400	5010	206000	248000	167000	159000	137000	161000	171000	180000	66100	259000	187000	-	-	-	-	-	-	-	-	-	-	-	8100	14900	5550	127000	-	-	-	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			18200	40600	3710	15800	10600	266	17300	14800	13800	-	-	-	-	-	-	-	-	-	-	-	9690	7150	17500	8820	6360	37000	28500	27200	17800	11400	3200	10600	14500	-	-	-	-	-	-	-	-	-	-	-	8270	8920	8170	13900	-	-	-	-	-
Phenols																																																																
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0105	0.0106	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0152	0.0109	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0154	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0344
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																																																
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0064	0.0091	-	0.136	0.319	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.266	-	-	-	-	-
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	12.6	11.8	11.8	12.7	12.2	10.2	12.8	12.7	12.5	-	-	-	7.86	7.76	-	-	-	-	-	-	7.87	7.91	12.7	12.7	12.7	11.8	9.98	11.2	11.5	12.1	12.2	12.7	12.4	-	-	7.83	8.37	-	8.07	-	-	-	-	-	7.41	8.28	8.28	11.2	8.22	8.54	-	-	-
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5420	18700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2700	-	-	-	-	-
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.199	0.164	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.597	0.492	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.271	0.19	-	0.542	1.87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.27	-	-	-	-	-
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	12	12	12	12	12	12	12	44.8	12	102	246	398	262	86.7	21.5	142	135	123	193	199	96.5	307	12	12	12	15.5	12	12	12	12	12	12	12	12	288	131	138	50.6	138	155	141	64.1	224	64.6	297	249	185	21.9	334	96.1	119	263	116
Asbestos																																																																
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		19/12/2017	-	19/12/2017	-	19/12/2017	19/12/2017	19/12/2017	19/12/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23/01/2018	-	23/01/2018	06/10/2017	06/10/2017	19/12/2017	19/12/2017	19/12/2017	19/12/2017	19/12/2017	19/12/2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysed By	TM048	No units		1371	0	0				0.00		Neville Mann	-	Neville Mann	-	Renata Bozhkov	Renata Bozhkov	James Richards	James Richards	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Christian Hallam	-	Christian Hallam	Neville Mann	Neville Mann	Renata Bozhkov	Renata Bozhkov	Renata Bozhkov	Neville Mann	Neville Mann	Renata Bozhkov	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0				0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Comments	TM048	No units		1371	0	0			0	0.00		0	-	0	-	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	0	0	0	Loose fibres in soil	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																																																																
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-	-	-	-	-	-	-	-	-	-	-	0.13	0.13	0.13	0.13	0.13	-	-	0.13	0.13	0.13	0.13	0.13	0.13	-	-	-	-	-	-	-	-	-	-	-	0.13	0.13	0.13	-	-	-	-	-	-
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																																																																
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	TP3AK401	TP3AK402	TP3AK2V	TP3AK3V	TP3AK4V	3DV01	3DV02	3DV03	3DD2	3DD2	3DD3	3DD3	3DD2V	3DD3V	3DE2	3DE2	3DE3	3DE3	3DE5	3DE5	3DE2V	3DE3V	3DE5V	3DF1	3DF1	3DF2	3DF2	3DF3	3DF3	3DF4	3DF4	3DF5	3DF5	3DF1V	3DF2V	3DF3V	3DF4V	3DG1	3DG2	3DG2	3DG3	3DG4	3DG5	3DG5	3DG5	3DG6	3DG6	3DG1V	3DG2V
											Depth	0.5	1	0	0	2	0	0	0	0.2	0.8	0.5	1	1.5	2	0.5	1	0.5	1	0.5	1	1.4	2.6	2	0.4	1	0.5	1	0.3	0.5	0.1	0.5	0.5	1.5	1.4	1.4	1.35	1.6	0.5	0.4	1	0.5	0.5	0.5	1.4	2	0.5	1	1	1.9
											Sampled Date	26/09/2017	26/09/2017	24/01/2018	24/01/2018	26/09/2017	16/05/2017	16/05/2017	16/05/2017	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	25/03/2019	25/03/2019	26/03/2019	26/03/2019	25/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	25/03/2019	25/03/2019	26/03/2019	26/03/2019	26/03/2019	26/03/2019	18/03/2019	26/03/2019	26/03/2019	19/03/2019	19/03/2019	19/03/2019	19/03/2019	19/03/2019	26/03/2019	26/03/2019	18/03/2019	26/03/2019
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**WQS**	**Percentage of exceedances**																																																	
Carbon																																																												
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	0.376	0.35	1.49	4.72	1.98	0.972	4.43	1.83	3.88	4.62	5.88	4.95	1.34	26.4	2.98	3.12	5.24	7.69	1.21	4.47	3.07	40.7	12	1.52	3.29	5.33	3.33	3.6	3.02	11	13.5	1.28	26.5	9.65	0.931	1.88	3	10.5	3	19.7	1.68	3.88	6.45	42.2	26.9	4.81	4.48	3.81	0.746
Metals (Solids)																																																												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	6	6	15.3	11.2	12	12	12.1	8.49	13.9	19.2	9.62	10	12.3	1.49	8.01	8.11	16.7	14.6	7.44	15.6	12.3	2.9	15.1	9.42	8.2	10.3	8.45	14.3	8.73	24	12.2	10.3	11.1	20.9	10.4	13.2	23.8	9.22	6.5	9.95	13	8.93	18.5	24.8	11.3	16.3	8.09	11.8	9.02
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	0.2	0.2	0.02	0.312	0.234	0.02	0.02	0.02	0.587	1.15	1.83	0.778	0.245	0.071	0.633	0.514	0.466	2.33	0.518	1.79	0.274	0.108	1.18	0.677	0.452	2.64	2.83	0.516	0.266	15.3	4.44	2.83	4.72	0.873	0.298	0.219	0.328	1.06	0.507	2.7	0.486	6.09	8.94	5.07	4.74	3.5	3.88	0.236	0.22
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	73	9	36.6	46.4	27.8	22.1	24.5	34	24.2	82.8	222	47	30.8	3.62	20.4	211	31.8	132	43.4	48.2	36.8	3.84	37.1	45.2	115	64.4	79.8	314	103	9	159	216	9	31.8	31.6	36.4	32.2	87	66.8	85.4	38.3	361	9	9	9	413	274	43.2	24.6
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	14	14	15.8	16	12.5	10.1	14.7	16.6	20.3	34	18.8	20.2	15.9	2.57	14.8	17.9	20.3	23.3	13.3	21.8	16.2	7.28	21.6	17.3	29.4	34	20.2	89.6	29.1	68.9	34.3	23.5	16.2	20.7	11.7	15.2	15.7	21.6	12.8	21.9	12.3	26.7	31.1	27	23.1	52.1	17.9	14.9	8.71
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	66.5	7	25.6	34.3	31.1	17.4	28.3	27.1	75.8	89.2	152	87.4	24	2.85	53.7	45.8	57	185	23.6	69.2	28.9	4.16	63.3	58.7	87.8	295	328	75.8	34.9	3120	800	227	586	51.6	30.7	27.1	33.9	75.5	42.3	229	28.5	261	967	556	719	406	498	23.5	19.6
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	1.4	2.92	0.14	0.14	0.697	0.544	0.65	0.574	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	3.96	2	33.7	30.3	42.5	28.3	31.2	33.6	20.5	28.9	16.8	16.3	37.9	4.54	14.6	13.7	19.2	26.4	17.2	29.6	33	7.33	24.1	15.3	13.7	29.7	19.6	44.9	12.5	52.7	28.2	22.1	22.3	25.9	39.2	35.4	29.4	16.3	13.4	25.6	39.6	32	65.2	33.1	28.8	49.6	13.5	28.1	32.4
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	10.7	10	1	1	1	1	1	1	1	3.01	10	1.93	1	1	1	3.48	2.28	10	2.43	10	1	1	1	1.94	5.95	10	10	13.2	7.17	10	10	10	10	1	1	1	1	2.95	1	10	1	10	10	10	10	19.2	12.8	1	1
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	334	18.1	54.8	70	60.1	44.5	52.5	61.6	34.7	99.8	381	105	51.8	6.25	41.3	125	112	214	73.2	190	58.2	10.3	69.1	69.6	157	127	333	219	110	154	194	243	83.8	59.2	86.7	57.5	53.2	117	207	125	60	152	311	122	171	441	1640	67.8	45.7
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	19	19	129	133	117	96.3	119	129	127	394	317	320	118	7.15	157	174	188	488	97.1	188	117	13.5	257	162	259	897	977	116	123	7350	1960	528	1420	169	122	110	123	275	123	604	124	827	2100	1500	1560	991	1130	132	93.1
TPH Criteria Working Group (TPH CWG)																																																												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04																																									
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00	0.0134	0.008	0.008	0.0139	0.0109	0.008	0.008	0.008																																									
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012																																									
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009																																									
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.0414	0.02	0.02	0.02	0.02	0.0253	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0719	0.02	0.02	0.02	0.01	0.328	0.02	0.02	0.02	0.02	0.0499	0.02	0.0302	0.02	0.02	0.02	0.02	0.2	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.0482	0.02	0.0502	0.0258	0.0263	0.0759	0.02	0.02	0.02	0.0246	0.0559	0.0348	0.02	0.02	0.02	0.0344	0.0476	0.02	0.0947	0.0217	0.0585	0.02	0.0363	0.663	0.0384	0.02	0.021	0.02	0.0557	0.0559	0.137	0.02	0.02	0.02	0.023	0.585	0.0319	0.02	0.02	0.02
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.0526	0.02	0.0524	0.0206	0.02	0.0759	0.02	0.02	0.02	0.0225	0.0616	0.0268	0.02	0.02	0.02	0.0344	0.0429	0.02	0.126	0.02	0.0449	0.02	0.0331	74.2	0.0256	0.02	0.02	0.02	0.0557	0.057	0.12	0.02	0.02	0.02	0.0387	60.4	0.0231	0.02	0.02	0.02
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0244	0.19	0.02	0.136	0.02	0.02	0.116	0.02	0.02	0.02	0.0385	0.158	0.0268	0.02	0.02	0.02	0.0611	0.0464	0.02	0.167	0.0228	0.0394	0.02	0.0843	987	0.0304	0.02	0.02	0.02	0.0557	0.0855	0.146	0.02	0.02	0.0269	0.092	767	0.022	0.02	0.02	0.02
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	0.141	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.03	1.96	2.75	0.1	0.1	1.16	2.36	3	3.61	2.97	8.91	0.339	2.97	5.37	1.34	4.76	3.83	3.65	6.1	2.63	0.743	1.68	1.88	11.7	0.1	0.1	0.1	0.1	1.77	2.89	3.87	0.1	2.88	0.1	2.25	67.9	1.95	0.124	0.1	0.1
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	3.29	0.1	0.1	0.1	0.1	0.1	0.1	0.1	3.03	9.52	9.94	12.4	0.1	0.1	8.33	10.1	10.7	15	14.1	24.5	0.804	0.583	17.3	10.7	20.6	33.8	29.8	26.5	10.6	10.8	9.33	9.13	121	0.1	0.115	0.1	0.1	9.84	18.4	25.8	0.1	29.6	0.1	10.5	668	13	8.59	0.1	0.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	11.6	2.96	0.1	4.26	0.1	2.19	4.39	2.96	73.8	57.3	41	55.2	0.1	3.02	73	69.3	54.3	70	99.2	114	2.1	12.5	39	187	122	185	147	252	76.1	30.1	37.7	70.8	53.5	2.13	1.13	0.1	0.1	51.6	408	82.5	2.45	194	0.1	30.5	152	95.2	35.9	7.45	0.1
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	4.85	0.1	0.1	0.1	0.1	0.1	7.81	0.1	25.1	14.7	10.7	15	0.1	0.306	33.4	33.1	20.9	24.1	29.1	31.4	0.1	0.1	15.2	104	46.8	48.9	33.6	157	38.3	2.88	6.55	34.1	2.81	0.1	0.1	0.1	0.1	17.2	276	30.9	0.1	53.7	0.1	1.7	5.27	34.1	5.32	0.1	0.1
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	2.8	0.02	0.02	0.02	0.02	0.02	0.02	0.0202	0.02	0.02	0.02	0.02	5.26	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0464	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0359	0.02	0.02	0.02	0.01	16.9	0.02	0.02	0.02	0.02	0.02	0.02	0.0224	0.02	0.02	0.02	0.02	20.3	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.0347	0.02	0.0353	0.02	0.02	0.0506	0.02	0.02	0.02	0.015	0.041	0.02	0.02	0.02	0.02	0.0233	0.029	0.02	0.0849	0.02	0.0299	0.02	0.0213	49.5	0.02	0.02	0.02	0.02	0.0371	0.0376	0.0795	0.02	0.02	0.02	0.0254	40.3	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.127	0.02	0.0901	0.02	0.02	0.0782	0.02	0.02	0.02	0.0257	0.106	0.02	0.02	0.02	0.02	0.0411	0.0313	0.02	0.111	0.02	0.0258	0.02	0.0566	658	0.0208	0.02	0.02	0.02	0.0371	0.057	0.0974	0.02	0.02	0.02	0.0617	512	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	0.1	0.1	0.1	0.1	0.1	0.1	1.32	1.51	0.414	2.93	2.17	2.96	0.1	0.1	1.97	1.76	2.61	3.78	1.67	3.11	0.1	5.14	11.8	2.18	0.694	3.54	2.52	3.36	4.24	0.1	1.95	7.68	1010	0.174	0.1	0.1	0.1	5.63	3.71	8.77	0.1	1.45	0.633	2.69	5280	1.4	1.75	1.08	0.1
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	0.1	0.1	0.1	0.427	0.1	0.1	0.813	1.56	1.36	19.1	7.63	32	0.1	0.979	10.3	13.2	12.9	17.9	12.2	15	0.1	5.56	33.9	12.2	7.83	24.9	20.7	11.1	13	7.2	8.57	44.7	2710	0.675	0.1	0.1	0.1	45.4	23.1	72.6	0.1	15.2	8.06	8.69	9800	12	43.9	4.58	0.1
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	3.77	0.1	0.1	15.6	0.1	0.37	0.1	6.35	33.3	61.6	36.6	67.8	0.1	42.7	74.3	67.4	57.4	79.5	65.7	65	1.26	69.4	83.1	183	59.6	106	75.9	135	60.7	13.3	31.8	132	2330	19.6	0.5	3.72	5.54	129	378	183	3.56	100	24.5	13	9010	49.6	112	25.4	0.1
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	5.45	0.1	0.1	4.64	0.1	0.1	3.12	2.76	9.31	23.7	9.39	22.8	0.1	7.47	58.4	46.9	27.1	34.5	33.7	35.7	0.417	19.1	27.5	148	43.3	46.2	27.7	106	33.1	0.709	9.96	55.3	419	2.02	2.41	0.855	0.733	50.5	414	61.6	0.1	59.8	6.56	0.442	1400	27.8	32.5	8.77	0.1
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	2.38	0.1	0.1	1.46	0.1	0.1	1.53	1.15	1.13	8.52	1.78	8.01	0.1	2.34	24.6	20.4	10.1	12.8	13.3	15	0.1	4.58	10.5	57.8	18.7	17.7	10.3	41.9	12.1	0.1	2.99	20.5	124	0.158	1.01	0.1	0.1	17.2	191	22.6	0.1	23.3	1.98	0.1	366	11.3	9.21	2.78	0.1
Polyaromatic Hydrocarbons (PAHs)																																																												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	12	12	12	12	12	12	12	12	29.1	339	84	121	12	12	57.3	120	254	294	343	144	12	12	12	60	20.8	208	84.9	50.4	68.5	17.5	136	57600	2100000	12	12	12	12	1950	59.7	827	12	197	407	28.3	355000	25.9	340	313	12
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	8	8	8	8	8	8	8	8	8	29.1	13.3	15.9	8	8	26.1	80	26.2	34.7	8	15.5	8	8	8	40	13.6	46.6	41.5	17.3	8	8	40	3450	115000	8	8	8	8	216	53.9	105	8	52	8	15.8	13300	27.9	21.3	19.9	8
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	18.3	16	16	16	16	16	16	16	44.5	847	123	212	16	16	174	160	540	461	455	241	16	16	71.1	80	52.5	488	196	103	128	43.5	317	43300	1860000	16	16	16	16	5970	232	2050	16	478	1040	33.4	268000	97.6	855	1000	16
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	63.9	14	14	14	14	14	14	90	191	1690	402	586	14	14	405	140	1230	1390	1640	505	14	14	118	70	262	1490	669	321	381	67.9	762	39200	1150000	68.4	14	14	14	11400	639	4410	14	1200	1580	39.2	185000	432	3320	1680	14
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	61.5	15	15	15	15	15	34	103	186	1540	369	506	15	15	335	150	1100	1230	1790	520	15	15	110	75	236	1310	610	281	310	39.1	570	31900	714000	72	15	15	15	9500	450	3370	15	930	1280	22.2	125000	390	2810	1120	15
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	130	15	15	15	15	15	74.1	136	287	2590	495	644	15	15	494	150	1430	1930	2660	832	15	15	224	130	435	1950	995	420	410	87.4	746	46200	1110000	124	15	15	15	15600	683	4790	15	1240	2270	26.5	140000	685	4300	1900	15
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	43.5	14	14	14	14	14	23.4	48.1	97.1	856	162	278	14	14	183	140	533	662	1110	278	14	14	67.8	70	139	631	330	149	179	20.5	274	18500	373000	36.1	14	14	14	5590	205	1670	14	500	894	14	60700	248	1730	651	14
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	71.3	24	24	24	24	24	24	83.8	142	1080	297	397	24	24	245	0.24	805	885	1430	407	24	24	91.8	120	217	976	457	235	250	24	442	19100	333000	66.4	24	24	24	5760	283	2160	24	700	790	24	65400	329	2170	647	24
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	73.3	10	10	10	10	10	46.2	65.8	189	1630	397	622	10	10	418	0.1	1120	1280	1580	461	10	10	139	79.4	298	1440	660	338	373	71.1	713	37100	1090000	89	10	10	10	12500	618	3590	16.5	1210	1500	42.7	167000	487	3300	1560	10
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	35.3	211	68.3	88.5	0.023	0.023	59	0.23	189	203	302	81.3	0.023	0.023	0.023	0.115	37.8	217	104	54.6	60.8	0.023	0.115	5770	109000	0.023	0.023	0.023	0.023	1760	79.8	560	0.023	182	236	0.023	20600	52	573	190	0.023
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	46.8	0.018	0.018	0.018	0.018	0.018	0.018	64.7	113	1260	236	318	0.018	0.018	190	180	701	696	1280	438	0.018	0.018	102	90	192	760	324	183	196	0.018	405	19300	374000	48.7	0.018	0.018	0.018	5450	219	1950	0.018	588	779	0.018	65000	311	1930	645	0.018
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	133	0.017	0.017	0.017	0.017	0.017	96.8	94.7	357	4350	840	1490	0.017	0.017	884	0.17	2790	3310	2610	1060	0.017	0.017	326	142	434	3960	1850	701	914	269	2030	83900	2940000	163	0.017	0.017	0.017	27200	1510	11500	38.6	2740	3090	112	580000	896	6220	4840	0.017
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	10	10	10	10	10	10	10	10	15.4	296	43.6	82.3	10	10	74.7	0.1	148	150	122	98.7	10	10	62.3	50	18.6	148	88	36.6	42.4	17.7	102	51900	1890000	10	10	10	10	1920	103	960	10	191	53.7	29.3	280000	25.5	113	471	10
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	29	9	9	9	9	9	44.2	30.4	42.5	643	314	405	9	18.6	120	90	406	588	354	293	9	32.5	123	45	51.1	295	237	195	256	106	410	119000	4680000	9	9	9	9	2010	133	828	11.7	201	9	6770	1170000	81.3	224	89.9	9
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	90.2	15	15	15	15	15	104	59.6	141	2060	483	876	15	15	575	150	1280	1350	967	482	15	15	280	75	201	1930	799	446	548	200	836	104000	3810000	84.4	15	15	15	12900	892	6280	23.4	1410	1030	106	794000	479	2800	3880	15
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09									0.282	3.19	0.651	1.13	0.015	0.015	0.747	0.15	2.06	2.56	2.06	0.885	0.015	0.015	0.219	0.141	0.456	2.98	1.48	0.545	0.691	0.256	1.6	17.9	1950	0.126	0.015	0.015	0.015	18.4	1.09	7.94	0.0303	1.98	2.17	0.0773	341	0.783	5	3.02	0.015
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	0.862	0.118	0.118	0.118	0.118	0.118	0.493	0.862	2.15	22.6	4.98	7.77	0.118	0.118	4.99	1.18	14.6	17	18.7	6.74	0.118	0.118	1.93	0.59	3.07	18.8	8.92	4.08	4.81	1.2	9.34	697	24600	0.878	0.118	0.118	0.118	138	7.25	53	0.12	13.8	17.1	7.3	4630	5.35	35.7	22	0.118
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	101	101	86.1	112	99.5	103	109	107	93.3	87.1	93.6	93.6	94.7	90.6	88	86.3	92.2	94.9	101	94.8	95	96.4	97.5	89.9	87.5	90.4	90	92.1	92.6	101	96.9	83.2	1100	93.5	93.5	94.7	95.3	96.3	92.5	87.9	101	111	96.5	86.1	99	88.7	92	95.4	92.8
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	95.2	96.8	76.7	107	93.3	104	106	104	82	81.5	83.5	83.5	85.5	83.9	85.4	70.5	85.1	86.2	93.3	87.6	82.2	83.9	87.9	75	80.8	85.6	84.7	84.1	83.2	90.1	80	95.1	249	83.7	83.5	86	88.7	96.4	85.4	80.1	93.7	108	93.8	72.6	99.5	81.3	85.3	94.2	85.2
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	94.1	94.6	71.3	102	88.5	100	105	102	85.4	86.8	85.1	84.7	85.6	90.8	91.8	79.8	87	83.7	97.5	91	85.3	84.6	89.7	80.5	85.7	90	88.9	89.1	87.2	93.6	72.4	93.3	97	88.5	85.1	84.2	87.2	96.3	84.9	87.9	94.6	110	101	55.9	93	81	85.6	98.4	90.4
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	91.6	93.6	78.7	119	84.3	93.4	106	103	85.7	83.8	83.6	75.6	83.8	79.2	84.9	70.9	86.9	74.9	98.8	83.8	83.7	82.3	84.1	72.4	84.3	81.7	79.5	85.4	85.3	63.9	53.3	77.2	81.1	87.2	78.5	75.9	76.4	98.3	78.2	81.3	97.6	115	83.3	27.9	108	70.8	77.7	106	82.6
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	93	99.5	73.1	112	82.6	95.6	112	110	90.9	91.5	86	77.7	88.2	78.2	89.1	75.3	86.2	75.7	105	85.4	87.2	83.1	86.2	77.8	93.2	82.2	75.6	90.3	89.4	43.4	41.9	84.1	69.5	91.6	81.7	79.4	81.3	99.7	84.3	78.3	102	112	79	16.6	108	70.3	78.2	111	84.5
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	19.8	2.96	0.1	4.26	0.1	2.19	12.2	2.96	102	84.5	63.6	85.4	0.1	3.33	116	115	88.9	113	145	179	3.24	16	76.9	303	194	272	214	441	128	44.6	55.3	116	189	2.13	1.25	0.1	0.1	80.4	705	143	2.45	281	0.1	44.9	894	144	50	7.45	0.1
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	9.21	0.1	0.1	20.7	0.1	0.37	5.25	12.2	44.3	107	55.8	126	0.1	51.1	145	129	100	136	113	119	1.68	99.2	156	346	111	181	127	255	111	21.2	52.3	240	6470	22.5	2.91	4.58	6.28	230	818	326	3.56	177	39.7	24.8	25500	90.7	190	39.8	0.1
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00									146	192	119	211	0.1	54.5	261	244	189	249	259	298	5.01	115	233	648	306	453	341	698	239	65.9	108	356	8450	24.7	4.16	4.58	6.28	311	1520	470	6.01	457	39.7	70	27800	235	240	47.3	0.1
Metals - (Solid)																																																												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			130000	381000	28300	28700	43500	31500	37500	35500	23600	55400	101000	60200	37400	4300	29600	64100	89900	99400	38600	144000	30800	7030	25400	52900	67500	100000	149000	127000	60500	426000	189000	168000	232000	28000	40600	33200	35600	76700	41100	73900	36500	117000	344000	261000	212000	205000	194000	39000	32300
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			24400	1010	295	200	837	963	779	446	897	6380	12100	4180	804	122	1770	9250	7490	9870	3440	7340	846	167	344	4670	11800	5000	8490	17000	10700	7700	11300	12700	3180	393	1360	304	318	6350	2210	5930	323	8640	5240	6040	4380	31000	24500	635	946
Metals - (Liquid)																																																												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			198000	2730	-	-	-	-	-	-	10900	-	-	115000	-	-	-	136000	103000	-	103000	-	-	-	-	86600	-	-	114000	161000	-	-	97400	106000	-	-	-	-	-	-	140000	-	4330	133000	38600	45500	-	147000	-	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			24400	4870	-	-	-	-	-	-	3860	-	-	21600	-	-	-	32600	13600	-	16100	-	-	-	-	14900	-	-	14300	17200	-	-	10600	10500	-	-	-	-	-	-	30600	-	10300	34900	5120	7130	-	11500	-	-	-
Phenols																																																												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.0114	0.01	0.01	0.01	0.011	0.0115	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0348	0.0228	0.01	0.01	0.01	0.01	0.01	1.21	0.01	0.01	0.01	0.01	0.0232	0.01	0.0336	0.01	0.0113	0.01	0.01	0.1	0.01	0.0109	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0116	0.01	0.0109	0.0114	0.01	0.01	0.01	4.77	0.01	0.01	0.01	0.01	-	0.01	0.01	0.01	0.01	0.01	0.01	1.22	0.01	0.01	-	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	4.41	0.015	0.015	0.015	0.015	-	0.015	0.015	0.015	0.015	0.015	0.015	0.434	0.015	0.015	-	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0464	0.035	0.035	0.035	0.035	0.035	0.035	10.4	0.035	0.035	0.035	0.035	-	0.035	0.035	0.035	0.035	0.035	0.035	1.65	0.035	0.035	-	0.035
Inorganics																																																												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	0.154	0.021	-	-	-	-	-	-	0.0489	-	-	0.158	-	-	-	0.0578	0.238	-	0.134	-	-	-	-	0.152	-	-	0.16	0.133	-	-	0.159	0.0433	-	-	-	-	-	0.235	0.117	-	0.0325	0.2	0.025	0.147	-	0.105	-	-	-
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	11.5	10.6	-	-	7.82	-	-	-	7.4	10.9	11	11.1	7.64	7.78	11.1	11	11.2	11.1	9.57	11.3	7.68	7.6	7.79	10.3	11.5	10.8	11.1	12.2	12	8.09	8.52	12.1	11	8.3	7.77	7.73	7.38	11.2	10.1	11.1	7.81	11.3	8.96	10.7	10.8	12.1	12.3	7.85	8.15
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33	9460	<48	-	-	-	-	-	-																																									
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	-	-	-	-	-	-	-	-	0.0695	-	-	0.2	-	-	-	0.122	0.289	-	0.235	-	-	-	-	0.219	-	-	0.206	0.678	-	-	0.18	0.169	-	-	-	-	-	0.24	0.138	-	0.02	0.311	0.0819	0.217	-	0.219	-	-	-
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	-	-	-	-	-	-	-	-	0.209	-	-	0.6	-	-	-	0.366	0.867	-	0.705	-	-	-	-	0.657	-	-	0.618	2.03	-	-	0.54	0.507	-	-	-	-	-	0.72	0.414	-	0.06	0.933	0.246	0.651	-	0.657	-	-	-
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	0.946	0.02	-	-	-	-	-	-	0.0521	-	-	0.342	-	-	-	0.18	0.405	-	1.42	-	-	-	-	0.425	-	-	0.311	1.25	-	-	0.248	0.31	-	-	-	-	-	0.417	0.199	-	0.02	0.429	0.0687	0.206	-	0.355	-	-	-
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.39	1	1	1	14.2	4.69	1	4.16	1	1	1	1	1	1	1	1	3.51	1	9.28	1.25	2.52	1.83	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	176	12	53.3	239	182	12	22.7	33.8	28.3	12	12	12	76.3	12	12	12	12	12	12	12	112	32.6	162	12	12	12	12	12	12	12	12	12	12	179	70.4	71.2	12	-	12	12	164	12	12	12	12	12	12	-	17
Asbestos																																																												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	0.001	-	-	0.001	-	-	-	-	0.0838	-	-	-	-	-	-	-	-	-	0.001	0.001	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		-	06/10/2017	-	-	-	-	-	-	09/04/2019	-	-	08/04/2019	-	-	-	09/04/19	09/04/19	-	08/04/2019	-	-	-	-	09/04/19	-	-	09/04/2019	08/04/2019	-	-	09/04/2019	08/04/2019	-	-	-	-	-	22/03/2019	09/04/19	-	02/04/2019	02/04/2019	02/04/2019	02/04/19	-	09/04/2019	-	22/03/2019	-
Analysed By	TM048	No units		1371	0	0				0.00		-	Neville Mann	-	-	-	-	-	-	Lucy Caroe	-	-	Renata Bozhkov	-	-	-	Andrzej Ferfecki	Andrzej Ferfecki	-	Renata Bozhkov	-	-	-	-	Andrzej Ferfecki	-	-	Lucy Caroe	Barbara Urbanek-Walsh	-	-	Lucy Caroe	Barbara Urbanek-Walsh	-	-	-	-	-	Marcin Magdziarek	Andrzej Ferfecki	-	Marcin Magdziarek	James Richards	Marcin Magdziarek	Andrzej Ferfecki	-	Lucy Caroe	-	Lucy Caroe	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	0.001	-	-	0.001	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	0.0012	0.001	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00		-	-	-	-	-	-	-	-	None	-	-	None	-	-	-	-	None	-	-	-	-	-	-	-	-	-	None	None	-	-	-	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0				0.00		-	-	-	-	-	-	-	-	N/A	-	-	N/A	-	-	-	-	N/C	-	-	-	-	-	-	-	-	-	N/C	N/C	-	-	-	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	0.001	-	-	0.001	-	-	-	-	0.084	-	-	-	-	-	-	-	-	-	0.0019	0.001	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	-	-	-	-	-	Detected	-	-	Trace	-	-	-	Not Detected	Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Detected	Detected	-	-	Not Detected	Trace	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		-	Not Detected	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	-	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Detected	-
Comments	TM048	No units		1371	0	0			0	0.00		-	0	-	-	-	-	-	-	Loose fibres in soil	-	-	Loose fibres in soil.	-	-	-	-	fibre bundles in soil	-	-	-	-	-	-	-	-	-	Fibre bundles in soil	Loose fibres in soil.	-	-	-	Loose fibres in soil.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																																																												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		-	-	-	-	-	-	-	-	107	107	95.2	101	104	113	105	105	92	95.7	102	101	105	114	109	106	107	99.5	105	103	104	100	90.8	102	104	108	105	105	111	110	108	96.8	106	105	103	116	105	104	102	114	107
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		-	-	-	-	-	-	-	-	99.2	99.3	94.1	98.4	99.1	91.4	100	98.2	87.8	93.7	97.5	98.9	100	87.9	97	98.3	97.7	96.2	98.4	95.5	93.2	99.7	88	98.6	99.7	96.3	100	100	96.8	101	94.9	94.8	99.1	98.1	99.4	95.7	97.9	96.9	97.3	102	100
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		-	-	-	-	-	-	-	-	95.3	94.2	81.8	91.8	98.3	79.2	97.2	96	73.5	80.1	89.9	92	102	79.5	91.5	95.7	94.8	86.7	94.4	89.6	91.9	94.4	69.8	94.1	98.4	90.6	98.5	101	97.4	82.2	90.1	84.6	98.7	94.5	94.6	87.8	89.6	93.3	91.7	85.7	102
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		-	-	-	-	-	-	-	-	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	7.03	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		-	-	-	-	-	-	-	-	0.121	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	3.55	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	28.3	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		-	-	-	-	-	-	-	-	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	1.15	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	9.31	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	61.5	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.8	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	17.5	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		-	-	-	-	-	-	-	-	0.13	1.35	0.13	0.13	0.13	0.13	0.13	0.13	0.241	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.907	2790	0.13	0.13	0.13	0.13	0.26	0.169	0.31	0.13	0.13	0.13	0.228	15500	0.13	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		-	-	-	-	-	-	-	-	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	15.7	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	116	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																																												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	3DG3V	3DG4V	3DH1	3DH2	3DH3	3DH3	3DH4	3DH5	3DH6	3DH1V	3DH2V	3DH3V	3DH4V	3DH5V	3DH6V
Depth	0.9	1	0.5	0.5	0.5	1	0.5	0.5	0.5	1	1	1.5	1	1.1	1.6
Sampled Date	19/03/2019	19/03/2019	18/03/2019	18/03/2019	19/03/2019	19/03/2019	19/03/2019	21/03/2019	21/03/2019	18/03/2019	18/03/2019	19/03/2019	19/03/2019	21/03/2019	21/03/2019
Carbon															
Soil Organic Matter (SOM)	3.07	0.964	14.6	6.38	18.3	7.26	0.717	4.81	2.24	2.26	1.57	7.71	2.16	2.19	6.48
Metals (Solids)															
Arsenic	8.72	12.9	10.7	9.81	22	10.8	7.06	10.3	9.5	13.4	13	13.5	9.27	9.79	11.2
Cadmium	2.88	0.254	1.32	1.19	0.2	0.332	0.666	1.11	1.8	0.392	0.364	0.229	0.02	0.02	0.37
Chromium	133	35.7	30.2	36.8	83.9	111	86.7	106	61.2	37.6	35.6	42.2	33.9	34	39.7
Copper	25.9	12.1	29.5	20.7	47.6	27.9	11	20.7	25.6	16.6	14.6	20	12.4	13.8	17.7
Lead	240	27.9	127	84.5	60.2	125	27.9	281	155	23.9	25.1	40	26.6	25.2	26.7
Mercury	1.4	0.14	0.14	0.14	1.4	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	18.9	39.3	24	57.9	47.7	31.1	12.6	28.6	23.6	38.1	36.6	27.6	32.7	31	39.7
Selenium	10	1	1.71	1.77	10	10	3.56	10	4.55	1	1	1	1	1	1
Vanadium	210	56.3	63.1	84.5	232	314	288	254	194	58.7	54.1	70.8	53	54.2	59.3
Zinc	718	121	413	270	183	373	98.9	750	600	108	107	143	111	124	99.1
TPH Criteria Working Group (TPH CWG)															
Benzene															
Toluene															
Ethylbenzene															
sum of detected mpo xylene by GC															
Aliphatics >C5-C6	0.02	0.02	0.02	0.01	0.0269	0.02	0.02	0.02	0.0592	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.01	0.115	0.02	0.02	0.02	0.0812	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.01	0.131	0.02	0.02	0.0127	0.4	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.01	0.868	0.02	0.02	0.02	0.129	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	2.85	0.1	3.47	3.58	1.47	1.2	7.94	2.32	3.4	0.1	0.1	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	19.6	0.1	16	12.7	6.34	6.49	23.7	14.4	24.2	0.1	0.1	0.1	0.1	0.1	0.1
Aliphatics >C21-C35	105	0.1	85	67.2	17.9	17.7	184	67.1	149	2.14	0.1	6.57	8.36	0.871	0.1
Aliphatics >C35-C44	33.6	0.1	23.6	19.9	5.69	0.618	49.5	16.6	45.4	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.01	0.0878	0.02	0.02	0.02	0.267	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.01	0.579	0.02	0.02	0.02	0.0858	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	2	0.1	6.08	8.98	6.71	6.16	2.58	1.56	1.74	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	16.9	0.1	46	89	67.1	43.7	12.5	13.2	18.2	0.728	0.1	2.1	0.1	0.1	0.1
Aromatics >EC21-EC35	85.6	0.1	142	138	148	160	75.7	59.6	110	5.1	0.823	30.4	7.86	5.34	2.38
Aromatics >EC35-EC44	51.1	0.1	54.6	42	42.7	50.8	41.7	23.1	62	2.8	0.428	3.36	1.11	0.348	0.246
Aromatics >EC40-EC44	20.5	0.1	18.5	15.5	15.2	16.2	16.3	7.87	25.1	0.96	0.165	0.1	0.1	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)															
Acenaphthylene	56	12	2460	265	621	287	27.5	286	281	12	12	12	12	12	12
Acenaphthene	27.7	8	93.5	48.8	8	130	8	47.2	60.2	8	8	13.5	8	8	8
Anthracene	156	16	5900	547	2400	960	78.7	442	464	16	16	16	16	16	16
Benz(a)anthracene	393	14	19600	1880	4820	2730	341	1550	1190	14	14	52.7	14	14	14
Benzo(a)pyrene	335	15	14300	1710	3960	2220	369	1500	1010	15	15	45.4	15	15	15
Benzo(b)fluoranthene	643	15	23000	2620	6490	3510	589	2330	1500	15	15	99.5	15	15	15
Benzo(k)fluoranthene	238	14	8400	979	2330	1300	250	752	565	14	14	29.4	14	14	14
Benzo(g,h,i)perylene	265	24	7630	1110	2580	1490	288	1000	617	24	24	41	24	24	24
Chrysene	428	10	18400	1890	4780	2350	327	1630	967	10	10	55.9	10	10	10
Dibenzo(a,h)anthracene	62.7	0.023	2530	297	715	371	59.1	222	145	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	211	0.018	7790	1010	2430	1340	238	1200	772	0.018	0.018	32.2	0.018	0.018	0.018
Fluoranthene	929	0.017	52100	3950	9770	5390	667	3410	2950	32.2	0.017	163	0.017	0.017	0.017
Fluorene	61.8	10	2050	197	573	356	10	147	378	10	10	20.8	10	10	10
Naphthalene	202	12.2	428	278	942	576	9	457	284	9	9	505	9	9	27.9
Phenanthrene	491	15	11300	1600	4670	3040	306	1210	2190	15	15	101	15	15	15
Pyrene	0.793	0.015	32.8	2.8	7.42	4.02	0.549	2.89	2.23	0.0213	0.015	0.114	0.015	0.015	0.015
PAH, Total Detected USEPA 16	5.29	0.118	209	21.2	54.5	30.1	4.09	19.1	15.6	0.118	0.118	1.27	0.118	0.118	0.118
Naphthalene-d8 % recovery**	98.6	114	95.4	97.7	97.6	94.5	96.8	94.7	99.8	97.6	95.1	93.7	93.2	94	96.5
Acenaphthene-d10 % recovery**	96.8	107	96	96.1	97.8	75.4	95.8	94.5	96.7	97.6	94.4	93.3	91.1	90	94.9
Phenanthrene-d10 % recovery**	101	116	97.6	98.8	102	100	101	103	102	99	95.8	101	96.9	95.3	99.3
Chrysene-d12 % recovery**	82.5	111	108	107	81.9	86	86.3	91.5	88.5	107	96.6	90.8	90.6	84.9	89
Perylene-d12 % recovery**	75.7	114	109	115	86.5	86.1	84.8	87.2	84.3	113	99	86.3	87.2	101	84.9
Total Aliphatics >C12-C44	161	0.1	128	103	31.4	26	265	100	222	2.14	0.1	6.57	8.36	0.871	0.1
Total Aromatics >EC12-EC44	156	0.1	248	278	264	261	133	97.5	192	8.62	1.25	35.8	8.97	5.69	2.63
Total Aliphatics & Aromatics >C5-C44	316	0.1	377	381	297	287	398	198	415	10.8	1.25	42.4	17.3	6.56	2.63
Metals - (Solid)															
Iron	83100	38300	55700	58700	300000	109000	67700	119000	79800	33300	32800	18900	18600	23800	34700
Manganese	13600	340	3340	3830	8540	7840	6650	8970	10800	327	294	348	438	464	467
Metals - (Liquid)															
Calcium	-	-	-	-	94900	125000	139000	127000	167000	-	-	-	-	-	-
Magnesium	-	-	-	-	9910	14900	15400	14600	25000	-	-	-	-	-	-
Phenols															
Phenol	0.01	0.01	0.01	0.0114	0.01	0.01	0.0114	0.069	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.011	0.01	-	-	0.01	0.01	0.01	0.0115	0.01	-	-	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	-	-	0.015	0.015	0.015	0.015	0.015	-	-	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	-	-	0.035	0.035	0.035	0.0575	0.035	-	-	0.035	0.035	0.035	0.035
Inorganics															
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	0.189	0.138	0.173	0.235	0.241	0.2	0.233	-	-	-	-	-	-
pH	11.3	8.16	11.1	11.2	11.4	11.6	10.9	11.2	11.1	7.79	7.74	7.72	7.75	7.43	7.64
Sulphate, Total															
Sulphur, Total	-	-	0.258	0.183	0.247	0.31	0.242	0.226	0.318	-	-	-	-	-	-
Sulphate, Total potential	-	-	0.774	0.549	0.741	0.93	0.726	0.678	0.954	-	-	-	-	-	-
Sulphate, acid soluble (total)	-	-	0.41	0.243	0.466	0.548	1.26	0.585	0.682	-	-	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	101	-	-	12	12	12	12	12	-	-	187	12	266	119
Asbestos															
Asbestos Quantification - Gravimetric - %	-	-	0.0065	-	-	-	0.0165	0.0053	-	-	-	-	-	-	-
Date of Analysis	-	-	22/03/2019	22/03/2019	02/04/2019	02/04/19	02/04/19	03/04/2019	05/04/19	22/03/2019	25/03/2019	-	-	-	-
Analysed By	-	-	Lucy Caroe	Lucy Caroe	James Richards	Andrzej Ferfecki	Andrzej Ferfecki	Marcin Magdziarek	Christian Hallam	Marcin Magdziarek	James Richards	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	0.001	-	-	-	0.0133	0.001	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	None	-	-	-	None	None	-	-	-	-	-	-	-
Analysts Comments	-	-	N/A	-	-	-	PCOM analysis shows fibres typical of Amphibole asbestos.	N/C	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	0.0065	-	-	-	0.0298	0.0058	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	Detected	Not Detected	Not Detected	Not Detected	Detected	Detected	Not Detected	Not Detected	Not Detected	-	-	-	-
Amosite (Brown) Asbestos	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-
Crocidolite (Blue) Asbestos	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-
Fibrous Anthophyllite	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-
Fibrous Tremolite	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-
Fibrous Actinolite	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-
Non-Asbestos Fibre	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-
Comments	-	-	Soil containing ACM debris	-	-	-	loose fibres in soil	Loose fibres in soil	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)															
Dibromofluoromethane**	102	103	104	104	97.7	116	105	101	106	115	117	108	101	111	107
Toluene-d8**	99.9	102	98.9	97.4	98.1	103	100	101	99.5	103	102	97.4	100	101	100
4-Bromofluorobenzene**	92.6	98.1	73.1	72.3	85.5	96.8	91.2	94.6	94.7	89.3	86.7	92	95.4	101	98.5
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.181	0.26	0.13	0.212	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics															
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3DI1	3DI1	3DI2	3DI3	3DI4	3DI1V	3DI2V	3DI3V	3DI4V
Depth	0.5	1	0.5	0.5	0.5	1.5	1.2	1.8	1
Sampled Date	13/03/2019	13/03/2019	18/03/2019	19/03/2019	19/03/2019	13/03/2019	18/03/2019	19/03/2019	19/03/2019
Carbon									
Soil Organic Matter (SOM)	10.6	33.4	4.07	9.93	4.91	1	3.76	8.98	2.53
Metals (Solids)									
Arsenic	7.74	13.1	11.4	20.7	10.9	18.3	11.7	15.8	14.5
Cadmium	1.41	2.99	1.21	1.92	1.4	0.28	0.489	0.808	0.02
Chromium	441	131	37.9	204	58.8	33.8	39.4	46.8	36.6
Copper	18.8	38.9	22.9	20.6	24.9	13	17.4	19.7	15.3
Lead	67.7	185	106	350	295	28	28.7	46	24.6
Mercury	1.4	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14
Nickel	18.7	44.7	29	21.7	31.3	39.2	29.5	25.7	31.5
Selenium	10	10	2.88	10.5	10	1	1	1	1
Vanadium	509	218	186	229	206	55.5	63.4	79.5	59.9
Zinc	179	818	237	999	794	112	135	149	124
TPH Criteria Working Group (TPH CWG)									
Benzene									
Toluene									
Ethylbenzene									
sum of detected mpo xylene by GC									
Aliphatics >C5-C6	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.0296	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.0205	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.0365	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	5.22	1.76	3.45	1.91	3.98	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	21.8	9.35	14.2	22.9	23	0.339	0.1	0.1	0.1
Aliphatics >C21-C35	59.8	59.5	73.1	103	123	0.1	5.2	13	0.1
Aliphatics >C35-C44	23.3	15	18.1	31.2	30.6	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.0137	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.0239	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	9.78	1.14	2.66	2.73	4.01	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	67.2	7.64	15.9	29.9	29.1	0.169	1.13	2.77	0.1
Aromatics >EC21-EC35	205	51.8	75.7	120	108	2.93	18.4	44.4	2.8
Aromatics >EC35-EC44	65	20.5	32.4	51.8	43.7	1.1	5.25	6.54	0.1
Aromatics >EC40-EC44	21.3	7.61	12	19.9	16.6	0.256	1.7	0.733	0.1
Polyaromatic Hydrocarbons (PAHs)									
Acenaphthylene	956	154	217	255	296	12	12	27.6	12
Acenaphthene	130	21.3	36	70.3	70.1	8	8	8	8
Anthracene	1510	239	700	577	593	16	16	32.9	16
Benz(a)anthracene	6080	647	1570	2010	1630	14	29.5	143	14
Benzo(a)pyrene	5390	584	1290	1840	1540	15	25.6	143	15
Benzo(b)fluoranthene	7530	933	1840	3030	1790	15	40.6	152	15
Benzo(k)fluoranthene	4310	309	691	989	758	14	14	75.3	14
Benzo(g,h,i)perylene	3750	498	805	1300	1160	24	24	123	24
Chrysene	4790	693	1530	2080	1450	10	32.4	131	10
Dibenzo(a,h)anthracene	806	99.9	209	325	273	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	2390	355	723	1140	938	0.018	0.018	136	0.018
Fluoranthene	11700	1430	3300	4020	3790	0.017	61.5	282	0.017
Fluorene	547	149	152	177	274	10	10	16.9	10
Naphthalene	2100	221	217	574	404	9	40.6	75.6	9
Phenanthrene	4250	916	1090	1540	2040	15	44.8	127	15
Pyrene	9.51	1.2	2.32	3.28	2.81	0.015	0.0449	0.217	0.015
PAH, Total Detected USEPA 16	65.8	8.44	16.7	23.2	19.8	0.118	0.32	1.68	0.118
Naphthalene-d8 % recovery**	83.6	87.2	95.5	89.4	108	89.6	97.3	102	92
Acenaphthene-d10 % recovery**	73	81.4	94.9	89.7	101	80.1	96.7	94.5	92.5
Phenanthrene-d10 % recovery**	73.9	78.9	98.1	95.7	102	73.4	102	97.5	97.3
Chrysene-d12 % recovery**	104	84.2	99.1	78.3	98.6	81	107	98.6	84.3
Perylene-d12 % recovery**	95.8	86.6	102	77.3	101	80.4	110	104	79.1
Total Aliphatics >C12-C44	110	85.6	109	159	181	0.339	5.2	13	0.1
Total Aromatics >EC12-EC44	347	81.1	127	204	185	4.2	24.8	53.7	2.8
Total Aliphatics & Aromatics >C5-C44	457	167	236	363	366	4.54	30	66.7	2.8
Metals - (Solid)									
Iron	91200	164000	117000	159000	118000	38300	23300	28400	23600
Manganese	17900	7770	7030	16000	6500	384	451	443	263
Metals - (Liquid)									
Calcium	-	-	-	164000	126000	-	-	-	-
Magnesium	-	-	-	11600	16300	-	-	-	-
Phenols									
Phenol	0.0114	0.0114	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	-	-	-	0.01	0.01	-	-	0.01	0.01
Xylenols	-	-	-	0.015	0.015	-	-	0.015	0.015
Phenols, Total Detected monohydric	-	-	-	0.035	0.035	-	-	0.035	0.035
Inorganics									
Soluble Sulphate 2:1 extract as SO4 BRE	0.125	-	0.239	0.129	0.256	-	-	-	-
pH	11	11.2	11.2	10.9	10.9	7.95	8.09	7.62	7.32
Sulphate, Total									
Sulphur, Total	0.239	-	0.274	0.179	0.286	-	-	-	-
Sulphate, Total potential	0.717	-	0.822	0.537	0.858	-	-	-	-
Sulphate, acid soluble (total)	0.303	-	0.491	0.227	0.574	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	-	-	-	12	12	-	-	217	12
Asbestos									
Asbestos Quantification - Gravimetric - %	-	-	0.001	0.001	0.0033	-	-	-	-
Date of Analysis	21/03/2019	21/03/19	22/03/2019	02/04/2019	02/04/2019	-	22/03/2019	-	-
Analysed By	Renata Bozhkov	Andrzej Ferfecki	Renata Bozhkov	Marcin Magdziarek	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	0.001	0.001	0.001	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	None	None	None	-	-	-	-
Analysts Comments	-	-	N/A	N/C	N/A	-	-	-	-
Asbestos Quantification - Total - %	-	-	0.001	0.001	0.0038	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	Detected	Detected	Detected	-	Not Detected	-	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-
Comments	-	-	Loose fibres in soil.	Loose fibres in soil	Loose fibres in soil	-	-	-	-
Volatile Organic Compounds (VOCs)									
Dibromofluoromethane**	99.6	107	115	103	101	121	116	104	104
Toluene-d8**	96.9	99.6	102	99.4	99.5	103	100	99	100
4-Bromofluorobenzene**	79.2	85.3	83.8	92.5	90.1	92.6	91.1	92.1	96.4
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.426	0.161	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics									
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-

Sample ID	3DJ1	3DJ1	3DJ1	3DJ2	3DJ2	3DJ3	3DJ4	3DJ4	3DJ1V	3DJ2V	3DJ3V	3DJ4V	3DK1	3DK1	3DK1
Depth	0.5	1	1.6	0.5	2	0.5	0.5	1.1	2.4	3.3	2	2	0.5	1.2	2
Sampled Date	18/03/2019	18/03/2019	18/03/2019	19/03/2019	19/03/2019	19/03/2019	19/03/2019	19/03/2019	18/03/2019	19/03/2019	19/03/2019	19/03/2019	13/03/2019	13/03/2019	13/03/2019
Carbon															
Soil Organic Matter (SOM)	20.3	62.8	2.62	27.4	12.3	11.8	6.79	4.33	3.33	3.1	4.14	7.41	21.6	>100	9.34
Metals (Solids)															
Arsenic	7.9	8.97	10.9	3.64	9.05	6	21	35.8	10.1	12.4	11.1	12.7	6	6.89	8.4
Cadmium	1.27	0.189	0.143	0.613	0.381	0.2	5.52	14.9	0.489	0.02	0.02	0.02	1.11	0.31	0.256
Chromium	238	157	16.6	230	33	533	9	9	32.1	34.1	37.1	38.9	487	53.6	28.6
Copper	12.8	15.7	24.7	9.61	23.2	14	39.5	98.6	23.2	21.1	17.3	17.2	14	18.7	8.69
Lead	99.1	11.9	14.7	27.6	19.9	32.5	1500	3300	28.2	25.9	27.6	35.9	30	17.9	10.7
Mercury	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	1.4	0.14	0.14
Nickel	11.7	9.03	40.1	6.94	24.2	14.5	54.8	80.2	34.2	31.9	26.4	24.9	8.96	8.75	11.2
Selenium	3.87	2.71	1	5.53	1.14	17.7	10	10	1	1	1	1	12.3	3.75	1.01
Vanadium	169	164	26.1	189	47.2	378	209	217	52	54.2	55.4	65.1	497	203	75.6
Zinc	408	103	63.7	87.1	64.4	82.4	3390	7120	129	130	125	125	86.9	21.2	24.9
TPH Criteria Working Group (TPH CWG)															
Benzene															
Toluene															
Ethylbenzene															
sum of detected mpo xylene by GC															
Aliphatics >C5-C6	0.0821	0.0921	0.01	0.0207	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0109	0.0422	0.0119
Aliphatics >C6-C8	0.0744	0.17	0.01	0.0598	0.02	0.0362	0.02	0.02	0.02	0.02	0.02	0.02	0.0612	0.18	0.0474
Aliphatics >C8-C10	0.0488	0.0888	0.01	0.0311	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0557	0.0522	0.0291
Aliphatics >C10-C12	0.0344	0.0677	0.01	0.0253	0.02	0.0224	0.02	0.02	0.02	0.02	0.02	0.02	0.047	0.0189	0.0183
Aliphatics >C12-C16	5.73	9.12	0.1	13.3	4.36	1.42	0.1	0.1	0.1	0.1	0.1	0.1	4.06	6.43	3.07
Aliphatics >C16-C21	36.7	42	0.1	18.3	4.46	6.46	7.61	0.1	0.1	0.1	0.1	0.1	15	11.1	19.7
Aliphatics >C21-C35	403	220	0.1	47.5	7.17	75.4	23	0.1	5.9	0.1	6.53	3.6	28	23.5	27.5
Aliphatics >C35-C44	96	53.3	0.1	5.82	0.1	4.3	1.19	0.1	0.1	0.1	0.1	0.1	6.31	4.97	6.93
Aromatics >EC5-EC7	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.11	0.014
Aromatics >EC7-EC8	0.02	0.0444	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0599	0.0151
Aromatics >EC8-EC10	0.0322	0.0588	0.01	0.0207	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0372	0.0344	0.0194
Aromatics >EC10-EC12	0.0222	0.0444	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0306	0.0122	0.0119
Aromatics >EC12-EC16	9.24	10.4	0.1	17.9	3.7	1.36	1.79	0.1	0.1	0.1	0.1	0.1	7.93	16.3	3.48
Aromatics >EC16-EC21	55.1	44.8	0.1	78.9	23.1	6.04	15	4.04	0.1	0.1	1.5	1.58	36.8	35.6	11.4
Aromatics >EC21-EC35	185	92.7	0.1	166	43.4	24	50.5	5.49	7.05	6.12	22.2	23	74.7	55.9	25.7
Aromatics >EC35-EC44	74.6	32.8	0.1	33.2	6.96	3.54	8.34	0.1	0.1	1.07	2.51	3.89	18.1	14.8	8.16
Aromatics >EC40-EC44	25.6	11.2	0.1	8.54	1.07	0.65	1.12	0.1	0.1	0.1	0.1	1.35	5.51	4.83	2.87
Polyaromatic Hydrocarbons (PAHs)															
Acenaphthylene	719	12	12	1990	2070	84.7	133	12	12	12	40.1	12	2020	85.9	14.5
Acenaphthene	111	8	8	131	18900	8	8	8	8	8	8	8	2850	363	31.7
Anthracene	1670	16	16	2900	46700	16	94.5	16	16	16	59.1	16	7410	272	42.8
Benz(a)anthracene	3300	624	14	6500	152000	238	466	14	14	14	74.4	27	5870	516	140
Benzo(a)pyrene	2900	559	15	5020	105000	282	420	15	15	15	54.8	15	5140	323	135
Benzo(b)fluoranthene	4350	639	27.1	5650	137000	372	676	15	26.9	15	60.4	45.4	7330	455	207
Benzo(k)fluoranthene	1670	627	14	2420	60300	113	175	14	14	14	27.2	14	2310	149	73.2
Benzo(g,h,i)perylene	1900	346	24	3050	57500	149	315	24	24	24	40.4	24	3800	206	111
Chrysene	3030	651	22.5	5150	127000	275	394	24.5	10	10	53	31.1	6780	650	186
Dibenzo(a,h)anthracene	508	96.4	0.023	749	19800	39.8	62.5	0.023	0.023	0.023	0.023	0.023	784	63.5	0.023
Indeno(1,2,3-cd)pyrene	2400	287	0.018	2750	54600	123	250	0.018	0.018	0.018	40	0.018	3050	128	69.9
Fluoranthene	7800	2020	0.017	17500	275000	721	1210	108	37.7	0.017	260	74.1	17600	1450	284
Fluorene	649	97.7	10	1270	24500	33.5	31.5	10	10	10	74.3	10	4060	725	50.1
Naphthalene	1740	9	17.1	4400	<0.45	522	173	57.7	9	14.9	173	43.1	5530	2350	245
Phenanthrene	4460	1640	37.3	8370	135000	688	431	150	15	15	328	67.2	20600	2410	271
Pyrene	5.76	1.45	0.015	12.5	184	0.473	0.915	0.158	0.0306	0.015	0.169	0.0536	12.7	1.09	0.23
PAH, Total Detected USEPA 16	43	9.04	0.118	80.4	1400	4.11	5.75	0.498	0.118	0.118	1.45	0.342	108	11.2	2.09
Naphthalene-d8 % recovery**	93.9	0	97.3	105	109	96.2	93.9	102	96.2	97.4	100	94.9	88.6	98.7	91.2
Acenaphthene-d10 % recovery**	99.4	58.4	95.2	86.2	99	94.2	83.3	94.7	95.8	97.5	94.4	94.1	90	97	82.4
Phenanthrene-d10 % recovery**	99.7	87.2	96.1	87.1	95.5	97.8	74.5	94.1	98	104	95.9	99.9	89.5	92.6	77.2
Chrysene-d12 % recovery**	86.7	75.6	98.4	87.9	110	84.5	56.6	85.8	106	98.5	91.7	90.1	87.8	77	84.1
Perylene-d12 % recovery**	86.8	61.9	103	76.4	109	79.8	45.3	78.6	114	94.7	95.1	87.2	81	56.7	80.4
Total Aliphatics >C12-C44	542	324	0.1	85	16	87.5	31.9	0.1	5.9	0.1	6.53	3.6	53.3	46	57.2
Total Aromatics >EC12-EC44	324	181	0.1	296	77.2	34.9	75.7	9.54	7.05	7.18	26.2	28.5	138	123	48.7
Total Aliphatics & Aromatics >C5-C44	865	505	0.1	381	93.2	122	108	9.54	12.9	7.18	32.8	32	191	169	106
Metals - (Solid)															
Iron	78000	80300	22600	66300	24000	133000	404000	669000	28700	21300	21700	19100	108000	37200	24900
Manganese	9800	9070	451	11900	1680	27300	5970	11500	400	452	256	315	23000	4820	2220
Metals - (Liquid)															
Calcium	-	-	-	101000	40200	211000	53000	53700	-	-	-	-	-	-	-
Magnesium	-	-	-	14800	6810	35500	5800	2300	-	-	-	-	-	-	-
Phenols															
Phenol	0.01	0.0111	0.0234	0.069	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0219	0.0222	0.0108
Cresols	-	-	-	0.0345	0.01	0.01	0.01	0.01	-	0.01	0.01	0.01	-	-	-
Xylenols	-	-	-	0.015	0.015	0.015	0.015	0.015	-	0.015	0.015	0.015	-	-	-
Phenols, Total Detected monohydric	-	-	-	0.104	0.035	0.035	0.035	0.035	-	0.035	0.035	0.035	-	-	-
Inorganics															
Soluble Sulphate 2:1 extract as SO4 BRE	0.089	-	0.0303	0.0464	0.031	0.0112	0.0405	0.597	-	-	-	-	0.043	-	0.0588
pH	10.4	11.2	9.77	11.7	10.8	12.7	8.45	10.7	8.83	7.38	7.35	7.65	11.8	12.6	11.6
Sulphate, Total															
Sulphur, Total	0.155	-	0.103	0.125	0.138	0.144	0.175	0.293	-	-	-	-	0.254	-	0.153
Sulphate, Total potential	0.465	-	0.309	0.375	0.414	0.432	0.525	0.879	-	-	-	-	0.762	-	0.459
Sulphate, acid soluble (total)	0.201	-	0.0907	0.0927	0.237	0.247	0.117	0.683	-	-	-	-	0.353	-	0.215
Cyanide, Total	1	1	1	1	1	1	1	6.41	1	1	1	1	1	1	1
Exchangeable Ammonia as N	-	-	-	12	12	12	12	12	-	212	235	171	-	-	-
Asbestos															
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001
Date of Analysis	22/03/2019	22/03/2019	25/03/2019	02/04/2019	02/04/2019	02/04/2019	02/04/19	02/04/19	22/03/2019	-	-	-	21/03/2019	21/03/2019	21/03/2019
Analysed By	James Richards	Renata Bozhkov	James Richards	Marcin Magdziarek	Marcin Magdziarek	Marcin Magdziarek	Andrzej Ferfecki	Andrzej Ferfecki	James Richards	-	-	-	Barbara Urbanek-Walsh	James Richards	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/C
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001
Chrysotile (White) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Trace
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected
Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Loose fibres in soil
Volatile Organic Compounds (VOCs)															
Dibromofluoromethane**	108	109	122	115	91.1	86.5	106	102	125	103	104	103	77.4	101	101
Toluene-d8**	102	104	99.8	101	89.9	96.9	98	101	101	100	99.8	100	93.7	97.7	93.1
4-Bromofluorobenzene**	93.3	91.8	82.8	97.6	71	86.7	91.6	96.3	82.3	96.4	95.8	91.2	70.3	93.6	71.1
Methyl Tertiary Butyl Ether	2	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1
Benzene	1.8	1.8	0.09	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	1.8	0.13
Toluene	1.4	1.4	0.07	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	1.4	0.128
Ethylbenzene	0.8	0.8	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.8	0.04
p/m-Xylene	2	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1
o-Xylene	2	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1
Naphthalene	2.6	2.6	0.13	2.6	0.361	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1.4	2.6	0.141
Sum of BTEX	8	8	0.4	8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	8	0.4
Subcontracted: Inorganics															
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	3DK2	3DK2	3DK4	3DK4	3DK1V	3DK2V	3DK4V	3DL1	3DL1	3DL2	3DL2	3DL4	3DL4	3DL1V	3DL2V
											Depth	0.5	1.2	0.3	0.6	2.9	2.5	0.8	0.3	0.8	0.5	1	0.5	1.2	2.8	2.8
											Sampled Date	13/03/2019	13/03/2019	21/03/2019	21/03/2019	13/03/2019	13/03/2019	21/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019	21/03/2019	21/03/2019	13/03/2019	13/03/2019
Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances															
Carbon																										
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	16.7	60.9	18.6	4.36	2.22	2.76	1.9	17.9	0.35	33.8	3.33	35.2	2.86	2.45	8.5
Metals (Solids)																										
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	5.8	6	4.69	11.1	11.6	12	13.2	6	6	9.58	6	6	14.6	11.7	16.1
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	0.287	0.758	0.482	0.959	0.443	0.343	0.02	1.56	0.979	1.72	1.03	1.35	0.387	0.424	0.605
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	109	267	6.07	29.9	36.3	33.8	34.3	264	412	268	596	433	20.1	37.7	43.5
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	13.3	14	18.8	31.8	18.3	14	16.9	18.4	14	22.3	14	148	8.71	16.9	21.2
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	22.7	17.1	14.4	170	23.4	25.9	23.8	61.2	8.98	99.2	15	21.8	7	26.4	42.7
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	0.14	1.4	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	10	7.19	25.1	31	29.4	27.7	44.1	29.1	4.24	17.7	11	10	6.77	39	26.1
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	3.69	12.1	1	1.41	1	1	1	10	15.3	10	12.2	11.7	5.46	1	1
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	140	938	17.6	26.3	57.8	58.1	54.8	302	1530	274	503	360	71.6	60.3	74.4
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	75.2	30.2	143	314	127	114	130	163	24.2	243	94.4	184	31.7	116	132
TPH Criteria Working Group (TPH CWG)																										
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00															
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00															
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00															
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00															
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.02	0.01	0.0452	0.02	0.02	0.02	0.02	0.0505	0.02	0.0154	0.01	0.0372	0.02	0.02	0.02
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.0396	0.0231	0.115	0.02	0.02	0.02	0.02	0.271	0.02	0.0638	0.0306	0.0733	0.02	0.02	0.02
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.0237	0.01	0.0742	0.02	0.02	0.02	0.02	0.342	0.02	0.0572	0.0186	0.0897	0.02	0.02	0.02
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.0203	0.01	0.0527	0.02	0.02	0.02	0.02	0.285	0.02	0.12	0.0284	0.0667	0.02	0.02	0.02
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	4.23	14.5	4.08	1.35	0.377	0.1	0.384	5.32	0.955	2.54	3.52	5.4	2.32	0.1	0.1
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	17.1	17.1	6.52	3.02	1.16	0.1	0.134	17.1	5.32	7.5	7.4	7.41	4.89	0.1	0.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	45.6	59.9	17.1	6.81	3.56	1.14	0.642	65.4	31.3	15	25	48	14.2	0.1	5.37
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	10.8	13.9	1.99	0.1	1.14	0.932	0.1	13	14	2.81	3.3	2.63	3.62	0.1	0.1
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.0296	0.02	0.01	0.01	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.0373	0.02	0.011	0.01	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.02	0.01	0.0495	0.02	0.02	0.02	0.02	0.228	0.02	0.0385	0.012	0.0602	0.02	0.02	0.02
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.02	0.01	0.0355	0.02	0.02	0.02	0.02	0.19	0.02	0.0803	0.0186	0.0438	0.02	0.02	0.02
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	8.02	12	4.65	0.1	0.1	0.1	0.1	7.35	0.967	7.4	6.43	5.34	2.14	0.625	0.1
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	55.3	31.4	13.5	0.1	0.1	0.1	0.1	26.7	10.1	51.3	23.8	15.3	11.6	1.02	0.1
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	267	72.3	37.7	3.5	4.18	3	3.21	76.3	34.1	108	70.1	38.1	30.1	7.45	24.1
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	66.5	20.7	10.8	0.1	1.96	0.561	0.1	21.4	12	22.5	18	8.52	5.9	2.35	2.11
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	19.1	6.73	3.5	0.1	0.737	0.1	0.249	6.61	3.7	6.52	5.98	2.41	1.36	0.952	0.1
Polyaromatic Hydrocarbons (PAHs)																										
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	419	146	26.4	12	12	12	12	162	38.6	1550	3300	142	58.6	12	12
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	115	60.2	10.7	8	8	8	8	36.3	79.6	457	1990	17.5	11.2	8	8
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	1560	277	41.9	16	16	16	16	294	203	2370	6840	305	103	16	16
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	5990	689	109	14	14	14	14	785	777	4380	12000	544	218	14	28.7
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	4950	451	91.9	15	15	15	15	703	688	3720	9090	395	212	15	15
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	7730	642	196	17.4	15	15	15	1110	1130	4280	10500	652	250	15	26.6
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	2280	282	51.3	14	14	14	14	317	420	1650	3950	215	101	14	14
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	3620	259	76.8	24	24	24	24	574	532	2630	6420	227	146	24	24
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	5250	811	180	25.2	10	10	10	751	885	3400	8870	470	232	10	32.5
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	1000	80.7	0.023	0.023	0.023	0.023	0.023	125	82.1	582	1270	71.4	35.5	0.023	0.023
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	2880	212	50.5	0.018	0.018	0.018	0.018	416	426	2040	4490	271	115	0.018	0.018
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	11100	1720	251	23.9	0.017	0.017	0.017	1760	1820	11200	34600	1260	569	0.017	55.5
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	498	195	59.8	10	10	10	10	169	49.6	1750	6390	95.2	62.4	10	10
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	1260	894	321	34.1	9	9	9	1110	99.1	12600	41500	1120	404	13.1	23.3
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	5610	1860	444	66	15	15	15	1210	1670	8130	28200	1280	478	15	32.4
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09	8.19	1.22	0.193	0.0181	0.015	0.015	0.015	1.28	1.34	8.09	21.9	0.937	0.417	0.015	0.0422
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	62.4	9.8	2.1	0.185	0.118	0.118	0.118	10.8	10.2	68.8	201	8	3.42	0.118	0.241
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	86.7	90.9	92.3	95.9	86.9	95.5	96.6	91	103	92.1	96	97	93.3	104	86.8
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	85.2	89.7	87.3	89.6	85.2	100	95	87.1	97.5	90.7	82	95.9	86.2	95	87.6
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	81.4	86.7	88.7	89.1	83.6	102	100	81.8	96.4	91.4	79.2	99.1	88.7	96	83.2
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	84.9	78.4	74.8	74.3	84.4	95.8	90.4	85.8	88.4	98.8	109	87.1	78.2	85.2	84.6
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	78.3	62	77.6	83.4	84.1	88.2	86.5	79.1	83.7	87.6	82	78.8	87.8	81.8	83.1
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	77.7	105	29.7	11.2	6.24	2.07	1.16	101	51.5	27.8	39.2	63.4	25	0.1	5.37
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	397	136	66.7	3.5	6.14	3.56	3.21	132	57.2	189	118	67.2	49.8	11.4	26.2
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00	474	242	96.7	14.7	12.4	5.64	4.37	234	109	218	158	131	74.8	11.4	31.6
Metals - (Solid)																										
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			53800	79600	31100	26000	37700	38600	31700	109000	141000	107000	139000	123000	48200	34900	27600
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			7470	20800	897	796	523	680	493	13500	32900	16400	27300	22300	7310	298	274
Metals - (Liquid)																										
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			-	-	37600	22600	-	-	-	-	-	-	-	186000	-	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			-	-	2390	9100	-	-	-	-	-	-	-	34800	-	-	-
Phenols																										
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.022	0.0219	0.0109	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	-	-	0.01	0.01	-	-	0.0133	-	-	-	-	0.01	0.01	-	-
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	-	-	0.015	0.015	-	-	0.015	-	-	-	-	0.015	0.015	-	-
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	-	-	0.035	0.035	-	-	0.035	-	-	-	-	0.035	0.035	-	-
Inorganics																										
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	0.0957	-	0.0111	0.0154	-	-	-	-	0.0105	0.059	-	0.0107	-	-	-
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	11.3	12	8.52	8.27	6.79	7.93	7.49	12.2	12.8	11.1	12.6	12.7	11.7	7.84	7.13
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33															
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	0.191	-	0.0976	0.0837	-	-	-	-	0.156	0.265	-	0.128	-	-	-
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	0.573	-	0.293	0.251	-	-	-	-	0.468	0.795	-	0.384	-	-	-
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	0.461	-	0.033	0.107	-	-	-	-	0.188	0.361	-	0.182	-	-	-
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	1	1	1	1	1	1	1	1	1.61	1	1	1	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	-	-	12	12	-	-	129	-	-	-	-	12	12	-	-
Asbestos																										
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0					0.00	21/03/19	20/03/19	04/04/19	05/04/19	-	-	-	21/03/2019	21/03/2019	21/03/2019	21/03/2019	05/04/19	-	-	-
Analysed By	TM048	No units		1371	0	0					0.00	Andrzej Ferfecki	Christian Hallam	Christian Hallam	Christian Hallam	-	-	-	James Richards	Lucy Caroe	Lucy Caroe	Barbara Urbanek-Walsh	Christian Hallam	-	-	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0					0.00	-	-	-	-	-	-	-	N/A	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Fibrous Tremolite	TM048	No units		1371	0	0					0.00	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Fibrous Actinolite	TM048	No units		1371	0	0					0.00	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-
Comments	TM048	No units		1371	0	0			0		0.00	-	-	-	-	-	-	-	Fibre bundles in soil	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																										
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105		0.00	86.5	104	100	109	121	113	115	103	79	98.7	97.5	81.3	97.1	119	119
Toluene-d8**	TM116	%		1371	1100	1100		115	97		0.00	95.7	97.4	99.9	99.3	101	102	101	96.6	102	99.1	94.7	88.1	96.9	101	102
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90		0.00	72.1	90	96.5	86.5	85.8	93.5	102	75.4	95.2	79.9	74	70.3	82.4	90	88.3
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0		0.00	0.2	2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0		0.00	0.18	1.8	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0		0.00	0.14	1.4	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0		0.00	0.08	0.8	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0		0.00	0.2	2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0		0.00	0.2	2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17		0.00	0.26	2.6	2.6	0.13	0.13	0.13	0.13	0.712	0.13	4.38	1.07	0.273	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1		0.00	0.8	8	8	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																										
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14		0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12		0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14		0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12		0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1		0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14		0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15		0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3DM1	3DM1	3DM2	3DM2	3DM4	3DM1V	3DM2V	3DM4V	TPAC13	TPAC13	TPAC13	TPAD10	TPAD10	TPAD10
Depth	0.5	1.2	0.5	1	0.5	3	2.7	2.7	0.5	1.5	2.4	1	2	2.5
Sampled Date	13/03/2019	13/03/2019	13/03/2019	13/03/2019	21/03/2019	13/03/2019	13/03/2019	21/03/2019	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017
Determinand														
Carbon														
Soil Organic Matter (SOM)	92.1	11.5	9.52	55.5	62.1	3.64	5.28	1.84	5.36	1.61	6.93	0.919	1.47	24.3
Metals (Solids)														
Arsenic	6	6	6.59	1.97	5.35	12.2	13.6	17.3	11.8	11.4	10.5	6	9.88	12.4
Cadmium	0.488	0.367	1.5	0.258	0.861	0.391	0.467	0.484	5.29	0.2	0.557	0.591	0.2	0.0479
Chromium	322	386	325	223	132	40.8	40.7	33.7	20.2	9	24.5	9	574	24.5
Copper	14	14	14	7.33	15.6	19.6	16.1	10.2	37.9	14	39.4	22.1	55.1	15.2
Lead	5.15	0.763	107	8.83	73.8	25.9	33.3	31.8	289	50	327	21.7	110	36
Mercury	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	5.11	1.4	0.937	3.54	1.4	0.972
Nickel	8.13	6.22	12.5	3.48	10.2	37.9	28.5	32.4	37.2	9.32	20.1	17.9	28.5	22.7
Selenium	10	15.4	10.4	4.67	3.53	1	1	1	10	10	1	10	13.3	1
Vanadium	241	1750	503	152	76.8	66.4	67.5	57.7	98.1	83.5	53.5	168	213	54.7
Zinc	133	28.9	247	35	202	118	119	101	790	131	364	62.8	287	154
TPH Criteria Working Group (TPH CWG)														
Benzene									0.04	0.04	0.04	0.04	0.04	0.04
Toluene									0.025	0.008	0.0189	0.008	0.008	0.008
Ethylbenzene									0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC									0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.0209	0.02	0.02	0.02	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.0209	0.02	0.02	0.0667	0.091	0.02	0.02	0.02	0.04	0.0497	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.08	0.02	0.02	0.02	0.04	0.167	0.0554	0.04	0.04	0.04
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.0947	0.02	0.02	0.02	0.04	0.472	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	27.6	6.1	2.21	16	14	0.1	0.1	0.1	0.581	18.2	0.1	2.65	7.01	0.1
Aliphatics >C16-C21	111	21.2	11.3	18.5	31.3	0.1	1.19	0.1	5.99	34.5	0.748	10.1	16.6	0.1
Aliphatics >C21-C35	158	120	47.9	39.1	53.8	2.03	7.94	0.1	34.2	62.6	25.5	39.5	53.6	7.05
Aliphatics >C35-C44	25.2	31.9	14.3	4.65	8.9	0.1	0.1	0.1	7.04	12.1	11.1	6.22	12.9	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.0529	0.02	0.02	0.02	0.04	0.111	0.0403	0.04	0.04	0.04
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.064	0.02	0.02	0.02	0.04	0.315	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	17.4	3.64	4.53	14.7	17.4	0.642	196	0.1	1.97	4.49	0.916	0.579	3.23	0.1
Aromatics >EC16-EC21	56.5	11.4	31.1	28.4	70.1	1.68	413	0.1	10	13.1	2.66	3.09	9.69	0.1
Aromatics >EC21-EC35	93.6	51.1	79.3	59	113	7.54	224	1.74	47	30.9	43.9	21.5	34.9	27.2
Aromatics >EC35-EC44	28.3	19.2	23.2	15.5	26.6	1.21	15.5	0.1	18.9	14.7	41.8	9.08	14.2	3.37
Aromatics >EC40-EC44	10.9	6.52	7.73	5	8.61	0.1	5.38	0.1	7.38	6.26	18	3.18	5.29	0.1
Polyaromatic Hydrocarbons (PAHs)														
Acenaphthylene	166	34.8	340	89.6	882	12	12	20.2	9260	12	82.5	12	84.3	12
Acenaphthene	40.5	53.9	29.6	8	114	8	8	10.9	413	29.1	8	10.9	33.1	8
Anthracene	327	75.6	592	126	1320	16	16	27.9	6670	38.6	160	16	228	16
Benz(a)anthracene	770	468	1610	222	2180	14	36.7	89.1	17300	113	521	121	782	28.4
Benzo(a)pyrene	528	508	1290	107	1480	15	29.9	97.2	15400	90.6	547	105	671	38.4
Benzo(b)fluoranthene	650	643	2230	280	2250	15	31.3	116	19900	163	984	154	951	44.4
Benzo(k)fluoranthene	231	170	738	68.3	889	14	14	30.3	7540	59.9	317	62.5	345	20.8
Benzo(g,h,i)perylene	318	498	958	84.2	835	24	36.3	63.5	11400	86.1	571	89.8	446	40.3
Chrysene	885	578	1640	327	1840	10	40.8	86.8	9570	115	616	108	676	32.6
Dibenzo(a,h)anthracene	81	83	212	0.023	246	0.023	0.023	0.023	2400	0.023	135	0.023	134	0.023
Indeno(1,2,3-cd)pyrene	214	294	753	74.1	1090	0.018	0.018	49.5	9870	63.7	452	73.3	407	27
Fluoranthene	1990	1010	3270	583	6090	0.017	87.4	218	69700	188	831	163	1400	46.6
Fluorene	175	48.9	213	10	816	10	10	13.9	7040	29.2	33	10	76.7	10
Naphthalene	917	297	2390	885	5120	9	11.4	75.8	4370	72.9	142	42.6	228	13.8
Phenanthrene	1630	772	1780	991	5640	15	41.2	120	68200	144	342	71.7	654	40.2
Pyrene	1.49	0.834	2.71	0.466	4.24	0.015	0.0695	0.168						
PAH, Total Detected USEPA 16	10.4	6.37	20.8	4.3	35	0.118	0.384	1.18	311	1.38	6.35	1.16	8.14	0.368
Naphthalene-d8 % recovery**	90.8	95.4	89.1	99.6	91.6	88	98.8	93	93.5	95.2	92	101	107	112
Acenaphthene-d10 % recovery**	93.6	91.7	84.5	100	93.7	83.2	96.3	87.4	91.6	93.1	88.7	97.7	103	106
Phenanthrene-d10 % recovery**	94.9	93.4	76.2	99	95.2	74.2	96.8	92	91.5	90.1	86.8	95.3	100	103
Chrysene-d12 % recovery**	93.7	105	81.7	85.5	77.7	79.9	106	81.8	103	92.8	87.6	99.3	106	94.8
Perylene-d12 % recovery**	74.8	97.9	79.1	65.4	70.2	78.6	101	98.5	105	95.4	91.3	109	113	113
Total Aliphatics >C12-C44	322	180	75.8	78.2	108	2.03	9.14	0.1	47.8	127	37.4	58.5	90.2	7.05
Total Aromatics >EC12-EC44	196	85.4	138	118	227	11.1	849	1.74	77.9	63.2	89.3	34.3	61.9	30.5
Total Aliphatics & Aromatics >C5-C44	518	265	214	196	336	13.1	858	1.74						
Metals - (Solid)														
Iron	84600	103000	104000	41000	30300	34400	31900	43000	106000	171000	44500	232000	188000	41400
Manganese	12200	21700	19800	9380	6550	382	289	585	3300	7380	2610	5830	17200	652
Metals - (Liquid)														
Calcium	-	-	-	-	63300	-	-	-	-	124000	-	-	188000	-
Magnesium	-	-	-	-	7150	-	-	-	-	12700	-	-	7940	-
Phenols														
Phenol	0.011	0.011	0.01	0.0109	0.01	0.01	0.01	0.01	0.0238	0.01	0.01	0.01	0.131	0.01
Cresols	-	-	-	-	0.01	-	-	0.01	0.0714	0.01	0.01	0.01	0.01	0.01
Xylenols	-	-	-	-	0.015	-	-	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	-	-	-	-	0.035	-	-	0.035	0.0952	0.035	0.035	0.035	0.131	0.035
Inorganics														
Soluble Sulphate 2:1 extract as SO4 BRE	0.0569	-	-	0.0499	0.114	-	-	-	-	0.155	-	-	0.114	-
pH	11.9	12.7	11.6	11.9	8.71	8.79	7.25	8.22	10.2	11	7.8	11.1	11.1	7.23
Sulphate, Total										-	-	-	-	-
Sulphur, Total	0.044	-	-	0.13	0.107	-	-	-	-	0.265	-	-	0.294	-
Sulphate, Total potential	0.132	-	-	0.39	0.321	-	-	-	-	0.795	-	-	0.882	-
Sulphate, acid soluble (total)	0.15	-	-	0.157	0.0928	-	-	-	-	0.979	-	-	0.322	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	-	-	-	-	12	-	-	137	38.2	12	31.7	12	12	242
Asbestos														
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	20/03/19	20/03/19	21/03/19	21/03/19	04/04/2019	-	-	-	-	22/12/2017	-	-	22/12/2017	-
Analysed By	Christian Hallam	Lucy Caroe	Andrzej Ferfecki	Andrzej Ferfecki	James Richards	-	-	-	-	James Richards	-	-	Barbara Urbanek-Walsh	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Fibrous Tremolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Fibrous Actinolite	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-
Comments	-	-	-	-	-	-	-	-	-	0	-	-	0	-
Volatile Organic Compounds (VOCs)														
Dibromofluoromethane**	103	101	107	101	93.4	122	117	116	-	-	-	-	-	-
Toluene-d8**	97.7	97.3	95.3	95.3	98.2	101	100	102	-	-	-	-	-	-
4-Bromofluorobenzene**	86.4	83.3	76.9	80.5	82.6	91.1	87.1	103	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	2	0.2	0.1	2	0.1	0.1	0.1	0.1	-	-	-	-	-	-
Benzene	1.8	0.18	0.09	1.8	0.09	0.09	0.09	0.09	-	-	-	-	-	-
Toluene	1.4	0.14	0.07	1.4	0.07	0.07	0.07	0.07	-	-	-	-	-	-
Ethylbenzene	0.8	0.08	0.04	0.8	0.04	0.04	0.04	0.04	-	-	-	-	-	-
p/m-Xylene	2	0.2	0.1	2	0.1	0.1	0.1	0.1	-	-	-	-	-	-
o-Xylene	2	0.2	0.1	2	0.1	0.1	0.1	0.1	-	-	-	-	-	-
Naphthalene	2.6	0.26	0.602	2.6	0.29	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	8	0.8	0.4	8	0.4	0.4	0.4	0.4	-	-	-	-	-	-
Subcontracted: Inorganics														
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TPAD11	TPAD11	TPAD11	TPAD12	TPAD12	TPAD12	TPAD12	TPAD13	TPAE10	TPAE10	TPAE10	TPAE11	TPAE11	TPAE12	TPAE12	TPAE12	TPAE13
Depth	0.5	1.5	2.7	0.9	1.5	2.3	2.7	0.3	1	2	3	0.5	1.5	0.5	1.5	1.8	0.7
Sampled Date	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017
Determinand																	
Carbon																	
Soil Organic Matter (SOM)	2.69	1.66	5.1	4.6	2.84	3.5	1.39	5.45	1.84	1.93	1.04	0.934	6.53	4.57	1.01	0.864	1.38
Metals (Solids)																	
Arsenic	12.3	13.4	8.73	8.73	10.2	6.61	10.1	6.14	6.75	8.96	9.56	6.89	6	8.36	6	13.4	6
Cadmium	4.89	0.989	0.0993	1.79	0.205	0.02	0.02	0.482	0.22	0.2	0.02	0.2	0.2	1.05	0.2	0.2	0.2
Chromium	143	83.9	12.5	35.5	94.1	136	28.1	69	94.3	352	23	454	487	63.1	558	173	390
Copper	38.8	34.2	24	29	30.7	20.5	11.7	21.8	19.9	27.2	7.8	25	29.7	30.9	16.7	45.3	19.6
Lead	120	195	33.6	355	57.4	20.7	24.8	65.4	36.9	57.5	21.8	36.6	33.8	109	16	17.9	33
Mercury	6.24	1.69	0.729	1.4	1.4	0.14	0.896	1.42	1.4	1.4	0.707	1.4	1.4	2.02	1.4	1.4	1.4
Nickel	36.9	24.2	22.8	26.9	22.9	17.9	36.5	18.4	15.1	21.7	32.5	16.6	9.53	27.9	5.48	13.8	7.26
Selenium	11.2	10	1	10	10	3.42	1.6	10	10	11.9	1.32	21.4	16.3	10	14.9	15.9	10
Vanadium	299	187	30	102	133	159	64.3	176	163	278	52.4	472	394	201	492	255	336
Zinc	384	561	96.9	963	183	67.9	111	185	99.2	110	98.6	116	55.4	338	72	54.7	92.1
TPH Criteria Working Group (TPH CWG)																	
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.0686	0.019	0.008	0.032	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.0409	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.0807	0.108	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.234	0.0594	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	2.92	15.6	1.21	2.71	14.6	1.2	1.02	1.11	3.85	0.268	1.08	0.683	1.34	3.65	0.463	3.89	0.1
Aliphatics >C16-C21	9.86	30.5	1.39	10.8	34.7	2.98	1.49	6.99	20.5	5.36	2.06	5.73	6.13	14.5	5.37	11.9	2.49
Aliphatics >C21-C35	59.2	77.3	15	47.9	126	19.3	5.44	34.3	109	51.8	6.42	45.2	52	59.2	45.9	61.1	24
Aliphatics >C35-C44	23.9	32	0.595	11.8	41.7	8.05	0.762	10.2	39.6	15.2	0.978	7.86	7.9	23.9	10.9	27	5.32
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.0686	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.0534	0.0818	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.156	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	1.23	4.61	1.41	2.77	3.33	1.03	0.182	1.87	1.73	0.673	0.318	0.696	0.921	3.5	0.1	1.78	0.706
Aromatics >EC16-EC21	7.6	19.8	4.87	12.9	14.2	4.04	0.831	14.6	15.3	6.77	0.678	10.5	12.9	30.5	2.09	7.23	2.3
Aromatics >EC21-EC35	44.5	73.7	59.2	59.5	80.9	36.5	4.6	66.9	102	58.5	3.52	60.1	69.4	115	15	35.2	14.4
Aromatics >EC35-EC44	32.1	47.1	14.4	23.5	58.8	24.6	0.774	23.6	52.1	27.2	0.995	18.2	22.9	50.2	6.49	13.6	7.39
Aromatics >EC40-EC44	14.4	19.7	5.38	8.98	25.3	10.4	0.1	8.44	20.8	10.8	0.1	6.13	8.48	20.4	2.64	5.26	3
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	70.8	112	12	70.2	32.7	31.7	12	86.8	32.9	26.8	12	14.4	12.2	835	12	12	71.8
Acenaphthene	20.5	61.3	8	46.7	31.6	12.2	8	16.3	44.5	63.6	8	110	62.6	70.6	21.3	27.6	13.2
Anthracene	125	234	25.3	168	63.4	45.4	16	157	127	173	16	219	143	1550	29.6	67.1	169
Benz(a)anthracene	349	759	147	696	372	284	20.6	757	1010	1520	83.9	2470	2080	6340	220	639	601
Benzo(a)pyrene	335	843	178	720	383	322	29.6	744	1080	1650	106	2380	2060	6290	214	661	558
Benzo(b)fluoranthene	483	860	259	996	541	382	30.3	1170	1280	2060	124	3160	2730	8790	342	899	914
Benzo(k)fluoranthene	211	439	90.4	368	228	163	14	462	560	830	60.5	1360	1200	3150	151	363	342
Benzo(g,h,i)perylene	290	594	150	515	291	220	24	601	737	1130	101	1810	1490	4310	208	503	439
Chrysene	343	793	146	650	399	270	23	782	959	1460	54.3	2530	2150	5260	221	624	564
Dibenzo(a,h)anthracene	77.6	149	46.6	146	69.1	64.3	0.023	158	199	292	0.023	460	378	1210	48.5	125	126
Indeno(1,2,3-cd)pyrene	241	500	119	447	229	189	0.018	499	616	920	81.3	1460	1250	4100	180	401	392
Fluoranthene	661	1420	194	1170	515	388	34.2	939	1320	1900	74	4140	3370	11200	368	936	1050
Fluorene	68.1	119	10	90.5	28.6	28.2	10	39.9	38	42.3	10	37.5	18.8	453	11.7	19.1	48.5
Naphthalene	260	279	32.6	235	93.5	122	9	141	108	126	30.8	115	39.6	1280	32.7	31.2	112
Phenanthrene	478	736	122	696	271	214	23.1	409	586	807	62.6	2100	1140	4390	289	390	470
Pyrene																	
PAH, Total Detected USEPA 16	4.51	9.12	1.66	7.96	4.12	3.11	0.19	7.98	9.93	14.8	0.885	25.8	20.9	67.4	2.63	6.47	6.68
Naphthalene-d8 % recovery**	85.2	101	96.2	99.1	97.7	101	103	95.3	102	101	118	106	92	104	102	102	93.2
Acenaphthene-d10 % recovery**	79.7	94.5	94.8	94.7	93.5	98.5	101	92.9	97.9	97.2	115	103	87.6	101	98.5	99.2	92.6
Phenanthrene-d10 % recovery**	78.3	92.8	92.7	91.7	91	96	96.6	91.5	96.8	95.8	112	102	87.2	99.6	97.4	97.8	90.8
Chrysene-d12 % recovery**	79.3	92.4	92.4	93.7	90.8	94.1	97.2	93.8	98.6	98.2	116	106	91.4	105	97.8	98.4	92.7
Perylene-d12 % recovery**	82.4	106	97	100	104	101	104	98	106	107	126	114	102	113	106	106	98.2
Total Aliphatics >C12-C44	96	155	18.2	73.2	218	31.5	8.7	52.6	173	72.7	10.5	59.4	67.3	101	62.6	104	31.8
Total Aromatics >EC12-EC44	85.4	145	79.9	98.7	157	66.1	6.39	107	171	93.2	5.51	89.5	106	199	23.5	57.9	24.8
Total Aliphatics & Aromatics >C5-C44																	
Metals - (Solid)																	
Iron	207000	195000	28300	130000	162000	71700	41400	75000	147000	204000	37000	185000	174000	167000	144000	333000	117000
Manganese	10300	10900	858	4360	10800	8930	690	4090	11000	17800	1150	36500	30500	10400	30100	20000	19800
Metals - (Liquid)																	
Calcium	-	137000	31500	70600	-	90700	-	146000	-	157000	-	-	239000	-	264000	-	-
Magnesium	-	13300	11300	10000	-	12700	-	32500	-	12700	-	-	7350	-	27800	-	-
Phenols																	
Phenol	0.322	0.147	0.01	0.0357	0.0314	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.023	0.0105	0.0132	0.0714	0.01	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.0213	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.345	0.157	0.035	0.107	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.162	0.0756	0.069	-	0.0447	-	0.158	-	0.19	-	-	0.0308	-	0.011	-	-
pH	11.4	11.3	7.75	10.1	11.4	8.6	7.53	11.4	9.68	11.6	8.46	12.6	12.6	11.2	12.7	12.6	11.2
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	-	0.0563	0.0813	0.121	-	0.0922	-	0.2	-	0.226	-	-	0.286	-	0.218	-	-
Sulphate, Total potential	-	0.169	0.244	0.363	-	0.277	-	0.6	-	0.678	-	-	0.858	-	0.654	-	-
Sulphate, acid soluble (total)	-	0.258	0.0481	0.212	-	0.107	-	0.371	-	0.361	-	-	0.322	-	0.517	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	26.9	12	12	157	12	12	12	113	12	12	12	12	12	12
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-
Date of Analysis	-	22/12/2017	22/12/2017	22/12/2017	-	22/12/2017	-	22/12/2017	-	22/12/2017	-	-	22/12/2017	-	22/12/2017	-	-
Analysed By	-	Eva Guerra	Barbara Urbanek-Walsh	Eva Guerra	-	James Richards	-	Eva Guerra	-	Barbara Urbanek-Walsh	-	-	Barbara Urbanek-Walsh	-	James Richards	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	N/C	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Detected	-	Not Detected	-	-
Amosite (Brown) Asbestos	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Fibrous Anthophyllite	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Fibrous Tremolite	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Fibrous Actinolite	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Non-Asbestos Fibre	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-
Comments	-	0	0	0	-	0	-	0	-	0	-	-	Fibre bundles in soil.	-	0	-	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.013	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	TPAE13	TPAE13	TPAF9	TPAF10	TPAF12
Depth	1.1	2	0.2	0.5	0.3
Sampled Date	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017
Carbon					
Soil Organic Matter (SOM)	2.12	7.33	5.81	1.71	1.41
Metals (Solids)					
Arsenic	6	17.6	16.6	6	12.8
Cadmium	0.2	0.222	1.23	0.2	0.2
Chromium	733	28.4	14.4	207	9
Copper	19.2	18.6	50.9	23.3	29.2
Lead	60.9	47.9	240	96.9	41.6
Mercury	1.4	0.791	1.4	1.4	2.61
Nickel	11.2	25.1	32.3	12.6	5.6
Selenium	16.4	1.48	10	14	10
Vanadium	538	56.9	87.1	353	42.7
Zinc	168	315	678	107	161
TPH Criteria Working Group (TPH CWG)					
Benzene	0.04	0.04	0.04	0.04	0.04
Toluene	0.008	0.008	0.0176	0.008	0.008
Ethylbenzene	0.012	0.012	0.012	0.012	0.012
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.0454	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.0706	0.04	0.04
Aliphatics >C12-C16	0.741	0.632	6.32	4.59	0.1
Aliphatics >C16-C21	5.18	2.81	54.5	20.4	1.74
Aliphatics >C21-C35	43.8	7.02	162	158	19.8
Aliphatics >C35-C44	17.5	0.1	39	34	9.88
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.0504	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.0466	0.04	0.04
Aromatics >EC12-EC16	1.24	0.1	4.82	2.13	0.613
Aromatics >EC16-EC21	4.99	0.705	37.8	18	1.28
Aromatics >EC21-EC35	28.5	39.1	139	134	7.09
Aromatics >EC35-EC44	16.7	6.41	62.1	43.7	1.7
Aromatics >EC40-EC44	7.02	1.6	25.1	16	0.1
Polyaromatic Hydrocarbons (PAHs)					
Acenaphthylene	26.4	21.7	695	29	12
Acenaphthene	23	8	109	153	8
Anthracene	54	16	1210	564	16
Benz(a)anthracene	336	127	4570	3870	14
Benzo(a)pyrene	362	123	4520	4890	20
Benzo(b)fluoranthene	557	174	6820	6530	35
Benzo(k)fluoranthene	207	77.7	2460	2370	14
Benzo(g,h,i)perylene	304	108	3420	3080	24
Chrysene	327	130	3870	3910	19.6
Dibenzo(a,h)anthracene	77.5	40.7	945	767	0.023
Indeno(1,2,3-cd)pyrene	267	96.1	3030	2370	0.018
Fluoranthene	541	183	8250	5130	30.7
Fluorene	21.2	17.6	445	97.7	10
Naphthalene	69.3	42.7	3340	136	9
Phenanthrene	246	141	3280	2770	26
Pyrene					
PAH, Total Detected USEPA 16	3.88	1.41	53.1	41.5	0.157
Naphthalene-d8 % recovery**	101	115	98.5	102	95.1
Acenaphthene-d10 % recovery**	96.6	118	95.8	100	92.1
Phenanthrene-d10 % recovery**	94.9	115	94.2	98.3	90.2
Chrysene-d12 % recovery**	94.6	118	103	105	87.3
Perylene-d12 % recovery**	102	125	106	122	87.8
Total Aliphatics >C12-C44	67.1	10.5	261	217	31.4
Total Aromatics >EC12-EC44	51.4	46.2	244	198	10.7
Total Aliphatics & Aromatics >C5-C44					
Metals - (Solid)					
Iron	149000	32100	191000	219000	230000
Manganese	37000	316	20300	5190	16600
Metals - (Liquid)					
Calcium	216000	-	111000	196000	-
Magnesium	16200	-	10800	10400	-
Phenols					
Phenol	0.0112	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035
Inorganics					
Soluble Sulphate 2:1 extract as SO4 BRE	0.0774	-	0.0962	0.136	-
pH	12.2	6.8	9.45	11.8	11.1
Sulphate, Total	-	-	-	-	-
Sulphur, Total	0.361	-	0.147	0.358	-
Sulphate, Total potential	1.08	-	0.441	1.07	-
Sulphate, acid soluble (total)	0.561	-	0.209	0.623	-
Cyanide, Total	1	1	1	1	1
Exchangeable Ammonia as N	12	269	12	12	12
Asbestos					
Asbestos Quantification - Gravimetric - %	-	-	0.001	0.001	-
Date of Analysis	22/12/2017	-	22/12/2017	22/12/2017	-
Analysed By	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	-
Asbestos Quantification - PCOM Evaluation - %	-	-	0.001	0.001	-
Additional Asbestos Components (Using TM048)	-	-	None	None	-
Analysts Comments	-	-	N/C	N/C	-
Asbestos Quantification - Total - %	-	-	0.001	0.001	-
Chrysotile (White) Asbestos	Not Detected	-	Detected	Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	Not Detected	-
Comments	0	-	Loose fibres in soil.	Loose fibres in soil.	-
Volatile Organic Compounds (VOCs)					
Dibromofluoromethane**	-	-	-	-	-
Toluene-d8**	-	-	-	-	-
4-Bromofluorobenzene**	-	-	-	-	-
Methyl Tertiary Butyl Ether	-	-	-	-	-
Benzene	-	-	-	-	-
Toluene	-	-	-	-	-
Ethylbenzene	-	-	-	-	-
p/m-Xylene	-	-	-	-	-
o-Xylene	-	-	-	-	-
Naphthalene	0.13	0.13	0.518	0.13	0.013
Sum of BTEX	-	-	-	-	-
Subcontracted: Inorganics					
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-

Sample ID	TPAF12	TPAF13	TPAF13	TPAF13	TPAG10	TPAG11	TPAG11	TPAG11	TPAG12	TPAG12	TPAG13	TP3BC401	TP3BC402	TP3BC403	TP3BC404	TP3BC501	TP3BC502	TP3BC503	TP3BC504
Depth	1	0.4	2	3.1	0.5	0.4	1.3	2	0.5	0.8	0.3	0.5	1	2	3	0.4	0.8	1.5	2
Sampled Date	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	11/12/2017	02/05/2018	02/05/2018	02/05/2018	02/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018
Carbon																			
Soil Organic Matter (SOM)	1.13	8.72	2.14	7.84	13.6	1.66	5.6	0.931	3.41	1.35	2.81	4.45	7.83	3.15	8.72	14.2	13.4	9.21	14
Metals (Solids)																			
Arsenic	6	6	6	7.83	6	4.27	6	6	6	191	6	4.57	5.74	5.27	4.37	13.3	22.1	21.2	24.7
Cadmium	0.2	0.2	1.04	0.197	0.2	0.02	0.2	0.2	0.2	0.2	0.2	0.0732	0.706	0.156	0.431	0.2	5.63	5.04	4.75
Chromium	353	770	796	18.6	115	10.2	283	9	169	775	9	30.5	47	18.5	50.5	9	9	9	9
Copper	20.4	14	26.5	12.3	14	1.4	14	14	20.7	123	22	1.4	9.19	2.18	1.4	18.3	35.2	45.9	37
Lead	23.7	19.4	348	27.8	20.3	5.31	8.24	14.9	71.5	84.2	86.8	6.73	31.6	17.6	1.59	97	2260	1960	1680
Mercury	1.4	1.4	1.4	0.488	1.4	1.01	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4
Nickel	4.38	3.4	10.2	13	5.22	2.84	2	3.39	22	18.2	18.5	3.76	7.42	4.95	5.57	28.1	30.9	32.6	38.2
Selenium	12.9	19.3	17.2	1	10	1	10	10	10	15.7	10.3	6.44	3.64	4.57	4.14	10	10	10	10
Vanadium	331	617	685	35.8	136	22.7	259	66.1	293	504	117	112	92.6	46.5	265	164	181	144	137
Zinc	59.8	57.4	917	75.2	55.1	36.7	19.2	25	209	755	236	43.8	166	70.4	41.1	286	5130	4470	3780
TPH Criteria Working Group (TPH CWG)																			
Benzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04								
Toluene	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008								
Ethylbenzene	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012								
sum of detected mpo xylene by GC	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009								
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0837	0.0541	0.04	0.0613	0.04	0.0419	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0487	0.0443	0.04	0.0613	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0604	0.0497	0.0533	0.0452	0.04	0.0445	0.04	0.04
Aliphatics >C12-C16	0.862	1.42	0.597	0.1	2.53	3.62	6.07	1.53	0.655	1.65	1.76	2.04	4.93	3.8	5.13	4.21	4.75	5.01	2.05
Aliphatics >C16-C21	7.82	11.2	4.95	0.1	14	15.7	15.4	5.7	4.69	11.3	12.2	21.3	35.5	19	98.5	22.7	31.9	46.4	17.3
Aliphatics >C21-C35	62.2	75.4	46.1	3.93	98.3	363	283	158	31	136	100	28	76	46.4	57	50.7	87.4	134	51.3
Aliphatics >C35-C44	15.5	8.96	4.83	0.1	17	238	187	88.9	8.19	30.9	25	6.73	30.9	15.3	8.53	20.8	16.9	21.7	7.13
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0508	0.0519	0.04	0.0667	0.04	0.0508	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0402	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	0.649	0.729	0.543	0.1	1.56	3.69	4.36	2.71	0.392	1.35	1.26	7.09	8.03	7.66	2.34	6.83	3.88	34.9	2.4
Aromatics >EC16-EC21	4.09	4.83	4.29	0.1	6.37	12.2	15.7	9.33	4.72	3.91	8.31	34.2	47.4	31.7	33	49.5	24.4	310	17
Aromatics >EC21-EC35	27.6	23.8	20.9	44.8	40.6	289	247	148	25.8	33.4	45.6	92.2	143	89	47.2	136	36.3	507	36.7
Aromatics >EC35-EC44	11.2	8.85	4.9	6.9	14.3	243	198	114	13.3	12.6	16.6	31	72.9	37.2	13.4	45	5.61	88.9	3.15
Aromatics >EC40-EC44	4.54	3.32	1.32	2.08	5.27	96.7	81.3	46.3	5.45	5.01	6.41	11.1	28.7	14.5	4.71	14.8	1.63	27	0.1
Polyaromatic Hydrocarbons (PAHs)																			
Acenaphthylene	12	26.3	12	12	12	12	60	12	148	12	65	1880	1720	605	404	1440	16.4	68.9	12
Acenaphthene	80.4	14.5	11.5	8	14	59.2	40	14.5	29.7	8	14.1	198	151	69.8	48.5	153	34.4	40.9	15.6
Anthracene	72.9	59.2	30.1	16	33.4	83.2	80	16	231	16	164	1640	2210	519	349	1890	118	415	99.8
Benz(a)anthracene	540	255	139	85.1	318	186	240	109	1310	91.8	430	4810	5180	1540	762	5840	49.9	355	57.9
Benzo(a)pyrene	630	218	108	97.1	320	140	189	91.1	1410	75.5	409	4950	5120	1570	867	5560	20.7	256	36.6
Benzo(b)fluoranthene	1040	407	202	152	472	236	316	171	1900	134	639	8030	7920	2530	1610	8360	37.6	436	69.2
Benzo(k)fluoranthene	493	165	67.2	59.6	207	99.1	124	74.4	719	39.6	281	3230	2770	855	479	2940	14	129	14
Benzo(g,h,i)perylene	539	193	103	93.2	290	136	176	89.6	1020	74.5	343	4210	4200	1300	1070	4030	24	174	24
Chrysene	619	258	151	81.3	345	205	259	152	1140	86.1	508	4890	4160	1550	601	4370	53.3	419	66.5
Dibenzo(a,h)anthracene	137	52.3	29.3	0.023	55.2	44	0.115	25.4	299	0.023	88.8	963	1100	304	239	1070	0.023	44.4	0.023
Indeno(1,2,3-cd)pyrene	457	164	80.4	73.4	216	104	143	63.8	914	59.3	277	4440	3660	1400	897	3530	0.018	128	0.018
Fluoranthene	822	423	266	119	465	549	781	416	1810	139	810	9630	11200	2760	1410	11500	313	1280	304
Fluorene	34.5	15.6	10	10	13	10	50	10	79.6	10	33.5	1050	933	313	190	930	110	183	80.3
Naphthalene	44.6	226	57.8	33.6	67.2	17	45	16.2	385	16.9	197	5600	4470	2620	2370	3240	202	320	120
Phenanthrene	527	317	237	104	213	866	594	175	770	81.6	421	6340	5480	1780	1080	5140	449	948	356
Pyrene																			
PAH, Total Detected USEPA 16	6.73	3.13	1.69	0.99	3.47	3.18	3.4	1.72	13.6	0.908	5.34	69	68.5	21.8	13.5	69.6	1.87	6.46	1.59
Naphthalene-d8 % recovery**	90.2	91.9	98.7	109	100	103	99.9	99.2	101	90.9	78.6	93.4	91.9	87.4	91	89.2	103	85	104
Acenaphthene-d10 % recovery**	87	90.4	95.6	108	96.7	98.7	93.5	93.1	97.7	90.3	69	101	92.4	98.5	90.3	88.7	100	83.3	105
Phenanthrene-d10 % recovery**	86.2	88.4	94.3	105	95.5	98	93.5	91	96	88.8	68.2	98.6	89.2	104	88	86.8	88.9	74.8	101
Chrysene-d12 % recovery**	90.1	90.4	95.8	106	96.3	99.3	87.7	92	97.6	91.9	68.3	101	90.1	109	86.6	86.7	47.8	36	71.7
Perylene-d12 % recovery**	92.5	92.5	94.7	113	103	111	95.5	109	106	95.6	69	98.6	89.1	96.2	83	84.3	25.3	23.1	55
Total Aliphatics >C12-C44	86.3	97	56.5	3.93	132	620	491	254	44.5	180	139	58.1	147	84.5	169	98.5	141	207	77.8
Total Aromatics >EC12-EC44	43.6	38.2	30.6	51.7	62.8	548	465	274	44.2	51.3	71.8	165	271	166	95.9	237	70.2	940	59.3
Total Aliphatics & Aromatics >C5-C44																			
Metals - (Solid)																			
Iron	157000	201000	22200	116000	153000	18000	64700	185000	135000	122000	248000	32400	53600	24200	69800	255000	308000	287000	295000
Manganese	36800	32400	277	4200	10100	6010	17700	8330	12200	25900	8480	7430	693	4840	9170	6030	9130	6220	5800
Metals - (Liquid)																			
Calcium	180000	-	222000	-	186000	215000	-	128000	-	267000	71900	218000	-	168000	-	81000	-	57400	-
Magnesium	8430	-	13100	-	18400	26200	-	10800	-	30200	7190	32700	-	26700	-	11200	-	4990	-
Phenols																			
Phenol	0.0106	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.0107	0.0108	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0107	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																			
Soluble Sulphate 2:1 extract as SO4 BRE	0.004	-	0.0404	-	0.144	0.322	-	0.177	-	0.0222	0.139	0.627	-	0.908	-	0.131	-	0.521	-
pH	12.7	12.7	12.7	7.27	12	11.4	12.1	11.8	10.3	12.7	11.4	9.62	10.2	10.1	8.33	10.3	10.5	9.92	8.37
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.0691	-	0.215	-	0.314	0.494	-	0.339	-	0.352	0.123	0.885	-	1.03	-	0.198	-	0.231	-
Sulphate, Total potential	0.207	-	0.645	-	0.942	1.48	-	1.02	-	1.06	0.369	2.66	-	3.09	-	0.594	-	0.693	-
Sulphate, acid soluble (total)	0.145	-	0.407	-	0.534	1.02	-	0.694	-	0.358	0.194	2.35	-	2.85	-	0.197	-	0.194	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1.07	1	1.08	1	9.21	9.46	7.29
Exchangeable Ammonia as N	12	12	12	243	12	12	12	12	12	12	12	12	12	12	12	12	15.9	65.5	114
Asbestos																			
Asbestos Quantification - Gravimetric - %	-	-	-	-	0.001	-	-	0.001	-	-	-	-	-	-	-	-	-	0.001	-
Date of Analysis	22/12/2017	-	22/12/2017	-	22/12/2017	22/12/2017	-	22/12/2017	-	22/12/2017	22/12/2017	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-
Analysed By	Barbara Urbanek-Walsh	-	James Richards	-	Barbara Urbanek-Walsh	James Richards	-	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	James Richards	Barbara Urbanek-Walsh	-	James Richards	-	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	0.001	-	-	0.001	-	-	-	-	-	-	-	-	-	0.001	-
Additional Asbestos Components (Using TM048)	-	-	-	-	None	-	-	None	-	-	-	-	-	-	-	-	-	None	-
Analysts Comments	-	-	-	-	N/C	-	-	N/C	-	-	-	-	-	-	-	-	-	N/A	-
Asbestos Quantification - Total - %	-	-	-	-	0.001	-	-	0.001	-	-	-	-	-	-	-	-	-	0.001	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Detected	Not Detected	-	Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Comments	0	-	0	-	Fibre bundles in soil.	0	-	Fibre bundles in soil.	-	0	0	0	-	0	-	0	-	Loose fibres in soil.	-
Volatile Organic Compounds (VOCs)																			
Dibromofluoromethane**	-	-	-	-	-	-	-	-	-	-	-	99.8	100	94.9	98.6	108	105	104	97.2
Toluene-d8**	-	-	-	-	-	-	-	-	-	-	-	92.8	93.5	96.1	92.3	95.8	99.1	95.5	105
4-Bromofluorobenzene**	-	-	-	-	-	-	-	-	-	-	-	79.4	81.4	84.3	79.7	79	89.9	93.4	88.2
Methyl Tertiary Butyl Ether	-	-	-	-	-	-	-	-	-	-	-	0.01	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Benzene	-	-	-	-	-	-	-	-	-	-	-	0.009	0.09	0.18	0.09	0.09	0.09	0.09	0.09
Toluene	-	-	-	-	-	-	-	-	-	-	-	0.007	0.07	0.14	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	-	-	-	-	-	-	-	-	-	-	-	0.004	0.04	0.08	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	-	-	-	-	-	-	-	-	-	-	-	0.01	0.1	0.2	0.1	0.1	0.1	0.1	0.1
o-Xylene	-	-	-	-	-	-	-	-	-	-	-	0.01	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.013	0.13	0.13	0.013	0.13	0.13	0.13	0.13	0.576	1.05	1.08	0.359	0.282	0.13	0.13	0.13
Sum of BTEX	-	-	-	-	-	-	-	-	-	-	-	0.04	0.4	0.8	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																			
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3BC601	TP3BC602	TP3BC603	TP3BC604	TP3BC701	TP3BC702	TP3BC703	TP3BC704	TP3BC801	TP3BC802	TP3BC803	TP3BC804	TP3BC4V	TP3BC5V	TP3BC6V	TP3BC7V	TP3BC8V
Depth	0.5	1.5	2	3	0.3	0.8	1.2	1.8	0.3	0.8	1.2	1.7	3.4	2.5	3.2	2	1.9
Sampled Date	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	02/05/2018	01/05/2018	02/05/2018	01/05/2018	01/05/2018
Carbon																	
Soil Organic Matter (SOM)	1.24	0.46	0.572	0.493	2.22	0.56	0.602	1.63	0.872	1.88	1.01	1.08	3.65	4.72	7.55	6.65	2.84
Metals (Solids)																	
Arsenic	6.1	40.4	92.6	77.4	7.02	9.04	46.6	16.8	14.9	4.24	7.28	8.47	11	12.9	18.1	17.1	12.2
Cadmium	0.02	0.2	1.58	1.57	0.2	0.2	3.43	3.22	0.274	0.02	0.137	0.368	0.471	0.603	0.915	0.592	0.548
Chromium	754	371	150	277	324	387	9	8.63	77.5	2.07	73.9	11.4	32.5	32.7	29.9	36.2	36.5
Copper	3.35	14	1.4	1.4	14	27.3	116	15.2	9.19	1.4	2.27	2.44	13.9	16	19.4	14.8	13.2
Lead	13	26.4	17	14.3	28.7	45.2	45.4	93.5	59.7	0.7	13.1	1.52	28.9	38.7	59.2	45.9	35.4
Mercury	0.14	1.4	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	5.82	44.8	75.1	58	21.8	22.2	19.3	27.1	16.9	2.8	8.21	4.34	25.8	23.1	31	23.7	33.7
Selenium	11.8	10	1	1.95	12	15.1	10	1.24	2.58	4.65	4.26	3.43	1	1	1	1	1
Vanadium	432	360	357	407	1090	395	142	31.1	156	9.69	105	33.6	51.3	56.7	54.6	59.7	60.9
Zinc	26.5	92.3	183	140	82.6	75.4	120	192	198	12.1	52	22.5	108	119	207	117	126
TPH Criteria Working Group (TPH CWG)																	
Benzene																	
Toluene																	
Ethylbenzene																	
sum of detected mpo xylene by GC																	
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0755	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.169	0.04	0.04
Aliphatics >C10-C12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.126	0.04	0.04
Aliphatics >C12-C16	3.62	2.06	0.59	1.75	0.437	0.264	0.82	1.56	1.17	0.1	0.234	0.1	0.535	0.1	0.614	0.187	0.927
Aliphatics >C16-C21	10.7	5.47	2.83	3.3	3.69	2.93	4.46	2.15	6.51	0.1	2.79	0.719	1.47	0.1	0.521	0.1	0.1
Aliphatics >C21-C35	50	28.4	42.5	22.5	38.5	24.8	37.1	5.64	46.3	1.65	17.9	9.66	4.69	0.1	11.1	0.1	2.36
Aliphatics >C35-C44	8.85	3.21	0.944	4.73	8.09	3.53	5.8	1.06	29.8	0.1	7.1	2.07	0.1	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.112	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0844	0.04	0.04
Aromatics >EC12-EC16	3.88	2.15	0.1	0.1	0.946	0.578	0.251	0.984	0.322	0.198	0.425	0.25	0.449	0.1	0.823	0.1	0.803
Aromatics >EC16-EC21	12.7	4.36	0.689	0.1	4.12	3.31	1.81	2.92	2.02	0.1	2.28	1.16	1.56	0.1	2.76	0.1	0.1
Aromatics >EC21-EC35	45.8	14.8	13.5	1.93	22.5	18.7	14.1	11.8	19.8	3.41	10.8	6.59	21.3	9.68	39.7	16	10.6
Aromatics >EC35-EC44	11.2	3.67	1.14	0.1	11.4	8.46	7.44	4.54	28.8	5.33	10.4	3.2	2.09	0.648	7.87	0.777	1.28
Aromatics >EC40-EC44	4.61	1.54	0.129	0.1	4.51	8.81	2.66	2.09	13.9	2.51	4.16	1.18	0.1	0.1	1.52	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)																	
Acenaphthylene	12	12	12	12	45.6	12	12	12	12.6	12	12	12	12	12	12	12	12
Acenaphthene	48.2	8	8	8	17.5	8	8	8	8	8	8	8	8	8	8	8	8
Anthracene	54.5	16	16	16	84.7	16	16	16	28.3	16	16	16	16	16	16	16	16
Benz(a)anthracene	214	47.8	18	14	313	113	65.3	14	95.4	14	74.4	36.1	14	14	54.9	14	14
Benzo(a)pyrene	171	44.9	15	15	324	111	67.3	16.7	92.2	15	75.5	31.9	15	15	53.6	15	15
Benzo(b)fluoranthene	273	105	19.9	15	480	188	122	32.5	148	15	132	55.6	15	15	15	29.6	15
Benzo(k)fluoranthene	97.4	30.5	14	14	194	99.9	45.4	14	53.5	14	56.1	20.2	14	14	37.6	14	14
Benzo(g,h,i)perylene	131	47.6	24	24	288	98.5	70.9	24	88.6	24	66.2	27.1	24	24	42.3	24	24
Chrysene	408	76.6	30.3	11.9	275	143	90.1	10	102	10	95.5	37.6	10	10	75.3	17.5	10
Dibenzo(a,h)anthracene	31.2	0.023	0.023	0.023	66.2	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	90.8	33	0.018	0.018	221	84	58.2	0.018	64.3	0.018	66.7	29	0.018	0.018	43.8	0.018	0.018
Fluoranthene	466	103	26.4	19.4	551	199	90.8	34.1	192	0.017	130	66.8	0.017	0.017	112	33.8	0.017
Fluorene	19	10	10	10	35.6	10	10	10	12.6	10	10	10	10	10	10	10	10
Naphthalene	146	40.1	14.5	12	200	23.3	12.4	9	61.4	9	41.9	21.3	9	9	9	9	9
Phenanthrene	564	90.4	30.3	29	325	65.4	47.4	61.8	130	15	75	39.7	15	15	59.8	15	15
Pyrene																	
PAH, Total Detected USEPA 16	3.15	0.702	0.171	0.118	3.87	1.33	0.753	0.173	1.26	0.118	0.937	0.418	0.118	0.118	0.566	0.118	0.118
Naphthalene-d8 % recovery**	86.9	90.2	93.3	87.1	95.4	87.7	91.9	88.7	94.9	90.3	89.2	92.7	90.8	88.3	92	89.5	82.9
Acenaphthene-d10 % recovery**	85.8	86.8	95.4	85	93.5	86.4	95.6	92.1	92	94.7	93.7	95.7	88.9	87.8	99.7	87.8	81.7
Phenanthrene-d10 % recovery**	86.9	87.1	88.2	84.1	90.9	85.7	88.9	87.8	90.1	89	89.9	89.9	86.7	85.5	96.3	87	80.1
Chrysene-d12 % recovery**	101	96.5	90	92.5	87	82.4	86.4	96.5	82.7	96.6	95.2	106	76.1	77.3	113	90.4	71.5
Perylene-d12 % recovery**	101	96.4	88.1	93	89.8	79.1	87	95.7	84	95.2	97.1	110	75.2	77.9	116	92.5	71.3
Total Aliphatics >C12-C44	73.2	39.2	46.9	32.3	50.7	31.5	48.2	10.4	83.8	1.65	28	12.4	6.7	0.1	12.2	0.187	3.29
Total Aromatics >EC12-EC44	73.6	25	15.4	1.93	39	31.1	23.6	20.2	51	8.94	23.8	11.2	25.4	10.3	51.1	16.8	12.7
Total Aliphatics & Aromatics >C5-C44																	
Metals - (Solid)																	
Iron	137000	168000	214000	214000	190000	186000	287000	49500	150000	18200	65900	36200	32100	30600	26700	26600	33600
Manganese	29900	9970	2640	9670	27300	32800	10900	2300	8560	3280	5420	3660	208	199	427	170	402
Metals - (Liquid)																	
Calcium	218000	-	174000	-	186000	-	73700	-	190000	-	201000	-	-	-	-	-	-
Magnesium	16500	-	5380	-	14600	-	5780	-	25400	-	35300	-	-	-	-	-	-
Phenols																	
Phenol	0.0103	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																	
Soluble Sulphate 2:1 extract as SO4 BRE	0.0151	-	0.158	-	0.0639	-	0.13	-	0.276	-	0.343	-	-	-	-	-	-
pH	12.5	12.3	9.71	11.7	11.2	11.7	11	8.38	11.5	11.3	11.4	11.3	7.78	10.7	7.97	7.13	7.9
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.113	-	0.0822	-	0.144	-	0.104	-	0.489	-	0.26	-	-	-	-	-	-
Sulphate, Total potential	0.339	-	0.247	-	0.432	-	0.312	-	1.47	-	0.78	-	-	-	-	-	-
Sulphate, acid soluble (total)	0.305	-	0.0478	-	0.195	-	0.119	-	0.426	-	0.911	-	-	-	-	-	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	12	12	12	228	319	385	323	217
Asbestos																	
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	-	-	-	-	-
Analysed By	Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	Marcin Magdziarek	-	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Comments	0	-	0	-	0	-	0	-	0	-	0	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																	
Dibromofluoromethane**	79.1	104	107	110	106	109	106	113	104	106	107	105	106	111	104	104	117
Toluene-d8**	96.1	97.2	100	103	98.2	99	98.2	99.6	95.5	99	99.3	98.9	97.1	99.8	98.6	100	98.5
4-Bromofluorobenzene**	92.4	99.1	97	96.1	92.7	102	99	92.6	102	96.7	96.4	94.5	99.3	91.5	95.4	92.2	97.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.01	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.009	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.007	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.004	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.01	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.01	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-	-	0.013	-	-
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.04	0.4	0.4
Subcontracted: Inorganics																	
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	TP3BD401	TP3BD402	TP3BD403	TP3BD404	TP3BD501	TP3BD502	TP3BD503	TP3BD504	TP3BD601	TP3BD602	TP3BD603	TP3BD604	TP3BD701	TP3BD702	TP3BD703	TP3BD704	TP3BD801	TP3BD802	TP3BD803	TP3BD804	TP3BD4V	TP3BD5V	TP3BD6V	TP3BD7V	TP3BD8V
											Depth	0.5	1	2	3	0.3	0.8	1.5	2	0.5	1	2	3	0.3	0.8	1.5	2.3	0.3	1	1.5	1.8	3.4	2.3	3.2	2.5	1.9
											Sampled Date	02/05/2018	02/05/2018	02/05/2018	02/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	01/05/2018	02/05/2018	01/05/2018	02/05/2018	01/05/2018	01/05/2018
Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances																									
Carbon																																				
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	4.57	7.98	7.48	9.79	37.4	22.6	15.6	7.91	0.559	0.391	0.35	0.35	0.448	0.583	0.465	1.04	3.48	3.93	2.29	1.23	2.71	7.52	4.47	6.67	1.95
Metals (Solids)																																				
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	24	13.6	31.4	10.5	10.7	13.7	9.23	11.6	101	118	68	108	3.61	7.9	30.9	8.11	14.2	14.4	20.1	7.32	12.9	19.7	13.5	16.9	13.5
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	0.2	0.2	0.2	3.97	0.2	0.2	0.2	0.554	1.94	0.2	0.2	0.731	0.802	0.02	0.2	0.629	0.02	0.2	2.92	0.862	0.589	0.918	0.568	0.723	0.464
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	9	9	9	0.9	14.5	31.3	80.7	99.6	255	216	212	303	369	386	34.1	11.1	394	254	80.2	26.6	31.1	33.8	43.9	40.8	32.2
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	32	16.3	39.9	23	21	28.1	22.1	23.3	14	14	14	14	1.4	10.4	14.2	12.4	19.1	24.4	34.7	10.9	13.2	17.5	16.2	17	13
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	167	79.2	112	84.7	98.1	45.2	108	110	26.7	19.5	17.8	19.8	6.85	14.4	78	19.2	22.1	109	224	95.1	42.6	97	32.3	46	25.7
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	1.4	1.4	1.4	0.14	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	43.1	26.9	46.2	22.8	31.4	23.8	23.2	24.6	104	113	99.4	114	5.18	5.94	17.6	28.3	22.6	25.6	39.5	8.8	32.4	25.9	28.7	25.2	31.9
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	10	10	10	1	10	10	10	10	10	10	10	10	8.57	14.1	10	1	4.75	10	10	3.97	1	1	1	1	1
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	128	106	146	106	121	111	400	151	495	487	376	470	394	400	144	23	239	278	132	59	54.7	65.6	56.3	71.9	55.2
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	675	269	383	405	240	127	290	331	200	217	178	208	52.3	26.2	210	76.9	82.1	212	226	135	150	247	199	131	107
TPH Criteria Working Group (TPH CWG)																																				
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00																									
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00																									
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00																									
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00																									
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.04	0.0466	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.04	0.143	0.0533	0.04	0.04	0.0683	0.0627	0.0688	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0422	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.04	0.104	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0558	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.04	0.194	0.04	0.0858	0.04	0.0616	0.0844	0.121	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.114	0.04	0.04	0.04	0.04
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	1.18	4.73	3.08	2.36	13.4	6.59	5.89	7.85	1.16	0.119	0.1	1.05	0.34	0.1	2.4	0.571	2.1	1.15	1.94	1.94	0.1	0.295	0.1	0.525	0.789
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	9.03	20.8	13.2	12.7	53.2	30.4	30.3	20.3	8.43	2.67	0.596	2.72	4.35	0.74	7.62	0.797	17	10.7	16.2	11.2	0.1	0.1	0.1	0.1	0.361
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	43.1	79.4	52	50.9	114	97.9	57.1	79.3	122	33.7	6.32	9.97	62.2	13.8	71.5	2.91	125	83.7	123	86.1	5.65	9.75	0.692	4.48	0.999
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	19.7	30.3	21.5	21.6	42.5	34.8	14.4	25.3	12.7	2.32	0.1	0.936	8.05	3.87	9.39	0.1	40.1	25.8	50.3	38.9	1.93	0.1	0.622	0.1	0.1
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.04	0.112	0.0566	0.04	0.04	0.047	0.0604	0.0555	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.04	0.13	0.04	0.0572	0.04	0.0403	0.0559	0.081	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0762	0.04	0.04	0.04	0.04
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	1.62	6.23	3.5	2.44	133	16.2	15.1	7.86	0.1	0.488	0.1	0.1	0.444	0.1	0.793	0.486	0.1	1.14	1.1	1	0.1	0.468	0.1	0.244	0.146
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	12.8	35.7	20.4	21.3	719	137	121	188	2.5	1.1	0.1	0.1	2.05	0.82	2.15	1.53	0.544	5.68	8.47	9.14	1.16	1.77	0.33	0.192	0.1
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	43	108	62.8	57.5	1310	374	317	296	40	9.55	3.14	0.1	20.3	9.21	21.1	5.55	11.1	33.5	56	44.1	13.6	52.7	18.6	48.7	3.31
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	15.6	41.8	24.4	17.2	428	112	85.8	9.51	8.98	1.29	1.31	0.1	5.73	5.49	3.93	3.49	3.45	20.7	37.2	24.2	5.64	6.55	1.43	6.01	1.03
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	5.91	15.9	9.04	5.58	166	33.1	24	2.94	3.26	0.1	0.876	0.1	1.9	2.63	0.972	1.45	0.876	9.06	15.9	9.48	1.21	1.55	0.1	1.17	0.233
Polyaromatic Hydrocarbons (PAHs)																																				
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	160	371	333	238	57800	10200	5100	1300	12	12	12	12	12	12	12	12	18.2	23.6	12	18.7	12	12	12	12	12
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	17.2	53.6	42.8	30.7	4650	919	496	197	8	8	8	8	8	26.8	8	8	23.6	14.7	13.7	13.2	8	8	8	8	8
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	491	596	552	479	81600	13200	6990	1830	16	16	16	16	16	92.4	40.5	16	52.7	43.1	35.3	30.4	16	16	16	16	16
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	1150	1310	1770	1300	106000	26900	14500	3320	67.8	14	14	14	63.5	1010	61.5	14	211	167	171	201	19.7	56.8	14	14	14
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	1150	1260	1710	1250	96800	19000	14400	2950	47.6	15	15	15	77.4	1070	57.6	15	160	164	103	175	15	54	15	15	15
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	1890	2060	2710	1980	135000	37600	19100	4760	95.9	15	15	15	104	1670	98.2	18.6	313	326	249	363	24.3	94.1	15	35.5	15
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	558	689	972	630	53300	11200	10900	1760	40.4	14	14	14	41.1	597	35.4	14	109	135	105	126	14	29.2	14	14	14
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	989	898	1360	1030	63300	17500	9230	2060	36.5	24	24	24	64.8	675	57	24	140	163	112	152	24	59.9	24	24	24
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	981	1400	1440	1280	98200	24500	14400	3310	97.8	12.8	10	10	69.2	1130	67.2	19	265	254	217	279	26.3	52.7	10	28	10
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	221	206	340	249	16600	4610	2370	541	0.023	0.023	0.023	0.023	0.023	167	0.023	0.023	34.5	42	27.9	38.4	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	789	1010	1120	850	68200	17900	9890	2340	34.2	0.018	0.018	0.018	49.1	714	39.9	0.018	143	159	87.9	157	0.018	38	0.018	0.018	0.018
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	2180	2960	3300	2720	322000	70800	35900	7530	142	24.4	0.017	0.017	98.8	1320	121	17.7	451	300	507	458	46.3	129	0.017	44.5	0.017
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	145	294	256	159	81600	10100	3380	1150	10	10	10	10	10	10	10	10	26.1	19.2	12.9	14.8	10	10	10	10	10
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	406	926	934	668	36200	9180	6910	2390	27.1	9	9	9	22.6	15.3	15.4	9	112	140	41.4	54.1	14.9	18	9	9	9
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	967	1700	1550	1200	316000	45000	16400	5560	103	21.4	15	15	52.4	366	73.1	42.3	264	210	305	225	26.4	71.3	15	26.5	15
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09																									
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	14.2	18.1	21.3	16.4	1750	371	196	46.5	0.825	0.118	0.118	0.118	0.731	10	0.771	0.118	2.74	2.45	2.41	2.69	0.202	0.702	0.118	0.172	0.118
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	90.8	93.4	93.3	90.4	94.1	90.2	89.9	92.3	86.7	85.5	92.8	92.4	91.4	90.8	95	88.7	88.2	90.9	90.8	90.4	76.4	92	83.9	87.1	89
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	88.6	94.9	92.4	89.3	108	98.7	92.2	97.4	94	91.7	90.3	93.4	91.4	93.4	92.4	86.8	97.5	96	88.5	95	83.5	91.6	85.3	95.2	92.5
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	85.8	93.2	89.3	86.3	98.5	96	93.2	91.5	95.5	90.8	90.4	87.7	91	92.7	91.8	88.9	97.3	96.2	88.3	92.7	90.9	90.2	89.2	97.9	86.4
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	79.7	88.6	86	79.4	85.4	101	96.9	91.2	102	75.2	85.1	91.9	88.3	91.6	87.3	84.4	93.6	103	85.6	101	105	80.4	92.1	105	100
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	76.8	83.5	84.5	77.7	87.1	97.5	95.4	94.4	89	72.5	92.2	88.8	94.3	88.5	91	75.1	84.6	96.9	87.5	101	93.2	80.1	88.9	94.9	108
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	73	135	89.8	87.6	223	170	108	133	145	38.8	6.91	14.7	75	18.4	90.9	4.28	184	121	192	138	7.58	10	1.31	5	2.15
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	73	191	111	98.4	2590	640	539	501	51.5	12.4	4.45	0.1	28.5	15.5	28	11.1	15.1	61	103	78.4	20.4	61.4	20.4	55.1	4.49
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00																									
Metals - (Solid)																																				
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			343000	240000	328000	374000	154000	145000	147000	94000	199000	244000	189000	210000	162000	182000	257000	39900	173000	161000	207000	62400	43700	35900	30700	30400	36300
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			5610	6490	4900	5950	4200	6350	9630	7570	5190	3420	4160	4160	29100	41700	11300	1610	13700	16100	10700	6790	695	352	273	347	525
Metals - (Liquid)																																				
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			46300	-	56300	-	78100	-	139000	-	181000	-	221000	-	208000	-	83700	-	155000	-	151000	-	-	-	-	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			7010	-	8780	-	11200	-	10700	-	7700	-	5180	-	40500	-	10000	-	15000	-	18800	-	-	-	-	-	-
Phenols																																				
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.0224	0.0114	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.01	0.01	0.0112	0.0224	0.0228	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.0448	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																				
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	0.239	-	0.216	-	0.144	-	0.185	-	0.227	-	0.11	-	0.0149	-	0.0928	-	0.258	-	0.316	-	-	-	-	-	-
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	10.7	9.57	10.6	10.3	10.3	10.4	10.7	11.1	10.5	9.93	9.04	8.6	12.6	12.2	11.6	8.24	11.5	11.3	11.3	11.8	7.62	7.46	7.07	6.97	7.5
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	0.167	-	0.172	-	0.64	-	0.273	-	0.142	-	0.049	-	0.15	-	0.171	-	0.43	-	0.324	-	-	-	-	-	-
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	0.501	-	0.516	-	1.92	-	0.819	-	0.426	-	0.147	-	0.45	-	0.513	-	1.29	-	0.972	-	-	-	-	-	-
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	0.224	-	0.279	-	1.14	-	0.467	-	0.107	-	0.043	-	0.272	-	0.132	-	0.535	-	0.588	-	-	-	-	-	-
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	1	1	1	4.36	5.23	3.13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	12	12	12	12	12	12	12	12	12	12	16.6	12	12	12	12	12	12	12	12	12	163	279	282	334	159
Asbestos																																				
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	15/05/2018	-	16/05/2018	-	15/05/2018	-	15/05/2018	-	-	-	-	-	-
Analysed By	TM048	No units		1371	0	0				0.00		Marcin Magdziarek	-	James Richards	-	Marcin Magdziarek	-	Marcin Magdziarek	-	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	James Richards	-	Barbara Urbanek-Walsh	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00		-	-	-	-	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0				0.00		-	-	-	-	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-
Comments	TM048	No units		1371	0	0			0	0.00		0	-	0	-	Loose fibres in soil	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																																				
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		108	96.2	101	103	83.6	85.7	90.5	96.6	113	110	107	117	111	106	112	114	104	121	115	111	104	107	113	106	106
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		97.9	94.3	97.6	96	89.7	91.4	93.9	96.7	97.5	98	98	98.5	99.1	97.5	98.1	99.8	98.5	99.5	96.5	97.3	98.5	99.5	97.5	98.5	99.5
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		97.9	80.1	95	90.6	68.1	79.4	73.2	81.5	98.9	100	98.3	96.1	98.6	97.8	103	93.1	94.4	97.1	97.3	97.5	100	92.3	99.2	93.7	96.3
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		0.01	0.1	0.01	0.01	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		0.009	0.09	0.009	0.009	0.18	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		0.007	0.07	0.007	0.007	0.14	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		0.004	0.04	0.004	0.004	0.08	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		0.01	0.1	0.01	0.01	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		0.01	0.1	0.01	0.01	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		0.013	1.21	0.183	2.96	2.21	3.54	1.05	1.22	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-	-	0.13	-	-
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		0.04	0.4	0.04	0.04	0.8	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																				
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3BE6	TP3BE6	TP3BE6	TP3BE7	TP3BE7	TP3BE7	TP3BE8	TP3BE8	TP3BE401	TP3BE402	TP3BE403	TP3BE404	TP3BE501	TP3BE502	TP3BE4V	TP3BE5V	TP3BE8V	TP3BF1	TP3BF1	TP3BF1	TP3BF1
Depth	0.5	1	1.5	0.5	1.2	1.8	1	2	0.5	1	2	3	1	2	4	2.5	2.2	0.5	1	2	3
Sampled Date	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	02/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018
Determinand																					
Carbon																					
Soil Organic Matter (SOM)	1.52	1.27	1.04	1.21	0.667	1.43	2.45	3.22	5.67	2.91	10.2	9.98	5.05	4.38	4	8.36	1.25	12	17.2	6.05	0.821
Metals (Solids)																					
Arsenic	10.5	16.3	91.9	7.41	19.8	13.9	16	13	15.1	5.41	20.1	30.4	13.3	9.5	13.3	22.4	12.6	9.81	9.97	30.4	8.09
Cadmium	0.2	0.2	2.31	0.2	0.2	1.39	0.2	0.2	2.08	4	2.45	3.76	0.328	0.02	0.245	0.93	0.132	0.2	0.231	0.2	0.2
Chromium	801	203	189	559	119	425	143	103	0.9	0.9	9	9	138	223	36.5	54.2	32.1	310	129	472	879
Copper	17.7	14	14	15.7	44.2	42.7	16.3	30.2	21	19.2	23.3	164	20	9.01	15.8	21.7	10.5	14.5	14.3	82.2	25.4
Lead	35.5	25.6	82.7	21	410	820	40.5	52.7	46.3	89.5	1050	1880	101	28	49	53	30.2	46.4	20.5	31.6	14.4
Mercury	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.166	1.4	1.55	1.4	0.14	0.14	0.14	0.14	1.5	1.4	1.4	1.4
Nickel	12.4	21.6	86.7	11.8	19.9	26.2	28.3	37.2	20.2	21.5	29.4	31.9	23.5	9.98	30.8	33	40.2	12.4	11.6	97.8	19.7
Selenium	18.5	10	10	15.3	18	25.9	10	10	1	1	10	10	10	7.9	1	1	1	18.7	11.5	14.8	36
Vanadium	528	215	414	763	125	1110	305	202	84.2	31.4	105	105	228	352	57.1	106	62.5	1340	496	1110	1440
Zinc	117	72.6	312	119	172	274	129	113	199	306	2340	4290	340	90.3	149	170	128	342	97.5	114	41.3
TPH Criteria Working Group (TPH CWG)																					
Benzene																					
Toluene																					
Ethylbenzene																					
sum of detected mpo xylene by GC																					
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0439	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0715	0.101	0.04	0.115	0.0655	0.04	0.0521	0.04	0.0511	0.0407	0.04	0.04
Aliphatics >C8-C10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.299	0.337	0.0537	0.0626	0.04	0.04	0.0664	0.04	0.11	0.04	0.04	0.0449
Aliphatics >C10-C12	0.04	0.04	0.134	0.04	0.04	0.04	0.04	0.04	0.04	165	194	0.076	0.0845	0.756	0.0658	0.0537	0.04	0.165	0.0682	0.092	0.606
Aliphatics >C12-C16	1.98	2.31	27.7	0.827	3.37	7.43	1.19	1.16	0.1	33.2	14.4	2.18	6	2.92	0.1	0.63	0.1	20.7	14.3	5.65	1.26
Aliphatics >C16-C21	10.4	11.1	37.2	5.04	18.6	31.8	10.1	5.62	6.73	979	410	16.3	23.7	19.6	0.1	0.643	0.1	86.7	49.1	27.2	3.17
Aliphatics >C21-C35	71.3	74.9	60.5	64.8	145	167	83.4	36.6	16.6	164	120	70	140	39.8	0.1	3.85	0.1	356	802	164	16.6
Aliphatics >C35-C44	23	18.5	7.22	5.02	24.2	45.7	33.6	15.4	1.7	14.3	17.8	14.7	105	6.5	0.1	1.88	0.1	371	913	172	8.4
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.116	0.0952	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.13	0.107	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.325	0.35	0.0445	0.0747	0.04	0.04	0.0442	0.04	0.0888	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.04	0.0899	0.04	0.04	0.04	0.04	0.04	0.04	110	130	0.0511	0.056	0.504	0.0429	0.04	0.04	0.11	0.0451	0.0614	0.405
Aromatics >EC12-EC16	0.679	1.09	2.65	0.1	0.308	1.97	1.4	0.924	0.468	25.2	19.2	1.43	5.01	2.67	0.1	0.1	0.1	20.1	17.1	7.28	1.25
Aromatics >EC16-EC21	5.93	5.91	8.02	1.86	6.58	15.8	6.69	4.19	8.09	316	166	11.5	26.1	25.5	0.1	0.343	0.1	115	93.9	49.9	8.71
Aromatics >EC21-EC35	33	30.5	17.5	15.5	39.7	71.9	41.2	22	23.2	97.5	91.6	20.2	116	94	6.7	42	3.3	776	1810	411	36.4
Aromatics >EC35-EC44	17.3	12.6	4.26	4.64	14.2	30.8	30.2	17.9	6.24	14.9	16.2	5.71	75	30.2	0.1	53	0.916	602	1580	321	16.2
Aromatics >EC40-EC44	6.97	4.71	1.42	1.47	5.36	12.9	12.7	7.65	1.8	4.98	6.24	2.17	31.7	9.8	0.1	26	0.1	260	724	142	6.71
Polyaromatic Hydrocarbons (PAHs)																					
Acenaphthylene	32.7	52.2	12	31.1	12	16.5	33.3	12	163	5070	2080	12	336	1000	12	12	12	1500	1620	51800	4100
Acenaphthene	28.5	18.7	11.3	17.6	24.2	32.6	42.2	21.7	51	310	245	30.7	106	107	8	8	8	1900	870	3310	192
Anthracene	104	103	36	67.3	159	89.9	88.4	23.4	228	2050	1080	97.5	606	1160	16	16	16	5700	6690	51300	2420
Benz(a)anthracene	321	240	53.5	290	377	692	319	97.1	760	976	501	47	1520	3680	14	26.2	14	10200	13500	57600	5260
Benzo(a)pyrene	280	218	40.8	319	274	649	341	88.1	742	831	338	28	1540	3990	15	25	15	9150	13000	56900	5490
Benzo(b)fluoranthene	567	394	73.8	573	576	953	566	115	1110	1450	568	65.8	1930	5530	15	51	15	13300	14400	66000	6610
Benzo(k)fluoranthene	207	133	24.8	182	186	402	194	52.4	426	509	261	18.4	751	2060	14	14	14	4150	6220	26900	2580
Benzo(g,h,i)perylene	226	169	32.5	310	227	568	261	85.5	482	623	328	24	1170	2760	24	24	24	6590	8400	48100	4540
Chrysene	430	301	52.9	344	420	751	352	107	774	1040	541	43.8	1320	3740	10	39.4	10	8460	12400	56900	4270
Dibenzo(a,h)anthracene	45.2	33.2	0.023	67.8	62.4	132	62.9	0.023	117	161	0.23	0.023	309	735	0.023	0.023	0.023	1460	1930	10200	894
Indeno(1,2,3-cd)pyrene	236	173	24.6	328	188	448	218	60.8	535	702	261	0.018	974	3320	0.018	0.018	0.018	5420	7030	38000	3590
Fluoranthene	736	651	146	535	1040	1590	600	253	1570	3290	1870	271	3200	7710	0.017	53.7	0.017	32900	38500	269000	18400
Fluorene	46.2	61.4	20.3	40.7	23.5	19.5	33	10	149	3320	1450	79.2	341	648	10	10	10	2980	3550	39000	2820
Naphthalene	151	181	48.7	79	35.9	67.6	150	90.6	1470	372000	1550000	472	1330	3100	35.4	27.9	9	2000	2340	37400	5230
Phenanthrene	450	530	137	306	689	667	397	180	727	11700	5360	370	2020	3820	15	28.8	15	27400	35700	275000	19700
Pyrene																					
PAH, Total Detected USEPA 16	4.39	3.71	0.819	3.92	5.12	8.39	4.16	1.37	10.5	407	1570	1.92	19.8	49	0.118	0.296	0.118	157	192	1280	99.6
Naphthalene-d8 % recovery**	97.8	97.8	107	103	104	104	106	98	89	96.8	102	93.6	94	92.9	91	93.7	103	103	94.1	95.5	91
Acenaphthene-d10 % recovery**	107	106	104	104	101	102	104	95.1	93.1	102	107	90.3	93.2	98.9	95.5	96.4	99.7	101	97.5	97.9	94.2
Phenanthrene-d10 % recovery**	110	110	103	104	100	100	108	92.2	85	99.4	105	83.2	92.4	96.9	88.7	92.8	104	101	98.6	102	94.8
Chrysene-d12 % recovery**	96.7	96.4	88.3	91.7	92.3	100	111	83.8	74.7	110	68.8	53.3	90.6	97.1	89.8	106	101	90.7	110	122	107
Perylene-d12 % recovery**	90.9	89.5	82.5	97.2	92.3	105	112	82.5	71.1	108	41.1	40.1	98.9	96.3	86.8	106	103	91.1	119	131	108
Total Aliphatics >C12-C44	107	107	133	75.6	191	252	128	58.9	25	1190	562	103	274	68.8	0.1	7.01	0.1	835	1780	369	29.5
Total Aromatics >EC12-EC44	56.9	50	32.5	22	60.8	121	79.5	45	38	454	293	38.9	222	152	6.7	95.3	4.22	1510	3500	789	62.6
Total Aliphatics & Aromatics >C5-C44																					
Metals - (Solid)																					
Iron	175000	390000	211000	173000	599000	235000	168000	109000	223000	413000	316000	350000	103000	166000	37600	48800	35000	100000	63700	314000	166000
Manganese	28100	12700	5340	47100	42100	40900	15100	6640	4480	5520	7350	8530	9990	22500	257	289	383	27000	13600	25500	38800
Metals - (Liquid)																					
Calcium	222000	87800	155000	222000	117000	217000	153000	76900	65300	-	49500	-	146000	-	-	-	-	205000	167000	159000	226000
Magnesium	21700	8960	9150	38200	13100	15000	23100	15000	7700	-	5240	-	9240	-	-	-	-	24400	18100	7020	8940
Phenols																					
Phenol	0.0106	0.0105	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0439	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.0115
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.033	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0549	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																					
Soluble Sulphate 2:1 extract as SO4 BRE	0.004	-	0.315	0.0235	-	0.0162	0.19	0.147	0.206	-	0.224	-	0.548	-	-	-	-	0.159	-	0.167	-
pH	12.6	11.2	11	12.6	12.1	12.6	11.7	11	10.3	8.51	8.89	11.1	10.9	11.2	7.82	7.23	7.41	11.6	12	11.5	12.6
Sulphate, Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.169	-	0.178	0.211	-	0.276	0.314	0.166	0.156	-	0.13	-	0.294	-	-	-	-	0.599	-	0.752	-
Sulphate, Total potential	0.507	-	0.534	0.633	-	0.828	0.942	0.498	0.468	-	0.39	-	0.882	-	-	-	-	1.8	-	2.26	-
Sulphate, acid soluble (total)	0.295	-	0.25	0.305	-	0.458	0.469	0.246	0.209	-	0.117	-	0.565	-	-	-	-	0.763	-	0.865	-
Cyanide, Total	2.62	1	1	1	1	1	1	1	1	1	4.03	1.73	1	1	1	1	1	8.48	3.31	2.44	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	12	12	29.6	12	12	246	321	170	12	12	12	12
Asbestos																					
Asbestos Quantification - Gravimetric - %	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	22/05/2018	-	22/05/2018	21/05/2018	-	22/05/2018	21/05/2018	22/05/2018	15/05/2018	-	15/05/2018	-	15/05/2018	-	-	-	-	22/05/2018	-	22/05/2018	-
Analysed By	Barbara Urbanek-Walsh	-	Marcin Magdziarek	Andrzej Ferfecki	-	Andrzej Ferfecki	Lucy Caroe	James Richards	James Richards	-	James Richards	-	James Richards	-	-	-	-	James Richards	-	Barbara Urbanek-Walsh	-
Asbestos Quantification - PCOM Evaluation - %	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-
Comments	Loose fibres in soil.	-	0	0	-	0	0	0	0	-	0	-	0	-	-	-	-	0	-	0	-
Volatile Organic Compounds (VOCs)																					
Dibromofluoromethane**	102	101	120	104	104	104	105	106	110	107	97.1	96.9	102	97.4	111	108	107	107	116	110	106
Toluene-d8**	94.8	96.7	97.5	99.1	97.8	99.1	98.5	98.6	96.6	93.5	97.8	98.3	94.8	96.2	97.7	95.5	97.7	93	81.6	95.7	97.6
4-Bromofluorobenzene**	92	97.2	99.3	97.2	99.3	102	94.7	95.7	92.6	82.7	90.3	96.4	84.4	85.8	96.1	87.8	99.2	86.4	70	89.6	97.2
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.0689	0.009	0.009	0.009	0.009	0.009	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.067	0.0862	0.007	0.007	0.007	0.007	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.0668	0.0353	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.0341	0.01	0.01	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.198	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.439	2.6	2.6	0.638	1.21	13.7	-	-	-	0.289	1.15	0.758	0.591
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.237	0.122	0.04	0.04	0.04	0.04	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																					
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	TP3BF2	TP3BF2	TP3BF2	TP3BF2	TP3BF3	TP3BF3	TP3BF3	TP3BF4	TP3BF4	TP3BF4	TP3BF4	TP3BF5	TP3BF5	TP3BF5	TP3BF5	TP3BF6	TP3BF6	TP3BF6	TP3BF6	TP3BF7	TP3BF7	TP3BF7	TP3BF7	TP3BF8	TP3BF8	TP3BF8	TP3BF1V	TP3BF2V	TP3BF3V	TP3BF4V	TP3BF5V	TP3BF7V	TP3BF8V	TP3BA2	TP3BA2	TP3BA2	TP3BA3	TP3BA3	TP3BA3	TP3BA2V	TP3BA3V	TP3BB2	TP3BB3	TP3BB3	TP3BB4	TP3BB4	TP3BB4	TP3BB4	TP3BB5	TP3BB5
											Depth	0.5	1	1.8	2.3	0.5	1	2	0.5	1	2	2.5	0.5	1	1.5	2	0.3	0.7	1	1.5	0.5	1.2	1.7	2.3	0.5	1	1.5	3.1	2.7	2.2	2.7	2.4	2.7	2	0.4	0.5	1.5	0.5	1.2	2	2.1	3.9	0.7	0.5	1.2	0.5	1	1.5	2.5	0.8	1.5
											Sampled Date	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	15/05/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**WQS**	**Percentage of exceedances**																																																		
Carbon																																																													
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	21.6	3.55	3.41	4.53	6.86	6.02	2.48	11.3	28.8	12.6	14.4	3.67	0.655	2.95	12.2	2.45	2.43	0.471	0.543	1.07	0.352	1.78	1.84	0.988	2.02	1.38	5.31	4.41	1.33	2.84	1.16	2.24	4.14	76.5	27.4	6.76	19.7	63.8	2.76	2.72	0.772	6.22	5.97	14.3	7.64	15.6	2.93	4.81	1.88	25.7
Metals (Solids)																																																													
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	12.7	7.89	15.5	24.8	16	15	12.6	15.7	17.8	20.4	32.1	14.7	6.12	10.2	35.9	9.39	15.1	125	92.3	10.1	15.3	22	12.1	17	11.8	12.4	14.3	12.1	10.2	14.6	13.7	12.1	12.3	5.32	6	4.2	6.89	11.3	13.3	10.9	8.31	6	14.5	10.4	13	6.82	13.2	20.3	8.97	6
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	0.28	0.2	0.265	0.2	0.2	0.2	0.2	0.206	1.42	3.53	8.97	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.275	0.156	0.38	0.02	0.02	0.02	0.02	0.143	0.467	0.2	0.02	0.2	0.02	2.24	0.02	0.02	0.2	0.627	0.02	0.2	0.02	0.2	0.2	0.2	0.2
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	196	419	507	602	50.4	11	269	9	17.3	9	9	174	204	108	219	581	170	388	217	498	261	42.2	264	168	55.4	24.9	38.9	26.9	34.2	32.4	28.8	31.9	34.7	45.6	468	309	300	152	15.1	33.2	22.8	96.5	126	159	67.9	217	9	9	595	375
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	37.2	14	42.3	110	16.9	14	24.4	22.3	24	19.5	37.2	17.9	14	14	20.4	14	14	14	14	14	14.1	29.9	15.8	14	18.6	21.5	18	14	13.4	20.3	12.1	12.8	15.7	27.6	31.6	11.4	28.9	28.7	197	14.2	7.78	15.2	20.6	11.6	27.6	28.7	14	18.9	36	14
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	93.3	35.8	45.3	39.4	38.1	43	18.7	170	430	952	2280	63.7	8.37	61.4	93.3	15.9	23.7	23.6	37.1	25.7	39	45.2	29.9	24.4	30.2	58.9	38.8	29.9	27.4	33.8	27.6	26.3	31.1	11.1	11.7	9.08	69.6	16.7	561	26.6	15.5	69.7	84.3	32.5	57.7	0.7	7	47.5	22.2	31.2
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.65	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	1.4	0.14	0.14	1.4	1.4	0.14	1.4	0.14	1.4	1.4	1.4	1.4
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	33.7	9.24	33.9	73	19.6	23.1	12.6	31.6	26.1	22.1	35.7	41.8	6.1	16.8	40.9	8.34	14.6	119	92.2	14.3	18.3	28.9	20.8	22.6	13.9	40.4	27.3	23.9	40.5	38.3	41.6	35	26.9	19.6	13.4	5.46	19.6	16.2	24.1	28.5	28.5	6.86	27.5	21.3	40.4	12.8	5.15	23.2	22.1	12.6
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	15.6	30.7	19.7	25.7	10	10	13	10	10	10	10	10	13.6	10	11.7	15.5	10	10	10	15.6	15.1	10	14.9	10	10	10	1.03	10	1	1	1	1	1	2.89	18.6	10.1	10	5	10	1	1	10	10	3.08	10	6.99	10	10	11.9	11.5
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	1100	2880	677	753	224	87.7	374	52.2	158	67.4	198	196	201	192	279	436	192	639	436	654	742	130	449	230	125	40.3	74	45.3	63.1	63.4	59.5	61.2	60.9	121	1680	1050	308	238	25.1	52.1	40	134	210	243	341	1130	26.7	179	581	373
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	183	52	337	87.7	64.9	95	49.5	393	986	2210	5280	180	31.6	177	254	44.3	55.5	246	193	138	94.4	122	65.3	77.7	105	157	137	90.7	125	146	118	105	122	89.6	59.5	52.8	228	63.9	1280	111	86	161	245	124	166	36.9	29.3	227	87.7	112
TPH Criteria Working Group (TPH CWG)																																																													
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00																																																		
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00																																																		
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00																																																		
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00																																																		
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.0404	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.0322	0.0173	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.04	0.04	0.04	0.046	0.04	0.103	0.04	0.04	0.0599	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0522	0.04	0.04	0.04	0.0433	0.04	0.0547	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.0314	0.153	0.0667	0.0164	0.0186	0.0141	0.01	0.0181	0.01	0.01	0.01	0.02	0.0226	0.0213	0.01
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.04	0.04	0.04	0.092	0.04	0.0818	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0978	0.118	0.04	0.04	0.04	0.04	0.04	0.0449	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.0202	0.142	0.0736	0.012	0.012	0.01	0.01	0.0249	0.01	0.01	0.01	0.0169	0.0147	0.0117	0.01
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.04	0.04	0.0552	0.147	0.04	0.0499	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0827	0.354	0.917	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.0728	19.8	0.305	0.0394	0.01	0.01	0.01	0.0475	0.01	0.01	0.01	0.0232	0.026	0.0245	0.01
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	11.6	0.1	3.56	5	2.29	20.4	0.743	2.92	4.83	2.64	0.1	1.51	0.1	0.521	1.1	1.23	2.08	4.15	4.66	1.78	5.74	2.84	2.09	1.74	2.13	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	26.5	1.04	2.62	0.74	12.3	7.11	0.1	0.1	3.07	1.1	0.717	1.89	8.44	0.526	4.91	1.97	3.96
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	17.5	2.88	15.6	15.6	6.27	55.7	2.7	18.8	28.4	19.3	8.39	10.9	1.45	9.52	16.6	6.37	8.88	18.6	13.3	9.13	13	5.37	4.86	7.63	10.5	2.23	0.1	0.1	0.1	0.1	0.1	0.1	0.1	35.2	5.81	1.63	12.7	23.3	22.1	0.1	0.1	14.3	7.69	4.2	13.2	12.2	11.5	16.6	13	3.27
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	40.2	17.6	114	126	29.6	90.4	14.9	89	62.7	44.4	28.5	138	11.5	42.6	79.8	47.4	71.3	123	78.5	77.3	54.1	19.9	20.4	52.5	66.9	11.4	2.63	5.06	0.1	0.1	0.1	0.1	0.1	93.6	20.1	12.8	47.6	66.9	59.8	0.1	2.83	44.7	29.3	22.1	27.8	46.1	14.1	76.1	147	71.8
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	7.62	2.11	58.5	68.9	3.43	11.5	1.41	32.3	9.53	7.13	1.93	48.4	2.97	11.9	24.4	13.3	13.7	11.6	12.3	11.1	7.35	3.66	2.67	19.4	31.6	2.81	0.1	0.1	0.1	0.1	0.1	0.1	0.1	19.4	4.3	2.58	81.5	10.3	14.4	0.1	0.357	12.4	9.7	4.85	6.3	11.6	2.14	48.4	49.9	70
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.0345	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.043	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.0433	0.0161	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.04	0.04	0.04	0.0667	0.04	0.0977	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0656	0.0844	0.04	0.04	0.04	0.04	0.04	0.047	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.0134	0.0944	0.0483	0.01	0.01	0.01	0.01	0.0158	0.01	0.01	0.01	0.0116	0.0102	0.01	0.01
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.04	0.04	0.04	0.0978	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0548	0.236	0.611	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.0482	13.2	0.202	0.0263	0.01	0.01	0.01	0.0316	0.01	0.01	0.01	0.0158	0.017	0.016	0.01
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	26	1.17	2.53	2.37	2.74	41.4	1.34	4.2	20.8	3.3	0.1	1.8	0.1	1.26	1.16	0.942	2.13	0.1	1.33	0.893	0.893	0.966	0.1	0.395	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	82.8	4.77	6.39	12.8	34.9	2.17	0.1	0.1	4.87	2.56	0.135	10.5	12	3.98	0.1	3.63	6.38
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	213	8.69	20.3	25.7	10	116	5.13	27.5	130	26.4	6.62	15.8	1.42	10	11.7	8.26	13.6	5.2	4.56	10.4	5.14	2.51	2.63	3.45	3.01	1.17	0.1	0.1	0.1	0.1	0.1	0.1	0.1	745	26.3	23.4	104	240	24.9	0.1	0.1	35.3	20.8	15.8	58.9	38.3	68	4.46	20.3	21.7
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	453	35.8	110	146	33.4	220	16.9	85.7	320	53.4	13.4	85.6	4.39	31.1	41.2	38.6	59.1	45.4	29.5	41.4	32.3	10.3	11.9	23.4	28.8	8.83	15.8	17.2	2.82	8	3.17	0.1	8.84	1230	65.4	59	246	424	104	8.35	2.75	115	61.8	47.6	150	96.1	184	12.4	124	72.9
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	92.5	12.1	46.2	52.7	11.3	52.8	5.31	28.3	80	10.1	0.963	54.6	1.04	12.4	23.5	11.7	15	3.97	7.96	13.8	11	3.3	2.14	18	33.5	7.61	2.1	1.61	0.1	0.617	0.523	0.1	1.02	242	15.9	19.6	74.3	98.2	35.7	1.06	0.598	33.1	20.9	17.4	35.5	37.1	54.1	1.33	84.6	97.2
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	21.4	3.97	16.4	16.8	3.73	16.1	1.56	9.22	22.4	3.31	0.1	21.6	0.1	4.13	9.54	3.98	5.72	0.1	2.87	4.96	4.24	1.05	0.1	7.95	16.6	3.26	0.1	0.1	0.1	0.1	0.1	0.1	0.1	68.3	4.43	6.72	29.9	31.1	12	0.1	0.1	10.1	7.09	6.37	9.67	13.8	17.9	0.1	34.5	48.7
Polyaromatic Hydrocarbons (PAHs)																																																													
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	2980	204	122	77.6	416	719	176	487	2580	117	29.8	120	29	629	88.4	41.7	66.8	12	12	23.1	15.8	12	12	12	13.6	12	12	12	12	12	12	12	12	133000	712	1090	6850	6090	213	12	12	592	449	546	4360	1980	249	137	358	103
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	154	47.3	168	157	43.4	90.6	53.2	41.9	141	41.6	40.5	35.9	8	125	40	54.1	154	8	8	31.2	39.6	8	8	15.4	32.9	8	8	8	8	8	8	8	8	7580	104	125	309	524	285	8	8	125	73.4	127	298	291	73.3	35.5	67.3	113
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	5060	315	362	315	500	894	174	1110	3450	425	212	200	38.1	965	145	135	259	16	16	92.1	97	25.2	22	19.3	32.9	16	16	16	16	16	16	16	16	114000	827	1310	16000	7830	625	16	16	1610	863	1210	6620	4290	566	149	521	255
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	11500	989	1900	2530	1270	1550	390	2780	10100	1320	142	543	105	1620	336	554	998	16.8	46.1	503	474	96.5	49.1	84	95.5	35.8	14	14	14	14	14	14	14	186000	1820	3580	31700	15300	3050	14	14	4960	2290	2790	11700	6770	1390	278	1700	378
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	9890	1020	2380	3310	1090	1280	359	2600	9610	952	98.9	601	102	1460	319	515	928	15	40.1	549	494	99.6	45.6	91.6	85.6	34.8	15	15	15	15	15	15	15	131000	1880	3150	23100	12500	3520	15	15	3920	2060	2650	11600	5990	1480	286	1750	250
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	16000	1460	3070	3240	1510	2130	548	3170	14700	1570	173	943	178	2170	590	815	1300	19.4	54.6	928	833	175	96.7	134	154	51.6	15	15	15	15	15	15	15	197000	2110	4490	36600	16800	4820	15	15	6290	2870	3830	14800	9220	1310	436	2330	479
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	6200	569	1240	1590	601	768	193	1300	5530	483	54.8	296	59.8	800	207	268	544	14	20.6	392	334	55.8	30.8	54.3	50.9	19.3	14	14	14	14	14	14	14	62700	1060	1500	15700	7020	1890	14	14	2540	1140	1470	5330	3070	672	149	1050	136
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	6000	689	1520	2120	797	871	241	2000	7180	541	69.5	468	83.5	1020	254	368	611	24	34.2	453	416	82.7	46	104	78.7	27.8	24	24	24	24	24	24	24	73500	1140	1810	13100	8060	2530	24	24	2400	1440	1790	8200	3620	1010	225	1360	181
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	10200	1050	2020	2420	1040	1580	448	2260	9640	1260	127	640	115	1730	438	701	1170	17.1	41.5	622	583	100	64.1	92.4	86	40.3	10	10	10	10	10	10	10	117000	1730	3050	24800	13900	2820	10	10	4500	2240	2710	10300	6750	1220	299	1650	495
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	1540	128	266	491	218	222	45.4	522	1960	135	0.023	95.9	0.023	213	0.115	86.1	121	0.023	0.023	76.1	64.9	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	20000	265	449	3850	2430	596	0.023	0.023	666	367	440	1840	868	214	53.6	346	52.1
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	6610	706	1510	1710	673	944	243	1680	6270	744	46	462	85.4	1030	241	354	594	0.018	23.4	438	404	65.2	33.6	67.8	58.9	21.1	0.018	0.018	0.018	0.018	0.018	0.018	0.018	72500	1250	1590	12300	8260	2040	0.018	0.018	2280	1720	2170	9060	3910	1040	203	1610	167
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	32700	2160	2980	3260	2860	3990	963	6060	22500	2780	627	1090	236	4380	730	1140	1790	27.3	76.1	967	866	185	118	161	172	77.2	0.017	0.017	26.5	0.017	0.017	0.017	0.017	578000	4710	8490	82200	44600	5330	0.017	0.017	10700	5940	7270	29600	20300	2860	674	3780	1160
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	1940	127	129	99.1	316	628	149	335	1360	159	156	82.4	30.3	675	68.4	50.2	135	10	10	38.8	34.1	10	10	10	13.8	10	10	10	10	10	10	10	10	141000	411	565	3260	3200	252	10	10	376	329	475	3530	2410	288	122	210	274
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	4050	593	721	403	1370	2880	1080	1210	6570	434	308	344	98	1290	328	151	332	9	14	109	167	48.3	38.3	32.9	51.4	12	9	9	20.9	284	9	9	9	<0.45	2360	2650	17400	34600	2000	9	9	898	1650	2020	6870	4140	935	544	1050	824
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	14400	1090	1390	1340	2040	3390	772	2250	9640	1650	738	613	142	3510	479	667	1330	23.8	45.6	465	422	122	82.8	104	129	68.7	15	15	15	15	15	15	15	607000	3110	5290	40900	30100	2540	15	15	4340	2670	4170	22600	17100	1970	541	1980	1550
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09																																		384	3.63	6.18	60.5	29.9	4.86	0.015	0.015	7.79	4.64	5.35	23	15.1	2.43	0.579	3.01	0.858
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	154	12.9	22.7	26.3	16.8	24.7	6.61	32.2	128	14.8	3.58	7.43	1.49	24.8	4.82	6.91	11.9	0.131	0.464	6.51	6.03	1.22	0.721	1.11	1.19	0.451	0.118	0.118	0.118	0.284	0.118	0.118	0.118	2830	27.1	45.3	388	241	37.4	0.118	0.118	54	30.8	39	170	106	17.7	4.71	22.8	7.27
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	90.6	95.7	93.6	90.2	95	96.6	95.9	90.9	105	89.9	89.8	97.8	98.9	155	110	93.8	97	92.6	108	95.4	94.6	106	107	103	103	102	103	93.4	85.8	83.2	94.6	89.7	86.3	93.5	95.7	85.3	84.3	91.2	91.8	75.1	81.8	79	87.6	96.4	98.7	105	87.6	97.9	96.9	101
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	98.7	105	103	94.1	92.1	105	104	99.7	103	87.1	90.4	106	110	164	113	104	108	97	108	103	103	103	105	98.2	101	101	102	98	91.2	89.5	94.1	94	89.4	115	84.1	90.1	90	88.2	88.7	77.4	77.6	79.9	81.5	85.8	94.9	94.1	91.9	97.6	93.8	105
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	104	110	108	94.7	90.2	108	110	102	107	88.3	79.5	109	113	171	111	107	109	95.1	106	107	108	101	102	95.8	97.6	99.1	102	99.1	97.7	100	96.1	93.6	92.9	115	80.8	94.9	95.3	89.4	97.5	73.9	87.1	81.7	85.5	80.8	93.9	93	92.7	90.2	93.4	99.5
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	84.2	97.8	92.7	102	90.3	89.3	93.5	107	108	79.8	42	94.7	99.4	158	96.6	90.7	95.6	109	106	97.9	98.6	86.4	87.9	90.4	83	93.7	89.5	105	91.6	93	98.8	99.3	92.1	94.5	80.5	94	85.7	84.7	95.1	87.1	88.7	89.9	79.8	76.9	93.6	88.5	88	84.7	89.3	85.7
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	78.5	87.1	86.8	104	87	75.2	83.2	101	110	70.1	23.1	86.2	92.7	144	78.5	82.8	90.2	112	112	88.3	88	83.6	84.5	86.9	79.6	95.9	88.3	105	84.7	84.6	87.8	98.2	83	102	79.5	83	73.4	84.9	97.1	77.3	84.1	74.8	76.3	76.9	93.7	81.7	83.2	79.9	91.2	70.3
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	76.9	22.6	191	216	41.6	178	19.8	143	106	73.5	38.8	199	15.9	64.5	122	68.3	95.9	158	109	99.2	80.2	31.8	30	81.3	111	16.5	2.63	5.06	0.1	0.1	0.1	0.1	0.1	175	31.3	19.7	143	113	103	0.1	3.19	74.5	47.8	31.9	49.1	78.3	28.3	146	211	149
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	785	57.7	179	227	57.5	430	28.7	146	551	93.2	21	158	6.86	54.8	77.6	59.5	89.9	54.6	43.4	66.5	49.3	17.1	16.7	45.2	65.3	17.6	17.9	18.9	2.82	8.62	3.69	0.1	9.87	2300	112	108	437	797	167	9.41	3.34	188	106	80.9	255	183	311	18.2	233	198
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00																																		2470	144	128	613	910	271	9.41	6.55	263	154	113	304	262	339	164	444	347
Metals - (Solid)																																																													
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			134000	166000	215000	376000	340000	170000	248000	390000	237000	207000	618000	153000	83900	114000	281000	187000	296000	265000	197000	212000	244000	183000	138000	126000	99600	47800	28700	-	39000	41000	36300	33700	30400	14400	148000	112000	122000	35200	15600	23500	24800	55600	108000	110000	143000	157000	142000	379000	242000	127000
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			21700	>50000	36100	45000	14300	5010	21600	6210	5100	5560	11600	11400	17800	13700	18400	23700	11200	11700	4560	24200	24300	8580	23100	10400	6760	2240	437	-	746	777	955	391	243	2950	30600	32200	27500	9130	290	317	900	20400	8250	8990	20600	28500	1050	5440	28500	1140
Metals - (Liquid)																																																													
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			-	223000	165000	165000	92800	146000	149000	47600	76900	103000	53800	148000	225000	189000	131000	199000	87400	188000	174000	170000	168000	68800	166000	174000	178000	33300	-	5870	-	-	-	-	-	-	201000	-	-	130000	-	78400	-	208000	-	-	-	-	-	75300	-	193000
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			6350	7490	7410	4930	5000	3980	8690	5450	7580	14600	4930	12700	26700	23100	7410	15600	6970	5410	10400	26500	16600	11700	10300	35400	33000	10900	-	7930	-	-	-	-	-	-	8130	-	-	3280	-	7180	-	43700	-	-	-	-	-	13300	-	36900
Phenols																																																													
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.0115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0215	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.01	0.01	0.01	0.01	0.023	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.0105
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.0112	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0217	0.01	0.01	0.01	0.0209	0.0115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0313	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0522	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																																													
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	-	0.124	-	0.0365	0.108	-	0.162	0.141	-	0.326	-	-	0.049	-	0.0974	0.028	-	0.106	-	-	0.0144	-	0.0526	0.211	-	0.0712	-	-	-	-	-	-	-																	
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	10.9	11.9	12.3	10.5	11.4	11.2	11.4	11	9.45	10.8	11	10.6	10.9	11.1	10.8	11.8	11.9	8.77	9	12.7	12.3	11.4	11.5	11.3	10.8	7.72	7.5	7.65	7.83	7.55	7.96	7.37	7.3																	
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																	
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	-	0.358	-	0.299	0.208	-	0.301	0.106	-	0.281	-	-	0.628	-	0.199	0.197	-	0.0942	-	-	0.201	-	0.161	0.404	-	0.0731	-	-	-	-	-	-	-																	
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	-	1.07	-	0.897	0.624	-	0.903	0.318	-	0.843	-	-	1.88	-	0.597	0.591	-	0.283	-	-	0.603	-	0.483	1.21	-	0.219	-	-	-	-	-	-	-																	
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	-	0.609	-	0.602	0.307	-	0.561	0.132	-	0.283	-	-	1.81	-	0.213	0.419	-	0.0788	-	-	0.281	-	0.207	1.16	-	0.0732	-	-	-	-	-	-	-																	
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	1	1.63	1	1	1	1	1	1.22	2.9	7.85	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	1	1	1	1	1																	
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	37.5	376	341	311	172	119	178	290																	
Asbestos																																																														
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		-	22/05/2018	-	22/05/2018	21/05/2018	-	21/05/2018	22/05/2018	-	22/05/2018	-	-	22/05/2018	-	22/05/2018	22/05/2018	-	22/05/2018	-	-	22/05/2018	-	22/05/2018	22/05/2018	-	22/05/2018	-	-	-	-	-	-	-	-	18/07/2018	-	-	16/07/2018	-	18/07/2018	-	18/07/2018	-	-	-	-	-	08/06/2018	-	08/06/2018
Analysed By	TM048	No units		1371	0	0				0.00		-	Barbara Urbanek-Walsh	-	Lucy Caroe	Andrzej Ferfecki	-	Lucy Caroe	James Richards	-	Lucy Caroe	-	-	Barbara Urbanek-Walsh	-	Lucy Caroe	Barbara Urbanek-Walsh	-	Andrzej Ferfecki	-	-	Lucy Caroe	-	James Richards	Lucy Caroe	-	Andrzej Ferfecki	-	-	-	-	-	-	-	-	Andrzej Ferfecki	-	-	Lucy Caroe	-	Andrzej Ferfecki	-	Andrzej Ferfecki	-	-	-	-	-	James Richards	-	James Richards
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00		-	-	-	None	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																	
Analysts Comments	TM304	No units		1002	0	0				0.00		-	-	-	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	Detected	-	Not Detected
Comments	TM048	No units		1371	0	0			0	0.00		-	0	-	Loose fibres in soil	0	-	0	0	-	0	-	-	0	-	0	0	-	0	-	-	0	-	0	0	-	0	-	-	-	-	-	-	-	-	0	-	-	0	-	0	-	0	-	-	-	-	-	0	-	0
Volatile Organic Compounds (VOCs)																																																													
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		103	105	103	102	96.1	92.4	108	101	91.4	86.6	70.2	103	104	99.4	107	107	104	112	104	112	104	115	115	103	104	109	112	109	108	106	104	109	114	91.5	81.6	98	101	97.8	92.1	94.6	96.6	105	99.9	103	102	96.7	104	107	105	106
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		98.6	98.6	98.6	96.1	95.1	93	94.6	95	91.8	94.4	96.4	97.7	99.5	96.5	98.6	98.8	97	93.1	97.9	97.6	98.9	98.6	98.2	99.4	98.5	97.4	93.7	96.9	97.1	97.9	98.9	98.5	98.8	90.9	87.8	99.4	96.1	96.3	95.6	90.9	96.5	95.5	98.7	98.3	97.2	97.7	97.9	99.8	99.2	94.7
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		94.4	93.7	93.5	95.6	83	76.3	90.7	86.3	80.5	87.1	88.5	86.7	94.9	87.8	93.3	91.9	97.3	96.3	99	96.7	97.8	89.7	95.2	95.4	93.2	91.7	94.1	94.7	95.9	100	93.8	95.7	96.5	81.1	73.3	103	100	99.9	88	77.9	98.4	89.9	104	103	103	92.2	103	103	87.7	95.8
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.01	0.1	0.1	2	0.1	0.01	0.1	0.01	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		1.8	0.09	0.09	0.09	1.8	0.18	0.18	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.009	0.09	0.09	1.8	0.09	0.009	0.09	0.009	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		1.4	0.07	0.07	0.07	1.4	0.14	0.14	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.007	0.07	0.07	1.4	0.07	0.007	0.07	0.007	0.07	0.07	0.07	0.007	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		0.8	0.04	0.04	0.04	0.8	0.08	0.08	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.004	0.04	0.04	0.8	0.04	0.004	0.04	0.004	0.04	0.04	0.04	0.004	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.01	0.1	0.1	2	0.1	0.01	0.1	0.01	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.01	0.1	0.1	2	0.1	0.01	0.1	0.01	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		3.26	0.13	0.13	0.13	4.82	0.673	0.418	0.239	0.815	0.13	0.13	0.13	0.13	0.338	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	-	-	-	-	-	-	-	0.474	0.17	0.13	0.13	2.6	0.13	0.013	0.225	0.013	0.13	0.13	0.13	0.013	0.13	0.13	0.745	0.283
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		8	0.4	0.4	0.4	8	0.8	0.8	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.04	0.4	0.4	8	0.4	0.04	0.4	0.04	0.4	0.4	0.4	0.04	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																																													
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	TP3BB5	TP3BB8	TP3BB8	TP3BB8	TP3BB2V	TP3BB3V	TP3BB4V	TP3BB5V	TP3BB8V	TP3BC1	TP3BC1	TP3BC1	TP3BC1
Depth	2	0.5	1	1.5	2.1	2.1	3	2.9	1.9	0.5	1	2	3
Sampled Date	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	04/07/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
Carbon													
Soil Organic Matter (SOM)	11.3	4.67	2.1	2.19	0.795	3.64	4.1	2.55	3.41	2.69	3.31	1.57	5.02
Metals (Solids)													
Arsenic	25.3	6	9.15	4.47	9.36	10.6	12.5	11.7	8.87	15.5	6	43.7	7.2
Cadmium	2.76	0.2	0.02	0.02	0.02	0.02	0.28	0.02	0.02	1.11	0.907	1.18	0.407
Chromium	9	386	104	76.9	22	33.3	34.9	30.8	31.6	0.9	401	279	132
Copper	21.8	21.1	14.2	13	7.39	15	15.5	12.7	11.4	17.5	14	85.9	26.8
Lead	1050	34.8	20.9	47.1	19.3	28	34.2	27.6	23.1	36.4	29.3	58	20.2
Mercury	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14
Nickel	21.4	12.3	20	4.95	27.5	24.9	28.8	35	22	19.1	13.2	11.7	10.7
Selenium	10	10	1	4.08	1	1	1	1	1	2.32	11.3	13	5.39
Vanadium	284	688	311	117	41.2	53.8	56.8	52.4	47	129	374	932	161
Zinc	2420	117	125	146	83.5	116	170	120	101	121	237	139	48.4
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.0145	0.01	0.01	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.0188	0.0348	0.0253	0.0221	0.04	0.04	0.04	0.108
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.0161	0.0247	0.02	0.0179	0.04	0.04	0.101	0.123
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.01	0.0121	0.0203	0.0106	0.011	0.04	0.089	0.193	0.311
Aliphatics >C12-C16	2.86	0.489	2.09	2.62	0.1	0.1	1.65	0.1	0.1	0.1	1.37	37.1	9.24
Aliphatics >C16-C21	22.2	3.88	8.75	0.887	0.1	0.288	0.1	0.1	0.425	6.74	5.87	166	52.5
Aliphatics >C21-C35	80	26.8	50.9	16	0.1	4.2	4.38	0.23	3.35	50.6	53.3	1610	263
Aliphatics >C35-C44	3.82	6.31	9.38	2.4	0.1	0.1	0.1	0.1	0.1	20.4	6.68	482	73.1
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.0107	0.016	0.0133	0.011	0.04	0.04	0.0746	0.0889
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.0145	0.01	0.01	0.04	0.06	0.129	0.207
Aromatics >EC12-EC16	4.14	1.38	2.69	1.36	0.1	0.422	1.41	0.1	0.1	0.1	11	9.83	3.91
Aromatics >EC16-EC21	22.4	4.01	10.6	1.57	0.1	1.1	0.436	0.1	0.582	6.45	51.3	59.5	29.2
Aromatics >EC21-EC35	51.1	18.6	54.5	5.71	1.04	22.6	4.15	8.48	14.3	38.8	106	400	114
Aromatics >EC35-EC44	9.02	8.6	30	0.444	0.453	2.95	0.1	1.49	2.31	20.5	28	180	38.6
Aromatics >EC40-EC44	2.49	3.08	12.3	0.1	0.1	0.326	0.1	0.1	0.1	7.63	10.4	57.8	12
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	93.9	32.6	113	12	12	12	12	12	12	181	5140	45.6	275
Acenaphthene	91.1	34.7	32.5	8	8	8	8	8	8	22.9	609	172	69.4
Anthracene	302	108	206	27.9	16	16	16	16	16	245	10900	745	506
Benz(a)anthracene	479	385	654	71.5	14	14	21.3	14	14	992	18500	4790	1030
Benzo(a)pyrene	295	417	611	59.7	15	15	15	15	15	890	13500	4090	1080
Benzo(b)fluoranthene	548	602	1030	104	15	15	34.6	15	15	1340	19400	4020	1450
Benzo(k)fluoranthene	191	259	310	35.9	14	14	14	14	14	446	7810	5280	534
Benzo(g,h,i)perylene	190	285	512	53.7	24	24	24	24	24	647	9450	4350	907
Chrysene	542	422	677	71.7	10	10	24.8	10	10	945	15200	6640	1080
Dibenzo(a,h)anthracene	40.8	63.7	122	0.023	0.023	0.023	0.023	0.023	0.023	171	2290	929	235
Indeno(1,2,3-cd)pyrene	180	215	407	40.9	0.018	0.018	0.018	0.018	0.018	677	10500	3980	1030
Fluoranthene	1530	732	1250	162	0.017	0.017	51.2	24.2	0.017	2130	56900	11300	2360
Fluorene	266	36.8	63	10	10	10	14.6	10	10	68.3	3170	36.8	155
Naphthalene	393	141	461	69.4	9	9	35.1	9	9	162	12700	1270	2810
Phenanthrene	1580	419	704	97.8	15	15	46.6	15	15	580	37400	6530	1280
Pyrene	1.35	0.699	1.08	0.137	0.015	0.015	0.0401	0.015	0.015	1.66	38.4	9.96	1.82
PAH, Total Detected USEPA 16	8.06	4.85	8.23	0.933	0.118	0.118	0.268	0.118	0.118	11.2	262	64.2	16.6
Naphthalene-d8 % recovery**	85.2	87.7	95.8	79.2	83.6	108	85.6	75.3	85.3	89.1	84.7	93.4	93.1
Acenaphthene-d10 % recovery**	84.3	88.5	94	81	82.4	93	88.8	70.4	88.2	89.2	90.6	93.3	86.2
Phenanthrene-d10 % recovery**	78.8	93.9	107	82	83.2	93.9	92.9	83.7	96.2	88.8	86.4	91.5	84.8
Chrysene-d12 % recovery**	48.1	94.1	99.1	79.1	91.2	84.6	86.4	89.5	99.5	85	84.7	89.7	89
Perylene-d12 % recovery**	34.8	83.5	95.4	74.4	84.2	84	88.5	82	92.5	82.1	83.4	100	101
Total Aliphatics >C12-C44	109	37.5	71.1	21.9	0.1	4.49	6.03	0.23	3.78	77.7	67.2	2290	398
Total Aromatics >EC12-EC44	86.7	32.6	97.8	9.09	1.49	27.1	6	9.97	17.2	65.8	196	649	185
Total Aliphatics & Aromatics >C5-C44	196	70.1	169	31	1.49	31.6	12.2	10.3	21.1	144	264	2940	584
Metals - (Solid)													
Iron	333000	116000	184000	139000	28100	21800	19200	22600	20700	233000	169000	134000	58000
Manganese	8320	10500	11500	7400	592	229	240	472	156	7950	24800	43800	11200
Metals - (Liquid)													
Calcium	-	201000	-	53700	-	172000	-	217000	-	-	-	-	-
Magnesium	-	35600	-	7050	-	19200	-	15800	-	-	-	-	-
Phenols													
Phenol	0.01	0.0107	0.0107	0.0119	0.476	0.05	0.0108	0.05	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.0107	0.0107	0.01	0.014	0.05	0.01	0.05	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.075	0.015	0.075	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.49	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potential													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	08/06/2018	-	08/06/2018	-	11/06/2018	-	11/06/2018	-	-	-	-	-
Analysed By	-	James Richards	-	James Richards	-	Lucy Caroe	-	Barbara Urbanek-Walsh	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-	-	-	-	-
Amosite (Brown) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Tremolite	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Actinolite	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Comments	-	0	-	0	-	0	-	Loose fibres in soil.	-	-	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	111	95.8	101	113	110	105	104	95.1	104	108	105	112	94.8
Toluene-d8**	98.6	95.7	98.9	98.9	98	95.1	97.4	95.9	97	97.6	97.9	97.9	96.9
4-Bromofluorobenzene**	96.9	87.7	91	98.4	93.8	88.5	89.6	84.4	86.8	98.9	87.4	88.6	83.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	4.17	0.537	14.2	0.13	0.315	0.392	0.13	1.38	0.305	0.13	0.13	0.13	1.34
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3BC2	TP3BC2	TP3BC2	TP3BC2	TP3BC3	TP3BC3	TP3BC3	TP3BC3	TP3BC1V	TP3BC2V	TP3BC3V	TP3BD1
Depth	0.3	1	2	3.5	0.5	1	2	3	4.1	3.8	3.3	0.4
Sampled Date	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
Carbon												
Soil Organic Matter (SOM)	5.36	9.09	3.05	3.84	5.91	1.34	4.81	5.53	5.14	5.19	6.48	1.33
Metals (Solids)												
Arsenic	2.07	2.25	9.71	8.56	9.35	6	2.74	5.49	12.7	12.2	12.8	6
Cadmium	0.471	0.716	0.474	0.566	1.21	0.674	0.631	0.359	0.407	0.288	0.664	0.802
Chromium	374	337	15.7	26.4	335	409	293	79.1	33	34.3	31.8	455
Copper	6.22	8.84	13.6	14.2	20	14	11.9	11	16.2	15.3	16.1	14
Lead	17.7	6.8	21.4	22.2	42.9	14.7	9.53	14.2	35.6	29.5	46.3	12
Mercury	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	1.4
Nickel	4.11	1.9	17.2	26.1	28.9	2.83	2.58	12.6	23.6	25.4	28.1	9.25
Selenium	7.54	12	1.48	1.99	10	18.2	10.6	5.11	1	1	1	14.1
Vanadium	281	1940	97.8	124	647	2010	1580	341	54.5	57	65.4	432
Zinc	69.7	16.2	72.2	92.4	134	28	28.6	53.8	124	118	172	58.5
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.04	0.0944	0.04	0.04	0.04	0.04	0.04	0.0445	0.04	0.04	0.04	0.04
Aliphatics >C8-C10	0.04	0.124	0.04	0.07	0.04	0.04	0.04	0.184	0.04	0.04	0.04	0.04
Aliphatics >C10-C12	0.04	1.19	0.04	0.0952	0.04	0.04	0.0828	1.12	0.04	0.04	0.04	0.0814
Aliphatics >C12-C16	4.69	3.52	6.12	9.61	9.33	21	7.07	24.9	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	57.6	7.54	17.8	28.5	226	581	182	69.8	0.1	0.1	0.1	3.76
Aliphatics >C21-C35	111	25.2	156	213	128	212	74.7	180	4.02	3.33	6.74	24.1
Aliphatics >C35-C44	16.1	3.06	64.3	29.9	23.7	14.7	5.41	55.7	0.1	0.1	0.1	3.37
Aromatics >EC5-EC7	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.04	0.12	0.04	0.0462	0.04	0.04	0.04	0.144	0.04	0.04	0.04	0.04
Aromatics >EC10-EC12	0.04	0.791	0.04	0.063	0.04	0.04	0.0555	0.749	0.04	0.04	0.04	0.0539
Aromatics >EC12-EC16	17.4	12.7	1.13	4.88	5.24	8.04	7.74	9.3	0.905	0.1	0.1	3.59
Aromatics >EC16-EC21	80.4	61	5.53	24.7	69	162	89	57	2.74	0.1	0.1	17.6
Aromatics >EC21-EC35	234	93.1	39.3	103	97.5	133	90	125	58	29.9	17.8	36.9
Aromatics >EC35-EC44	59.9	26	23.2	25.2	24.3	24.6	21.4	55.2	10.4	3.41	3.47	8.4
Aromatics >EC40-EC44	17.6	8.33	8.43	7.53	8.18	7.84	8.08	22.2	3.5	0.1	0.1	2.45
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	3180	2710	14.9	138	763	350	1010	62.3	12	12	12	1350
Acenaphthene	254	244	8	55.9	71.5	134	112	460	8	8	8	86.6
Anthracene	3510	4160	24	1130	729	604	1460	1010	16	16	16	1870
Benz(a)anthracene	7670	5610	56.1	1650	2210	2220	3070	2440	21.5	14	23.8	3880
Benzo(a)pyrene	8740	4810	50.4	1200	2120	2000	2800	2300	22.8	15	15	3340
Benzo(b)fluoranthene	11000	6100	79.6	1740	3430	3040	4230	2700	36.6	15	37	4730
Benzo(k)fluoranthene	4340	2540	25.3	673	1000	1080	1500	1300	14	14	14	1660
Benzo(g,h,i)perylene	6940	3200	42	672	1690	1480	2070	1420	24	24	24	2330
Chrysene	6630	4520	59.5	1550	1960	1860	2810	2400	22.6	17.4	32.8	3310
Dibenzo(a,h)anthracene	1710	771	0.023	155	397	329	459	280	0.023	0.023	0.023	546
Indeno(1,2,3-cd)pyrene	7180	3250	44.4	771	1960	1640	2260	1400	0.018	0.018	0.018	2680
Fluoranthene	18200	16200	126	5420	5180	6360	8460	6520	49.4	39.4	53	10700
Fluorene	2940	1760	19.6	259	347	198	377	469	10	10	10	1110
Naphthalene	7480	26000	119	1010	1690	1140	4130	1460	28.7	26.9	20.7	2140
Phenanthrene	15800	15400	110	2440	2580	1750	5340	4760	36.7	28.8	37.4	6390
Pyrene	14.3	11.2	0.0958	4.06	4.2	5.05	6.09	5.21	0.039	0.0278	0.0423	7.45
PAH, Total Detected USEPA 16	120	109	0.867	22.9	30.3	29.2	46.2	34.2	0.257	0.14	0.247	53.5
Naphthalene-d8 % recovery**	91	88.4	93	90.2	87.2	85.7	87.8	91.5	90.6	86.5	87.2	84.2
Acenaphthene-d10 % recovery**	91	91.1	90.6	95	88.9	87.3	81.2	90.7	88.2	83.6	82	85.2
Phenanthrene-d10 % recovery**	89.5	88.9	87.3	98	88.7	89.4	89.2	87.3	85.4	91.4	87.6	86.3
Chrysene-d12 % recovery**	91.8	86.3	84.8	102	85.1	85.2	87.6	82.4	81.1	82.4	80.1	83.9
Perylene-d12 % recovery**	99.7	81.9	92.9	89.5	90	90.2	92.1	77.7	95	79.7	75.7	86.1
Total Aliphatics >C12-C44	190	39.3	244	281	387	828	270	331	4.02	3.33	6.74	31.2
Total Aromatics >EC12-EC44	392	193	69.1	158	196	328	208	247	72.1	33.3	21.2	66.5
Total Aliphatics & Aromatics >C5-C44	582	234	313	439	583	1160	478	580	76.1	36.6	28	97.8
Metals - (Solid)												
Iron	139000	137000	83800	89500	211000	151000	130000	64000	20700	30600	32700	165000
Manganese	24600	33500	2970	3240	20000	40900	33300	9590	196	200	481	31500
Metals - (Liquid)												
Calcium	82600	-	183000	-	259000	-	-	150000	-	-	-	-
Magnesium	5730	-	40600	-	10900	-	-	16600	-	-	-	-
Phenols												
Phenol	0.0646	0.0204	0.05	0.01	0.01	0.01	0.01	0.0217	0.17	0.01	0.01	0.01
Cresols	0.226	0.0511	0.05	0.01	0.01	0.01	0.01	0.0326	0.283	0.01	0.0167	0.01
Xylenols	0.162	0.0307	0.075	0.015	0.015	0.015	0.015	0.0326	0.15	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.452	0.102	0.035	0.035	0.035	0.035	0.035	0.0868	0.452	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE												
pH												
Sulphate, Total												
Sulphur, Total												
Sulphate, Total potential												
Sulphate, acid soluble (total)												
Cyanide, Total												
Exchangeable Ammonia as N												
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	11/06/2018	-	11/06/2018	-	06/06/2018	-	-	11/06/2018	-	-	-	-
Analysed By	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Marcin Magdziarek	-	-	Barbara Urbanek-Walsh	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)												
Analysts Comments												
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	Detected	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-
Comments	0	-	0	-	0	-	-	Loose fibres in soil.	-	-	-	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	109	99.4	99.7	101	109	103	98	94.3	104	109	111	110
Toluene-d8**	98.8	90	95.9	96	96.6	97.6	97.5	95.3	98.8	96.8	98.6	98.2
4-Bromofluorobenzene**	96.2	74.9	81	92.7	85.1	93.3	89.3	83.2	95.2	88.9	89.7	94.2
Methyl Tertiary Butyl Ether	2	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	1.8	0.09	0.09	0.18	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	1.4	0.07	0.07	0.14	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.8	0.04	0.04	0.08	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.0592
p/m-Xylene	2	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	2	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	2.6	5.11	2.26	0.439	1.22	0.26	0.219	3.22	5.9	0.13	0.13	6.39
Sum of BTEX	8	0.4	0.4	0.8	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3BD1	TP3BD1	TP3BD2	TP3BD2	TP3BD2	TP3BD2	TP3BD3	TP3BD3	TP3BD3	TP3BD1V	TP3BD2V	TP3BD3V	TP3BE1
Depth	1	2	0.4	1	2	2.8	0.3	1	2	2.6	3	2.4	0.5
Sampled Date	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
Carbon													
Soil Organic Matter (SOM)	13.4	12.6	11.5	7.15	2.83	6.69	20	29	17.9	3.43	9.02	3.91	1.28
Metals (Solids)													
Arsenic	11.6	7.99	6	3.14	6	12.6	34.1	7.87	6.56	11.4	15.7	9.69	3.78
Cadmium	2.06	0.895	0.738	0.689	0.615	4.11	17.3	1.08	1.14	0.343	1.24	0.309	0.842
Chromium	41.9	151	480	243	401	121	0.9	210	153	30.9	54.6	35.2	269
Copper	16.9	8.88	14	9.6	14	21.7	49.9	17.7	14	16.9	22.7	15	12.2
Lead	23.5	11.9	20.5	38.4	13	736	4220	64.8	41.8	28.7	66.7	36.7	17
Mercury	1.4	0.14	1.4	0.14	1.4	0.14	1.24	1.4	1.4	0.14	0.14	0.14	0.14
Nickel	54.7	13	8.06	5.21	4.18	20.1	23.7	18.7	13.3	25.7	26.7	26.2	162
Selenium	10	6.96	11.7	9.1	18.3	3.88	5.07	10.6	10	1	1.79	1	11.1
Vanadium	688	885	499	339	2880	124	69.4	1600	1060	50.7	98.5	55.5	2180
Zinc	74.9	53	78.4	136	19	1530	11900	121	104	137	209	132	46.4
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.0808	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.274	0.118	0.04	0.04	0.04	0.0686	0.04	0.04	0.0452	0.04	0.04	0.0691	0.04
Aliphatics >C8-C10	0.258	0.113	0.04	0.0466	0.0949	0.147	0.04	0.04	0.0881	0.04	0.04	0.18	0.04
Aliphatics >C10-C12	0.654	0.463	0.209	0.04	0.708	0.0635	0.04	0.089	0.588	0.04	0.0451	0.574	0.04
Aliphatics >C12-C16	29	9.53	28.3	36.6	117	4.05	5.21	16.3	11.3	0.1	0.1	29.1	4.5
Aliphatics >C16-C21	39.3	22.3	511	647	1600	85.3	90	91.9	98.2	0.133	3.56	264	18.2
Aliphatics >C21-C35	151	89.6	135	158	294	59.3	224	94.9	64	2.39	6.04	56	99.8
Aliphatics >C35-C44	85.5	55	7.08	10.7	11.6	6.96	45.4	21.5	8.59	0.1	0.1	0.121	27.7
Aromatics >EC5-EC7	0.116	0.0501	0.04	0.04	0.04	0.0838	0.0482	0.0477	0.04	0.04	0.04	0.04	0.04
Aromatics >EC7-EC8	0.11	0.0685	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Aromatics >EC8-EC10	0.28	0.139	0.04	0.053	0.0764	0.169	0.04	0.0521	0.0881	0.04	0.04	0.409	0.04
Aromatics >EC10-EC12	0.435	0.309	0.139	0.04	0.472	0.0419	0.04	0.0597	0.392	0.04	0.04	0.382	0.04
Aromatics >EC12-EC16	27.8	34.1	35.1	13.8	47.5	1.76	4.25	68.8	233	0.346	0.1	16.1	1.2
Aromatics >EC16-EC21	115	129	245	211	447	28.7	59.7	354	671	1.69	2.53	111	14.8
Aromatics >EC21-EC35	289	239	228	160	219	41.2	147	779	1040	15.9	21.7	45.1	84.3
Aromatics >EC35-EC44	141	90.9	47.8	32.6	35.1	6.61	33.8	191	248	7.09	4.01	6.04	31
Aromatics >EC40-EC44	57.4	35.1	14.1	9.58	9.9	1.25	14.2	57.4	68.9	3.19	0.1	2.06	10.4
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	1040	4240	9770	1840	3530	128	79.5	17000	204000	12	20.7	342	16.8
Acenaphthene	207	647	446	127	274	18	153	1950	13000	25.9	8	619	144
Anthracene	1800	5060	11800	2160	2970	180	172	19900	167000	16	30.1	169	230
Benz(a)anthracene	2900	5830	14100	4680	3960	259	187	31900	134000	44.5	80.9	27.1	1500
Benzo(a)pyrene	2310	4080	10600	4160	2980	193	115	31900	106000	28.5	72.8	15	1800
Benzo(b)fluoranthene	3450	2480	16300	6470	4350	306	258	47800	161000	45.8	135	32.2	2390
Benzo(k)fluoranthene	1200	2250	6250	1960	1680	107	83.8	15100	52800	14	40.9	14	960
Benzo(g,h,i)perylene	1600	2740	7320	3280	2050	132	103	22300	69400	24	61.9	24	1330
Chrysene	2520	4570	11800	3720	3740	276	175	27900	112000	40.5	80.9	26.7	1670
Dibenzo(a,h)anthracene	372	534	1860	795	479	35.3	0.023	5600	17800	0.023	0.023	0.023	227
Indeno(1,2,3-cd)pyrene	1800	3000	8320	3730	2060	138	93.5	24600	78300	0.018	64.7	0.018	1440
Fluoranthene	8000	17500	42600	12000	15400	905	556	78900	400000	112	233	204	2350
Fluorene	878	3560	7720	838	2690	113	237	14600	166000	19	25.7	930	68.7
Naphthalene	2330	9270	11900	5740	3950	550	1630	29600	380000	29	50.9	5920	162
Phenanthrene	5730	15900	45200	8400	10800	823	567	51900	485000	87.1	164	1490	953
Pyrene	6.16	13.1	30.7	9.1	11.1	0.682	0.717	53.7	269	0.0813	0.164	0.147	2.37
PAH, Total Detected USEPA 16	42.3	94.7	237	69	72.1	4.85	5.12	475	2820	0.514	1.23	9.9	17.6
Naphthalene-d8 % recovery**	85.5	90.9	86.2	89.3	85.9	86.6	91.4	88.9	85.7	86.2	90	90.3	90
Acenaphthene-d10 % recovery**	85.8	85	89.6	92.2	97.1	89.7	90.6	88.8	99.3	83.3	83.9	91.2	83.9
Phenanthrene-d10 % recovery**	85.1	88.4	91.5	89.6	87.8	88.5	93.4	85.4	85	90.5	87.8	91.3	87.9
Chrysene-d12 % recovery**	78.5	87.5	87.1	85.4	79.6	78.8	81.6	91.6	79.2	83.1	81.2	80.2	85.7
Perylene-d12 % recovery**	78.5	79.6	84.4	92.9	76.7	72.9	66.8	99.1	87.1	84.7	79.4	80	84.7
Total Aliphatics >C12-C44	305	177	681	852	2020	156	365	225	182	2.53	9.6	350	150
Total Aromatics >EC12-EC44	572	493	556	417	748	78.3	245	1390	2190	25	28.2	179	131
Total Aliphatics & Aromatics >C5-C44	880	671	1240	1270	2770	235	609	1620	2380	27.6	37.9	530	282
Metals - (Solid)													
Iron	292000	173000	131000	121000	123000	100000	243000	139000	133000	29600	25500	29600	160000
Manganese	12200	21400	23000	25400	42100	6120	7520	24400	17300	282	1220	239	36400
Metals - (Liquid)													
Calcium	208000	-	233000	138000	-	196000	-	76600	-	186000	-	-	-
Magnesium	14900	-	12100	26600	-	28500	-	8790	-	12900	-	-	-
Phenols													
Phenol	0.01	0.01	0.05	0.0224	0.0112	0.339	0.024	0.0336	0.1	0.011	0.05	0.01	0.01
Cresols	0.01	0.01	0.05	0.0448	0.056	0.0113	0.204	0.0672	0.1	0.033	0.05	0.01	0.01
Xylenols	0.015	0.015	0.075	0.015	0.015	0.015	0.024	0.0784	0.15	0.033	0.075	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.0672	0.0672	0.35	0.252	0.179	0.035	0.077	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potential													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	08/06/2018	-	11/06/2018	11/06/2018	-	11/06/2018	-	11/06/2018	-	11/06/2018	-	-	-
Analysed By	James Richards	-	Andrzej Ferfecki	James Richards	-	Renata Bozhkov	-	Barbara Urbanek-Walsh	-	Renata Bozhkov	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Non-Asbestos Fibre	Not Detected	-	Trace	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Comments	0	-	0	Fibre bundles in soil	-	0	-	0	-	0	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	107	92.1	102	101	94.6	102	106	102	78.3	104	105	108	113
Toluene-d8**	96.4	90.9	95	98	94.4	98.1	98.9	96.6	90.7	94.1	96.9	100	98.3
4-Bromofluorobenzene**	87.9	73.5	86.1	101	82.7	87.5	101	93.2	73.4	79.8	84.6	103	99
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	2	0.2	2	2	2	0.1	0.1	0.1	2	0.1
Benzene	0.09	0.09	0.09	1.8	0.18	1.8	1.8	1.8	0.172	0.09	0.09	1.8	0.09
Toluene	0.07	0.07	0.07	1.4	0.14	1.4	1.4	1.4	0.116	0.07	0.07	1.4	0.07
Ethylbenzene	0.04	0.04	0.04	0.8	0.08	0.8	0.8	0.8	0.04	0.04	0.04	0.8	0.04
p/m-Xylene	0.1	0.1	0.1	2	0.2	2	2	2	0.183	0.1	0.1	2	0.1
o-Xylene	0.1	0.1	0.1	2	0.2	2	2	2	0.1	0.1	0.1	2	0.1
Naphthalene	0.13	1.77	0.356	23.2	0.681	11.9	6.44	37.3	236	10.3	0.13	2.6	0.13
Sum of BTEX	0.4	0.4	0.4	8	0.8	8	8	8	0.47	0.4	0.4	8	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	TP3BE1	TP3BE1	TP3BE2	TP3BE2	TP3BE2	TP3BE2	TP3BE3	TP3BE3	TP3BE3	TP3BE1V	TP3BE2V	TP3BE3V
Depth	1	2	0.5	1	2	2.9	0.5	1	2	2.2	3	2.3
Sampled Date	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
Carbon												
Soil Organic Matter (SOM)	5.6	2.6	26.7	29.7	58.1	47.8	52.2	17.4	10.5	4.79	2.47	2.71
Metals (Solids)												
Arsenic	2.77	6	3.34	6	6	5.44	9.36	2.58	6	12.1	11.6	10.3
Cadmium	0.764	0.846	0.02	0.809	0.895	0.421	0.727	0.416	1.32	0.261	0.17	0.246
Chromium	313	399	60.9	245	373	161	35.9	178	222	28.4	32.2	37.4
Copper	12.3	14.7	4.28	24.5	14	15.3	31.1	11.1	20.4	20.8	19.6	15.4
Lead	17.7	31.7	8.62	21.4	19.6	27.7	66	9.68	55.5	28.2	25.8	26.6
Mercury	0.14	1.4	0.14	1.4	1.4	0.569	1.58	0.14	1.4	0.14	0.14	0.14
Nickel	5.45	6.36	7.45	11.8	5.25	12.7	19	7.81	12.7	25.9	27.2	30.1
Selenium	12	19.8	3.44	10	12.1	5.1	1.93	10.8	10	1	1	1
Vanadium	1550	2410	254	779	449	311	86.8	1890	1400	49.2	52.7	60
Zinc	53.6	52.5	46.9	62.6	69.6	106	230	42.7	118	129	119	126
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0526	0.04	0.04	0.04	0.04
Aliphatics >C6-C8	0.0727	0.04	0.0571	0.0403	0.04	0.0672	0.0784	0.193	0.0803	0.04	0.04	0.04
Aliphatics >C8-C10	0.117	0.04	0.04	0.04	0.04	0.0516	0.0448	0.35	0.241	0.04	0.04	0.04
Aliphatics >C10-C12	0.617	0.04	0.157	0.0874	0.04	0.0912	0.212	3.88	5.17	0.04	0.04	0.04
Aliphatics >C12-C16	4.34	2.83	12.4	11.9	11.4	15.8	10.5	14.9	123	0.1	0.1	0.1
Aliphatics >C16-C21	18.3	11.2	75	138	64.7	167	71.6	57.6	2440	0.1	0.1	0.1
Aliphatics >C21-C35	64.5	63.4	266	92.2	65.3	113	106	114	856	8.89	0.37	0.1
Aliphatics >C35-C44	16.7	19.3	61.2	22.4	10.8	12.7	13.1	14.8	44.9	0.345	0.1	0.1
Aromatics >EC5-EC7	0.04	0.04	0.0571	0.04	0.04	0.04	0.0459	0.214	0.044	0.04	0.04	0.04
Aromatics >EC7-EC8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.108	0.0429	0.04	0.04	0.04
Aromatics >EC8-EC10	0.104	0.04	0.056	0.0459	0.04	0.0564	0.0594	0.472	0.296	0.04	0.04	0.04
Aromatics >EC10-EC12	0.411	0.04	0.105	0.0582	0.04	0.06	0.141	2.59	3.45	0.04	0.04	0.04
Aromatics >EC12-EC16	10.5	3.41	34.5	23.7	33.1	63.1	38.7	489	160	0.58	0.332	0.477
Aromatics >EC16-EC21	49	21.6	205	155	163	446	203	1900	1050	0.771	0.805	1.7
Aromatics >EC21-EC35	154	72.8	441	298	400	874	406	2530	881	60.5	10.7	23.7
Aromatics >EC35-EC44	53.6	23.9	111	85.7	93.4	185	100	504	175	11.5	4.17	6.74
Aromatics >EC40-EC44	19.6	7.94	32.8	29.2	27	47.5	30.5	158	58.4	3.77	1.73	2.82
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	9610	1360	4980	15600	10600	16000	17900	39300	8530	12	12	12
Acenaphthene	1670	130	340	1380	313	906	1870	3270	840	8	57.3	8
Anthracene	10300	2200	5130	25200	10900	15700	18200	27000	8100	16	41.7	16
Benz(a)anthracene	27200	5410	11500	48700	34100	43400	38400	40700	14500	39.4	91.5	14
Benzo(a)pyrene	27100	4950	10100	42000	32000	40900	35700	32300	11600	35.4	72.8	15
Benzo(b)fluoranthene	41100	7220	13400	52700	47600	61100	52500	46300	16700	57	108	15
Benzo(k)fluoranthene	13900	2510	5730	24200	15200	17300	17400	16400	6060	14	42.5	14
Benzo(g,h,i)perylene	18600	3380	6700	27100	24400	31300	26300	20600	7710	24	48.8	24
Chrysene	27400	4640	9310	40100	29800	36300	28600	31400	12000	34.1	91.8	10
Dibenzo(a,h)anthracene	4630	799	1660	7360	6270	7290	6230	4590	1700	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	21500	3860	7710	29900	27500	34600	29200	21400	7980	27.9	43.5	0.018
Fluoranthene	57600	14600	29800	129000	79400	103000	109000	135000	47700	90.5	192	0.017
Fluorene	4320	703	2730	13500	3440	8640	22700	39200	9200	10	45.5	10
Naphthalene	39900	929	22000	23300	17700	34100	40600	110000	26100	57.8	68.2	12.5
Phenanthrene	37600	6920	18600	79100	29100	56600	93100	142000	34800	51.1	204	15
Pyrene	49.4	10.7	21.4	94.3	58.1	74.4	75.4	90.4	36.8	0.069	0.157	0.015
PAH, Total Detected USEPA 16	392	70.3	171	654	426	582	614	800	250	0.462	1.26	0.118
Naphthalene-d8 % recovery**	89	85.2	90.1	87.1	90.1	86.9	90.5	76.3	98.7	80.7	82	90.6
Acenaphthene-d10 % recovery**	86.6	84.6	89.5	87.8	89.4	89.5	90.7	87.8	106	83	84.5	87.3
Phenanthrene-d10 % recovery**	93.5	86.7	85.6	80.1	82	85.9	84.2	86	96.4	85.6	86.9	84.7
Chrysene-d12 % recovery**	85.1	87.6	81.3	77.9	82.7	86.4	82.3	82.2	87.9	83.9	81.8	81.4
Perylene-d12 % recovery**	86	92.3	76.1	100	92.4	85.9	89.9	70.6	86.4	89.2	80.3	89.7
Total Aliphatics >C12-C44	104	96.7	414	264	152	308	201	201	3470	9.24	0.37	0.1
Total Aromatics >EC12-EC44	267	122	791	563	689	1570	748	5420	2260	73.3	16	32.6
Total Aliphatics & Aromatics >C5-C44	372	218	1210	827	842	1880	950	5630	5740	82.5	16.4	32.6
Metals - (Solid)												
Iron	136000	149000	86300	105000	161000	80500	63400	69000	140000	31000	28200	29700
Manganese	37600	44100	9240	18700	29000	12900	3660	25700	26900	461	448	280
Metals - (Liquid)												
Calcium												
Magnesium												
Phenols												
Phenol												
Cresols												
Xylenols												
Phenols, Total Detected monohydric												
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE												
pH												
Sulphate, Total												
Sulphur, Total												
Sulphate, Total potential												
Sulphate, acid soluble (total)												
Cyanide, Total												
Exchangeable Ammonia as N												
Asbestos												
Asbestos Quantification - Gravimetric - %												
Date of Analysis												
Analysed By												
Asbestos Quantification - PCOM Evaluation - %												
Additional Asbestos Components (Using TM048)												
Analysts Comments												
Asbestos Quantification - Total - %												
Chrysotile (White) Asbestos												
Amosite (Brown) Asbestos												
Crocidolite (Blue) Asbestos												
Fibrous Anthophyllite												
Fibrous Tremolite												
Fibrous Actinolite												
Non-Asbestos Fibre												
Comments												
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**												
Toluene-d8**												
4-Bromofluorobenzene**												
Methyl Tertiary Butyl Ether												
Benzene												
Toluene												
Ethylbenzene												
p/m-Xylene												
o-Xylene												
Naphthalene												
Sum of BTEX												
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)												
Gross Calorific Value Original Q(V/gr/ar)												
Net Calorific Value in Dry Matter Q(V/net/d)												
Net Calorific Value in Original Q(V/net/ar)												
Water Analytical M (ad)												
Water Gross M(ex)												
Water Total M(ar)												

Glan Llyn Residential Soil Data

											Sample ID	TP3CB301	TP3CB302	TP3CB303	TP3CB501	TP3CB3V	TP3CB5V	TP3CD301	TP3CD302	TP3CD3V	TP3CM401	TP3CM402	TP3CM403	TP3CM4V	3CA1	3CA1	3CA1	3CA2	3CA2	3CA2	3CA3	3CA3	3CA3	3CA4	3CA4	3CA4	3CA5	3CA5	3CA5	3CA6	3CA6	3CA7	3CA7	3CA8	3CA8	3CA1V	3CA2V	3CA3V	3CA4V	3CA5V	3CA6V	3CA7V	3CA8V	3CB2	3CB2
											Depth	0.45	0.65	0.9	0.5	1.3	1.6	0.45	0.65	1.7	0.5	1.2	2	3.6	0.5	1	1.5	0.5	1.5	2.5	0.5	1	1.5	0.5	1	1.5	0.5	1	1.5	0.5	1.5	0.5	1.5	0.5	1	2.3	2.9	2	2.2	1.8	2.2	2.2	1.8	1	2.2
											Sampled Date	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	28/09/2017	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	30/07/2018	30/07/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	07/08/2018	30/07/2018	13/08/2018	13/08/2018
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**WQS**	**Percentage of exceedances**																																												
Carbon																																																							
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	8.59	46.7	3.86	7.02	4.52	1.78	2.98	3.5	0.888	4.19	>100	6.59	5.55	6.15	17.4	16.7	5.65	55.3	6.19	14.4	10.8	5.72	6.83	22.8	8.28	9.38	16.7	8.24	3.79	4.67	6.24	5.72	1.46	4.83	5.24	5.9	1.36	1.43	6.62	1.72	1.57	1.91	5.59	74
Metals (Solids)																																																							
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	6	4.85	7.92	7.14	9.1	9.75	8.64	6	11.9	7.66	0.652	6	11.4	8.07	4.25	4.94	8.52	3.53	7.05	6.25	18.6	12.8	9.27	7.43	6	9.35	7.92	6	6.29	6.77	9.54	2.62	5.12	12.6	12.6	12.1	9.17	8.92	13.2	8.64	10.8	10.6	16.2	3.14
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	1.5	0.958	1.93	1.48	0.559	0.22	3.28	0.2	0.168	0.375	0.159	0.978	0.02	0.114	0.02	0.142	0.02	0.0729	0.2	0.02	0.02	0.2	0.2	1.2	0.211	0.455	1.67	0.2	0.02	0.02	0.381	0.02	0.02	0.2	0.0351	0.101	0.02	0.02	0.347	0.02	0.02	0.02	0.887	0.122
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	252	80.3	227	265	33.8	46.4	10.1	137	19.5	25.3	3.01	637	72.8	41.4	15.1	9.23	104	6.89	539	72	81.4	92.1	143	200	584	155	168	385	167	235	147	112	300	303	34.3	34	34.2	36.7	24.8	34.7	29.6	36.8	127	12.2
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	28.9	21.7	109	30.5	24.5	18	1790	22.5	9.51	15.2	8.91	14	22.9	15.3	13.5	13.2	17.7	10.2	15.2	18.1	26.2	42	20.1	47.3	19	22.8	28.3	16.2	13.4	19.3	18.6	7.11	14.4	45.1	34.7	24.2	20.1	21.2	27.5	20.1	13.6	16	18.6	16.5
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	103	39.3	68.7	93.5	44.4	25.2	312	29.5	20.2	32.3	6.34	29.9	30.5	44.5	21.1	17.9	58.2	10.6	10.5	24.6	55.8	88	59.5	91.7	55.9	88.7	99.8	23.3	29.7	48.3	63.9	10.4	11.9	17.9	37.3	40.1	22.9	20.9	45.3	21.1	21.3	25.9	84.4	30.1
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	1.4	0.14	1.4	1.4	0.663	0.645	1.4	1.4	0.526	0.69	0.14	1.4	0.856	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	1.4	0.14	1.4	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	17.7	18.4	65	22.6	27.2	37.3	22.8	19.1	32.9	29.2	1.43	2.7	29.4	12	8.52	11.8	16.4	6.33	14.7	17.3	32.5	39.9	16.7	14.6	12.7	22.6	17.3	2.07	9.68	12.8	17.6	5.46	5.29	35.3	27.1	28.7	36.6	37.4	29.3	33.4	29.9	28.5	19	7.25
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	10	9.64	14.4	12.6	1	1	10	10	1	1	1	13.1	1	1.2	1.44	1.5	2.99	1	13.3	1.89	4.2	10	10	12.6	15.5	10	12	10.6	3.84	4.84	10	3.92	9.33	10	1	1	1	1	1	1	1	1	10	1
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	756	91.8	454	333	66.9	66.4	59.1	223	46.6	48.6	8.94	528	100	67.4	20.2	20.9	149	17.1	454	261	165	613	210	223	415	304	302	291	230	369	213	167	244	338	49.8	52.1	51.2	52.6	41.7	50.7	48	53.5	469	15.7
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	379	324	178	446	150	116	4930	94.8	82.9	146	17.8	56.6	120	191	86.3	113	289	67.8	47.2	118	205	306	178	1050	227	308	635	175	122	296	218	51.3	56.6	108	136	149	109	125	145	123	90.2	104	292	105
TPH Criteria Working Group (TPH CWG)																																																							
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04																															
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00	0.0158	0.0109	0.008	0.0101	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008																															
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012																															
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009																															
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0286	0.0106	0.026	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0136	0.0154	0.01	0.01	0.01	0.01	0.0241	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.019
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0456	0.01	0.0195	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0124	0.0143	0.01	0.01	0.01	0.01	0.0197	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0123
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.04	0.04	0.537	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.134	0.01	0.0282	0.01	0.01	0.01	0.0132	0.01	0.01	0.0121	0.01	0.01	0.0249	0.0363	0.01	0.01	0.0134	0.0132	0.035	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0347
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	2.81	4.11	0.1	4.18	0.1	0.1	10.8	10.9	0.1	0.1	37.6	0.166	1.26	3.97	1.62	2.28	5.62	8.91	0.1	3.27	2.28	2.96	2.34	4.95	9.14	1.86	2.52	0.298	1.52	3.04	2.14	0.768	0.786	1.34	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	5.47	6.29
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	11	15.5	0.1	16.9	0.1	0.1	22.1	26	0.1	0.1	19.3	11.9	2.84	12.9	10.9	12.5	26	83.5	0.259	25.9	13.3	14.6	13.4	37.1	23.9	10.5	25	3	6.58	16.3	9.73	5.57	6.09	6.51	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	27.6	62.8
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	89.9	78.3	0.1	91.1	4.33	1.83	112	114	0.708	9.47	22.3	28.4	20.8	74.5	34.7	43.2	146	65.7	16.5	89	51.7	65.1	51.2	66.5	47.9	60.7	53.9	31.3	45	73.6	47.9	25.4	28.7	32.1	1.04	8.52	1.58	1.2	3.86	0.1	0.1	0.146	78.7	81.3
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	41.4	11.8	0.1	27.4	0.1	0.1	25.2	113	0.1	0.1	1.11	7.14	2.61	41.1	8.85	15.5	53.2	13.2	2.15	40.7	15.2	19.4	16.4	16.2	11.9	26.8	12.1	25.5	17.3	35	15.9	6.18	7.44	8.73	0.1	1.73	0.1	0.1	0.1	0.1	0.1	0.1	39.6	19.5
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0308	0.01	0.013	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0131	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.04	0.04	0.358	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0891	0.01	0.0184	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0158	0.0242	0.01	0.01	0.01	0.01	0.023	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0235
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	6.13	7.66	11.4	5.76	0.1	0.1	4.5	5.98	0.1	0.1	104	0.586	0.533	5.43	9.65	70.7	3.92	31.7	0.287	13	5.28	6.87	5.01	19.5	6.54	3.68	16.8	1.03	2.2	6.09	4.39	2.83	0.758	1.56	0.161	0.1	0.1	0.164	0.1	0.1	0.1	6.53	8.18	255
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	32.6	72	46.4	25.7	0.1	0.138	16	32.6	0.1	0.1	90.5	5.95	3.15	39.9	98.2	418	23.5	442	3.92	154	45.9	66.5	33.7	324	81.3	27.8	236	7.03	12.2	37.1	30.9	14.4	12.9	13.7	1.03	1.83	0.312	1.35	2.37	0.1	0.1	51.5	43.6	4330
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	130	206	59.4	143	13.4	6.42	73.4	144	2.21	18.2	116	27.4	42.4	146	432	755	118	1420	26.6	500	161	241	109	1030	370	104	701	54.3	54.4	151	85.3	45.9	71.6	72.1	15.9	20.4	4.22	8.13	21.9	3.99	3.02	160	152	5480
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	60.2	53.7	15.1	55.5	5.4	2.1	30.9	151	0.658	6.02	15.7	8.87	14.1	73.3	134	202	74	311	7.07	155	49.6	78.7	40.3	259	114	43.8	185	51.6	27	64.2	29.2	16.8	23.8	26.1	9.1	4.8	0.29	0.624	4.29	0.1	1.95	47.7	159	826
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	22.7	16.4	4.97	20.8	1.51	0.55	11.7	71.6	0.1	1.74	3.42	3.98	4.5	29.4	45.3	68.1	31.6	99.2	2.27	57.2	16.7	27.4	15.2	81.1	38.2	15.7	59.5	26.3	10.5	26.2	10.5	6.34	7.71	9.03	3.63	1.22	0.1	0.1	0.882	0.1	0.763	15.9	76.7	215
Polyaromatic Hydrocarbons (PAHs)																																																							
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	703	1170	622	291	26.2	12	157	38	12	12	127	12	12	890	1490	410	429	15600	382	3740	1480	1580	1060	9850	4600	962	5320	99.4	167	1120	533	801	12	249	12	12	12	28.9	22	12	12	12	855	61500
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	105	51.1	19.9	139	8	15.4	43.8	144	8	8	257	57.4	8	172	314	114	77	647	21.3	557	137	129	185	393	215	138	263	80	26.4	180	89.4	135	275	114	8	8	8	8	8	8	8	8	71.8	2720
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	1120	2490	415	523	24.4	20.9	293	256	16	16	529	81.8	16	1850	4560	1280	701	47500	529	6520	1940	2450	1450	14900	4310	1460	13900	224	186	1580	542	1030	472	550	16	16	16	22.3	27.4	16	16	16	1550	204000
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	4210	7240	1490	3480	63.7	369	1170	3790	14	22.8	1130	527	218	4290	18100	3790	1750	97300	1840	24000	5890	9560	4090	58600	22500	4080	29300	1630	596	4250	1720	2580	4180	2700	41.4	76.3	65	100	223	14	14	38	4110	358000
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	4270	6630	1350	4950	66.6	528	1260	3850	15	20.7	787	513	272	4010	13300	4770	1490	96900	2440	23300	6060	8290	4120	54200	28300	3740	26400	1950	584	3650	1660	2370	5300	2760	48.1	109	64	124	245	15	15	43.3	3670	303000
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	6850	10700	2620	5570	83.1	689	1750	5270	15	31.5	1490	679	364	6510	24800	6120	2030	139000	3600	37800	8590	12900	6250	72400	48800	6010	40900	2740	946	5580	2440	4010	8100	3690	82	148	98.5	190	356	15	15	63.7	4980	378000
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	2200	4080	830	2400	32.9	299	651	2460	14	14	482	275	145	2280	10200	2330	533	46100	1110	12900	3190	4160	2460	28200	11700	2220	16200	1140	324	2200	778	1500	2540	1300	14	52.1	44.6	63.1	118	14	14	19.7	2040	159000
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	3290	5400	1110	3400	60.1	400	1050	3170	24	24	562	411	226	2980	10100	3080	1040	76200	2010	18100	4270	6080	3190	37700	22800	2900	19900	1340	449	2630	1120	1790	3070	1840	41.3	80.8	47.9	103	146	24	24	24	2600	223000
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	3240	7060	1500	3450	34.6	431	1100	4040	10	23.4	1560	875	192	4260	17500	3640	1560	95400	2420	23400	5160	8900	3910	54500	22700	3750	27100	1810	582	3750	1500	2330	4190	2270	58.3	88.6	55.4	103	246	10	10	37.7	3450	308000
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	812	1410	304	815	0.023	98.5	233	839	0.023	0.023	209	102	0.023	736	3140	1030	231	18100	369	5320	1200	1700	896	11700	6230	839	5800	343	96.5	723	301	517	775	430	0.023	0.023	0.023	0.023	35	0.023	0.023	0.023	675	46100
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	2870	4780	964	2730	43	326	820	2600	0.018	0.018	377	291	170	2780	9880	3120	862	102000	2090	15900	5470	6980	2750	42800	19200	2530	25000	1270	580	2360	1590	1540	3780	1920	31.6	109	39.8	148	214	0.018	0.018	34.3	3210	194000
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	6750	14400	3570	4210	182	406	2280	8320	0.017	34.9	2210	798	268	9660	21700	5490	2730	241000	2410	48200	12200	18400	8170	110000	32700	8980	59300	2300	1240	8550	3500	6150	5200	4940	86.6	114	118	169	394	0.017	0.017	55.1	9730	1260000
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	437	696	259	325	41.6	10	93.1	66.7	10	10	686	30.4	10	735	1350	352	360	10600	21	1670	782	767	618	4330	910	584	4370	81.8	93.3	841	308	705	118	165	10	10	10	10	10	10	10	10	609	76800
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	1710	1230	1480	2050	34.9	46.9	302	419	39.5	9	4140	117	59.6	977	1260	262	415	4090	56.3	2120	1790	1630	2330	3290	1590	1520	2900	148	384	2340	1240	1780	66.2	451	9	9	9	9	13.2	9	9	9	719	13300
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	3390	6310	2790	2220	251	135	973	3790	15	31.5	6470	633	136	5670	14000	3300	2150	103000	141	13400	5630	5880	3860	38500	7470	4220	29900	895	617	4880	1850	3930	1990	2020	49.3	65.1	30.7	53.3	108	15	15	27.6	5290	831000
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09														7.1	15.4	3.83	1.73	193	2.74	35.7	9.52	14.9	6.53	89	33.6	6.6	41.5	2.19	0.906	6.54	2.65	4.46	4.97	4.13	0.0756	0.102	0.0953	0.166	0.325	0.015	0.015	0.0493	6.83	953
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	47	84.1	21.7	40.4	1.06	4.17	14.1	45.6	0.118	0.192	22.8	6.21	2.3	54.9	167	42.9	18.1	1290	22.2	273	73.3	104	51.9	630	268	50.5	348	18.2	7.77	51.2	21.8	35.6	45	29.5	0.514	0.945	0.659	1.27	2.47	0.118	0.118	0.369	50.4	5370
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	99.5	113	102	107	117	115	108	103	124	113	104	98.2	122	95.7	96.3	65.6	71	89.5	96.1	92.2	93.2	93	91.2	91.7	91.3	95.6	97.8	93	94.6	87.1	90	93.9	92.5	94	91.7	92.3	87.8	90	99.2	90.5	88	90.4	111	109
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	94	107	97.1	102	112	105	104	93.7	111	102	103	94	118	107	92	85	106	72.5	91.1	97.9	95	95	99.5	88.5	98	98.1	96.3	94.8	92.8	89.4	90.5	96.1	95.1	91	95	91.7	88	82.3	98.3	87.7	84.1	85.6	116	116
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	94.1	106	95.9	101	110	103	102	94.6	110	101	102	93.7	115	100	118	98.4	98.9	76.5	84.7	94.1	88.3	101	104	95.1	98.9	99.3	92.5	97.2	92.8	91.7	86.5	98.5	96	93.4	94.6	83.1	93.2	85.2	99.8	85.9	87.5	91.1	114	117
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	98.7	108	95.1	105	103	102	104	100	107	97.3	103	96	114	96.3	117	71.9	89.1	79.5	81.5	98.9	94.8	95.2	110	95.3	106	103	97.4	90.9	86	95.4	92.1	100	92.2	92.8	95.1	94.7	96.2	89.9	93.7	79.4	83.7	87	100	111
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	104	112	97.1	112	107	95.1	111	94.4	99.3	89.5	100	98.9	121	95.1	93.9	80.3	88.7	91	79.5	112	107	92.9	114	113	120	109	108	88.8	87.5	95.5	96.6	106	105	93.1	102	94.2	101	91	93.6	81	85.4	95.9	100	105
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	145	110	0.1	140	4.33	1.83	170	264	0.708	9.47	80.3	47.6	27.5	133	56.1	73.4	231	171	18.9	159	82.6	102	83.3	125	92.8	99.8	93.5	60.1	70.4	128	75.7	38	43	48.7	1.04	10.2	1.58	1.2	3.86	0.1	0.1	0.146	151	170
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	229	340	132	230	18.8	8.66	125	333	2.86	24.2	327	42.8	60.2	264	674	1450	219	2200	37.9	823	262	393	188	1630	572	180	1140	114	95.8	258	150	79.9	109	113	26.2	27	4.82	10.3	28.6	3.99	4.97	266	362	10900
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00														397	731	1520	449	2370	56.8	981	344	495	272	1760	665	280	1230	174	166	386	226	118	152	162	27.2	37.3	6.4	11.5	32.4	3.99	4.97	266	514	11100
Metals - (Solid)																																																							
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			128000	102000	276000	162000	34100	39700	169000	141000	36900	31800	1160	127000	39800	45000	24100	15600	54800	8780	118000	68000	72900	185000	85700	102000	109000	97500	113000	124000	80400	75900	72800	44100	132000	255000	20700	27500	24200	29500	28000	21700	29400	32600	94800	12100
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			19200	<0.13	26800	24000	807	1640	4020	15100	1590	750	133	28800	2460	3730	2790	1890	10200	523	26200	7800	12700	9430	9510	33100	27600	11500	20800	21400	12300	14300	9310	9660	33900	21400	287	417	383	472	776	487	941	332	12100	735
Metals - (Liquid)																																																							
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			199000	102000	160000	169000	-	-	118000	174000	-	37200	2090	265000	-	128000	-	211000	-	137000	-	194000	-	171000	85000	-	50200	57500	47900	-	-	-	-	-	-	-	-	175000	111000	164000	-	85500	-	74000	-	18000
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			14100	15000	5700	10200	-	-	18500	19000	-	11200	279	12700	-	21900	-	16000	-	14100	-	39500	-	9800	13900	-	4320	7310	8570	-	-	-	-	-	-	-	-	14400	24500	17700	-	9830	-	6590	-	2820
Phenols																																																							
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.011	0.0112	0.01	0.01	0.01	0.0111	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0104	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.114	0.236	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.01	0.0224	0.01	0.01	0.01	0.01	0.01	0.0133	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0103	0.0411	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0226	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.124	0.277	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																																							
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	0.0933	0.111	0.0661	0.16	-	-	0.357	0.17	-	0.0972	0.0621	0.0917	-																															
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	10.7	11.5	12.3	10.9	8.48	8.86	10.5	12.1	8.29	8.08	7.81	12.7	8.24																															
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33	-	-	-	-	-	-	-	-	-	-	-	-	-																															
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	0.319	0.272	0.265	0.256	-	-	0.176	9.28	-	0.052	0.398	0.31	-																															
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	0.957	0.816	0.795	0.768	-	-	0.528	27.8	-	0.156	1.19	0.93	-																															
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	0.326	0.199	0.466	0.557	-	-	0.39	0.846	-	0.0481	0.02	0.628	-																															
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	4.21	13.9	1.13	1	1	1	1.64	1	1	1	1	1																															
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	12	18.3	12	12	342	141	14.8	12	170	12	12	12	246																															
Asbestos																																																							
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	0.001	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		06/10/2017	06/10/2017	06/10/2017	06/10/2017	-	-	06/10/2017	06/10/2017	-	06/10/2017	06/10/2017	06/10/2017	-	10/08/2018	-	09/08/2018	-	10/08/2018	-	10/08/2018	-	01/08/2018	10/10/2018	-	10/10/2018	10/10/2018	10/10/2018	-	-	-	-	-	-	-	-	01/08/2018	01/08/2018	03/08/2018	-	09/10/2018	-	10/10/2018	-	10/10/2018
Analysed By	TM048	No units		1371	0	0				0.00		Renata Hatos	Renata Hatos	Renata Hatos	Renata Hatos	-	-	Renata Hatos	Renata Hatos	-	Renata Hatos	Renata Hatos	Renata Hatos	-	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	Renata Bozhkov	-	James Richards	Andrzej Ferfecki	-	Andrzej Ferfecki	James Richards	Marcin Magdziarek	-	-	-	-	-	-	-	-	Lucy Caroe	James Richards	Andrzej Ferfecki	-	Marcin Magdziarek	-	Andrzej Ferfecki	-	James Richards
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	0.001	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00		-	-	None	-	-	-	None	-	-	-	-	-	-																															
Analysts Comments	TM304	No units		1002	0	0				0.00		-	-	N/C	-	-	-	N/C	-	-	-	-	-	-																															
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	0.001	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	Not Detected	Detected	Not Detected	-	-	Trace	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Detected	-	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		Not Detected	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Comments	TM048	No units		1371	0	0			0	0.00		0	0	Fibre bundles in soil	0	-	-	Loose fibres in soil	0	-	0	0	0	-	0	-	Loose fibres in soil	-	0	-	0	-	Material typical of asbestos cement debris	0	-	0	0	0	-	-	-	-	-	-	-	-	Soil containing material typical of asbestos cement	0	0	-	Loose fibres in soil	-	0	-	0
Volatile Organic Compounds (VOCs)																																																							
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	95.7	93.8	105	101	99.3	109	108	102	97.7	110	103	111	105	109	108	112	103	105	101	105	113	104	104	105	102	103	105	103	104	107	105
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	95.1	91.5	94.4	102	94.6	96	97.9	98.7	93.6	95.9	98.8	99.2	94.9	98	99.3	97	100	99.1	109	99.9	100	98.9	97.7	95.9	98.7	95	98.5	97.4	96.9	96.6	99.3
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	87.6	86.3	98.1	95.1	89.9	87.4	85.8	95.8	81.2	93.6	94.2	96.3	85.8	95.9	89.9	96.6	98.9	96.9	99.8	102	99.7	90.3	88.5	87.6	96.8	87.6	92	95.4	86.7	86.5	96.5
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.303	0.758	0.13	0.13	0.825	0.28	0.318	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.221	0.13	0.13	0.13	0.13	0.26	0.173	0.368	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4
Subcontracted: Inorganics																																																							
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00
Date of Analysis	TM048	No units		1371	0	0					0.00
Analysed By	TM048	No units		1371	0	0					0.00
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0					0.00
Analysts Comments	TM304	No units		1002	0	0					0.00
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0		0.00
Chrysotile (White) Asbestos	TM048	No units		1371	0	0					0.00
Amosite (Brown) Asbestos	TM048	No units		1371	0	0					0.00
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0					0.00
Fibrous Anthophyllite	TM048	No units		1371	0	0					0.00
Fibrous Tremolite	TM048	No units		1371	0	0					0.00
Fibrous Actinolite	TM048	No units		1371	0	0					0.00
Non-Asbestos Fibre	TM048	No units		1371	0	0					0.00
Comments	TM048	No units		1371	0	0			0		0.00
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105		0.00
Toluene-d8**	TM116	%		1371	1100	1100		115	97		0.00
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90		0.00
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0		0.00
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0		0.00
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0		0.00
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0		0.00
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0		0.00
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0		0.00
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17		0.00
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1		0.00
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14		0.00
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12		0.00
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14		0.00
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12		0.00
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1		0.00
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14		0.00
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15		0.00

Sample ID	3CE6V	3CE7V	3CE8V	3CE9V	3CF2	3CF2	3CF6	3CF6	3CF7	3CF7	3CF8	3CF8	3CF9	3CF9	3CF9	3CF2V
Depth	1.1	1	1.5	1.7	0.5	1	0.5	0.8	0.5	1	0.5	1	0.5	1	1.6	1.5
Sampled Date	01/08/2018	30/07/2018	30/07/2018	01/08/2018	13/08/2018	13/08/2018	01/08/2018	01/08/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	13/08/2018
Carbon																
Soil Organic Matter (SOM)	5	0.903	0.91	3.03	74.6	>100	8.93	11.8	3.59	2.91	6.96	8	4.02	3.59	4.52	2.97
Metals (Solids)																
Arsenic	12.9	9.01	13.1	10.2	8.55	5	5.9	8.39	10.2	11.4	9.48	9.86	9.81	12	11.8	11.4
Cadmium	0.189	0.02	0.02	0.02	0.02	0.02	0.02	1.3	0.02	0.02	0.02	0.2	0.171	0.288	0.0459	0.02
Chromium	47.7	34.7	38.9	45.7	48.7	7.82	489	84.9	67.9	8.22	141	196	24.7	35.3	39	34.2
Copper	18.3	12.5	13.6	10.4	27.4	20	12.2	17.4	19.2	16.8	24.1	38.4	23	28.2	24.2	20.9
Lead	81.2	27	23	21.2	40.8	14.5	138	238	54.9	38.8	159	111	48.8	96.2	89.5	23.4
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14
Nickel	25.9	37.6	38	24.6	20.3	9.53	8.3	17	14.2	20	47.4	25	22.6	24.2	26.7	32.8
Selenium	1	1	1	1.35	1	1	11.3	2.61	1.17	1	4.37	10	1	10.4	1.35	1
Vanadium	63.2	51.1	54.2	96.2	77.1	21.5	1720	242	301	129	615	485	40.9	49.8	72.9	48.2
Zinc	133	113	110	85.1	185	93.9	731	1140	204	169	636	346	164	335	308	116
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0116	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.038	0.01	0.01	0.01	0.0283	0.0161	0.0196	0.0452	0.01	0.0269	0.044	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.0152	0.01	0.01	0.01	0.0215	0.0173	0.015	0.029	0.01	0.0582	0.0242	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.0109	0.01	0.01	0.01	0.0339	0.038	0.0161	0.0186	0.01	0.133	0.0374	0.01
Aliphatics >C12-C16	0.192	0.1	0.1	0.248	7.77	2.32	1.07	12.1	6.14	4.85	1.51	2.32	1.72	24.2	3.95	0.1
Aliphatics >C16-C21	0.93	0.1	0.1	3.39	22.5	45.8	8.24	106	23.2	11.8	9.01	12.2	8.15	167	14.9	0.1
Aliphatics >C21-C35	5.2	0.931	0.1	4.33	38.6	44.2	21.3	97.5	79.7	51.5	38.5	46.6	48.6	88.4	80.1	3.17
Aliphatics >C35-C44	0.406	0.1	0.1	3.61	5.95	11.7	5.47	31.6	33.9	21.4	10	13.9	18.4	21.2	36.9	0.1
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0147	0.0115	0.01	0.0197	0.01	0.0392	0.0165	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0226	0.0253	0.0115	0.0128	0.01	0.0885	0.0253	0.01
Aromatics >EC12-EC16	0.676	0.1	0.1	0.822	15.9	4.36	2.74	21.4	2.57	1.7	3.96	17.2	1.55	13.7	2.54	0.1
Aromatics >EC16-EC21	2.91	0.218	0.301	2.17	41.8	29	24.4	224	11.5	9.21	24.6	105	7.18	57.9	11.4	0.1
Aromatics >EC21-EC35	24.7	2.68	3	6.86	117	87.6	56	433	54.4	41.4	75.4	206	40.2	65.1	50.9	9.45
Aromatics >EC35-EC44	4.05	4.29	2.97	5.62	28.6	70.7	16.3	124	38.4	22.1	23.2	58.9	22.3	27.1	35.8	1.28
Aromatics >EC40-EC44	0.945	2.4	1.61	2.71	8.97	33	5.57	42.1	17.2	8.9	8	19.2	8.94	11	16	0.1
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	12	12	12	196	81	636	807	67.7	60	508	489	76.6	256	143	12
Acenaphthene	8	8	8	130	35.9	36.4	98.9	239	44.1	40	62.2	54.1	29.9	222	64.7	8
Anthracene	16	16	16	68.6	475	222	2370	1530	162	195	997	1540	410	519	339	16
Benz(a)anthracene	74.9	14	14	76.9	2560	654	2620	3660	502	466	2250	3590	579	1030	875	37.7
Benzo(a)pyrene	63.8	15	15	78.1	2330	673	2240	3120	453	385	2060	2370	470	878	775	40.7
Benzo(b)fluoranthene	67.4	15	15	66.4	3970	1440	1910	5200	513	714	2410	4140	863	1240	1270	59.8
Benzo(k)fluoranthene	24.7	14	14	37.1	1410	417	1150	1690	224	305	990	1380	251	332	330	21.8
Benzo(g,h,i)perylene	48.1	24	24	69.8	1770	697	1640	2090	327	320	1490	1670	292	656	495	38.3
Chrysene	88.4	10	10	86.1	2460	606	2590	3730	467	440	2160	2640	536	894	709	40.3
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	582	179	447	569	73.5	0.115	342	426	82.6	146	140	0.023
Indeno(1,2,3-cd)pyrene	44.5	0.018	0.018	66.9	1770	562	1770	2490	432	256	1940	1440	270	706	469	40.9
Fluoranthene	192	28.4	0.017	280	4650	900	6530	8240	1070	999	5780	8520	1220	2680	1740	85.9
Fluorene	10	10	10	95.9	136	68.1	579	681	75	101	562	629	111	296	161	10
Naphthalene	18.1	9	9	176	725	377	1320	1290	151	163	323	384	181	2460	560	9
Phenanthrene	63.2	15	15	337	2190	1060	3470	3970	591	552	3470	4980	743	1610	985	49.3
Pyrene	0.129	0.0227	0.015	0.224	3.47	0.73	4.67	6.23	0.788	0.793	3.98	5.71	0.88	1.94	1.25	0.0668
PAH, Total Detected USEPA 16	0.814	0.118	0.118	1.79	28.7	-	34	45.5	5.94	5.69	29.3	40	7	15.9	10.3	0.482
Naphthalene-d8 % recovery**	101	88.2	81.8	102	89.1	-	87.7	92	88.1	84.3	91.1	76.6	87.6	83.8	88.1	105
Acenaphthene-d10 % recovery**	103	92.4	86.6	105	83	-	81.1	98	85.8	91.4	90.8	78.7	93.1	87.7	96	108
Phenanthrene-d10 % recovery**	99.9	95.6	87.2	101	90.7	-	86.5	108	83.1	84.6	90.7	85.2	95.5	85	100	106
Chrysene-d12 % recovery**	97	97.6	84.8	101	85.4	-	76.6	97.5	73.5	84.2	83.7	75.3	94.7	79.3	96.7	94.7
Perylene-d12 % recovery**	99.1	101	80.1	104	73.1	-	76.8	93.7	70.7	83.2	80.8	71.7	96	72.4	95	96.5
Total Aliphatics >C12-C44	6.73	0.931	0.1	11.6	74.9	104	36.1	247	143	89.6	59	75	76.8	301	136	3.17
Total Aromatics >EC12-EC44	32.3	7.19	6.27	15.5	203	192	99.5	803	107	74.3	127	387	71.3	164	101	10.7
Total Aliphatics & Aromatics >C5-C44	39.1	8.12	6.27	27	278	296	136	1050	250	164	186	462	148	465	237	13.9
Metals - (Solid)																
Iron	32600	38100	44200	38700	102000	15600	150000	74100	163000	112000	144000	143000	40100	67700	76700	35500
Manganese	776	280	434	3830	3950	682	36400	7930	9360	4980	16700	16100	2340	25900	6450	476
Metals - (Liquid)																
Calcium	107000	-	104000	189000	146000	-	82700	-	-	138000	-	151000	-	136000	-	121000
Magnesium	32300	-	11400	7230	31300	-	6460	-	-	11400	-	10900	-	13400	-	15000
Phenols																
Phenol	0.0113	0.0224	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0585
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0585
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE																
pH																
Sulphate, Total																
Sulphur, Total																
Sulphate, Total potential																
Sulphate, acid soluble (total)																
Cyanide, Total																
Exchangeable Ammonia as N																
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	01/08/2018	-	01/08/2018	16/10/2018	09/10/2018	-	09/10/2018	-	-	09/10/2018	-	08/10/2018	-	08/10/2018	-	02/08/2018
Analysed By	Marcin Magdziarek	-	James Richards	Barbara Urbanek-Walsh	Lucy Caroe	-	James Richards	-	-	Marcin Magdziarek	-	Andrzej Ferfecki	-	Andrzej Ferfecki	-	Andrzej Ferfecki
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																
Analysts Comments																
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	Detected	Not Detected	-	Not Detected	-	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	Not Detected	-	Not Detected	Not Detected	Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected
Comments	Loose fibres in soil	-	0	Loose fibres in soil.	0	-	0	-	-	Loose fibres in soil	-	0	-	0	-	0
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	111	107	102	115	91.4	108	99.1	104	107	109	103	100	103	98.5	98.6	102
Toluene-d8**	99.1	98.1	98.2	98.5	90	97.8	94.8	98.7	97.9	99	94.5	93.1	95	94.4	95.3	98.5
4-Bromofluorobenzene**	93.6	92.7	87.2	93.6	73.8	95.2	88.1	94.1	95	91.2	87.3	86	83.2	87.6	83	92
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.907	0.148	0.013	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.55
Sum of BTEX	0.4	0.4	0.4	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CF6V	3CF7V	3CF8V	3CF9V	3CG2	3CG2	3CG6	3CG6	3CG6	3CG7	3CG7	3CG8	3CG8	3CG9	3CG9	3CG2V
Depth	0.9	1.9	1.6	1.7	0.5	0.9	0.5	1	1.5	0.5	0.9	0.5	1	0.5	1	1.1
Sampled Date	01/08/2018	30/07/2018	30/07/2018	30/07/2018	13/08/2018	13/08/2018	01/08/2018	01/08/2018	01/08/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	30/07/2018	13/08/2018
Carbon																
Soil Organic Matter (SOM)	5.98	2.83	1.6	7.03	69.5	70.7	31.9	4.76	31.4	2.91	4.28	6.91	11.6	5.55	1.06	6.4
Metals (Solids)																
Arsenic	12.9	11	9.31	11.9	7.65	6.53	7.07	7.07	2.25	10	7.73	10.4	9.89	10.8	9.62	13
Cadmium	0.108	0.02	0.02	0.157	0.0331	0.2	0.02	0.02	0.02	0.02	0.02	0.32	0.878	0.408	0.02	0.242
Chromium	42.4	38.4	38.7	38.2	8.06	31.3	275	314	85.2	79.3	30.4	122	112	68.9	27.8	39.4
Copper	18.5	18.1	18.8	18.4	25.5	26.9	24.2	27	6.48	27.2	19.2	21.6	48.6	19.1	24.3	32.3
Lead	37.4	21.8	20.9	39.4	33.1	34.8	36.8	24.1	16	39.3	26.1	168	231	88.1	32.5	49
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14
Nickel	26.2	29.4	40.5	25.4	15.2	24.5	17.6	14.7	3.66	30.9	11.7	18.7	25.4	18.3	28.7	33.9
Selenium	1	1	1	1	1	10	5.98	7.62	3.64	1	1	3.08	10	1.63	1	1
Vanadium	63.3	55.3	52	60.2	29.1	84.7	793	1150	138	228	67.2	286	250	96	36.4	55.5
Zinc	128	116	104	134	118	131	203	127	82.1	212	134	677	636	309	131	167
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.01	0.01	0.01	0.1	0.013	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.298	0.0573	0.0102	0.01	0.01	0.0399	0.01	0.01	0.0152	0.0324	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	10.1	0.0162	0.01	0.01	0.01	0.0399	0.01	0.01	0.014	0.0312	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	60.2	0.01	0.01	0.01	0.01	0.0847	0.01	0.01	0.0222	0.0516	0.01	0.01	0.01
Aliphatics >C12-C16	0.1	0.413	0.1	514	10.2	4.13	4.41	1.04	8.15	4.02	3.41	2.93	1.25	3.36	0.1	0.1
Aliphatics >C16-C21	0.354	0.536	0.1	3530	18.3	83.3	15.4	8.43	40.5	3.88	15.9	15.6	9.81	13.4	0.1	0.1
Aliphatics >C21-C35	3.28	5.55	0.1	700	39.9	76.6	51.4	46.7	74.4	19.3	55.4	44	38.5	58.6	6.39	1.85
Aliphatics >C35-C44	0.1	0.315	0.1	0.2	7.1	11.3	15.4	16.1	28.3	4.59	27	11.1	10.2	17.5	0.1	0.1
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	6.75	0.0108	0.01	0.01	0.01	0.0266	0.01	0.01	0.01	0.0204	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	40.2	0.01	0.01	0.01	0.01	0.0569	0.01	0.01	0.0152	0.0336	0.01	0.01	0.01
Aromatics >EC12-EC16	0.1	0.582	0.1	461	20.3	6.86	5.97	2.95	35.9	1.97	6.58	4.44	2.7	1.74	14.7	0.1
Aromatics >EC16-EC21	0.816	1.43	0.1	1050	53.7	81.9	66.4	39.1	315	9.51	44.1	32.5	21.2	9.59	201	1.8
Aromatics >EC21-EC35	21.6	32.2	3.61	309	169	153	183	144	959	41.1	122	101	121	48.2	724	13.2
Aromatics >EC35-EC44	2.64	4.51	1.37	20.8	36.1	37.5	43.5	44.6	305	20.4	52.6	32.4	86.8	23.4	275	2.04
Aromatics >EC40-EC44	0.566	1.16	0.323	7.36	10.3	10.6	12.6	15.1	100	8.11	20.6	11.2	37.6	9.36	113	0.298
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	12	12	1780	3520	866	1010	1640	3800	509	176	329	455	119	12	12
Acenaphthene	8	8	8	36700	177	160	120	125	261	74.2	44	68	47.6	21.8	8	8
Anthracene	16	16	16	3170	7580	3200	2720	3530	8430	633	378	628	806	228	16	16
Benz(a)anthracene	14	14	14	173	16100	7000	7690	9930	19500	7980	1090	2010	2430	705	19.4	45.9
Benzo(a)pyrene	22.4	15	15	109	12400	5970	6010	8390	16200	5570	1080	1780	2060	652	23.1	47.6
Benzo(b)fluoranthene	24.3	15	15	170	16900	9630	9130	11900	24600	10600	1860	2980	2280	1090	40.4	72
Benzo(k)fluoranthene	14	14	14	50.3	5560	3850	3550	4200	7940	3160	561	1020	778	385	14	27.6
Benzo(g,h,i)perylene	24	24	24	68	7700	6920	4400	6170	11500	3220	780	1350	1330	461	24	42.9
Chrysene	21.9	10	10	187	13300	6900	6380	8590	17200	5690	1010	1650	1950	640	26.5	60.1
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	2460	1740	1110	1700	3100	1400	216	366	310	127	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	80.8	9630	7510	3750	6820	12800	4050	694	1110	1820	391	0.018	46.5
Fluoranthene	51.8	0.017	0.017	2030	39000	28000	18100	20800	47700	9910	2250	3570	5620	1350	47	138
Fluorene	10	10	10	18800	2650	390	917	826	2890	182	121	273	343	47.6	10	10
Naphthalene	422	27.2	9	172000	1840	1280	884	1020	2510	337	437	1230	2120	272	20.6	16.4
Phenanthrene	40.7	26.5	15	24500	25200	16800	8990	6260	20900	1770	1130	1750	2720	519	24.9	80.7
Pyrene	0.0414	0.015	0.015	1.06	25.1	16.3	12.7	15.1	32.1	7.3	1.74	2.66	4.02	1.04	0.0375	0.113
PAH, Total Detected USEPA 16	0.624	0.118	0.118	261	189	117	87.5	107	232	62.4	13.6	22.8	29.1	8.04	0.239	0.691
Naphthalene-d8 % recovery**	87.6	82.6	79.8	69.6	92.8	94.9	80.3	94.6	89.9	93.5	94.9	92.7	83.9	91.6	89.2	96.8
Acenaphthene-d10 % recovery**	94.2	81	80.7	91.7	95.8	96.4	86.4	88.7	88.9	92.4	87.9	94.2	80.3	82.6	78.8	97.1
Phenanthrene-d10 % recovery**	94.3	80.4	86.8	68.8	90.9	95.2	87.3	93.4	89.3	95.7	89.3	94.3	84.5	88.5	85.2	93.8
Chrysene-d12 % recovery**	91.3	78.7	87.3	82.3	75.3	78.1	79.6	79.2	77.8	92.2	81	86.6	81.2	77.8	78.7	83.9
Perylene-d12 % recovery**	92.3	82.1	85.2	83.4	75.9	82.2	76.9	80.3	80.9	94.5	78.1	86.7	74.7	74.2	77.7	84.4
Total Aliphatics >C12-C44	3.63	6.81	0.1	4740	75.5	175	86.7	72.3	151	31.8	102	73.6	59.8	92.8	6.39	1.85
Total Aromatics >EC12-EC44	25.1	38.7	4.98	1840	279	280	299	230	1610	73	225	171	232	83	1220	17.1
Total Aliphatics & Aromatics >C5-C44	28.7	45.5	4.98	6710	355	455	386	303	1770	105	327	244	292	176	1220	18.9
Metals - (Solid)																
Iron	32700	33300	33700	35200	49500	138000	100000	141000	40400	169000	74100	126000	166000	68900	38000	33700
Manganese	687	356	418	392	1190	3940	18000	25700	8550	7380	4130	11100	8750	5520	1260	321
Metals - (Liquid)																
Calcium	-	102000	-	196000	-	200000	159000	-	77000	-	64100	-	-	-	-	-
Magnesium	-	16500	-	13600	-	13000	12700	-	9830	-	5710	-	-	-	-	-
Phenols																
Phenol	0.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0102	0.01	0.01	0.01	0.01	0.01	0.058
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0846	0.01	0.278
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.116
Phenols, Total Detected monohydric	0.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0846	0.035	0.452
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE																
pH																
Sulphate, Total																
Sulphur, Total																
Sulphate, Total potential																
Sulphate, acid soluble (total)																
Cyanide, Total																
Exchangeable Ammonia as N																
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	01/08/2018	-	17/10/2018	-	16/10/2018	08/10/2018	-	09/10/2018	-	08/10/2018	-	-	-	-	-
Analysed By	-	Marcin Magdziarek	-	Lucy Caroe	-	Lucy Caroe	Lucy Caroe	-	Lucy Caroe	-	Andrzej Ferfecki	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																
Analysts Comments																
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Amosite (Brown) Asbestos	-	Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Tremolite	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Fibrous Actinolite	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	-	Detected	Not Detected	-	Detected	-	Not Detected	-	-	-	-	-
Comments	-	Loose fibres in soil	-	-	-	-	0	-	0	-	0	-	-	-	-	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	106	104	107	106	109	77.2	95	106	102	100	98.8	107	109	101	105	94.5
Toluene-d8**	98.4	99.2	98.8	92.7	95.9	94.3	93.3	93.6	97.8	98.4	98.2	98	94.3	97.9	95.7	96.9
4-Bromofluorobenzene**	94.8	87.1	95.7	81.6	85.2	85.9	78	82.9	91.8	94.5	92.1	92.1	79.7	91.2	85.1	88.7
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.12
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.144
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1
Naphthalene	0.644	0.13	0.13	0.13	0.13	0.013	0.13	0.13	0.13	0.13	0.13	0.13	0.013	0.13	0.13	579
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CG6V	3CG7V	3CG8V	3CG9V	3CH6	3CH7	3CH8	3CH8	3CH9	3CH9	3CH4	3CH4	3CH4	3CH5	3CH5	3CH5
Depth	2	1	1.3	1.2	0.5	0.5	0.5	1	0.5	1	0.5	1	2	0.3	0.8	1.5
Sampled Date	01/08/2018	30/07/2018	30/07/2018	30/07/2018	13/08/2018	01/08/2018	01/08/2018	01/08/2018	30/07/2018	30/07/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
Carbon																
Soil Organic Matter (SOM)	4.07	0.876	0.767	6.96	8.5	1.27	12.7	14.7	3.19	3.9	8.98	81.2	74.3	4.9	2.81	62.2
Metals (Solids)																
Arsenic	10.3	8.68	11.2	14.4	10.3	6.65	7.92	7.09	7.5	8.7	15.1	8.2	9.64	13.4	6	7.13
Cadmium	0.136	0.02	0.02	0.199	0.435	0.02	0.722	0.0699	0.854	0.935	0.931	0.386	0.532	0.0891	0.2	0.144
Chromium	44.4	32.3	38.7	38.6	232	156	62.3	28.4	48.3	48	56.4	53.9	73.8	41.3	460	42.3
Copper	20.9	11	15.9	20.3	45.2	33.3	14.1	13.7	17	61.6	26.2	29.5	33.8	22	14	42.9
Lead	36.8	19.6	22.8	37.9	146	42.5	158	70.7	129	169	131	2080	96.7	40.4	52.4	44.8
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14
Nickel	30.7	41.4	40.9	30.7	21.4	19.9	13.5	15.2	14	46	28.9	13.8	17.8	26.2	10.1	14.8
Selenium	1	1	1	1	6.44	2.87	2.44	1	2.38	1.92	1	2.03	2.23	1	14.4	1.24
Vanadium	62.2	54.8	56.3	61.3	274	155	134	49.3	72.2	76.6	75.5	56.6	73.7	65.6	427	28.7
Zinc	144	105	122	142	670	201	579	476	482	686	555	634	594	140	400	245
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.303	0.2	0.01	0.01	0.023
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.0129	0.01	0.01	0.01	0.0196	0.01	0.01	1.62	0.775	0.01	0.01	0.0771
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.0164	0.01	0.01	0.01	0.015	0.01	0.01	2.94	1.26	0.01	0.01	0.069
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0161	0.01	0.01	108	38.5	0.01	0.01	0.161
Aliphatics >C12-C16	0.995	0.1	0.1	0.1	0.1	3.47	6.11	3.94	1.53	1.95	0.1	14.8	16.5	0.1	0.1	8.96
Aliphatics >C16-C21	0.956	0.1	0.1	1.21	3.44	16.2	34.1	12.9	11.2	13.1	0.407	120	96.4	0.1	3.36	92.2
Aliphatics >C21-C35	3.09	0.614	0.1	8.35	15.7	90.8	89.4	44.5	60.8	70.8	8.23	152	212	6.31	51.7	109
Aliphatics >C35-C44	0.907	0.1	0.1	0.1	4.27	46.2	10.9	7.37	16.8	23.6	1.11	33.4	91.3	0.1	5.84	29.9
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.2	0.2	0.01	0.01	0.0426
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.2	0.2	0.01	0.01	0.0322
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.0105	0.01	0.01	0.01	0.0104	0.01	0.01	1.96	0.839	0.01	0.01	0.046
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0104	0.01	0.01	71.7	25.7	0.01	0.01	0.107
Aromatics >EC12-EC16	4.09	0.124	0.1	0.1	1.58	1.35	14.1	92.2	1.16	2.13	0.1	509	542	0.1	0.1	63.6
Aromatics >EC16-EC21	6.51	0.278	0.1	2.53	7.89	8.45	121	536	6	22.2	0.1	1350	1570	1.82	0.384	499
Aromatics >EC21-EC35	36.4	2.17	4.32	32.9	34.5	53.4	300	803	37	69.4	15.3	2090	2240	20.3	7.9	1530
Aromatics >EC35-EC44	4.21	1.87	2.74	7.91	10	32.4	82.9	215	21	31.8	1.16	477	522	10	0.1	444
Aromatics >EC40-EC44	0.217	0.772	0.914	2.65	3.2	13.4	26.5	66.8	8.69	13.6	0.1	126	142	4.46	0.1	116
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	12	12	12	268	44.7	1090	730	85.5	141	38.4	20700	70400	12	51.2	24900
Acenaphthene	8	8	8	23.5	31.7	23.6	97.9	87	34.3	33.5	8	27600	20300	8	8	2010
Anthracene	16	16	16	16	464	86.9	2470	1220	336	344	32.3	32300	66600	16	33	45200
Benz(a)anthracene	30.1	14	14	57.4	1250	330	7580	4020	790	798	134	33900	82800	80.5	162	111000
Benzo(a)pyrene	26.6	15	15	58.9	1170	302	6680	3300	657	681	200	24900	59900	82.5	214	92300
Benzo(b)fluoranthene	34.2	15	15	107	1750	610	8710	5820	1070	1250	242	36200	67600	130	285	96300
Benzo(k)fluoranthene	14	14	14	40.3	615	194	3030	1890	398	377	75	9930	32600	39.7	99.4	45500
Benzo(g,h,i)perylene	24	24	24	53.3	885	265	4420	2600	452	501	199	15800	39300	72.9	261	66200
Chrysene	29.4	10	10	79.7	1140	367	5790	3440	849	717	152	27600	74400	87.1	155	89700
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	239	66.6	1250	686	130	141	35.9	11.5	6730	0.023	48.9	16500
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	41.2	1090	195	5080	2150	373	410	141	14500	50200	44.3	199	51100
Fluoranthene	100	0.017	0.017	167	2710	614	15500	8500	1380	1630	265	101000	274000	146	260	289000
Fluorene	10	10	10	25.4	180	32.9	608	504	92.2	102	10	32300	56800	10	14.5	20900
Naphthalene	48.8	9	9	106	253	109	1060	1400	229	245	35.8	418000	1360000	29	101	18400
Phenanthrene	70.9	15	15	105	1310	305	6570	3430	668	793	133	109000	214000	102	152	152000
Pyrene	0.0747	0.015	0.015	0.12	1.9	0.482	12	6.32	1.1	1.27	0.224	66.1	187	0.107	0.204	203
PAH, Total Detected USEPA 16	0.415	0.118	0.118	0.984	15.2	4.03	81.9	46.1	8.65	9.43	1.91	970	2660	0.921	2.24	1320
Naphthalene-d8 % recovery**	97.2	91.6	89.8	89.8	103	84.5	84.5	78	91.3	88.7	90.6	135	86	91.5	92	87.5
Acenaphthene-d10 % recovery**	99.8	86.9	85.7	89	102	87.6	84.3	81.8	88.5	84.1	86.5	155	98	89.6	86.6	88.5
Phenanthrene-d10 % recovery**	97.5	87.1	87.3	89.2	102	83.2	85.1	84.6	85.5	83.9	82.9	158	96	91.5	83.3	87
Chrysene-d12 % recovery**	95.1	85.5	87	84	91.9	75.8	79.2	70.6	75.7	77.2	80.5	188	84	88.3	80.4	95
Perylene-d12 % recovery**	96.2	84.3	85.9	82.2	93.6	74.1	82.1	71.8	71.8	72.3	86.1	210	69	88.8	83.3	79
Total Aliphatics >C12-C44	5.94	0.614	0.1	9.56	23.4	157	140	68.7	90.4	109	9.75	321	416	6.31	60.9	240
Total Aromatics >EC12-EC44	51.2	4.44	7.06	43.3	54	95.6	518	1650	65.1	126	16.4	4420	4870	32.1	8.29	2540
Total Aliphatics & Aromatics >C5-C44	57.2	5.05	7.06	52.8	77.5	252	658	1710	156	235	26.2	4930	5360	38.4	69.2	2780
Metals - (Solid)																
Iron	32600	40300	39000	33900	84800	93000	86400	65000	55100	69500	36200	42900	39100	25000	158000	52100
Manganese	393	437	280	574	15000	9880	7030	3110	6250	5840	1530	3550	4970	891	35200	2190
Metals - (Liquid)																
Calcium	44500	8210	-	22500	96000	-	-	60200	127000	132000	-	-	140000	57200	108000	-
Magnesium	7310	6510	-	3160	12500	-	-	7720	22600	17900	-	-	15800	10200	12700	-
Phenols																
Phenol	0.0236	0.01	0.0109	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.142	0.0126	0.0109	0.023	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.0236	0.0378	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.189	0.0504	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE																
pH																
Sulphate, Total																
Sulphur, Total																
Sulphate, Total potential																
Sulphate, acid soluble (total)																
Cyanide, Total																
Exchangeable Ammonia as N																
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	29/10/2018	29/10/2018	-	29/10/2018	16/10/2018	-	-	17/10/2018	16/10/2018	16/10/2018	-	-	17/10/2018	17/10/2018	09/10/2018	-
Analysed By	Christian Hallam	Christian Hallam	-	Christian Hallam	Barbara Urbanek-Walsh	-	-	Andrzej Ferfecki	James Richards	Lucy Caroe	-	-	Andrzej Ferfecki	Andrzej Ferfecki	Andrzej Ferfecki	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)																
Analysts Comments																
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-
Comments	0	0	-	0	-	-	-	-	-	-	-	-	-	-	0	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	86	105	102	88.5	103	105	118	115	117	111	110	111	106	110	94.4	101
Toluene-d8**	92.8	98.5	98.7	89.6	94.2	96.5	96	96.2	95.5	97.1	97.1	96.1	95.4	96.2	93.2	93.4
4-Bromofluorobenzene**	82.5	99.7	95.6	73.3	78.1	83.4	78.9	90.2	86.6	87.6	89	82.4	84.3	81.1	83.2	78.3
Methyl Tertiary Butyl Ether	0.01	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.009	0.09	0.09	0.114	0.18	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.0284	0.07	0.07	0.146	0.14	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.004	0.04	0.04	0.04	0.08	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.0519	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.01	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	411	0.13	0.13	8.18	0.26	0.13	0.13	0.26	0.13	0.13	0.13	0.13	0.13	0.161	0.13	0.13
Sum of BTEX	-	0.4	0.4	0.4	0.8	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	18.4	-	-	18.1	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	15.3	-	-	15.6	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	18.2	-	-	17.8	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	14.7	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	1.01	-	-	0.86	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	16.1	-	-	12.8	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	17	-	-	13.5	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	3CH4V	3CH5V	3CH6V	3CH7V	3CH8V	3CH9V	3CI7	3CI7	3CI8	3CI8	3CI8	3CI9	3CI9	3CI4	3CI4	3CI4	3CI5	3CI5	3CI5	3CI5	3CI4V	3CI5V	3CI6V	3CI7V	3CI8V	3CI9V	3CJ5	3CJ5	3CJ5	3CJ5	3CJ6	3CJ6	3CJ6	3CJ6	3CJ7	3CJ7	3CJ8	3CJ4	3CJ4	3CJ4	3CJ4V	3CJ5V	3CJ6V	3CJ7V	3CJ8V	3CB1
											Depth	2.7	2.7	0.8	0.9	1.1	1.3	0.5	1	0.5	1	2	0.5	1	0.5	1	2	0.3	0.8	1.5	2	3.4	3.2	0.2	2	2.6	1.3	0.5	1.2	1.9	2.2	0.3	0.6	1.1	2	0.5	1	0.5	0.5	0.7	1.8	3.7	2.3	2.3	1.4	0.8	0.5
											Sampled Date	17/10/2018	17/10/2018	13/08/2018	01/08/2018	01/08/2018	30/07/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018	01/08/2018	30/07/2018	30/07/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	01/08/2018	01/08/2018	01/08/2018	30/07/2018	13/08/2018	13/08/2018	13/08/2018	13/08/2018	13/08/2018	13/08/2018	13/08/2018	13/08/2018	01/08/2018	01/08/2018	01/08/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	13/08/2018	13/08/2018	01/08/2018	01/08/2018	23/10/2018
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**WQS**	**Percentage of exceedances**																																														
Carbon																																																									
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	1.76	4.71	5.4	4.79	1.9	1.91	12.8	2.52	4.52	9.53	10.9	7.57	4.53	6.19	0.35	5.84	6.96	29.3	54.5	26.7	0.597	6.69	4.76	4.97	1.4	2.43	6.5	1.74	79	53.1	3	>100	76.9	52.6	21	3.28	4.76	6.1	14.9	1.14	3.57	3.83	3.53	9.83	1.76	2.59
Metals (Solids)																																																									
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	11	12.9	11.5	21.2	13.6	13.2	6.89	5.14	9.73	8.48	9.84	7.89	9.63	18.1	3.86	6	15	7.15	4.03	3.32	14.2	14.3	9.99	8.02	15.2	12	19.5	6	7.18	10.4	6	5.35	4.29	8.83	4.67	7.66	9.33	10.9	2.79	4.42	12.7	7.64	11.8	14.5	11.6	6.25
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	0.02	1.31	0.109	0.02	0.02	0.02	0.17	0.02	0.02	0.0231	0.225	0.316	0.172	0.388	0.02	0.2	2.41	0.02	0.02	0.02	0.02	0.02	0.02	0.052	0.02	0.02	9.59	0.596	3.09	0.564	0.2	0.02	0.02	0.0858	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.211	0.02	0.345
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	43.9	46.8	44.6	41.6	39.3	43.3	89.8	65.1	32.2	82.3	121	54.4	104	35.1	464	734	276	220	165	49.4	35.1	77.4	91.3	68.6	35.9	33.8	185	471	32	22.2	842	212	148	54.7	225	58.3	150	28.8	338	627	39.6	37.6	36.8	42.1	34	75.5
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	22.2	27.7	21.5	31.9	17.6	18	12.6	13	16.1	15.4	20	15.9	24.5	19.4	10.3	17.5	55.7	17.8	11.4	6.46	11.8	19.1	14.3	14	16	19	91.3	20.3	43	41.5	22.3	21.7	35.9	34.7	12.5	13.6	15.5	13.9	2.1	8.18	17.8	12.9	11.3	19.1	18.3	15.8
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	22	342	30.2	139	24.9	26.6	53.3	46.1	53.4	129	180	169	448	52.6	8.94	17.2	423	142	13.5	13.1	24.6	33.1	30.1	52.2	25.5	27.6	1330	175	385	105	10.3	31.3	24.7	56.1	22.2	32.1	137	36.1	14.4	5.03	30.2	28.3	25.5	41.6	21.1	28.6
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	33.8	19.2	29.9	28.4	38.5	35.9	17.3	12.2	19.3	18.2	17.6	14.9	18.8	28.9	3.82	8.02	43.5	11.3	7.78	3.31	34.2	26.5	25	15.4	38.4	28.9	62.1	15.2	30.5	20.7	7.82	10.2	10.1	16.8	23.8	26.7	14.1	29.4	18.7	1.62	29.9	36.8	27.2	24.7	36.9	17.7
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	1	1.31	1	1	1	1	2.24	1.89	1	1	3.31	1.82	2.25	1	6.41	15	10	4.62	4.61	4.01	1	1.49	1.12	2.56	1	1	10	11.1	10	3.14	13.8	4.38	4.32	2.41	4.76	1	3.98	1	6.6	8.12	1	1	1	1	1	2.02
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	80.3	76.9	63.5	83.5	55.2	61.2	109	108	52.3	137	213	111	116	63.7	406	631	249	217	161	59.6	55.2	119	159	119	52.9	53.2	147	375	67.5	48.4	614	195	168	53	182	65.8	160	48.5	371	499	64.3	53.4	56.6	63.1	52.4	235
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	124	2560	141	194	106	128	197	187	234	458	716	319	316	179	63.1	111	2610	1270	92	88.4	103	132	135	217	111	132	7680	1140	2140	479	69.8	159	86.7	161	101	168	586	178	83.5	28.8	147	118	99.7	128	108	121
TPH Criteria Working Group (TPH CWG)																																																									
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00																																														
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00																																														
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00																																														
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00																																														
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0106	0.01	0.112	0.0267	0.01	0.0147	0.01	0.01	0.01	0.01	0.01	0.01	0.0149	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.0181	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0383	0.01	0.01	0.01	0.01	0.01	0.0417	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0378	0.0142	0.424	0.126	0.0196	0.0622	0.01	0.01	0.01	0.01	0.01	0.01	0.0352	0.01	0.01	0.0191	0.01	0.01	0.01	0.02
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.0155	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0325	0.01	0.01	0.01	0.01	0.01	0.0176	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0448	0.0197	2.17	0.674	0.0185	0.0509	0.01	0.01	0.01	0.01	0.01	0.0113	0.0277	0.01	0.01	0.0203	0.01	0.01	0.01	0.02
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.143	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.051	0.01	0.01	0.01	0.01	0.01	0.0143	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0389	0.0153	162	25.4	0.0309	0.052	0.01	0.01	0.01	0.01	0.01	0.0127	0.0363	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	0.206	1.11	0.1	0.601	0.1	0.1	2.41	2.92	1.25	1.85	2.11	3.95	2.66	0.1	7.21	2.1	0.787	2.33	17.8	2.65	0.1	0.1	0.511	5.49	0.1	0.1	0.1	3.01	40.4	13.3	2.88	20.4	5.6	3.7	0.65	0.54	2	0.1	7.7	2.4	0.1	0.495	0.1	0.247	0.1	1.11
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	0.868	15.7	0.1	1.06	0.1	0.1	12.4	13.1	9.49	11.2	18.2	20.6	9.08	0.1	13.4	10.8	11.1	10	27.4	14	0.1	0.1	2	16.2	0.1	0.1	8.92	8.4	176	58.9	5.7	176	29.9	14.7	7.31	3.5	14.5	0.1	24.5	17.9	0.1	0.1	0.1	1.11	0.1	5.16
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	5.67	79	3.79	5.07	1.07	0.1	62.6	72.6	60.2	49.2	60.6	79.1	45	5.69	68.1	56.7	76.8	77	69.8	13.1	0.1	4.38	11.7	99.3	1.11	0.1	45.9	63.8	80.9	39.1	28.4	154	53.2	38.5	33.7	24.5	52.2	8.7	71.5	106	2.3	0.889	1.66	11.6	0.538	33.8
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	0.935	21.9	0.1	0.432	0.1	0.1	22	31	11.5	16.7	12.1	23.1	18.5	0.1	6.44	11.1	27.6	12.6	7.15	1.3	0.1	0.1	4.34	51.8	0.1	0.1	6.43	8.22	11.8	2.66	4.82	34.4	11.5	6.88	10.5	8.77	14.2	0.1	7.52	27.3	0.985	0.1	0.1	0.795	0.1	11.9
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.64	0.408	0.01	0.0158	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.511	0.254	0.01	0.0316	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.0103	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.022	0.01	0.01	0.01	0.01	0.01	0.0121	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0307	0.0131	1.45	0.449	0.0123	0.0339	0.01	0.01	0.01	0.01	0.01	0.01	0.0181	0.01	0.01	0.014	0.01	0.01	0.01	0.02
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.0955	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0336	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.026	0.0109	108	16.9	0.0206	0.035	0.01	0.01	0.01	0.01	0.01	0.01	0.0245	0.01	0.01	0.01	0.01	0.01	0.01	0.02
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	0.1	2.92	0.1	0.342	0.297	0.1	2.83	3	2.8	9.13	7.09	5.02	1.23	0.1	16.4	0.182	2.03	0.165	19.6	6.1	0.1	0.1	0.498	3.19	0.286	0.1	0.337	2.75	344	120	2.88	76.5	18.9	8.41	2.36	0.1	2.79	0.815	17.8	1.78	0.1	0.1	0.1	0.865	0.184	1.94
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	0.369	21.9	0.1	1.98	0.915	0.1	17.7	21.9	19.3	63.8	56	33.6	5.25	1.28	23.2	4.8	11.7	3.58	42.4	88.3	0.1	0.1	4.04	21	0.718	0.1	4.46	6.75	816	292	12.2	1060	182	43.7	13.9	3.33	23.1	2.13	104	18.8	0.1	0.343	0.851	4.9	0.687	9.01
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	6.57	112	13.2	48.9	9.89	5.33	76.9	90.8	87.6	152	185	119	24.9	25.5	53.7	18.6	93.7	19	79.6	167	2.45	26.6	21	114	6.53	12.6	23.1	26.5	826	327	32.6	3020	464	122	63.2	12.1	92.4	35.8	279	83.9	7.8	4.18	21.7	71.8	11.6	30.7
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	3.53	47.1	2.05	7.32	4.61	0.689	34.6	41.5	35.9	59	58.8	44.5	13.4	7.38	12.3	1	56.3	1.73	20.7	41	0.1	3.34	7	68.3	3.23	4.2	0.1	7.97	129	49.6	8.43	569	90.4	15.2	25.4	0.1	32.4	6.33	63.8	26.4	3.83	0.1	2.76	14.4	7.18	11
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	1.15	15.9	0.407	1.77	1.9	0.1	13.2	16.1	14.5	21.8	19.6	16.7	5.35	2.53	3.51	0.1	20.8	0.1	6.69	12.5	0.1	0.1	2.59	28.4	1.22	1.65	0.1	2.59	32.8	13.5	2.76	151	23.9	4.54	9.1	0.1	12	1.99	18.1	9.21	1.58	0.1	0.606	4.67	3.53	3.67
Polyaromatic Hydrocarbons (PAHs)																																																									
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	48.2	483	12	12	12	12	398	206	203	686	610	520	124	12	47.2	17.4	288	225	1090	143	12	12	133	244	12	12	24.2	12	99000	13900	91.9	25400	1860	952	582	48.8	545	12	3640	15.2	12	12	12	121	12	127
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	35.6	18.7	8	8	8	8	81.4	33.1	40	72.5	62.6	151	60.9	8	23.9	19.4	11.6	19.6	67	17.1	8	8	33.6	42.4	8	8	8	8	5550	849	11.7	768	101	126	77.8	18.2	70.2	8	129	92.8	8	8	8	14	8	28.5
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	71.8	243	16	16	16	16	665	455	393	1210	933	882	359	16	106	55.3	148	191	1050	284	16	16	244	478	16	16	52.3	31.4	81100	11600	153	42600	3550	1890	1480	102	1430	16	4980	142	16	16	16	325	16	227
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	136	1110	39	14	14	14	1700	1330	1240	3680	2520	2810	760	31.2	312	286	816	667	2080	908	14	112	862	1340	14	14	133	62.6	59600	8660	415	137000	12600	4650	2600	305	3540	74.7	15700	1250	14	14	31.9	813	14	646
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	103	1540	38.6	15	15	15	1550	1080	1090	3520	2490	2470	696	30.9	238	222	1040	723	1460	832	15	136	768	1190	15	15	116	51.7	39300	6110	362	108000	9400	3490	2270	264	2830	65.1	13700	981	15	15	28.7	645	15	571
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	116	1560	64.9	32.6	15	15	2560	1920	2040	4560	3040	4010	1110	29.2	385	307	1110	877	2550	1040	15	150	1350	2150	15	15	224	97.5	57100	9500	578	63400	17500	6060	3880	461	4860	101	17000	1700	15	15	43.7	1050	15	752
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	47.5	730	24.4	14	14	14	867	637	705	1670	1240	1160	403	14	119	124	454	309	831	361	14	59	450	683	14	14	67.9	29.9	20000	3570	201	70500	4750	1930	1550	138	1490	30.8	5960	513	14	14	14	302	14	325
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	75.9	1730	24	24	24	24	1120	762	838	2640	1840	1660	422	24	171	180	1120	654	787	716	24	97.8	531	935	24	24	107	52.3	19300	3460	244	62400	5000	1830	1660	193	2010	57.5	8300	755	24	24	24	387	24	524
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	107	1040	47.4	21.7	10	10	1590	1160	1320	3120	2250	2610	744	30.9	405	381	716	599	1820	792	10	135	847	1340	10	10	132	87.5	44600	8470	428	110000	12400	4390	2760	278	2850	75.4	11300	1590	10	10	28.9	815	10	641
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	0.023	323	0.023	0.023	0.023	0.023	297	201	220	688	464	489	116	0.023	48.2	39.7	213	129	248	152	0.023	0.023	142	236	0.023	0.023	31.4	0.023	5990	1.15	69.8	22100	1910	634	442	50.2	481	0.023	2560	189	0.023	0.023	0.023	111	0.023	116
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	101	1450	43	0.018	0.018	0.018	960	670	687	2870	1900	1430	366	31.2	135	267	928	880	1250	549	0.018	78.5	614	794	0.018	0.018	83.5	50.1	18400	3180	244	74800	5550	1650	1940	165	1680	49	6800	577	0.018	0.018	0.018	427	0.018	507
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	363	1570	101	37.5	0.017	0.017	3650	2760	2660	7730	5780	5320	1710	63.4	708	678	1050	1240	6280	2020	0.017	173	1720	2660	0.017	0.017	311	163	208000	29000	882	232000	23400	11900	6340	551	7140	138	35300	1850	0.017	0.017	59.6	1980	0.017	1500
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	71.8	59.4	10	10	10	10	450	196	132	441	397	374	181	10	91.1	22.1	37.6	111	791	95.4	10	10	107	172	10	10	10	19.1	90600	12300	41	13200	1210	831	598	38.8	458	10	1770	54.9	10	10	10	48.8	10	77.8
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	518	474	14.3	9	9	9	497	351	380	877	744	1410	344	9	474	91	262	847	8430	498	9	33.6	254	379	9	9	1180	166	2480000	588000	381	11400	1550	1070	445	113	642	45.1	2080	67.1	20.7	50	221	37.7	9	358
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	312	537	57.2	22.5	15	15	2130	1450	1150	3460	2440	2510	1270	25.2	949	516	367	736	5610	922	15	101	757	1260	15	15	234	208	307000	39700	534	84900	7140	5480	4560	272	3410	96.1	11300	1140	15	15	35.3	331	15	945
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09	0.226	1.31	0.0728	0.0293	0.015	0.015	2.7	2.04	1.99	5.96	4.38	4.09	1.26	0.0492	0.528	0.533	0.855	0.946	4.19	1.52	0.015	0.159	1.36	2.01	0.015	0.015	0.263	0.135	129	18.7	0.635	162	18	8.18	4.71	0.416	5.28	0.0985	25.2	1.76	0.015	0.015	0.0442	1.46	0.015	1.12
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	2.33	14.2	0.502	0.144	0.118	0.118	21.2	15.3	15	43.2	31.1	31.9	9.93	0.291	4.74	3.74	9.42	9.16	38.5	10.9	0.118	1.23	10.2	15.9	0.118	0.118	2.96	1.15	3660	757	5.27	1220	126	55	35.9	3.42	38.7	0.831	166	12.7	0.118	0.118	0.493	8.87	0.118	8.47
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	81.1	90.6	95.5	82.3	92.7	88.2	89.5	88.4	83.3	96.3	95.8	91.1	92.4	83.5	93.6	79	94.1	78.3	92.4	92.2	93.9	94.8	92.2	84.1	65.2	86.1	91.1	95	87.5	104	96.1	93.9	88.2	83.3	88.1	85.5	74.8	94.9	94.7	92.6	80.2	96.2	91.7	93.1	92.6	91.1
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	82.2	90.2	98.4	86	101	82	89.6	96.1	90.3	94.6	91.6	91.5	86.5	85	92.3	82.9	94.3	84.3	89.4	87.5	91	95.1	102	87.5	71.7	73.6	90.9	90.8	135	113	90	92.6	96.9	76.7	96.4	85.3	78.5	95.4	95	89.8	83	88.6	88.6	95	99.5	90.5
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	88.2	91.6	94.1	88.1	103	86.1	90.9	97.5	89.2	91.8	93.3	82.2	86.5	90.3	89.3	85.8	96.3	88.1	89.6	83.8	89.3	96.5	101	89.5	82.8	83.4	99.8	89	127	100	98.8	92.6	98.4	96.6	105	91.2	84.9	94.8	97.3	89.3	89.4	86.1	89.3	106	101	88.5
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	88.8	91.5	83.8	77.6	100	83.8	79.7	86.1	84	87.7	85.4	76.5	76.9	88.8	83.7	81.7	101	88.1	78.2	74.9	88.4	102	101	77.2	84.6	79.6	83.4	80.7	100	78.8	110	75.6	96	93.1	95.2	80.4	73.8	100	98.2	94.1	87.7	81.3	96.8	102	93.7	87.1
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	86.9	88.1	86.2	82.4	95.1	82.2	75.4	87.8	80.9	89	86.4	71.1	72.8	85.6	75.7	77.6	98.7	84.7	70.4	74.6	92.4	100	94.1	73	82.3	77.9	73.8	75.6	88.5	66.6	109	108	89.7	80.6	89.3	81.3	66.5	97.9	86.8	98.6	84.7	78.1	98.7	98.6	88.4	80.9
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	7.68	118	3.79	7.16	1.07	0.1	99.5	120	82.5	79	93	127	75.2	5.69	95.2	80.6	116	102	122	31.1	0.1	4.38	18.6	173	1.11	0.1	61.2	83.4	309	114	41.8	384	100	63.8	52.2	37.3	83	8.7	111	154	3.28	1.38	1.66	13.7	0.538	51.9
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	10.5	184	15.3	58.5	15.7	6.01	132	157	146	284	307	202	44.7	34.1	106	24.6	164	24.5	162	302	2.45	30	32.6	206	10.8	16.8	27.9	44	2120	788	56.2	4720	754	189	105	15.4	151	45.1	465	131	11.6	4.53	25.3	91.9	19.6	52.6
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00	18.4	302	19.1	65.7	16.8	6.01	232	277	228	363	400	329	120	39.8	201	105	280	126	284	333	2.45	34.4	51.1	379	11.9	16.8	89.3	128	2700	947	98.1	5110	855	253	157	52.8	234	53.8	577	285	14.9	5.96	27	106	20.2	105
Metals - (Solid)																																																									
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			28200	68300	32900	29100	36700	44600	55000	63900	54800	120000	131000	55200	86500	26700	132000	154000	130000	106000	59600	20700	35400	32100	78400	41400	36000	41000	225000	153000	87900	47100	155000	80500	41900	25100	67800	43000	150000	26400	107000	153000	30000	25200	37300	27100	38500	54200
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			891	4440	377	381	351	850	5720	6270	2580	5830	12200	5730	7800	792	20600	18600	11900	17200	8780	6630	492	2910	4010	5980	382	884	8030	27400	1900	1790	29500	10900	9530	2460	13400	2910	15500	1040	20900	24500	477	340	234	397	955	6440
Metals - (Liquid)																																																									
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			-	-	190000	-	108000	-	93600	171000	72900	-	149000	105000	-	157000	-	-	109000	193000	160000	118000	-	23400	-	64700	124000	-	233000	215000	114000	196000	-	127000	-	118000	-	78700	142000	157000	-	188000	160000	194000	-	156000	178000	90900
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			-	-	24900	-	13500	-	14600	22600	19100	-	15500	9870	-	24500	-	-	13600	31500	23000	16400	-	3870	-	15200	12200	-	45600	11700	17100	17500	-	22900	-	15500	-	12600	8530	27800	-	7390	31800	21700	-	27200	16100	16400
Phenols																																																									
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.0111	0.022	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0875	0.13	0.01	0.01	0.01	0.01	0.0747	0.0105	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.214	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.022	0.01	0.062	0.0444	0.022	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0219	0.59	0.01	0.0114	0.01	0.01	0.0213	0.01	0.01	0.01	0.01	0.0116	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0238	0.01	0.0111	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	1.16	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0333	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.062	0.0555	0.0439	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.109	1.88	0.035	0.035	0.035	0.035	0.096	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.238	0.035	0.0444	0.035	0.035	0.035
Inorganics																																																									
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42																																														0.0393
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01																																														11
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33																																														
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32																																														0.108
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32																																														0.324
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42																																														0.253
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90																																														1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61																																														12
Asbestos																																																									
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		-	-	29/10/2018	-	29/10/2018	-	29/10/2018	29/10/2018	16/10/2018	-	17/10/2018	17/10/2018	-	16/10/2018	-	-	16/10/2018	29/10/2018	24/10/2018	24/10/2018	-	17/08/2018	-	07/08/2018	07/08/2018	-	29/10/2018	24/10/2018	29/10/2018	29/10/2018	-	29/10/2018	-	29/10/2018	-	24/10/2018	24/10/2018	29/10/2018	-	24/10/2018	18/06/2018	21/06/2018	-	21/06/2018	21/06/2018	06/11/2018
Analysed By	TM048	No units		1371	0	0				0.00		-	-	Christian Hallam	-	Christian Hallam	-	Christian Hallam	Christian Hallam	Barbara Urbanek-Walsh	-	Lucy Caroe	Lucy Caroe	-	Lucy Caroe	-	-	Lucy Caroe	Christian Hallam	Paul Poynton	Paul Poynton	-	Andrzej Ferfecki	-	Renata Bozhkov	Renata Bozhkov	-	Christian Hallam	Paul Poynton	Christian Hallam	Christian Hallam	-	Paul Poynton	-	Christian Hallam	-	Paul Poynton	Paul Poynton	Christian Hallam	-	Paul Poynton	Christian Hallam	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	James Richards	James Richards
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00																																															-
Analysts Comments	TM304	No units		1002	0	0				0.00																																															-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Detected	Not Detected	-	Detected	Not Detected	Not Detected
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Detected	Detected	-	Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Comments	TM048	No units		1371	0	0			0	0.00		-	-	0	-	0	-	0	0	-	-	-	-	-	-	-	-	-	0	0	0	-	0	-	0	0	-	0	0	0	0	-	0	-	0	-	0	0	0	-	0	Loose fibres in soil.	0	-	Loose fibres in soil.	0	-
Volatile Organic Compounds (VOCs)																																																									
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		113	102	101	89.4	102	94	99.1	88.8	105	110	87.3	93.7	103	105	109	101	111	114	105	96.5	98.4	73.7	95	100	97	104	81.9	101	92.2	90.4	102	91.8	101	98	103	97.1	97.5	108	105	112	114	105	105	103	107	105
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		99.5	96.7	98.7	90.9	99.1	92.8	98.6	91.1	94.8	93.6	88.7	91	94.3	96.3	96.3	94.5	95.1	91.3	97.3	92.8	96.4	96.2	93.8	98.2	95.8	98.3	87.4	100	89.8	95.2	96.4	91.7	94.1	95	96.1	92.9	95.5	95.9	97.4	101	96.9	95.9	95.5	101	95.9	96
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		94.4	89.3	102	81.1	93	75.9	95.8	70.9	82.7	84.2	70	70.4	77.8	86.1	83.7	79.7	80.5	98.6	99.8	85.1	88.7	70.5	75.1	91	84.5	94.7	64.5	102	80.3	89.5	98.5	86.9	87.4	88.6	94.9	89.8	83.7	97	92.3	102	86.8	96.4	92.5	94.6	89.7	81.6
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		0.1	0.1	2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		0.09	0.09	1.8	0.09	0.09	0.09	1.8	0.18	0.18	0.09	0.18	0.18	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.947	0.09	0.09	0.09	0.09	0.18	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		0.07	0.07	1.4	0.07	0.07	0.07	1.4	0.14	0.14	0.07	0.14	0.14	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.581	0.07	0.07	0.07	0.07	0.14	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		0.04	0.04	0.8	0.04	0.04	0.04	0.8	0.08	0.08	0.04	0.08	0.08	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.0661	0.04	0.04	0.04	0.04	0.08	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		0.1	0.1	2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.33	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		0.1	0.1	2	0.1	0.1	0.1	2	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.59	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		0.13	0.13	2.6	0.13	0.13	0.13	4.59	0.327	0.26	0.13	0.26	0.26	0.26	0.597	0.73	0.244	0.13	0.13	0.13	0.13	0.13	2.6	0.13	0.13	0.205	0.13	0.26	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		0.4	0.4	8	0.4	0.4	0.4	8	0.8	0.8	0.4	0.8	0.8	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.51	0.4	0.4	0.4	0.4	0.8	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-	0.4	-	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																																									
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	3CB1	3CB1	3CB3	3CB3	3CB3	3CB4	3CB4
											Depth	0.8	1.2	0.5	1	1.9	0.7	1.4
											Sampled Date	23/10/2018	23/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018
Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances							
Carbon																		
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	0.934	1.95	13	40.2	12.9	9.14	1.95
Metals (Solids)																		
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	8.04	9.6	41.1	23.9	17	5.97	6
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	0.404	0.398	0.02	0.2	0.2	0.766	0.2
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	7.58	12.8	61.9	184	127	79.8	366
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	11.3	14.8	27.8	47.7	38.4	19.3	40.7
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	99.6	29.8	198	45.3	25.9	43	18.6
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	0.14	0.14	0.14	1.4	1.4	1.32	1.4
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	28.2	26.8	18.9	35.6	25.7	14.7	29.2
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	1	1	2.01	16.5	10	1.37	14.1
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	15	27.1	189	107	97.5	160	377
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	117	91	745	240	83.1	446	70.5
TPH Criteria Working Group (TPH CWG)																		
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00							
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00							
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00							
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00							
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.02	0.02	0.02	0.0341	0.0305	0.02	0.02
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.02	0.02	0.02	0.0737	0.0502	0.02	0.02
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.02	0.02	0.02	0.044	0.0295	0.02	0.02
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.02	0.02	0.02	0.0539	0.02	0.02	0.02
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	0.1	0.1	2.97	7.12	1.7	2.29	0.1
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	0.1	1.1	10.4	24.3	5.31	8.32	0.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	0.1	7.85	58.9	128	28.1	37.7	2.4
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	0.1	0.1	20.9	17.7	3.78	9.83	0.1
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.02	0.02	0.02	0.0286	0.02	0.02	0.02
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.02	0.02	0.02	0.0352	0.02	0.02	0.02
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	0.1	0.1	5.23	5.47	1.31	3.3	0.1
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	0.1	2.01	31.4	30.4	7	18.5	2.07
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	0.1	11.8	116	101	21.9	98.6	8.39
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	0.1	1.41	40.5	23.4	4.67	31.6	6.95
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	0.1	0.1	13.4	6.04	1.42	9.87	3.29
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	12	17.2	678	1400	467	429	15.9
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	8	8	82.6	60.7	8	25.5	8
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	16	41.3	989	2700	900	474	34.8
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	23	62.2	3090	6190	2080	1440	214
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	16.3	54.4	2840	5110	1870	1900	105
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	32.8	83.5	4520	8880	3210	2700	258
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	14	25.6	1730	3290	1140	845	106
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	24	47.4	2240	4190	1280	1770	102
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	22.9	70.3	2640	5440	2240	1570	312
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	0.023	0.023	609	1100	300	439	26.4
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	19	45.3	2790	4760	1630	2140	81.9
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	48.3	207	6830	14300	4620	2710	389
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	10	19.5	358	850	10	103	10
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	15.9	87.1	689	1110	537	252	39.7
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	45.9	186	2730	8150	1940	809	357
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09	0.0356	0.15	5.04	10.7	3.56	2.43	0.258
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	0.26	1.1	37.9	78.2	25.8	20	2.3
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	99.5	90.2	92.8	90.1	89.5	77.9	87.9
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	98.3	88.5	91.8	90.9	87.3	90.4	92.2
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	103	85.2	89.9	86.5	88.9	95.3	92.6
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	81	80.2	87.3	74.6	85.5	76.8	86.3
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	75.9	78.4	84.1	73.7	75.6	71.5	76.7
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	0.1	8.95	93.2	177	38.9	58.2	2.4
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	0.1	15.2	193	160	34.9	152	17.4
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00	0.1	24.2	286	337	73.9	210	19.8
Metals - (Solid)																		
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			17100	23800	61800	162000	209000	46100	214000
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			541	1150	8440	25600	10100	8760	26300
Metals - (Liquid)																		
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			-	52000	78300	-	59600	148000	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			-	13800	10400	-	7650	47900	-
Phenols																		
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.01	0.01	0.01	0.194	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.0363	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.23	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	-	0.182	0.134	-	0.0526	0.144	-
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	8.25	8.38	7.97	10.8	9.93	7.87	12.5
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33							
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	-	0.0983	0.163	-	0.207	0.105	-
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	-	0.295	0.489	-	0.621	0.315	-
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	-	0.104	0.155	-	0.152	0.163	-
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	1	4.05	1	2	142	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	12	12	12	12	12	12	12
Asbestos																		
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	0.001	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		-	06/11/2018	05/11/2018	-	05/11/2018	05/11/2018	-
Analysed By	TM048	No units		1371	0	0				0.00		-	James Richards	Lucy Caroe	-	Andrzej Ferfecki	Christian Hallam	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	0.001	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00		-	-	None	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0				0.00		-	-	N/C	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	0.001	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	Detected	-	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Comments	TM048	No units		1371	0	0			0	0.00		-	-	Fibre bundles in soil	-	0	0	-
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		108	116	97.9	101	108	102	80
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		98	98.3	89.4	89.6	96.5	95.2	99.9
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		103	89.5	73.1	70.4	76.8	87.7	95
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		0.1	0.1	0.1	0.2	0.2	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		0.09	0.09	0.09	0.18	0.18	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		0.07	0.07	0.07	0.14	0.14	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		0.04	0.04	0.04	0.08	0.08	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		0.1	0.1	0.1	0.2	0.2	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		0.1	0.1	0.1	0.2	0.2	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		0.13	0.13	0.13	0.469	0.309	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		0.4	0.4	0.4	0.8	0.8	0.4	0.4
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-

Sample ID	3CB5	3CB5	3CB1V	3CB3V	3CB4V	3CB5V	3CC1	3CC1	3CC3	3CC3	3CC3	3CC4	3CC4	3CC5	3CC5	3CC1V	3CC3V	3CC4V	3CD1	3CD1	3CD1
Depth	0.5	1	1.65	2.4	2.4	1.4	0.5	1	0.5	1	1.5	0.7	1.4	0.5	1	1.451.45	2.2	2.4	0.3	0.7	1.2
Sampled Date	18/10/2018	18/10/2018	23/10/2018	19/10/2018	19/10/2018	18/10/2018	23/10/2018	23/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	23/10/2018	19/10/2018	19/10/2018	23/10/2018	23/10/2018	23/10/2018
Determinand																					
Carbon																					
Soil Organic Matter (SOM)	6.74	3.03	4.14	1.88	6.47	2.31	0.391	2.28	61.9	4.45	0.36	9.26	0.828	19.7	7.84	2.31	1.32	1.01	2.72	3.91	0.35
Metals (Solids)																					
Arsenic	9	12.2	9.16	12.1	14.2	12.6	6.61	8.01	12.4	20.7	7.04	14.7	6	19.3	9.45	9.11	10.6	9.1	24.5	13.1	9.34
Cadmium	0.02	0.2	0.02	0.02	0.16	0.02	0.893	0.02	1.59	0.919	0.2	1.16	1.25	10.1	1.9	0.02	0.02	0.02	0.796	0.02	0.456
Chromium	170	174	34.6	32	37.4	30.3	34.5	99.6	195	192	465	32	516	115	204	27.6	34.7	22.4	12.9	0.9	20.6
Copper	18.8	57	20.2	18.8	23.2	18.4	14.3	10.2	30.4	188	42.5	42.4	15.3	44.9	69	17.8	17.5	7.35	13	23.4	11.4
Lead	81.5	54.6	24.1	19.8	46.7	26.9	44.4	13.7	182	70	7	369	34.6	1320	190	18.8	21	23.5	53.5	21.3	15.5
Mercury	0.14	1.4	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4	1.4	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	13.9	38.4	25.3	37.4	25.4	31.9	29.3	16.3	36	137	32.5	27.5	10.7	40.2	59.9	31.8	36.8	25	14.1	36.9	28
Selenium	5.13	10	1	1	1	1	10	3.26	10	10	15.3	1.82	14.6	10	10	1	1	1	1	1	1
Vanadium	231	275	53.2	48.5	63.5	53	67.4	259	155	344	460	64.7	693	195	399	46.7	53.6	41.1	30.1	25.5	35
Zinc	492	302	106	107	164	127	153	82.5	812	190	29.2	2870	89.1	5610	749	101	104	114	206	320	53.5
TPH Criteria Working Group (TPH CWG)																					
Benzene																					
Toluene																					
Ethylbenzene																					
sum of detected mpo xylene by GC																					
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.0231	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.0631	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.0724	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.0816	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	1.75	1.66	0.1	0.1	0.1	0.1	5.68	2.96	3.7	0.305	0.1	0.1	3.96	2.83	2.82	0.1	0.1	0.1	1.49	0.1	0.1
Aliphatics >C16-C21	8.01	12.3	0.1	0.1	0.1	0.1	24.6	9.5	24.2	1.07	0.1	1.53	10.5	11.7	12.1	0.1	0.1	0.1	5.78	2.97	0.1
Aliphatics >C21-C35	44.1	82.4	3.73	1.8	4.63	0.1	93.4	35.4	88.6	6.77	59.6	23.3	52.9	53.1	87.3	0.1	0.1	0.1	33.7	8.1	0.1
Aliphatics >C35-C44	18.2	31.3	0.1	0.1	0.1	0.1	33.2	12.6	33.9	1.78	50.3	5.73	11.1	11.8	35.4	0.1	0.1	0.1	12.9	2.46	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.0493	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.0539	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	13.2	2.54	0.1	0.1	0.1	0.1	3.23	3.1	29.5	1.5	0.1	0.15	1.14	3.92	1.73	0.1	0.1	0.1	2.45	0.1	0.1
Aromatics >EC16-EC21	307	22.7	0.1	0.1	2.17	0.1	15.4	14.4	371	14.8	0.637	2.33	13.8	37.4	14.2	0.1	0.1	0.1	9.67	1.33	0.1
Aromatics >EC21-EC35	634	133	14.6	1.54	20.7	6.66	59	37.2	1010	51.7	15.4	24.2	136	111	106	3.05	1.89	3.64	33.5	5.53	0.1
Aromatics >EC35-EC44	175	47.7	0.944	0.1	4.01	0.702	27.7	12.5	263	15.1	9.4	4.11	45.2	26.5	44.6	0.1	0.1	0.1	13.2	1.39	0.1
Aromatics >EC40-EC44	53	15.9	0.1	0.1	1.24	0.1	9.72	4.21	66.2	6.83	3.47	0.1	16.3	7.91	17.4	0.1	0.1	0.1	4.75	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)																					
Acenaphthylene	4040	131	12	12	12	12	226	208	10300	334	12	68.7	12	535	194	12	12	17.9	102	12	12
Acenaphthene	913	156	8	8	8	8	42.4	44.6	342	13.8	8	8	139	27.9	95.8	8	8	8	21.9	8	8
Anthracene	17600	372	16	16	16	16	454	425	12700	330	16	42	152	531	375	16	16	16	213	23.4	16
Benz(a)anthracene	63600	2850	14	39	77.5	22.4	872	806	43600	1350	136	271	2740	2120	2680	14	27.8	111	429	48.7	14
Benzo(a)pyrene	58700	3760	15	15	44.4	24.4	727	649	36800	1430	76.3	237	4710	1790	3510	15	22	120	363	41.7	15
Benzo(b)fluoranthene	88100	5310	15	23.6	76	36	860	956	64100	2360	955	444	4710	2360	4650	15	33.4	167	453	77.9	15
Benzo(k)fluoranthene	28900	2060	14	14	26.4	14	413	302	21800	797	333	115	2030	1010	1940	14	14	81.7	182	24.4	14
Benzo(g,h,i)perylene	42700	2590	24	24	24	24	612	554	29900	1110	560	239	3640	1300	2480	24	24	84	312	32.9	24
Chrysene	58900	3220	10	41.3	101	23.3	795	744	42300	1120	586	223	2900	1480	3010	10	22.9	123	398	49.2	10
Dibenzo(a,h)anthracene	10200	648	0.023	0.023	0.023	0.023	137	124	6970	243	110	40.1	643	334	374	0.023	0.023	0.023	63.2	0.023	0.023
Indeno(1,2,3-cd)pyrene	50600	2910	0.018	0.018	33.4	0.018	645	531	33100	1600	250	232	3810	1180	2300	0.018	0.018	65.4	295	50.7	0.018
Fluoranthene	197000	3670	0.017	107	240	28.2	2140	2130	99000	3070	287	398	2700	4370	3650	0.017	35.7	186	1100	125	0.017
Fluorene	7450	123	10	10	10	10	193	206	4060	106	10	10	52.9	238	101	10	10	10	89.5	10	10
Naphthalene	11900	498	9	9	9	9	671	655	3050	206	24.9	77.7	48.3	387	162	9	9	9	354	37.6	9
Phenanthrene	101000	1470	15	15	67.6	15	1690	1780	32900	982	81.1	164	732	1800	1170	15	15	33.3	823	99	15
Pyrene	133	3.69	0.015	0.089	0.171	0.0262	1.52	1.5	72.8	2.35	0.21	0.297	2.97	3.23	3.34	0.015	0.0298	0.146	0.79	0.0793	0.015
PAH, Total Detected USEPA 16	875	33.5	0.118	0.3	0.837	0.161	12	11.6	514	17.4	3.61	2.85	32	22.7	30	0.118	0.172	1.13	5.99	0.69	0.118
Naphthalene-d8 % recovery**	97.1	93.7	86.9	87.2	87.6	95.5	94.7	93.2	87.6	91	82.6	87.3	74.5	94.4	91.3	89.2	82.4	80.7	90.2	82.7	94.2
Acenaphthene-d10 % recovery**	91.8	90.5	88.4	90.7	92.9	96.1	94.5	93.2	98	89.9	83.4	93.3	82.4	93.6	92.2	89	93.6	82.2	88.8	81.4	92.6
Phenanthrene-d10 % recovery**	90.2	90.1	86.4	91	94.4	97	93.3	92.8	91.7	88.2	82.2	93.1	81.2	94.1	93.3	87.8	97.7	84.9	87.2	88.9	89.6
Chrysene-d12 % recovery**	85.6	87	84.4	84.8	90.8	93.1	91.9	91.9	78	85.1	83	91.5	70.5	87.2	87.6	85.9	80.3	84	84.1	72.1	86.5
Perylene-d12 % recovery**	96.4	90.9	83.1	76.6	83.1	91.5	87.5	88.2	81.1	89.2	78	81.6	77.8	75.6	89	76.6	74.8	80.6	79.4	71.7	85.4
Total Aliphatics >C12-C44	72.1	128	3.73	1.8	4.63	0.1	157	60.5	150	9.92	110	30.5	78.4	79.5	137	0.1	0.1	0.1	53.9	13.5	0.1
Total Aromatics >EC12-EC44	1130	206	15.5	1.54	26.9	7.37	105	67.2	1680	83.1	25.5	30.8	196	179	167	3.05	1.89	3.64	58.9	8.25	0.1
Total Aliphatics & Aromatics >C5-C44	1200	333	19.3	3.33	31.8	7.37	262	128	1830	93	135	61.3	275	259	305	3.05	1.89	3.64	113	21.8	0.1
Metals - (Solid)																					
Iron	113000	245000	32400	34400	36600	45300	60400	54900	113000	424000	190000	87800	120000	175000	252000	27700	22600	31500	30000	63700	20700
Manganese	10700	19800	195	501	792	1220	3460	6260	13200	19400	28700	3320	58200	10700	17900	710	405	1060	2260	2340	1260
Metals - (Liquid)																					
Calcium	-	135000	-	-	-	-	89800	-	-	86600	-	-	245000	-	132000	-	-	-	118000	-	18700
Magnesium	-	10200	-	-	-	-	8920	-	-	4950	-	-	11400	-	8300	-	-	-	36500	-	11900
Phenols																					
Phenol	0.01	0.0116	0.01	0.01	0.01	0.01	0.01	0.01	0.0122	0.0327	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0122	0.0436	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0762	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																					
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.239	-	-	-	-	0.149	-	-	0.0927	-	-	0.201	-	0.294	-	-	-	0.106	-	0.0225
pH	8.79	11	7.62	8.25	7.87	7.96	8.87	9.42	8.06	11.8	8.03	7.84	11.7	8.4	11.3	7.38	7.82	8.6	9.07	7.89	8.33
Sulphate, Total																					
Sulphur, Total	-	0.401	-	-	-	-	0.0703	-	-	0.161	-	-	0.24	-	0.298	-	-	-	0.261	-	0.02
Sulphate, Total potential	-	1.2	-	-	-	-	0.211	-	-	0.483	-	-	0.72	-	0.894	-	-	-	0.783	-	0.06
Sulphate, acid soluble (total)	-	0.759	-	-	-	-	0.265	-	-	0.263	-	-	0.662	-	0.932	-	-	-	0.417	-	0.02
Cyanide, Total	1.98	2.01	1	1	1.18	1	1	1	3.74	4.86	1	5.33	1	8.51	18.7	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	375	265	234	226	12	12	12	12	12	12	12	12	12	205	213	47.9	12	12	24.5
Asbestos																					
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-
Date of Analysis	-	05/11/2018	-	-	-	-	06/11/2018	-	-	05/11/2018	-	-	05/11/2018	-	05/11/2018	-	-	-	06/11/2018	-	06/11/2018
Analysed By	-	Lucy Caroe	-	-	-	-	Lucy Caroe	-	-	Barbara Urbanek-Walsh	-	-	James Richards	-	Lucy Caroe	-	-	-	Barbara Urbanek-Walsh	-	James Richards
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	Detected	-	Not Detected
Amosite (Brown) Asbestos	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Fibrous Tremolite	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Fibrous Actinolite	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	-	Not Detected	-	Not Detected
Comments	-	0	-	-	-	-	-	-	-	0	-	-	0	-	0	-	-	-	Loose fibres in soil.	-	-
Volatile Organic Compounds (VOCs)																					
Dibromofluoromethane**	103	106	112	107	108	107	113	111	95.4	103	109	115	112	93	109	120	102	107	129	114	146
Toluene-d8**	96.2	94.4	101	99.5	97.8	99.8	98.1	98.6	85.9	99	98.4	96.8	102	91.8	95.9	101	96.1	99.9	98.8	99.9	100
4-Bromofluorobenzene**	85.1	84.9	92.7	94.9	91.4	92.7	85.2	86.8	70.1	91.7	97.8	87.2	102	75.9	91.6	94.7	76.4	97.1	89	90.7	97.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.214	0.151	0.13	0.13	0.13	0.13	0.13	0.13	0.446	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																					
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CD3	3CD3	3CD4	3CD4	3CD5	3CD5	3CD1V	3CD3V	3CD4V	3CD5V	3CE1	3CE1	3CE3	3CE3	3CE4	3CE4	3CE5	3CE5	3CE5	3CF1
Depth	0.8	1.5	0.5	1	0.8	1.6	1.65	1.9	2.5	2.6	0.4	1	0.5	1	0.5	1	0.5	1.5	2	0.3
Sampled Date	19/10/2018	19/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	23/10/2018	19/10/2018	19/10/2018	18/10/2018	23/10/2018	23/10/2018	19/10/2018	19/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	18/10/2018	23/10/2018
Determinand																				
Carbon																				
Soil Organic Matter (SOM)	0.35	5.57	4.9	3	12.6	2.88	1.52	1.57	6.6	2.05	3.15	4.52	9	0.688	2.91	3.05	3.57	0.984	0.35	0.35
Metals (Solids)																				
Arsenic	21.5	8.76	11.9	5.3	9.01	12.9	11.3	11.6	14.4	10.6	7.53	10.9	7.93	8.19	12	5.1	10.4	6	6	6
Cadmium	0.2	0.02	0.02	0.02	0.192	0.02	0.02	0.02	0.224	0.02	0.256	1.05	0.02	0.583	0.565	0.02	0.02	0.5	1.06	1.04
Chromium	91.7	145	31.9	352	45	318	31.3	32.8	31.4	38.8	27.9	35.4	265	531	35.4	381	58.1	636	623	86
Copper	35.6	8.58	20.7	6.4	23	8.21	20.4	12.7	20.9	17.6	14.4	18.8	15.1	36.3	22.7	14	17	14	26.9	19.2
Lead	13.2	8.27	35.6	13.9	84.5	21.5	21.8	20.8	43.7	30.6	33.3	65.3	22.6	13.9	47.3	31.2	27	17.8	16.3	37
Mercury	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	1.4	1.4	1.4
Nickel	14.1	7.17	32.3	3.97	19.7	5.25	36	33.1	28.8	30.2	20.7	34.1	15	25.4	30.5	8.93	20.7	11.3	27.2	33.9
Selenium	10	4.72	1	7.89	1.45	8.45	1	1	1	1	1.03	10	5.08	11.8	1	13.6	1.45	10.8	10	10
Vanadium	163	192	53.5	318	67.7	307	49	54.6	51	60.3	71.1	85	262	629	49.7	741	105	940	1180	82.5
Zinc	144	108	144	82.9	300	66	103	96.9	139	126	147	149	106	190	149	102	113	190	45.4	128
TPH Criteria Working Group (TPH CWG)																				
Benzene																				
Toluene																				
Ethylbenzene																				
sum of detected mpo xylene by GC																				
Aliphatics >C5-C6	0.0407	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0214	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.14	0.043	0.0219	0.0217	0.02	0.02	0.02	0.02	0.02	0.0224	0.02	0.02	0.0655	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.162	0.0368	0.02	0.0206	0.02	0.02	0.02	0.02	0.02	0.0251	0.02	0.02	0.0567	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.176	0.0808	0.02	0.0733	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0353	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	5.24	22.2	0.1	5.18	1.07	16.7	0.1	0.1	0.167	0.1	3.36	1.94	1.89	0.1	0.1	2.63	0.1	0.1	0.1	1.22
Aliphatics >C16-C21	14.1	16.5	0.1	9.21	7	19.3	0.1	0.688	0.604	0.1	12	6.47	21.4	0.1	0.1	9.69	1.35	0.1	0.1	3.89
Aliphatics >C21-C35	98.4	77.2	4.95	142	24.7	86.5	0.1	0.901	3.77	0.1	70.9	36.3	39.1	0.1	3.53	76.3	16.5	0.1	2.42	17.7
Aliphatics >C35-C44	119	90.4	0.1	201	10.6	180	0.1	0.1	0.1	0.1	26.2	13.1	8.97	0.1	0.1	25.3	8.17	0.1	0.1	5.63
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.108	0.0246	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0378	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.117	0.0542	0.02	0.0485	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0239	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	2.6	6.73	0.1	2.48	2.64	5.31	0.1	0.1	0.1	0.1	4.89	2.57	4.17	0.1	0.1	2.03	0.1	0.1	0.1	1.27
Aromatics >EC16-EC21	17	16.7	0.1	18.7	30.9	21	0.1	0.1	0.1	0.1	23.6	10.8	24.1	0.1	1.63	21.9	1.33	1.75	0.1	5.76
Aromatics >EC21-EC35	120	102	8.55	173	122	131	0.1	1.7	12	3.72	74	37.4	81.4	0.1	14.8	127	29.3	12.5	1.44	17.8
Aromatics >EC35-EC44	110	91.3	1.38	172	43.8	219	0.1	0.1	1.63	4.04	28.1	15.2	27.4	0.1	5.06	51.8	19	6.23	0.1	4.69
Aromatics >EC40-EC44	47.1	38.3	0.1	77.1	14.8	109	0.1	0.1	0.1	1.92	9.88	5.39	9.53	0.1	1.88	19.5	7.78	2.67	0.1	1.32
Polyaromatic Hydrocarbons (PAHs)																				
Acenaphthylene	60	66	12	60	4020	60	12	12	12	12	301	175	184	12	12	12	14.4	12	16.2	86.9
Acenaphthene	89.9	131	8	80.9	101	40	8	8	8	8	59.6	28.4	77.6	8	8	82.1	24.6	8.74	8	16.4
Anthracene	181	288	16	265	2830	142	16	16	16	16	685	326	550	16	16	206	44.3	17.3	39	222
Benz(a)anthracene	2220	2620	21.2	2110	14800	2570	14	20.5	125	48.3	1610	586	949	55.6	53.9	1900	327	221	293	399
Benzo(a)pyrene	3090	2920	19.4	2050	14700	1810	15	20.1	61.7	36.6	1340	504	817	28.3	53	2100	493	245	235	317
Benzo(b)fluoranthene	3270	5000	27.9	3190	18900	3870	15	22.2	111	55.3	2070	602	1290	125	97.4	3880	572	490	347	306
Benzo(k)fluoranthene	1700	1870	14	1190	6950	1590	14	14	33.5	20.7	729	303	479	41.4	36.4	1520	208	171	107	171
Benzo(g,h,i)perylene	2700	2420	24	1380	10500	1690	24	24	49.8	24	910	424	572	94.9	47.2	1710	360	368	167	250
Chrysene	2500	3450	23	2190	12200	3080	10	24.1	175	51.2	1510	565	1100	143	64.6	2580	349	340	401	360
Dibenzo(a,h)anthracene	421	386	0.023	315	2690	293	0.023	0.023	0.023	0.023	246	87	119	0.023	0.023	342	85.9	75	27.5	62.3
Indeno(1,2,3-cd)pyrene	2570	2260	0.018	1090	9990	1270	0.018	0.018	42.9	0.018	1220	426	600	27.4	35	1360	402	206	159	258
Fluoranthene	2990	3630	34.1	3240	27800	2680	0.017	53.7	266	102	3490	1570	1780	93.5	88.1	3990	450	375	653	1070
Fluorene	50	50	10	50	590	50	10	10	10	10	297	138	204	10	10	29	16	10	10	78
Naphthalene	192	625	9	201	1330	45	9	9	50.2	9	878	487	568	9	9	79.6	30	27.3	49.3	305
Phenanthrene	934	1620	15	1290	5310	914	15	21.1	94.5	42.2	2410	1110	1430	36.9	31.6	2020	184	241	194	770
Pyrene	3.37	3.75	0.0289	3.73	21.7	3.87	0.015	0.0435	0.211	0.087	2.54	1.12	1.4	0.0762	0.0709	3.3	0.448	0.299	0.514	0.743
PAH, Total Detected USEPA 16	26.2	31	0.155	22.3	154	23.8	0.118	0.205	1.22	0.443	20.3	8.44	12.1	0.722	0.578	25.1	4.01	3.08	3.2	5.42
Naphthalene-d8 % recovery**	88.5	89.6	82.6	84.4	104	85.8	85.1	87.1	84.6	90.2	85.9	89.1	80.1	83	79.5	80.4	79.6	79.2	80.7	93.1
Acenaphthene-d10 % recovery**	88.7	95.1	83.5	83.6	103	89.7	89.6	88.6	91.7	93.4	92.6	90.9	88.9	86.7	80.3	80.7	91.7	84.9	88.2	91.5
Phenanthrene-d10 % recovery**	88	95.4	91.4	84.6	102	87.9	97.2	90.3	92.9	95.7	96.8	89.8	94.1	88.4	83	89.5	96.7	87.8	90.1	86.9
Chrysene-d12 % recovery**	83.7	103	94.7	87.9	92.4	91.9	105	85.9	87	86.3	104	85	88.7	82.3	78.5	92.3	78.5	78	81.2	81.2
Perylene-d12 % recovery**	79.9	90.6	85.1	78.3	92.9	87	101	90.9	77.7	79.1	91.4	79.2	76.4	84.4	76.1	85.4	71	77.9	70	76.6
Total Aliphatics >C12-C44	237	206	4.95	357	43.3	303	0.1	1.59	4.54	0.1	113	57.8	71.4	0.1	3.53	114	26	0.1	2.42	28.4
Total Aromatics >EC12-EC44	249	217	9.93	366	200	376	0.1	1.7	13.6	7.76	131	66	137	0.1	21.5	202	49.6	20.5	1.44	29.5
Total Aliphatics & Aromatics >C5-C44	487	423	14.9	723	243	679	0.1	3.29	18.1	7.76	243	124	209	0.1	25.1	316	75.6	20.5	3.86	58
Metals - (Solid)																				
Iron	277000	118000	31300	126000	51100	106000	29500	32600	22700	38300	56900	74900	75100	177000	24700	126000	39100	136000	175000	108000
Manganese	20500	20200	668	20500	3250	26000	376	1300	297	1200	3740	3920	24000	35700	1380	47200	3020	37700	37200	7190
Metals - (Liquid)																				
Calcium	91800	-	9350	-	83400	-	-	-	-	-	-	44600	-	225000	37000	-	-	247000	255000	42300
Magnesium	7500	-	9760	-	17900	-	-	-	-	-	-	7470	-	9530	14500	-	-	7750	800	8220
Phenols																				
Phenol	0.129	0.0102	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0252	0.01	0.01	0.044	0.01	0.0211	0.01	0.01
Cresols	0.107	0.0102	0.0129	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0504	0.01	0.01	0.01	0.0112	0.0211	0.01	0.01
Xylenols	0.075	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.311	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0756	0.035	0.035	0.044	0.035	0.0423	0.035	0.035
Inorganics																				
Soluble Sulphate 2:1 extract as SO4 BRE	0.0968	-	0.0515	-	0.114	-	-	-	-	-	-	0.0879	-	0.151	0.0368	-	-	0.0438	0.289	0.0267
pH	7.98	12.4	8.38	11.5	8.41	12	7.17	8.44	7.96	8.32	10.9	9.64	8.37	12.1	8.63	12.8	8.12	12.2	10.9	9.06
Sulphate, Total																				
Sulphur, Total	0.0831	-	0.0403	-	0.219	-	-	-	-	-	-	0.101	-	0.462	0.0826	-	-	0.2	0.302	0.0707
Sulphate, Total potential	0.249	-	0.121	-	0.657	-	-	-	-	-	-	0.303	-	1.39	0.248	-	-	0.6	0.906	0.212
Sulphate, acid soluble (total)	0.445	-	0.0282	-	0.119	-	-	-	-	-	-	0.205	-	0.863	0.0677	-	-	0.314	0.495	0.108
Cyanide, Total	1.99	1.98	1	1	1	1	1	1	1	1	1	1	1	1	1	4.03	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	15.1	12	95.5	111	124	185	12	12	12	12	12	12	12	12	12	12
Asbestos																				
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	0.001	-
Date of Analysis	05/11/2018	-	05/11/2018	-	05/11/2018	-	-	-	-	-	-	06/11/2018	-	05/11/2018	05/11/2018	-	-	05/11/2018	05/11/2018	06/11/2018
Analysed By	Marcin Magdziarek	-	Lucy Caroe	-	Christian Hallam	-	-	-	-	-	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	Christian Hallam	-	-	Lucy Caroe	Marcin Magdziarek	Renata Bozhkov
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	0.001	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	None	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	N/C	-	-	-	-	N/C	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	0.001	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Detected	Not Detected	-	-	Not Detected	Detected	Not Detected
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected
Comments	0	-	0	-	0	-	-	-	-	-	-	-	-	Loose fibres in soil.	0	-	-	0	Soil containing ACM debris	-
Volatile Organic Compounds (VOCs)																				
Dibromofluoromethane**	103	112	111	109	103	125	115	105	118	113	112	109	103	113	107	116	105	99.2	107	126
Toluene-d8**	94.2	95.7	100	93.5	96.2	93.8	99.6	99.3	99.6	99.8	97.9	96.6	96.9	99.9	95.6	101	99.1	97.2	99.6	98.3
4-Bromofluorobenzene**	81.9	83.4	95	86.8	82.6	79.6	92.9	96.9	102	99.8	82.5	82.5	79.9	98.8	80.5	98.8	90	92.9	94.3	84.7
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.147	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.013	0.13	0.13	0.13	0.13	0.224	0.16	0.173	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																				
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	3CF1	3CF3	3CF3	3CF3	3CF4	3CF4	3CF4	3CF5	3CF5	3CF5	3CF1V	3CF3V	3CF4V	3CF5V	3CG1	3CG1
Depth	1	0.5	1	2	0.5	1.1	1.5	0.5	1	2	1.75	2.8	2.7	3.4	0.5	1
Sampled Date	23/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	18/10/2018	18/10/2018	18/10/2018	23/10/2018	22/10/2018	22/10/2018	18/10/2018	22/10/2018	22/10/2018
Carbon																
Soil Organic Matter (SOM)	1.79	13.3	26.4	0.49	2.95	42.6	8.91	5.02	4.57	11.3	1.01	2.02	6.33	1.09	5.45	1.21
Metals (Solids)																
Arsenic	24.1	15.8	13.6	9.29	15.4	8.21	11.1	7.96	7.96	6	9.06	13.2	13.6	13.5	9.3	10.6
Cadmium	0.02	6.44	4.95	0.2	0.02	0.02	0.2	0.902	0.89	0.2	0.02	0.02	0.096	0.02	1.22	0.0723
Chromium	4.81	217	110	619	29.1	110	459	39.3	592	430	21.6	59.8	44	34.6	83.2	24.4
Copper	17.5	44.5	83.7	29.7	11.2	13.4	36.3	24.2	28.8	28.3	8.96	21.4	23.8	9.84	23.8	19.9
Lead	63.7	737	518	46.2	19.1	22	16.8	50.3	36	39.8	14.2	27.5	36.8	21.3	74.9	47.9
Mercury	0.14	1.4	1.4	1.4	0.14	0.14	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	1.4	0.14
Nickel	44.3	35.5	31.8	20.6	31.7	22.9	27.7	18.4	26.5	31.8	26.6	35.1	26.5	33.7	25.9	33.5
Selenium	1	10	10	22	1	2.75	15.9	1.18	10	17.6	1	1	1	1	10	1.01
Vanadium	19.9	284	141	830	55.5	106	654	45.8	970	880	38.3	91.9	65.5	60.4	141	39.5
Zinc	195	3440	2600	395	107	78	65.8	181	190	118	81.6	132	124	86.3	236	131
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.01	0.01	0.02	0.01	0.0454	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.01	0.01	0.02	0.01	0.0216	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02
Aliphatics >C12-C16	0.1	1.52	0.1	0.1	0.1	4.77	3.06	0.1	5.15	4.79	0.1	0.1	0.1	0.1	2.3	0.525
Aliphatics >C16-C21	2.82	8.74	6.85	0.1	0.563	16.7	15.1	0.1	10.1	13.2	0.1	0.1	0.1	0.1	7.65	1.18
Aliphatics >C21-C35	12.3	44.6	37	5.07	1.75	90.8	56.3	30.7	50.7	57.2	0.1	0.288	4.13	0.1	43.4	1.83
Aliphatics >C35-C44	5.46	7.66	3.24	0.1	0.1	13.1	8.84	17.9	11.7	14.2	0.1	0.1	0.1	0.1	14.3	0.1
Aromatics >EC5-EC7	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.01	0.01	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02
Aromatics >EC12-EC16	0.1	4.09	4.2	0.1	0.1	2.26	2.5	0.1	2.84	5.53	0.1	0.1	0.1	0.1	4.03	0.1
Aromatics >EC16-EC21	0.9	36	34.9	0.426	0.1	12.2	16.5	2.78	33	74.4	0.1	0.1	1.29	0.1	18.2	0.1
Aromatics >EC21-EC35	5.41	124	123	9.2	12	46.5	53.3	47	148	167	0.1	2.29	24.1	3.28	59.3	0.121
Aromatics >EC35-EC44	2.02	32.6	33.4	3.06	0.982	4.48	17.5	47.9	53.6	56.2	0.1	0.248	1.98	0.1	26.4	0.1
Aromatics >EC40-EC44	0.1	11.1	11.8	3.52	0.1	0.1	6.32	21.1	20.1	20.7	0.1	0.1	0.1	0.1	10.9	0.1
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	613	761	91.5	12	206	60	60	100	411	12	12	12	12	2600	81.8
Acenaphthene	8	37.4	31.8	10.4	8	28.2	44.4	40	107	163	8	8	8	8	392	8
Anthracene	16	754	1010	158	16	287	300	80	329	2410	16	16	16	16	5190	349
Benz(a)anthracene	21.3	2670	3690	336	14	955	2750	192	3560	8610	14	33.7	75.4	18.6	8370	325
Benzo(a)pyrene	15	2420	3380	306	15	841	3170	134	4420	6520	15	43.8	69.6	19.7	6180	248
Benzo(b)fluoranthene	24.6	3760	5560	669	15	1470	3410	208	6680	11100	15	99.6	111	26.4	9970	445
Benzo(k)fluoranthene	14	1190	2090	223	14	551	1390	70	2870	5930	14	42.7	41	14	3660	146
Benzo(g,h,i)perylene	24	1810	2460	293	24	604	2690	120	3660	4760	24	50.3	55.5	24	3810	174
Chrysene	23	2820	4000	426	10	1100	3000	239	4050	8940	10	55.9	93.6	20.2	8490	393
Dibenzo(a,h)anthracene	0.023	374	550	70.4	0.023	161	526	0.115	872	1220	0.023	0.023	0.023	0.023	765	41.8
Indeno(1,2,3-cd)pyrene	0.018	2050	2650	234	0.018	490	2560	90	4420	5650	0.018	61.5	63.1	0.018	3400	277
Fluoranthene	46	5130	7470	807	22.4	1890	5760	334	6740	21600	0.017	44.2	159	30.8	21800	946
Fluorene	10	172	274	81.4	10	83.8	50	50	61.1	107	10	10	10	10	3460	67.3
Naphthalene	22.8	432	608	91.8	9	517	219	45	231	301	9	15.5	18.8	9	4110	266
Phenanthrene	40.8	1790	2920	488	15	1060	4270	75	5580	18100	15	15	83.5	15	18700	840
Pyrene	0.0349	3.95	5.67	0.542	0.0178	1.46	5.09	0.275	5.76	17.2	0.015	0.0428	0.132	0.0263	15.1	0.614
PAH, Total Detected USEPA 16	0.213	30	43.2	4.83	0.118	11.7	35.2	1.38	49.4	113	0.118	0.49	0.903	0.142	116	5.21
Naphthalene-d8 % recovery**	101	80	88.8	81.3	88.9	70.8	116	89.3	88.9	82.7	86.4	81.2	83.2	84.9	96	91.8
Acenaphthene-d10 % recovery**	84	88.2	92.8	79.6	91.4	77.2	109	93.8	90.5	87.4	91.7	84.2	86.5	86.1	101	89.7
Phenanthrene-d10 % recovery**	88.9	89.7	94.1	78.2	92.7	68.6	123	95.6	93.3	94.8	98.2	87.1	89.7	85.4	103	91.9
Chrysene-d12 % recovery**	83.1	78.5	86.2	75	99.3	58.3	126	100	87.6	98.3	109	92.2	84.6	83	112	85.9
Perylene-d12 % recovery**	81.5	70.2	76.7	73.6	94.4	53.1	122	83	99.1	92.8	100	91.4	82.3	80.3	90.1	84.9
Total Aliphatics >C12-C44	20.5	62.5	47.1	5.07	2.32	125	83.3	48.6	77.6	89.4	0.1	0.288	4.13	0.1	67.7	3.53
Total Aromatics >EC12-EC44	8.33	197	196	12.7	12.9	65.4	89.8	97.7	237	303	0.1	2.53	27.4	3.28	108	0.121
Total Aliphatics & Aromatics >C5-C44	28.9	259	243	17.8	15.3	191	173	146	315	393	0.1	2.82	31.5	3.28	176	3.66
Metals - (Solid)																
Iron	41400	202000	223000	205000	29600	58400	187000	21400	163000	149000	26300	51900	31800	31200	84100	45900
Manganese	947	17700	20000	48300	551	6120	35000	3170	31300	26300	1040	1810	1140	657	10600	1660
Metals - (Liquid)																
Calcium	-	101000	-	189000	22900	-	181000	114000	191000	-	-	-	-	-	128000	-
Magnesium	-	12900	-	8530	10300	-	8320	23400	9860	-	-	-	-	-	20500	-
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.066	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.0115	0.0113	0.0111	0.0108	0.01	0.01	0.01	0.022	0.01	0.01	0.01	0.01	0.0109	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.088	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.117	-	0.0949	0.0789	-	0.0261	0.0351	0.0276	-	-	-	-	-	0.147	-
pH	8.51	7.86	8.36	12.1	8.53	9.99	12.8	8.14	12.8	13	8.42	9.07	8	8.42	10.6	8.61
Sulphate, Total																
Sulphur, Total	-	0.184	-	0.212	0.0885	-	0.199	0.109	0.383	-	-	-	-	-	0.321	-
Sulphate, Total potential	-	0.552	-	0.636	0.266	-	0.597	0.327	1.15	-	-	-	-	-	0.963	-
Sulphate, acid soluble (total)	-	0.117	-	0.651	0.0361	-	0.488	0.0901	0.597	-	-	-	-	-	0.575	-
Cyanide, Total	1	10.5	9.68	1.72	1	1	1	1	1.21	2.96	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	12	23.8	195	234	154	12	12
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	05/11/2018	-	05/11/2018	05/11/2018	-	05/11/2018	05/11/2018	05/11/2018	-	-	-	-	-	05/11/2018	-
Analysed By	-	Lucy Caroe	-	Barbara Urbanek-Walsh	Lucy Caroe	-	Christian Hallam	Christian Hallam	Lucy Caroe	-	-	-	-	-	James Richards	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-
Amosite (Brown) Asbestos	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-
Fibrous Tremolite	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-
Fibrous Actinolite	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected	-
Comments	-	-	-	-	-	-	-	0	0	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	108	119	107	116	124	119	114	113	104	85.7	115	118	126	113	107	121
Toluene-d8**	99.5	101	95.8	102	104	91.4	103	96.5	98	95.1	99.5	103	104	99.2	96	101
4-Bromofluorobenzene**	90.6	87.5	74.4	101	91.5	74.9	85.7	91.7	96.2	87.4	94.2	91.3	88.6	98.7	83.8	95
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.174	0.13	0.13	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.426	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CG3	3CG3	3CG3	3CG4	3CG4	3CG4	3CG5	3CG5	3CG5	3CG1V	3CG4V	3CG5V	3CH1
Depth	0.5	1	1.5	0.5	1	2	0.5	1	1.5	1.7	3.1	3	0.25
Sampled Date	22/10/2018	22/10/2018	22/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	22/10/2018	18/10/2018	18/10/2018	22/10/2018
Carbon													
Soil Organic Matter (SOM)	10.5	19.5	24.8	2.69	50.3	11	2.93	20.2	7.05	0.912	1.09	4.21	3.22
Metals (Solids)													
Arsenic	11.1	6	8.52	12.7	6	6	6	6	6	9.98	12.6	12.5	11.1
Cadmium	1.25	0.2	0.2	0.201	0.67	0.2	0.2	0.2	0.808	0.02	0.204	0.363	0.02
Chromium	122	444	300	28.7	166	680	537	743	760	24.3	44	41.6	49.7
Copper	24.6	14	16.6	15.4	14	17.9	14	16.5	14	12.3	11.3	20.4	17.7
Lead	162	20.1	59.5	49.4	23.1	7.14	11.8	25	13.3	21.5	34.5	34.1	20.8
Mercury	0.14	1.4	1.4	0.14	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14
Nickel	18.4	14.3	16.9	31.6	7.27	11.6	8.47	7.75	9.41	32.5	36.1	30.2	21.1
Selenium	4.67	11.7	10	1	10	18.1	11.9	22.6	13.3	1	1	1	2.25
Vanadium	211	305	248	50.8	194	578	364	635	865	43.3	64.5	61.8	187
Zinc	689	102	311	153	24.8	37.5	131	190	50	92.1	129	123	98.7
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.02	0.02	0.0684	0.02	0.0451	0.02	0.0203	0.01	0.0366	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.194	0.02	0.157	0.02	0.0857	0.0337	0.071	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.147	0.02	0.0748	0.02	0.0568	0.021	0.0548	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.174	0.02	0.0693	0.02	0.0482	0.0168	0.0688	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	2.19	5.28	6.98	0.1	12.3	6.19	6.54	12.2	5.54	0.1	0.1	0.1	0.766
Aliphatics >C16-C21	11.4	19.6	29.4	0.1	23.4	13.7	10.4	53	22.6	0.1	0.767	0.254	2.79
Aliphatics >C21-C35	27.9	82.5	114	2.53	61	106	55.3	82.3	108	1.1	9.78	9.83	10.3
Aliphatics >C35-C44	5.8	11.3	16.8	0.646	11.2	56.6	4.12	16.8	46.1	0.529	4.57	10.1	3.32
Aromatics >EC5-EC7	0.02	0.02	0.0456	0.02	0.0209	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.0661	0.02	0.0418	0.02	0.0257	0.0126	0.0215	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.098	0.02	0.0506	0.02	0.0375	0.0147	0.0366	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.116	0.02	0.0462	0.02	0.0321	0.0116	0.0462	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	3.54	5.34	6.91	0.1	9.52	5.2	6.51	11.7	6.5	1.59	0.1	0.36	0.564
Aromatics >EC16-EC21	18.8	22.7	36.3	0.1	25.2	24.8	20.3	73.3	31.6	0.1	1.6	1.55	2.97
Aromatics >EC21-EC35	63.7	73.4	93.7	3.7	66.7	107	48.1	157	112	3.24	9.84	24.5	6.78
Aromatics >EC35-EC44	14.3	18.3	29.6	0.1	16.5	58.4	12.8	37.3	52.4	0.191	5.11	17.2	0.588
Aromatics >EC40-EC44	3.71	5.14	12.3	2.5	4.58	21.7	4.38	11.2	19.4	0.1	2.03	7.65	0.1
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	148	450	1400	12	289	56.6	307	1560	364	12	12	12	128
Acenaphthene	38.4	31.3	51	8	41.2	77.4	26.5	156	162	8	8	8	24.7
Anthracene	221	878	1890	16	665	179	1240	2510	414	16	16	16	235
Benz(a)anthracene	858	3030	4510	25.2	1780	1480	1890	3800	1340	14	96.1	47.7	589
Benzo(a)pyrene	669	2400	3510	22.6	1480	1100	1430	3650	1180	15	73.9	27.1	453
Benzo(b)fluoranthene	1190	4210	6060	29.6	2740	1940	2240	4290	1590	15	110	38.7	846
Benzo(k)fluoranthene	416	1610	2090	14	991	726	919	1750	645	14	49.6	14	275
Benzo(g,h,i)perylene	475	1770	2250	24	920	887	746	2590	828	24	56.2	24	326
Chrysene	885	2680	4730	26.8	1720	1900	2070	3510	1220	10	106	49.4	606
Dibenzo(a,h)anthracene	100	504	587	0.023	279	157	226	472	149	0.023	0.023	0.023	76.7
Indeno(1,2,3-cd)pyrene	502	2120	1970	0.018	1260	874	1000	2900	847	0.018	46.6	0.018	352
Fluoranthene	1660	6230	12900	179	3860	4960	5210	10100	3390	39.1	179	78.1	1420
Fluorene	197	142	378	10	429	71.5	620	1950	320	10	10	10	134
Naphthalene	818	814	2460	9	782	292	727	1620	512	9	9	9	443
Phenanthrene	1060	2420	6920	63.2	1980	7440	3510	8020	3010	15	136	67	1080
Pyrene	1.29	4.66	9.2	0.129	2.95	3.4	3.51	7.19	2.52	0.0326	0.142	0.0656	0.981
PAH, Total Detected USEPA 16	10.5	33.9	60.9	0.475	22.2	25.5	25.7	56	18.5	0.118	0.997	0.374	7.97
Naphthalene-d8 % recovery**	91.2	92.1	77.4	86.5	93.1	83.5	80.4	77.8	80	75.6	91.5	90.7	82.7
Acenaphthene-d10 % recovery**	95.5	90.1	79.7	84.5	96.4	92.1	84.8	85.1	84.5	83.4	90.7	89.8	89.3
Phenanthrene-d10 % recovery**	96.5	88.7	84.8	86.9	94.4	91.3	86.2	87.6	87.1	79.5	88.4	89.2	87
Chrysene-d12 % recovery**	95.7	78.6	82.6	80	76.2	85.5	88.8	72.8	76	71.2	85.1	87.1	80.3
Perylene-d12 % recovery**	84.1	74.2	73.2	81.3	66.7	73.8	80.2	73.4	77.5	70.9	78.9	82.7	76.6
Total Aliphatics >C12-C44	47.3	119	167	3.17	108	182	76.3	164	182	1.63	15.1	20.2	17.2
Total Aromatics >EC12-EC44	100	120	167	3.7	118	195	87.8	279	202	5.02	16.6	43.6	10.9
Total Aliphatics & Aromatics >C5-C44	148	238	334	6.87	226	377	164	444	385	6.65	31.7	63.8	28.1
Metals - (Solid)													
Iron	62000	145000	144000	23800	57200	144000	152000	165000	142000	37300	25900	25200	51200
Manganese	10300	19700	29900	784	15600	35900	31000	40700	47200	621	791	590	4470
Metals - (Liquid)													
Calcium	85100	-	139000	-	111000	237000	192000	-	238000	-	-	-	-
Magnesium	7810	-	24900	-	15600	9810	38100	-	22000	-	-	-	-
Phenols													
Phenol	0.0351	0.01	0.01	0.01	0.01	0.0107	0.0214	0.021	0.0215	0.01	0.01	0.01	0.01
Cresols	0.117	0.0113	0.01	0.01	0.01	0.01	0.0107	0.0105	0.0108	0.01	0.01	0.01	0.01
Xylenols	0.0351	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.187	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	0.308	-	0.115	-	0.0868	0.0236	0.052	-	0.0222	-	-	-	-
pH	8.03	10.2	12.1	8.42	11.7	12.9	12.3	12.9	12.6	8.08	8.93	8.46	8.9
Sulphate, Total													
Sulphur, Total	0.178	-	0.154	-	0.397	0.398	0.214	-	0.191	-	-	-	-
Sulphate, Total potential	0.534	-	0.462	-	1.19	1.19	0.642	-	0.573	-	-	-	-
Sulphate, acid soluble (total)	0.177	-	0.291	-	0.334	0.456	0.305	-	0.445	-	-	-	-
Cyanide, Total	2.46	1	1.34	1	1.13	1	1	1.17	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	79.3	164	12	12
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	05/11/2018	-	05/11/2018	-	05/11/2018	05/11/2018	05/11/2018	-	05/11/2018	-	-	-	-
Analysed By	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	-	Marcin Magdziarek	Barbara Urbanek-Walsh	Lucy Caroe	-	Barbara Urbanek-Walsh	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-
Comments	-	-	-	-	0	0	0	-	0	-	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	100	108	100	112	107	95.8	99.8	99.6	99.4	112	112	110	109
Toluene-d8**	95	89.8	93.9	100	101	97.2	95.6	96.5	95.7	101	99.1	99.5	99.4
4-Bromofluorobenzene**	98.3	73.8	82.2	99.3	101	93.8	109	69.5	79.6	101	94.1	95.7	87.4
Methyl Tertiary Butyl Ether	0.2	0.1	0.1	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.18	0.09	0.09	0.09	1.8	0.09	1.8	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.14	0.07	0.07	0.07	1.4	0.07	1.4	0.11	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.08	0.04	0.04	0.04	0.8	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.2	0.1	0.1	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.2	0.1	0.1	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.355	0.13	0.586	0.13	2.6	0.13	2.6	0.279	0.288	0.13	0.13	0.13	0.13
Sum of BTEX	0.8	0.4	0.4	0.4	8	0.4	8	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CH1	3CH1	3CH2	3CH2	3CH2	3CH3	3CH1V	3CH2V	3CI1	3CI1	3CI1	3CI2	3CI2	3CI2	3CI3	3CI3
Depth	0.5	1	0.5	1	2	0.5	1.251.25	2.3	0.5	1	1.5	0.5	1	2	0.5	1.5
Sampled Date	22/10/2018	22/10/2018	19/10/2018	19/10/2018	19/10/2018	22/10/2018	22/10/2018	19/10/2018	22/10/2018	22/10/2018	22/10/2018	19/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018
Carbon																
Soil Organic Matter (SOM)	1.65	3.36	8.45	90.2	5.86	3.81	3.24	2.16	1.05	2	6	6.79	9.76	31.5	19	0.35
Metals (Solids)																
Arsenic	20.4	14.1	10.4	9.64	12.9	6	13.4	10.8	6.3	10.7	9	9.71	12.6	10.1	2.93	6
Cadmium	0.252	1.01	0.0482	0.02	0.053	0.2	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.2
Chromium	11.7	10.1	26.3	14.9	28.6	678	35.1	40	64.5	12.7	11.7	24.7	25.8	5.1	192	554
Copper	15.6	17.8	31.7	37.4	41.9	14	21.5	26.4	13.2	15.3	17.6	16.3	18	35.2	3.28	14
Lead	38.4	31.7	30.9	69	34.1	7	21.9	21.3	19.2	37.2	26.7	34.8	27.2	28.1	5.52	7
Mercury	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4
Nickel	16.5	17.7	20.4	19.2	26.7	6.26	26.3	39	10.4	33.9	19.1	22.5	23.6	22.7	4.3	10.4
Selenium	3.21	2.45	1	1.1	2.04	14.6	1	1	1.4	1	1	1	1	1	5.24	13.1
Vanadium	53.3	30.4	52.7	45	55.7	512	58.7	58.3	93.3	31.2	46.4	45.4	44.8	63	198	394
Zinc	168	227	158	335	105	46.2	90.6	114	87.9	118	95.9	179	144	127	55.2	67.4
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.02	0.02	0.02	0.0232	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.126	0.0223	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.0219	0.02	0.0662	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.288	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.403	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	4.68	0.0211	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	1.33	0.02
Aliphatics >C12-C16	0.1	0.1	2.38	31.1	2.51	0.1	0.1	0.1	2.26	1.27	1.69	0.1	1.05	1.06	58.4	0.999
Aliphatics >C16-C21	0.1	0.1	10.5	123	48.6	1.98	0.1	0.1	5.78	2.28	5.14	3.09	5.11	3.52	23	7.6
Aliphatics >C21-C35	3.98	5.34	41.8	194	36.2	19	1.05	0.1	33	6.31	33.9	26	35.1	16.7	297	54.7
Aliphatics >C35-C44	0.31	0.1	13.2	53.3	6.75	0.654	0.1	0.1	11.7	1.04	10.5	7.67	8.58	2.23	261	13.7
Aromatics >EC5-EC7	0.02	0.02	0.02	0.0255	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.0499	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.191	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.268	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	3.12	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.888	0.02
Aromatics >EC12-EC16	0.1	0.1	10.8	356	32.2	0.1	0.1	0.1	2.64	0.581	2.3	0.1	0.1	2.92	21.2	0.765
Aromatics >EC16-EC21	0.535	1.19	145	3100	343	0.1	0.1	0.1	14.1	1.97	10.8	2.81	5.95	32.5	41.3	4.78
Aromatics >EC21-EC35	0.1	15	371	3690	570	4.35	9.76	1.97	48.4	5.09	38.6	34.2	50.2	116	737	30
Aromatics >EC35-EC44	0.1	1.39	91.4	688	126	2.03	0.511	0.128	14.9	0.4	12.3	8.71	4.9	30.9	559	18.1
Aromatics >EC40-EC44	0.1	0.1	23.3	159	31.1	3.06	0.1	0.1	4.75	0.1	4.15	3.04	0.1	7.04	250	7.92
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	12	364	1950	7410	43.6	12	12	202	13.7	85	51.6	37.9	83.5	0.24	44.9
Acenaphthene	8	8	46.6	227	431	8	8	8	39.9	8	21	8	8	8	3600	8
Anthracene	16	16	1300	4350	12600	64.5	16	16	537	37.4	209	87.7	76.3	373	927	74.9
Benz(a)anthracene	38	42.8	6340	8840	31300	137	14	14	1310	117	642	272	295	2640	360	204
Benzo(a)pyrene	30	33.1	5150	8040	28000	119	15	15	988	82.2	459	259	208	2360	300	168
Benzo(b)fluoranthene	52	64.7	8700	10900	38000	209	15	15	1620	143	649	445	411	5750	391	266
Benzo(k)fluoranthene	20.6	26.6	2870	4240	12500	84.2	14	14	700	71.4	279	159	132	2000	280	94.6
Benzo(g,h,i)perylene	33.3	35.9	3660	5640	19000	106	24	24	743	57.4	321	195	163	2180	0.48	115
Chrysene	39.2	46.5	6640	7730	27500	149	10	10	1270	118	541	273	320	2830	390	260
Dibenzo(a,h)anthracene	0.023	0.023	793	993	4300	0.023	0.023	0.023	201	0.023	58.3	50.5	36.7	729	0.46	29
Indeno(1,2,3-cd)pyrene	27.3	31.2	3920	7060	22500	69.3	0.018	0.018	865	71	317	242	160	2850	0.36	129
Fluoranthene	87	72.5	14400	30900	93100	353	0.017	24.4	2790	226	1400	513	555	7450	2410	494
Fluorene	10	10	298	2970	6430	10.7	10	10	191	13.7	91.1	34.1	33.7	10	1650	13.7
Naphthalene	26.1	16.3	561	1320	5100	167	9	9	494	43.1	275	105	66.9	1090	10000	205
Phenanthrene	74.8	66.2	6640	22100	50800	239	15	15	1500	163	855	279	316	4960	6370	377
Pyrene	0.0644	0.0692	10.6	22.2	66.7	0.254	0.015	0.015	2.06	0.177	1.02	0.414	0.423	4.48	1.55	0.393
PAH, Total Detected USEPA 16	0.493	0.505	72.2	139	426	2.01	0.118	0.118	15.5	1.33	7.22	3.38	3.23	39.8	27.7	2.87
Naphthalene-d8 % recovery**	85	80.6	90.1	92.4	89.4	81.1	92.1	94.9	89.2	84.3	82.2	91.9	87	90.7	97.9	79.8
Acenaphthene-d10 % recovery**	86.1	85.4	95.3	100	91.8	82.3	92.1	98.4	89.7	76.3	84.9	95.1	92	93.3	92	83.2
Phenanthrene-d10 % recovery**	87.5	88.1	96.4	96.6	94.5	83.7	88.3	0	88.1	87.8	84.9	99.2	93.5	97.2	85	86.5
Chrysene-d12 % recovery**	80.1	95.5	96.8	89.8	98.3	83.1	84.1	107	83.2	91.1	78.4	105	96.2	101	80.1	83.1
Perylene-d12 % recovery**	78.6	88.4	91.7	89.4	91.1	74.2	84.5	102	82.8	85.5	72.2	101	84.7	95.2	82.9	73.4
Total Aliphatics >C12-C44	4.29	5.34	67.9	401	94.1	21.7	1.05	0.1	52.8	10.9	51.2	36.7	49.9	23.5	639	77
Total Aromatics >EC12-EC44	0.535	17.6	619	7830	1070	6.38	10.3	2.09	80.1	8.04	64.1	45.7	61.1	183	1360	53.6
Total Aliphatics & Aromatics >C5-C44	4.82	23	686	8240	1160	28	11.3	2.09	133	18.9	115	82.4	111	206	2000	131
Metals - (Solid)																
Iron	22600	27800	29600	68300	22100	165000	39800	36600	61100	40000	50100	24200	25100	73700	98400	176000
Manganese	3790	2500	1320	1780	1210	29900	286	416	4990	1210	1720	1260	952	1870	20000	36900
Metals - (Liquid)																
Calcium	107000	-	100000	-	18300	201000	-	-	195000	-	121000	64900	-	39600	182000	205000
Magnesium	18800	-	7920	-	3880	33800	-	-	55700	-	48300	12700	-	6030	34200	41100
Phenols																
Phenol	0.01	0.01	0.01	0.0116	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.0348	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0109	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.0464	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	0.101	-	0.146	-	0.349	0.0353	-	-	0.108	-	0.117	0.481	-	0.291	0.0697	0.0099
pH	8.38	7.53	8.7	8.24	7.61	12.6	7.48	7.72	9.9	8.64	9.02	8.38	8.11	7.97	12.7	12.4
Sulphate, Total																
Sulphur, Total	0.365	-	0.199	-	0.127	0.126	-	-	0.0927	-	0.134	0.179	-	0.324	0.461	0.0738
Sulphate, Total potential	1.1	-	0.597	-	0.381	0.378	-	-	0.278	-	0.402	0.537	-	0.972	1.38	0.221
Sulphate, acid soluble (total)	0.33	-	0.112	-	0.17	0.292	-	-	0.194	-	0.154	0.191	-	0.107	0.491	0.19
Cyanide, Total	1	1	1	8.59	2.85	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	116	104	12	12	12	12	12	12	12	12
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	0.001	-	0.001	-	-
Date of Analysis	05/11/2018	-	05/11/2018	-	05/11/2018	05/11/2018	-	-	05/11/2018	-	05/11/2018	05/11/2018	-	05/11/2018	05/11/2018	05/11/2018
Analysed By	Marcin Magdziarek	-	James Richards	-	Lucy Caroe	Marcin Magdziarek	-	-	Marcin Magdziarek	-	James Richards	Lucy Caroe	-	James Richards	Marcin Magdziarek	Christian Hallam
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	0.001	-	0.001	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	None	-	None	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	N/C	-	N/A	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	0.001	-	0.001	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Detected	-	Detected	Not Detected	Not Detected
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected
Comments	-	-	0	-	0	-	-	-	-	-	-	Loose fibres in soil	-	Fibre bundles in soil	0	0
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	113	112	108	116	122	112	112	110	107	117	108	109	110	111	107	101
Toluene-d8**	101	99.6	96.8	92.8	96.1	96.3	99.9	98.8	96.9	96.7	99.6	98.1	92.2	93.9	98.2	96.1
4-Bromofluorobenzene**	98.2	94	81.9	82.2	74.6	93.1	96.2	96.1	87.7	86.2	90.5	83.5	79.8	72.2	84	91.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.136	0.2	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	32.2	0.793	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.152	2.25	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	3CI1V	3CI2V	3CJ1	3CJ1	3CJ1	3CJ2	3CJ2	3CJ3	3CJ3	3CJ3	3CJ1V	3CJ2V	3CJ3V
Depth	1.7	2.3	0.5	1	1.5	0.5	1	0.5	1.5	2	1.8	1.3	3.4
Sampled Date	22/10/2018	19/10/2018	22/10/2018	22/10/2018	22/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	18/10/2018	22/10/2018	19/10/2018	18/10/2018
Carbon													
Soil Organic Matter (SOM)	0.609	1.81	4.43	1.56	5.05	>100	65.7	28.3	2.57	10.1	0.672	7.41	2.93
Metals (Solids)													
Arsenic	7.45	14.6	9.52	6.55	8.91	10.5	13.6	8.18	6	2.12	9.7	11.9	12.9
Cadmium	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.765	0.02	0.02	0.0489	0.343
Chromium	21.4	33	23.4	118	13.3	77	264	57	416	76.3	19.7	63.7	38.7
Copper	8.03	22.5	18.3	15.2	24	98.5	72.6	13.5	14	2.22	9	30.4	20.5
Lead	13	18.2	27.6	37.6	24.7	138	65	48.3	19.3	5.54	13.1	30.1	45.1
Mercury	0.14	0.14	0.14	0.14	0.14	1.4	1.06	0.14	1.4	0.14	0.14	0.14	0.14
Nickel	25.3	31.7	20.5	13.6	30.1	72.1	125	13.8	12	1.96	28.7	39	34.3
Selenium	1	1	1.28	2.57	1	1	1	1.99	10	6.09	1	1	1
Vanadium	35.8	57.4	57	144	33.5	28.7	43.7	185	284	94.6	36.2	70.2	71
Zinc	71.1	116	116	94.2	70.3	691	549	203	62.9	28.5	73.8	131	146
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.01	0.02	0.02	0.02	0.0365	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.01	0.02	0.02	0.02	0.0277	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.01	0.02	0.02	0.02	0.0718	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	0.1	0.1	1.58	0.472	0.1	56.1	14.9	6.41	9.48	3.43	0.36	0.1	0.1
Aliphatics >C16-C21	0.1	0.1	5.54	3.22	0.1	258	175	11.1	33.6	17	0.1	0.1	0.1
Aliphatics >C21-C35	0.1	0.1	28.5	23.8	4.46	316	357	37.7	168	107	0.325	0.1	3.04
Aliphatics >C35-C44	0.1	0.1	8.4	8.19	0.1	91.7	130	4.93	81.4	46.5	0.188	0.1	0.1
Aromatics >EC5-EC7	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.01	0.02	0.02	0.02	0.0479	0.02	0.02	0.01	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	0.1	0.1	1.59	2.42	0.713	635	105	9.8	6.32	3.71	0.1	0.1	0.1
Aromatics >EC16-EC21	0.1	0.1	6.68	11.2	1.12	3540	1210	26.9	32.2	20.7	0.1	0.1	0.1
Aromatics >EC21-EC35	0.1	4.17	21.4	38.6	5.13	4460	2350	70.6	236	116	0.1	12.1	1.6
Aromatics >EC35-EC44	0.1	0.982	6.27	16.6	0.396	926	538	18.8	144	66.5	0.1	2.14	0.1
Aromatics >EC40-EC44	0.1	0.1	2.08	8.5	2.78	220	162	8.9	61.7	27.3	1.56	0.1	3
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	12	12	182	296	12	24400	21600	616	423	279	12	12	12
Acenaphthene	8	8	38.8	67.7	8	1360	1470	92.5	61.2	73.5	8	8	8
Anthracene	16	16	375	621	16	101000	103000	659	690	564	16	16	16
Benz(a)anthracene	14	33.4	680	1340	43.6	117000	154000	1350	1610	1390	14	14	33
Benzo(a)pyrene	15	15	545	1210	35.7	93600	117000	890	1160	1150	15	15	29.8
Benzo(b)fluoranthene	15	37.8	766	1900	63.8	132000	170000	1800	1500	1830	15	15	44.9
Benzo(k)fluoranthene	14	14	286	807	20.2	45000	66300	612	609	651	14	14	14
Benzo(g,h,i)perylene	24	24	414	694	24	63600	89200	628	820	766	24	24	24
Chrysene	10	29.5	608	1360	73.5	113000	165000	1460	1360	1500	10	10	37.5
Dibenzo(a,h)anthracene	0.023	0.023	122	179	0.023	16800	16300	149	197	144	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	0.018	529	904	25.3	79300	85400	712	706	695	0.018	0.018	0.018
Fluoranthene	0.017	87.4	1760	2950	92.7	294000	391000	2960	3670	3350	0.017	35.5	70.2
Fluorene	10	10	191	293	10	30900	21200	436	269	315	10	10	10
Naphthalene	9	9	643	787	48.8	17300	16800	2990	1670	1030	9	347	9
Phenanthrene	15	57.8	1580	2230	167	195000	215000	2990	2730	2590	15	15	57.2
Pyrene	0.015	0.0569	1.25	2.2	0.063	216	278	2.11	2.67	2.51	0.015	0.0295	0.0543
PAH, Total Detected USEPA 16	0.118	0.303	9.97	17.8	0.634	1540	1910	20.4	20.1	18.8	0.118	0.412	0.327
Naphthalene-d8 % recovery**	80.9	75.6	79.6	83.1	81.5	78.9	93	91.6	96.7	90.5	92.7	79.6	94.9
Acenaphthene-d10 % recovery**	84.4	79.1	91.6	86.4	87.9	86.6	182	96.5	96.1	97.2	91.6	85.5	95.1
Phenanthrene-d10 % recovery**	87.6	77.8	94.2	89.8	91.4	84.5	111	96.4	94.1	96.8	92.5	88.1	94.7
Chrysene-d12 % recovery**	96.7	69.1	73.9	96.4	75.8	75.7	267	93	92.5	94.8	88.2	77.7	92.2
Perylene-d12 % recovery**	97.1	70.6	70.2	91.7	70.8	77.3	183	78.5	85.6	86.9	87.4	78.9	90.1
Total Aliphatics >C12-C44	0.1	0.1	44.1	35.6	4.46	722	677	60.2	293	173	0.873	0.1	3.04
Total Aromatics >EC12-EC44	0.1	5.16	36	68.8	7.37	9560	4200	126	419	207	0.1	14.2	1.6
Total Aliphatics & Aromatics >C5-C44	0.1	5.16	80	104	11.8	10300	4870	186	711	380	0.873	14.2	4.64
Metals - (Solid)													
Iron	22100	33000	50800	45300	17900	65100	61400	79400	97800	33200	27300	38000	31400
Manganese	586	577	2440	6530	913	1520	2020	4630	25900	13600	1140	423	998
Metals - (Liquid)													
Calcium	-	-	-	126000	-	-	36800	-	219000	211000	-	-	-
Magnesium	-	-	-	37100	-	-	6000	-	32100	27200	-	-	-
Phenols													
Phenol	0.01	0.01	0.01	0.01	0.01	0.0126	0.0126	0.01	0.01	0.0213	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.0756	0.0244	0.0112	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.0882	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	0.0552	-	-	0.103	-	0.15	0.144	-	-	-
pH	8.27	7.43	9.7	10.2	8.65	7.97	12.8	8.62	11.6	10.8	8.28	6.91	8.49
Sulphate, Total													
Sulphur, Total	-	-	-	0.112	-	-	0.541	-	0.4	1.05	-	-	-
Sulphate, Total potential	-	-	-	0.336	-	-	1.62	-	1.2	3.15	-	-	-
Sulphate, acid soluble (total)	-	-	-	0.211	-	-	0.116	-	0.912	0.795	-	-	-
Cyanide, Total	1	1	1	1	1	259	272	1	1	1	1	1	1
Exchangeable Ammonia as N	12	53.7	12	12	12	12	12	12	12	12	36.3	181	185
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-
Date of Analysis	-	-	-	05/11/2018	-	-	05/11/2018	-	05/11/2018	05/11/2018	-	-	-
Analysed By	-	-	-	Lucy Caroe	-	-	Andrzej Ferfecki	-	Lucy Caroe	Christian Hallam	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	None	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	N/A	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	0.001	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Amosite (Brown) Asbestos	-	-	-	Not Detected	-	-	Detected	-	Not Detected	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Fibrous Anthophyllite	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Fibrous Tremolite	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Fibrous Actinolite	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Non-Asbestos Fibre	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	-	-
Comments	-	-	-	-	-	-	loose fibres in soil	-	0	0	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	111	109	113	118	126	113	104	99.4	105	107	112	113	104
Toluene-d8**	102	101	97.3	95.5	94.9	90.5	88.1	96.5	98.1	92	102	101	98
4-Bromofluorobenzene**	102	90.3	85.9	81.6	82.7	74.2	71.4	111	70	90.2	102	100	87.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.194	0.154	0.13	1.3	0.13	2.6	0.506	0.265	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	10.8	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	9.06	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	10.6	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	8.5	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	0.87	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	15.5	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	16.2	-	-	-	-	-	-

Sample ID	3CK1	3CK1	3CK1	3CK2	3CK2	3CK4	3CK4	3CK5	3CK5	3CK6	3CK6	3CK7	3CK7
Depth	0.5	1	1.5	0.5	1	0.5	1	0.5	1.5	0.5	1	0.5	1
Sampled Date	22/10/2018	22/10/2018	22/10/2018	19/10/2018	19/10/2018	24/10/2018	24/10/2018	24/10/2018	24/10/2018	23/10/2018	23/10/2018	23/10/2018	23/10/2018
Carbon													
Soil Organic Matter (SOM)	2.02	1.55	5.83	40	47.6	8.41	0.35	2.16	4.12	27.8	20.3	17.6	20.2
Metals (Solids)													
Arsenic	5.44	8.83	14.2	4.51	12.4	6	6	6	6	11.2	11.5	8.46	9.17
Cadmium	0.15	0.2	1.1	0.02	0.02	1.66	1.02	1.35	1.33	2.79	0.9	0.922	0.02
Chromium	9.44	97.2	17.4	494	755	561	423	463	991	299	277	159	84.4
Copper	23.8	21.3	21.3	19.4	66.3	19.2	14	32.5	14	37.9	26.6	27.1	506
Lead	12.8	33.4	39.3	6.95	33.3	114	30.7	90.5	71	329	58.9	62.8	43.7
Mercury	0.14	1.4	1.4	0.14	0.14	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14
Nickel	24.5	19.1	28.2	70.9	307	15.7	10.5	21.4	8.89	25.8	19.5	27.9	15.4
Selenium	1	10	10	4.08	1	10	10	10	10.1	10	10	10	3.07
Vanadium	15	127	48.2	173	48.4	416	523	804	582	229	224	282	99.4
Zinc	60	75.3	118	41	99.4	396	137	438	278	1110	145	234	118
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.01	0.01	0.01	0.02	0.0667	0.0367	0.02	0.02	0.02	0.02	0.02	0.0234	0.02
Aliphatics >C8-C10	0.01	0.01	0.01	0.02	0.062	0.0291	0.02	0.02	0.02	0.02	0.02	0.0234	0.02
Aliphatics >C10-C12	0.01	0.01	0.01	0.02	0.0421	0.027	0.02	0.02	0.02	0.02	0.02	0.0445	0.02
Aliphatics >C12-C16	0.1	0.1	1.27	8.18	7.02	2.65	1.19	0.1	1.22	1.81	0.767	6.3	3.11
Aliphatics >C16-C21	0.764	0.1	10.8	41.2	27.3	13	4.04	2.39	8.17	5.63	4.92	40.1	18.4
Aliphatics >C21-C35	3.22	9.54	22.8	70.5	38.8	45	47.9	25.7	46.9	18.8	28.1	83.5	39.1
Aliphatics >C35-C44	0.1	0.1	0.1	16.3	4.24	6.4	2.94	8.03	9.21	2.81	5.38	20.6	9.18
Aromatics >EC5-EC7	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.01	0.01	0.01	0.02	0.041	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.01	0.01	0.01	0.02	0.0281	0.02	0.02	0.02	0.02	0.02	0.02	0.0293	0.02
Aromatics >EC12-EC16	0.1	0.837	0.1	18.5	16.3	4.66	2.5	0.1	2.19	2.41	1.26	28.8	10.6
Aromatics >EC16-EC21	2.27	2.81	3.1	175	163	22	6.03	4.04	15	8.14	7.67	296	127
Aromatics >EC21-EC35	7.11	10.9	43.9	489	545	71.7	25.3	29.4	69.9	24.8	27.8	718	428
Aromatics >EC35-EC44	1.2	3.04	7.34	107	126	21.2	7.13	11.1	21.9	6.65	8.08	177	101
Aromatics >EC40-EC44	0.1	1.13	2.18	28.4	38.1	7.82	2.65	4.19	8.11	2.33	2.73	43.4	25.2
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	12.6	51.6	12	1620	4600	155	37.4	38	238	98.5	35	8130	3440
Acenaphthene	8	10.8	8	8	264	8	8	22.3	86.4	20.9	8	472	206
Anthracene	23.4	73.1	16	5930	8240	221	80.1	70	866	150	82.7	118000	5720
Benz(a)anthracene	80.9	243	64	18900	30000	644	199	290	1660	457	215	38700	21800
Benzo(a)pyrene	63.1	212	71.7	14100	21800	491	144	285	1430	411	129	32800	19400
Benzo(b)fluoranthene	116	330	132	14200	37700	961	270	446	2300	340	277	50600	32000
Benzo(k)fluoranthene	41.9	126	43.3	7790	15500	334	103	160	783	239	88.9	18000	8890
Benzo(g,h,i)perylene	50	149	52.1	9190	15400	408	124	235	927	320	104	20700	16000
Chrysene	112	276	86	15700	23600	729	246	350	1830	437	287	37300	19000
Dibenzo(a,h)anthracene	0.023	37.2	0.023	3190	4990	109	30.1	46.5	284	72.8	28.5	5890	3710
Indeno(1,2,3-cd)pyrene	52.8	128	60.1	10000	19200	423	119	222	1030	283	161	31500	17200
Fluoranthene	141	450	146	34300	60600	1460	509	503	2930	1150	840	91000	42200
Fluorene	12.5	33.4	10	1900	1880	81.4	10	29.2	186	78.9	25.8	12900	1450
Naphthalene	61.4	96.7	14.1	1250	1430	868	170	94.8	321	318	131	7040	2390
Phenanthrene	211	289	70.9	18600	20100	1140	501	273	1370	738	756	45200	11700
Pyrene	0.109	0.335	0.115	26.1	41.5	1.01	0.34	0.448	2.38	0.856	0.534	61.2	32
PAH, Total Detected USEPA 16	1.09	2.84	0.854	183	307	9.03	2.87	3.51	18.6	5.97	3.7	580	237
Naphthalene-d8 % recovery**	91.5	81.4	84.3	89.1	91.3	86.1	83.7	87.5	80.8	94.6	82.2	74.8	86.8
Acenaphthene-d10 % recovery**	93.4	80.9	87.2	93.4	90	87.9	85.2	88	88.9	89.7	84	77.9	83.4
Phenanthrene-d10 % recovery**	95.3	79.4	92.9	99.6	88.6	91	87.6	90.3	92.7	88	87	81.1	84.9
Chrysene-d12 % recovery**	99.3	77.3	98.8	98.2	83.8	83.4	81.3	86.1	74.2	83.8	82	76.4	77.3
Perylene-d12 % recovery**	92.5	71.5	94.1	84.8	82.8	78.6	75.3	86.1	70.4	76.5	70.4	74.2	77.2
Total Aliphatics >C12-C44	3.99	9.54	34.9	136	77.4	67	56.1	36.1	65.5	29.1	39.2	150	69.8
Total Aromatics >EC12-EC44	10.6	17.5	54.4	790	850	120	40.9	44.6	109	42	44.8	1220	667
Total Aliphatics & Aromatics >C5-C44	14.6	27.1	89.2	926	927	187	97	80.6	175	71.1	84	1370	737
Metals - (Solid)													
Iron	13200	115000	63100	73600	36600	133000	141000	113000	162000	88300	65900	61100	66200
Manganese	341	11900	8420	10400	1310	26800	29400	26600	36800	14100	17300	15100	5690
Metals - (Liquid)													
Calcium	2440	-	43000	115000	-	190000	233000	226000	219000	98100	-	105000	-
Magnesium	2210	-	14600	11900	-	6910	31700	20900	4350	12700	-	9610	-
Phenols													
Phenol	0.01	0.01	0.01	0.0104	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.0142	0.01	0.01	0.0108	0.0106	0.01	0.01	0.01	0.0113	0.0117	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0226	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE	0.0402	-	0.225	0.0302	-	0.0743	0.004	0.0872	0.0322	0.151	-	0.345	-
pH	8.24	8.63	6.53	8.15	8.17	11.6	12.4	11.3	9.45	8.62	12	8.8	8.82
Sulphate, Total													
Sulphur, Total	0.0351	-	0.13	0.449	-	0.255	0.161	0.213	0.16	0.271	-	0.288	-
Sulphate, Total potential	0.105	-	0.39	1.35	-	0.765	0.483	0.639	0.48	0.813	-	0.864	-
Sulphate, acid soluble (total)	0.023	-	0.228	0.0343	-	0.305	0.296	0.364	0.224	0.276	-	0.447	-
Cyanide, Total	1	1	1	1	1	1.22	1	1	1	1	1	1	1.4
Exchangeable Ammonia as N	12	12	41.5	12	12	12	12	12	12	12	12	12	12
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	05/11/2018	-	05/11/2018	05/11/2018	-	07/11/2018	30/10/2018	30/10/2018	07/11/2018	06/11/2018	-	06/11/2018	-
Analysed By	Marcin Magdziarek	-	Marcin Magdziarek	Lucy Caroe	-	Paul Poynton	Lucy Caroe	Lucy Caroe	Christian Hallam	Renata Bozhkov	-	Renata Bozhkov	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-
Comments	-	-	-	0	-	0	0	0	0	-	-	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	123	122	134	97.2	92.2	99.5	94	103	106	94.4	97.3	104	88.4
Toluene-d8**	101	104	96.7	92.8	91.3	88.9	89.1	96	96.9	93	92.8	98.1	89.1
4-Bromofluorobenzene**	77.7	79.8	80.3	77.2	86.9	74.9	91.8	106	92.5	71.5	79.2	81.6	79.7
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2
Benzene	0.09	0.09	0.09	0.18	0.18	0.09	0.09	0.09	0.18	0.09	0.18	0.09	0.18
Toluene	0.07	0.07	0.07	0.14	0.14	0.07	0.07	0.07	0.14	0.07	0.14	0.07	0.14
Ethylbenzene	0.04	0.04	0.04	0.08	0.08	0.04	0.04	0.04	0.08	0.04	0.08	0.04	0.08
p/m-Xylene	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2
o-Xylene	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.2
Naphthalene	0.13	0.13	0.13	0.26	0.26	0.194	0.13	0.13	0.26	0.13	0.26	0.638	0.26
Sum of BTEX	0.4	0.4	0.4	0.8	0.8	0.4	0.4	0.4	0.8	0.4	0.8	0.4	0.8
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	19.8	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	16.9	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	19.6	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	16.3	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	1.16	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	13.9	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	14.9	-	-	-	-	-	-	-	-

Sample ID	3CK8	3CK8	3CK1V	3CK2V	3CK4V	3CK5V	3CK6V	3CK7V	3CK8V	3CL2	3CL2	3CL4
Depth	0.7	1.8	1.7	1.2	4	3.5	2.5	2.2	2.8	0.5	1	1
Sampled Date	23/10/2018	23/10/2018	22/10/2018	19/10/2018	24/10/2018	24/10/2018	23/10/2018	23/10/2018	23/10/2018	19/10/2018	19/10/2018	24/10/2018
Carbon												
Soil Organic Matter (SOM)	19.3	15.2	1.36	5.4	3.02	4.86	1.41	0.895	2.12	2.84	86.4	5.24
Metals (Solids)												
Arsenic	6	6	13.4	11.4	11.3	11.8	13.3	16.4	13.3	12.9	9.29	9.74
Cadmium	0.704	0.2	0.02	0.02	0.212	0.302	22.5	0.02	0.02	0.254	0.02	0.639
Chromium	539	366	31.6	39.3	34.2	37.9	37	38.6	36.5	114	8.5	32.8
Copper	15.3	19.8	16.4	17.7	17.1	18.4	81.4	18.6	22.7	14.3	33.5	15.5
Lead	36	37.4	21.1	31.5	27.9	35.7	172	24	20.8	49.3	38.9	67.2
Mercury	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	10.7	11.9	35.5	25.9	33.7	32.7	40.4	41.5	32.8	22.5	17.6	32.1
Selenium	10	11.7	1	1	1	1	1	1	1	1.97	1	1
Vanadium	404	787	52.5	62.7	55.7	62.1	52.7	58.8	57.8	109	28.4	50.8
Zinc	58.6	87.5	105	113	109	123	1240	124	127	190	158	313
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
Aliphatics >C6-C8	0.0902	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
Aliphatics >C8-C10	0.0704	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
Aliphatics >C10-C12	0.0726	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0201	0.02
Aliphatics >C12-C16	12.2	3.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	8.74	0.1
Aliphatics >C16-C21	27.4	10.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	69.2	0.1
Aliphatics >C21-C35	68.3	43.1	0.1	2.61	0.1	2.26	0.1	0.1	0.1	7.18	124	7.99
Aliphatics >C35-C44	11.1	8.04	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	30.5	0.94
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
Aromatics >EC8-EC10	0.0473	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
Aromatics >EC10-EC12	0.0484	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02
Aromatics >EC12-EC16	15.1	4.51	0.1	0.1	0.1	0.1	0.1	0.359	0.1	0.1	58.6	0.1
Aromatics >EC16-EC21	42.2	18.2	0.1	0.1	0.1	0.1	0.1	3.61	0.1	0.1	966	0.817
Aromatics >EC21-EC35	93	70.5	2.61	18.6	3.74	9.45	3.19	11.3	6.36	15.9	1880	16.2
Aromatics >EC35-EC44	20.9	16.7	0.1	1.85	0.547	1.99	0.607	1.22	0.1	1.59	379	8.05
Aromatics >EC40-EC44	5.84	4.75	2.35	0.1	0.1	0.1	0.1	0.1	0.1	0.1	97.3	3.62
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	267	104	12	12	12	12	12	25.4	12	12	13100	13.8
Acenaphthene	56.5	46.2	8	8	8	8	8	8	8	8	721	8
Anthracene	430	238	16	16	16	16	16	38.6	16	16	58000	20.2
Benz(a)anthracene	952	910	14	80.2	22.2	21.9	14	73.8	23.4	28	96500	88.7
Benzo(a)pyrene	723	894	15	57.9	15	15	15	62.3	15	32.7	86000	84.4
Benzo(b)fluoranthene	787	1120	15	96.3	15	27.6	21.2	58.9	29.8	58.2	117000	152
Benzo(k)fluoranthene	360	487	14	30.7	14	14	14	31.2	14	19	39100	50.6
Benzo(g,h,i)perylene	555	789	24	47.8	24	24	24	47.7	24	24	75700	67.5
Chrysene	944	950	10	90.1	18.4	24.3	16.3	63.9	17.4	26.5	80700	105
Dibenzo(a,h)anthracene	138	148	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	13800	0.023
Indeno(1,2,3-cd)pyrene	561	744	0.018	34.5	0.018	0.018	0.018	50.2	0.018	31.4	74900	70.8
Fluoranthene	2440	2010	0.017	176	55	42	29.1	206	40.2	49	287000	181
Fluorene	180	83.4	10	10	10	10	10	17.7	10	10	16000	10
Naphthalene	1720	494	9	9	9	16.6	9	82.8	9	9	5660	30
Phenanthrene	2160	1050	15	51.7	29.6	30	15	105	15	21.8	156000	96.9
Pyrene	1.81	1.75	0.015	0.138	0.0375	0.037	0.0206	0.153	0.0288	0.044	226	0.143
PAH, Total Detected USEPA 16	14.1	11.8	0.118	0.802	0.163	0.199	0.118	1.02	0.14	0.311	1350	1.1
Naphthalene-d8 % recovery**	88.7	86.4	92.2	87.4	85.7	86.9	79.1	85.1	79.9	92	80.9	80.9
Acenaphthene-d10 % recovery**	87.9	84.9	85.8	90.1	95.1	89	84.2	83.6	81.8	94.2	88.8	88.6
Phenanthrene-d10 % recovery**	84.9	82.2	89.8	93.2	100	92.8	88.4	79.5	86.8	96.7	89.6	93.3
Chrysene-d12 % recovery**	78.2	77.5	84	88	86.9	88.5	75.7	73.1	74.7	103	88.6	79.7
Perylene-d12 % recovery**	70.6	75.3	86.6	80.3	83.9	86.5	70.7	71.4	70.8	100	90.3	74.5
Total Aliphatics >C12-C44	119	65.1	0.1	2.61	0.1	2.26	0.1	0.1	0.1	7.18	233	8.93
Total Aromatics >EC12-EC44	171	110	2.61	20.5	4.28	11.4	3.8	16.5	6.36	17.5	3280	25.1
Total Aliphatics & Aromatics >C5-C44	291	175	2.61	23.1	4.28	13.7	3.8	16.5	6.36	24.7	3520	34
Metals - (Solid)												
Iron	89000	129000	26700	38500	27000	28400	36200	36700	32400	43900	36900	31500
Manganese	23500	21500	453	445	393	496	267	445	378	3640	1250	947
Metals - (Liquid)												
Calcium	163000	-	-	-	-	-	-	-	-	-	62800	26400
Magnesium	17400	-	-	-	-	-	-	-	-	-	4540	9160
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0118	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0115
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	0.114	-	-	-	-	-	-	-	-	-	0.0853	0.0834
pH	10.6	12	7.56	7.64	8.33	7.78	8.11	8.33	7.48	8.45	7.84	8.04
Sulphate, Total												
Sulphur, Total	0.345	-	-	-	-	-	-	-	-	-	0.298	0.055
Sulphate, Total potential	1.04	-	-	-	-	-	-	-	-	-	0.894	0.165
Sulphate, acid soluble (total)	0.552	-	-	-	-	-	-	-	-	-	0.0722	0.0583
Cyanide, Total	1	1	1	1	1	1	1	1.25	1	1	19.3	1
Exchangeable Ammonia as N	12	12	26.7	108	263	119	64	22	191	12	12	12
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	06/11/2018	-	-	-	-	-	-	-	-	-	05/11/2018	31/10/2018
Analysed By	Renata Bozhkov	-	-	-	-	-	-	-	-	-	Andrzej Ferfecki	Christian Hallam
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected
Amosite (Brown) Asbestos	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected
Fibrous Anthophyllite	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected
Fibrous Tremolite	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected
Fibrous Actinolite	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected
Non-Asbestos Fibre	Not Detected	-	-	-	-	-	-	-	-	-	Not Detected	Not Detected
Comments	-	-	-	-	-	-	-	-	-	-	0	0
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	85.2	99.5	113	106	105	113	111	105	112	125	99.5	101
Toluene-d8**	87.8	94.6	101	105	95.6	98.8	101	97.1	98.8	104	97.3	92.5
4-Bromofluorobenzene**	73.3	73.3	101	110	105	88.8	93.7	97.7	106	86.8	71.8	96.7
Methyl Tertiary Butyl Ether	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.34	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1.78	0.13
Sum of BTEX	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CL4	3CL4	3CL5	3CL5	3CL5	3CL6	3CL6	3CL7	3CL7	3CL2V	3CL4V	3CL5V
Depth	2.5	3	0.5	2	3	0.5	1	0.5	1	1.5	5.205.20	5.405.40
Sampled Date	24/10/2018	24/10/2018	23/10/2018	23/10/2018	23/10/2018	23/10/2018	23/10/2018	22/10/2018	22/10/2018	19/10/2018	24/10/2018	23/10/2018
Carbon												
Soil Organic Matter (SOM)	17.9	20.9	2.9	2.26	1.19	24	18.4	9.88	12.3	1.6	1.39	88.8
Metals (Solids)												
Arsenic	4.12	6.04	7.65	6	6	397	7.02	6.54	6.54	12	11.2	5.72
Cadmium	0.02	1.66	1.34	0.492	0.886	0.856	0.455	0.02	0.02	0.02	0.02	0.136
Chromium	372	490	30.8	359	910	193	174	461	358	28	36.3	3.07
Copper	9.82	36.4	15.6	15.2	14	144	16.3	11.3	10.5	11.9	15.4	36.6
Lead	17.9	136	91.7	197	16.2	80.6	34.6	23.2	15.7	20.2	24.9	24.9
Mercury	0.14	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.15
Nickel	8.5	31.7	38.6	14.5	6.16	313	14.5	10	6.11	30.4	40.8	13
Selenium	7.23	10	10	12.2	16.7	51.7	2.5	7.05	11.7	1	1	2.22
Vanadium	262	557	77.5	324	600	278	123	344	394	48.1	65.5	10.9
Zinc	44.1	164	389	827	52.8	205	129	143	72.4	95.7	124	23.5
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.0507	0.02	0.02	0.02	0.0245	0.02	0.02	0.0278	0.01	0.01	0.02	0.02
Aliphatics >C6-C8	0.247	0.02	0.02	0.02	0.0705	0.088	0.0966	0.071	0.0353	0.01	0.02	0.02
Aliphatics >C8-C10	0.204	0.02	0.02	0.02	0.0531	0.109	0.0644	0.0722	0.0217	0.01	0.02	0.02
Aliphatics >C10-C12	0.236	0.02	0.02	0.02	0.0378	0.229	0.104	0.354	0.0365	0.01	0.02	0.02
Aliphatics >C12-C16	19.4	19.7	0.411	0.932	1.79	8.58	7.81	9.69	6.6	0.1	0.415	6.04
Aliphatics >C16-C21	132	433	5.16	11	8.11	29.2	55.8	33	68.8	0.1	1.63	12.1
Aliphatics >C21-C35	93.2	151	30.2	50.5	38.2	54.6	72.7	75.4	77.8	0.1	3.89	35.7
Aliphatics >C35-C44	13.3	30.2	5.63	11.1	8.22	14	28.8	17.8	18.8	0.1	0.1	8.73
Aromatics >EC5-EC7	0.0224	0.02	0.02	0.02	0.0204	0.02	0.02	0.02	0.01	0.01	0.02	0.02
Aromatics >EC7-EC8	0.0696	0.02	0.02	0.02	0.0429	0.02	0.02	0.02	0.01	0.01	0.02	0.02
Aromatics >EC8-EC10	0.137	0.02	0.02	0.02	0.0358	0.0726	0.0437	0.0477	0.0148	0.01	0.02	0.02
Aromatics >EC10-EC12	0.157	0.02	0.02	0.02	0.0256	0.153	0.069	0.236	0.0239	0.01	0.02	0.02
Aromatics >EC12-EC16	26.7	7.58	0.1	1.94	3.33	118	14.4	45.4	9.26	0.1	0.1	7.69
Aromatics >EC16-EC21	158	124	2.36	8.81	10.8	512	72.6	395	58.3	0.1	0.633	14.8
Aromatics >EC21-EC35	638	199	26.6	40.6	35.7	632	142	695	103	0.1	5.67	55.2
Aromatics >EC35-EC44	181	43.5	7.62	11.3	7.21	114	46.1	150	28.7	0.1	0.537	9.21
Aromatics >EC40-EC44	56.8	16.2	2.35	3.56	1.82	26.8	15.1	35.9	9.11	0.1	0.1	2.76
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	226	96.5	16.8	15	238	3590	1340	4530	787	12	12	12
Acenaphthene	132	273	9.23	10.2	59.1	416	263	416	145	8	8	15
Anthracene	758	599	36.7	42.4	269	5250	2000	12700	2000	16	16	16
Benz(a)anthracene	3050	2800	131	129	739	10500	4150	18500	3250	14	22.6	34.7
Benzo(a)pyrene	2750	2580	143	113	525	9230	3540	13200	2610	15	15	26.5
Benzo(b)fluoranthene	3800	3450	167	176	584	11100	3510	21300	3900	15	38.7	70.2
Benzo(k)fluoranthene	1480	1410	82.4	67.6	270	4730	1480	7670	1420	14	14	14
Benzo(g,h,i)perylene	1730	1850	138	121	411	6770	2780	8770	1580	24	24	30
Chrysene	2620	2800	139	174	697	8760	3550	19100	3210	10	25.8	172
Dibenzo(a,h)anthracene	690	564	0.023	0.023	106	1350	669	2760	339	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	1550	2560	130	113	409	6520	2860	10300	1790	0.018	0.018	0.018
Fluoranthene	3240	5090	237	235	1990	29300	10200	54500	7590	0.017	27.8	95.2
Fluorene	294	195	12.6	15.7	243	2800	1210	5180	1060	10	10	114
Naphthalene	1960	336	47	69.3	980	11900	6870	7630	3690	9	9	290
Phenanthrene	2560	3230	107	207	1910	15000	6520	28400	5390	15	15	597
Pyrene	2.67	4.01	0.191	0.214	1.35	21.3	7.55	39.5	5.68	0.015	0.0241	0.0888
PAH, Total Detected USEPA 16	29.5	31.8	1.59	1.7	10.8	149	58.5	254	44.4	0.118	0.139	1.53
Naphthalene-d8 % recovery**	99.4	80.8	88.3	88.7	90.8	94	82.8	78.6	79.3	92.9	90.7	88.6
Acenaphthene-d10 % recovery**	91	86.8	85.7	93.4	89.5	88.3	82.8	85.1	87.8	87.7	85.9	92.6
Phenanthrene-d10 % recovery**	92.4	103	85.7	100	88.6	87.5	84.9	95.8	91	91.3	86.2	94.2
Chrysene-d12 % recovery**	88	96.4	80.4	93.9	85	75.4	77.9	97.8	83.7	85.8	77.7	82.6
Perylene-d12 % recovery**	86.5	87.6	74.1	80.2	82.4	71.7	72.7	89.3	72.7	87.4	83.1	52
Total Aliphatics >C12-C44	258	633	41.4	73.6	56.4	106	165	136	172	0.1	5.94	62.6
Total Aromatics >EC12-EC44	1000	374	36.6	62.6	57	1370	275	1290	199	0.1	6.84	86.9
Total Aliphatics & Aromatics >C5-C44	1260	1010	78	136	114	1480	440	1420	371	0.1	12.8	150
Metals - (Solid)												
Iron	99200	141000	82200	121000	165000	83600	48600	78100	126000	43800	34400	4500
Manganese	18700	27300	2840	22400	64800	188000	12100	25400	36100	1260	912	162
Metals - (Liquid)												
Calcium	176000	-	60600	-	248000	-	164000	-	180000	-	-	-
Magnesium	12800	-	10500	-	800	-	11400	-	8120	-	-	-
Phenols												
Phenol	0.0118	0.0102	0.01	0.01	0.0409	0.011	0.115	0.0555	0.125	0.01	0.01	0.012
Cresols	0.0354	0.01	0.0115	0.01	0.0511	0.022	0.023	0.0222	0.0228	0.01	0.01	0.012
Xylenols	0.0472	0.015	0.015	0.015	0.015	0.015	0.015	0.0333	0.015	0.015	0.015	0.036
Phenols, Total Detected monohydric	0.0944	0.035	0.035	0.035	0.092	0.035	0.138	0.111	0.148	0.035	0.035	0.06
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	0.168	-	0.0777	-	0.0202	-	0.205	-	0.145	-	-	-
pH	12.2	12.5	8.46	11	13	10.6	10.9	10.4	11.3	7.84	7.98	7.31
Sulphate, Total												
Sulphur, Total	0.457	-	0.185	-	0.286	-	0.371	-	0.365	-	-	-
Sulphate, Total potential	1.37	-	0.555	-	0.858	-	1.11	-	1.1	-	-	-
Sulphate, acid soluble (total)	0.513	-	0.209	-	0.328	-	0.545	-	0.438	-	-	-
Cyanide, Total	1	1	1	6.46	1	1	1	1.66	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	19	12	12	12	28.9	35.3	46.3
Asbestos												
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	0.001	-	-	-
Date of Analysis	07/11/2018	-	06/11/2018	-	06/11/2018	-	06/11/2018	-	05/11/2018	-	-	-
Analysed By	James Richards	-	James Richards	-	Barbara Urbanek-Walsh	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	0.001	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	None	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	N/C	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	0.001	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Detected	-	-	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Non-Asbestos Fibre	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-
Comments	0	-	-	-	-	-	-	-	Loose fibres in soil.	-	-	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	92.3	105	115	117	102	95.7	81.5	106	93.9	125	104	100
Toluene-d8**	88	87.6	99.3	98.3	91.6	95.6	94.1	99.6	96.6	103	95.4	93.5
4-Bromofluorobenzene**	70.5	95.7	90	89.3	73.7	76.4	70.2	91.3	85.3	87.5	108	83.1
Methyl Tertiary Butyl Ether	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2
Benzene	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	1.8
Toluene	0.175	0.07	0.07	0.07	0.139	0.07	0.07	0.07	0.07	0.07	0.07	1.4
Ethylbenzene	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.8
p/m-Xylene	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2
o-Xylene	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2
Naphthalene	1.07	0.13	0.13	0.13	0.13	1.74	18.4	8.37	1.37	0.13	0.13	2.6
Sum of BTEX	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	8
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	3CL6V	3CL7V	3CM2	3CM2	3CM3	3CM4	3CM4	3CM4	3CM5	3CM5	3CM5	3CM5	3CM6	3CM6	3CM7	3CM7	3CM7	3CM8	3CM8	3CM8
											Depth	3	2.5	0.5	1	0.5	0.7	1.8	2.5	0.5	2	3	4	0.7	1.5	0.5	1	2	0.5	1	2
											Sampled Date	23/10/2018	22/10/2018	19/10/2018	19/10/2018	24/10/2018	24/10/2018	24/10/2018	24/10/2018	23/10/2018	23/10/2018	23/10/2018	23/10/2018	23/10/2018	23/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018	22/10/2018
Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances																				
Carbon																															
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	3.26	8.31	6.86	25.9	1.09	6.05	21.9	0.76	2.48	6.09	5.48	10.4	2.41	5.28	12	14.9	28.8	9.95	7.76	16.7
Metals (Solids)																															
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	13.8	13.1	13.4	11.7	6	6	7.37	2.77	18.1	6	6	8.13	10.6	6	8.16	7.57	8.7	18	10.8	6.3
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	0.02	0.0685	2.15	0.2	1.94	1.11	0.427	0.02	8.99	0.2	0.972	0.867	0.289	0.2	0.363	0.02	0.02	0.02	0.02	0.02
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	34.2	37.3	82.8	9	560	1040	629	756	153	629	901	290	40.5	641	87.4	93.9	241	128	63	573
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	20.2	21.1	22.7	38.7	22.3	16.4	14	6.02	51.9	17.2	17.2	20.4	22.8	16.8	24.2	19.4	16.9	21.4	19.1	11.4
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	22.4	31.8	69.9	27.7	121	52.8	22.2	4.99	1390	305	43.2	58.5	28.7	43.8	53.3	22.5	66.1	50.6	30.7	81.4
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	0.14	0.14	1.4	1.4	1.4	1.4	1.4	0.14	1.4	1.4	1.4	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	30	24.5	25.2	45.2	22.9	18	17.1	3.46	39.6	10.3	18	20.6	46.2	16.9	12.8	13.8	11.7	22.9	20.1	8.24
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	1	1	10	10	10	10	12.6	11.2	10	17.6	10.3	10	1	16	1.53	4.31	5.02	4.27	1	9.54
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	61.4	52.7	124	125	647	498	344	672	356	459	503	282	62.1	683	78.3	227	318	168	93.2	535
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	112	117	288	142	401	203	59.9	33	6160	1020	165	230	121	150	192	92.2	139	218	146	445
TPH Criteria Working Group (TPH CWG)																															
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00																				
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00																				
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00																				
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00																				
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.02	0.02	0.02	0.0222	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0278	0.0244	0.02	0.02	0.0217
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.02	0.02	0.02	0.0855	0.02	0.02	0.0746	0.02	0.02	0.02	0.0757	0.0278	0.02	0.0509	0.02	0.132	0.0998	0.0259	0.02	0.0935
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.02	0.02	0.02	0.0588	0.02	0.02	0.0576	0.02	0.02	0.02	0.0746	0.02	0.02	0.0328	0.02	0.0999	0.0789	0.0218	0.02	0.0958
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.02	0.02	0.02	0.04	0.02	0.02	0.0565	0.02	0.02	0.02	0.08	0.02	0.02	0.0452	0.02	0.21	0.132	0.0539	0.02	0.368
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	0.1	2.88	2.89	2.93	1.4	0.972	19.2	0.96	0.444	2.56	1.4	7.23	0.1	3.98	3.72	15.8	6.38	2.49	3.16	6.02
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	0.1	0.982	14.3	25.6	8.37	3.24	18.7	8.37	11.1	11	7.04	15.1	0.1	17	20	257	25.2	14.1	14.8	21.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	0.1	10.6	54.6	33.2	42.7	16.4	29.7	41.8	50.6	57.5	48.2	52.2	0.1	36.3	50.7	210	57.5	39.5	39.3	71.4
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	0.1	0.1	15.8	8.15	11.6	5.1	5.98	13.9	7.11	9.41	12.6	12.5	0.1	11.1	13.4	33.7	17.9	11.6	10.5	21.8
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0206	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.02	0.02	0.02	0.0233	0.02	0.02	0.02	0.02	0.02	0.02	0.0235	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.02	0.02	0.02	0.0389	0.02	0.02	0.0384	0.02	0.02	0.02	0.0501	0.02	0.02	0.0215	0.02	0.0666	0.0534	0.02	0.02	0.0638
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.02	0.02	0.02	0.0266	0.02	0.02	0.0373	0.02	0.02	0.02	0.0533	0.02	0.02	0.0305	0.02	0.14	0.0882	0.0363	0.02	0.245
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	0.1	0.666	8.34	9.29	2.41	1.08	31.3	0.1	0.81	4.32	1.67	5.41	0.1	5.58	17.9	21.2	14.5	12.5	7.81	9.43
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	0.1	2.89	113	140	18.2	4.68	38.9	10.3	7.26	12.4	8.64	13.1	0.1	27.7	145	144	63.3	104	74.8	57
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	5.28	48.8	345	377	74.7	26.3	78	52.5	35.3	47.8	42.4	52.4	6.37	76	351	186	161	289	232	165
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	0.1	6.51	97.5	109	27.4	9	22.7	14.6	8.24	10.7	12.2	12	0.431	20.7	89	43.6	53.4	78.5	64.3	49.6
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	0.1	1.6	33	35.4	10.7	3.3	8.1	5.45	2.15	3.06	3.77	3.34	0.1	5.73	28.9	16.7	19.3	21.6	17.8	14.3
Polyaromatic Hydrocarbons (PAHs)																															
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	12	12	2230	7120	198	20.2	18.2	12	107	31.8	26.8	42.6	12	379	406	1980	471	2600	3170	1270
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	8	8	78.1	660	27.1	15.5	15.1	40	8	194	24.1	17.7	8	98.7	49	236	82	196	454	167
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	16	16	5600	39100	350	41.2	52.7	56.5	74.2	404	74.4	65.9	16	568	809	1930	953	6830	8700	1760
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	14	21.8	17400	44800	1130	192	150	288	260	1360	470	262	14	2090	2050	3100	1900	12700	19100	4620
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	15	15	14800	26900	1060	206	127	252	362	1500	557	303	15	1980	1810	2400	1400	10200	17100	4410
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	15	42.6	20200	50900	1490	241	148	291	390	1290	564	325	25.8	3130	2840	3990	2420	16000	25800	6570
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	14	14	9000	19200	559	112	63.9	134	157	632	267	155	14	1060	942	1350	842	6020	9660	2410
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	24	24	12000	27800	738	153	93.3	193	428	963	463	215	24	1260	1190	1460	1010	6470	11500	3570
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	10	36.3	17700	42700	1060	214	171	404	265	1290	537	324	14.7	1810	1990	3150	1930	11900	16600	4730
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	0.023	0.023	2820	8840	165	35.9	0.023	44.9	66.3	161	93.5	47.2	0.023	305	297	331	200	1680	2630	890
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	0.018	0.018	11800	26200	1070	143	83.6	169	409	993	452	229	0.018	1870	1360	1680	1050	5910	14300	4130
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	27.7	54.9	39700	105000	2080	331	329	494	396	2430	763	454	33.3	4470	4640	7450	4580	28400	51400	10700
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	10	10	904	7170	114	22.1	34.9	23.3	18.6	151	28.5	71	10	337	358	1660	472	1320	3260	924
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	9	9	983	2840	427	94.4	254	277	135	418	102	197	9	2000	514	6020	1180	4620	2840	4000
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	15	36.6	9720	75000	944	208	466	411	206	1720	564	545	21.7	2080	2330	6460	3710	25300	31600	4850
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09	0.015	0.0424	32	82.1	1.61	0.282	0.269	0.493	0.349	2.21	0.677	0.39	0.0245	3.63	3.33	5.33	3.27	21.2	37.8	8.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	0.118	0.235	197	567	13	2.31	2.28	3.57	3.62	15.8	5.66	3.64	0.12	27	24.9	48.5	25.5	161	256	63
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	83.4	85	83.5	79.8	79.2	75.2	91.7	80.3	89.9	87.6	90.3	91.4	86.9	78.3	76.2	81.5	88.4	77	93.7	92.5
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	82.1	90.9	89	88.5	80.4	76.4	90.8	81	93.3	87.6	87.8	96	88.8	82	79.4	87.9	93.9	79.8	93.9	92.7
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	82.9	89.6	96.8	94.2	87.1	78.7	87.9	83.7	97.2	87.2	86.7	102	89.6	86.1	79.6	90.1	94.9	83.4	97.1	92.4
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	82.4	82.1	110	84.8	86.8	72.3	85.3	79	86.3	84.2	86.5	99.6	75.6	78	74.1	85.7	89.8	78.6	105	87.7
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	75.5	79.4	96.7	86.5	75.9	70.3	82.3	77.1	72.4	77.4	83	88.3	72.3	70.8	72.2	73.8	81.5	74.9	103	90.2
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	0.1	14.5	87.6	69.9	64	25.8	73.6	65.1	69.3	80.4	69.2	87	0.1	68.2	87.8	517	107	67.8	67.7	120
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	5.28	58.9	564	635	123	41.1	171	77.4	51.6	75.3	64.9	82.9	6.8	130	602	395	292	484	378	281
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00	5.28	73.4	651	706	187	66.8	245	142	121	156	134	170	6.8	198	690	912	399	551	446	402
Metals - (Solid)																															
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			42300	22400	115000	268000	112000	127000	103000	156000	233000	184000	133000	61800	29800	126000	31200	56200	95200	68300	65900	80200
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			577	506	11500	4570	23500	21700	21300	48500	17300	34700	29900	21000	509	28300	3300	9310	16800	12900	3980	32400
Metals - (Liquid)																															
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			-	-	89800	-	161000	167000	-	288000	141000	-	225000	-	6180	-	109000	-	145000	-	96200	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			-	-	9740	-	11300	10700	-	14600	3490	-	12500	-	11400	-	44400	-	18400	-	17300	-
Phenols																															
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.0143	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0121	0.01	0.0113	0.0113	0.366	0.209	0.01	0.0228	0.228
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.0286	0.01	0.01	0.0101	0.01	0.0113	0.01	0.01	0.01	0.0107	0.0484	0.01	0.0113	0.01	0.0555	0.0464	0.0104	0.0114	0.0798
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0847	0.015	0.015	0.015	0.0333	0.015	0.015	0.015	0.0228
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.145	0.035	0.035	0.035	0.455	0.255	0.035	0.035	0.331
Inorganics																															
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	-	-	0.146	-	0.0757	0.0391	-	0.0769	0.0782	-	0.0158	-	0.0553	-	0.115	-	0.175	-	0.197	-
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	7.59	6.88	8.48	8.62	9.47	8.4	12.2	11.9	8.68	10.9	12.7	10.1	7.98	10.8	8.87	11.1	11.3	9.92	9.55	10.9
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33																				
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	-	-	0.229	-	0.137	0.124	-	0.219	0.182	-	0.269	-	0.0331	-	0.115	-	0.238	-	0.204	-
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	-	-	0.687	-	0.411	0.372	-	0.657	0.546	-	0.807	-	0.0993	-	0.345	-	0.714	-	0.612	-
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	-	-	0.214	-	0.307	0.12	-	0.329	0.218	-	0.491	-	0.0336	-	0.199	-	0.319	-	0.475	-
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	1	3.12	2.05	1	1	1	1	9.2	5.73	1	1	1	1	1.14	1	1	1	2.36	3.37
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	172	297	12	12	79.8	12	12	12	12	12	12	34.7	152	12	12	12	12	12	12	16.1
Asbestos																															
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		-	-	05/11/2018	-	29/10/2018	07/11/2018	-	07/11/2018	06/11/2018	-	06/11/2018	-	06/11/2018	-	05/11/2018	-	05/11/2018	-	05/11/2018	-
Analysed By	TM048	No units		1371	0	0				0.00		-	-	Andrzej Ferfecki	-	Lucy Caroe	Christian Hallam	-	Paul Poynton	Barbara Urbanek-Walsh	-	Andrzej Ferfecki	-	Renata Bozhkov	-	Marcin Magdziarek	-	James Richards	-	Barbara Urbanek-Walsh	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	0.0409	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00		-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0				0.00		-	-	-	-	-	-	-	-	-	-	N/A	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	0.0411	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		-	-	Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-
Comments	TM048	No units		1371	0	0			0	0.00		-	-	0	-	0	0	-	0	-	-	loose fibres in soil	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																															
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		113	108	107	104	103	111	110	79.5	107	103	109	105	120	96.7	103	94.9	91.9	108	107	96.3
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		101	101	99.9	97.1	94.9	98.7	98.7	86.1	100	98.8	95.4	98	100	96.8	99.8	94	93.1	100	97.2	92.4
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		94.4	99.7	71	70.6	98.7	95.5	101	78	90.4	103	79.8	101	91.1	87.9	91.6	76.8	75.5	80.9	77.6	80.1
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1	2	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		0.09	0.09	0.09	0.09	0.09	0.18	1.8	0.09	0.09	1.8	0.09	1.8	0.09	1.8	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		0.07	0.07	0.07	0.07	0.07	0.14	1.4	0.07	0.07	1.4	0.07	1.4	0.07	1.4	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		0.04	0.04	0.04	0.04	0.04	0.08	0.8	0.04	0.04	0.8	0.04	0.8	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1	2	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1	2	0.1	2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		0.13	0.13	0.154	0.257	0.13	0.26	2.6	0.245	0.13	2.6	0.13	2.6	0.13	4.32	0.567	1.7	0.87	1.01	0.583	7.55
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		0.4	0.4	0.4	0.4	0.4	0.8	8	0.4	0.4	8	0.4	8	0.4	8	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																															
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	3CML1	3CML1	3CML1V	3CM2V	3CM3V	3CM4V	3CM5V	3CM6V	3CM7V	3CM8V	4CA7	4CA8	4CA8	4CA9	4CA9	4CA9	4CA7V	4CA8V	4CA9V	4CB6	4CB6	4CB6	4CB7	4CB7	4CB8	4CB8	4CB9	4CB9	4CB6V	4CB7V	4CB8V
Depth	0.6	1	1.6	1.4	1.7	4.204.20	4.704.70	3.2	3.3	3.5	0.5	0.5	1	0.5	1	1.5	2.6	2.3	2.3	0.5	1	1.5	0.6	1.2	0.5	1	0.5	1	2.3	3.4	2.1
Sampled Date	22/10/2018	22/10/2018	22/10/2018	19/10/2018	24/10/2018	24/10/2018	23/10/2018	23/10/2018	22/10/2018	22/10/2018	03/10/2018	04/10/2018	04/10/2018	04/10/2018	04/10/2018	04/10/2018	03/10/2018	04/10/2018	04/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	04/10/2018	04/10/2018	04/10/2018	04/10/2018	03/10/2018	03/10/2018	04/10/2018
Determinand																															
Carbon																															
Soil Organic Matter (SOM)	0.35	2.52	1.1	5.72	1.35	1.03	6.29	32.9	1.6	1.29	2	0.46	0.464	4.79	1.84	9.71	1.42	0.498	0.962	4.71	3.29	4.53	3.88	3.95	0.85	0.559	6.4	1.15	2.53	0.962	2.29
Metals (Solids)																															
Arsenic	6.66	14.7	13.8	16	12.4	6.78	18.3	16.8	11.1	12.2	9.43	19	9.62	11	27.6	28.1	12	12.1	9.34	10.5	10.9	15.2	14.8	15.5	20.5	27.8	14.4	12.6	11.7	11	17.9
Cadmium	0.02	0.265	0.02	0.02	0.02	0.18	0.356	3.46	0.02	0.02	0.0281	1.42	2.17	0.02	0.02	0.02	0.02	0.02	0.02	0.254	0.02	1.58	0.39	0.2	1.81	2.69	0.02	0.02	0.02	0.02	0.02
Chromium	9.6	13	25.1	38.3	29.1	28.1	34	38.8	38.3	30.9	0.9	9	0.9	32.1	0.9	8.97	34.4	40.6	34.3	58	81.9	53.7	41.4	193	0.9	9	22.6	9.67	37.7	29.9	36.7
Copper	15.9	12.6	13.7	19.7	10.2	7.84	22.4	26.7	18	11	9.62	14	1.4	17.2	28.1	24.1	10.8	13.1	11.6	22.4	20.5	28.9	42.9	31.5	4.36	256	26	28.1	14.9	10.3	12.6
Lead	15.7	28.4	20	39.1	21.8	16.4	37.8	762	24	22.3	9.84	18.5	10.6	58	15.8	14.6	31.3	28.3	22.6	49.8	27.3	54.7	48.3	57.9	28.5	219	40.2	21	28.4	25.4	27.5
Mercury	0.14	0.14	1	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14
Nickel	17.1	28.4	32.5	29.5	40.5	29.8	28.3	20.7	40.8	35	13.6	12.2	2.11	16.4	30.6	22.9	43.3	45.1	37.3	19.1	18.4	33.5	20.7	18.4	8.7	33.8	23.9	30.6	35.3	36.3	41
Selenium	1	1	1	1	1	1	1	1.52	1	1	3.39	10	1	1.52	1	2.6	1	1	1	5.95	4	10	5.75	10	1.32	10	5.41	2.52	1.02	1	1
Vanadium	19.7	21.8	45.9	65.5	58	42.4	63.3	73.9	59	52.7	79.2	17.5	17	87.8	37.2	33.9	62.1	64.8	59.3	149	132	186	151	402	66	87.4	47.5	23.6	61.2	53	64.7
Zinc	79.8	199	94.6	125	112	78.6	120	2780	114	111	56.8	54	28.7	211	85	33	145	117	118	243	122	184	150	175	74.5	321	173	111	125	118	111
TPH Criteria Working Group (TPH CWG)																															
Benzene																															
Toluene																															
Ethylbenzene																															
sum of detected mpo xylene by GC																															
Aliphatics >C5-C6	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.0115	0.01	0.0142	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.0645	0.01	0.0297	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0134	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.0416	0.01	0.0245	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.0142	0.01	0.0583	0.01	0.0219	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	0.817	1.51	0.1	0.1	0.1	0.1	0.1	9.19	0.1	0.1	4.91	10.2	4.82	2.58	0.918	1.11	0.1	0.1	0.1	0.1	0.1	0.1	5.4	6.73	0.1	1.6	0.625	0.1	0.1	0.1	0.37
Aliphatics >C16-C21	1.91	1.51	0.1	0.1	0.1	0.1	0.1	72.6	0.1	0.1	13.9	5.78	15.5	8.55	1.69	1.85	0.1	0.1	1.46	2.74	0.1	1.88	15.9	19.2	2.88	3.58	6.53	0.1	0.1	0.1	0.376
Aliphatics >C21-C35	12.4	5.97	0.1	4.1	0.1	0.1	4.87	99	0.754	0.1	59.6	70.7	20.4	41.2	15.4	17.6	0.1	0.1	1.7	26	5.65	15.4	56.7	61.1	35.6	12.4	25	3.53	0.1	0.1	4.09
Aliphatics >C35-C44	2.96	0.959	0.1	0.1	0.1	0.1	0.1	15.2	0.1	0.1	43.3	32.8	7.05	14.4	5.29	5.68	0.1	0.1	0.1	6.15	1.22	5.46	11.2	20.8	5.55	2.14	8.66	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.0581	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.0297	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.0281	0.01	0.0155	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.0385	0.01	0.0142	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	1.8	1.07	0.1	0.1	0.1	0.1	3.38	19	0.1	0.1	1.37	4.53	1.1	2.44	0.1	0.1	0.1	0.1	0.1	0.95	0.404	0.435	5.73	4.98	0.306	0.589	2.05	0.1	0.1	0.192	0.1
Aromatics >EC16-EC21	7.49	3.68	0.1	1.17	0.992	1	5.78	174	0.1	0.1	5.49	8.06	4.31	14	1.31	0.1	0.1	0.1	0.1	6.25	2.35	4.07	38.8	20.2	1.44	1.76	13.2	0.1	0.538	0.436	0.1
Aromatics >EC21-EC35	23.3	9.48	1.37	10.5	4.69	6.69	29	553	2.9	5.53	67.3	64.3	12.2	47.8	7.77	5.27	0.1	1.44	1.5	33.2	12.4	22.4	81.5	62.5	13.2	14	47.7	0.12	3.71	0.48	3.86
Aromatics >EC35-EC44	7.42	1.99	0.1	1.55	3.16	0.1	3.17	139	0.731	0.705	53.9	51.7	6.84	19.4	2.44	0.1	0.1	2.85	0.1	15.8	4.98	12.1	27.9	24.9	12.2	8.67	20	0.1	0.1	0.1	1.81
Aromatics >EC40-EC44	2.47	0.438	0.1	0.292	1.32	0.1	0.1	33.4	0.1	0.1	22.2	20.1	2.53	7.34	0.829	0.1	0.1	1.84	0.1	6.67	1.98	5.33	10.8	8.73	6.32	3.93	8.04	0.1	0.1	0.1	0.729
Polyaromatic Hydrocarbons (PAHs)																															
Acenaphthylene	92.9	29.3	12	12	12	12	12	2810	12	16.3	120	120	12	323	12	12	12	12	12	206	97	166	311	401	27.5	12	422	12	12	12	12
Acenaphthene	17.9	8	8	8	8	8	8	487	8	8	80	80	8	121	8	8	8	8	8	46.9	40	26.8	59.8	71.8	8	8	28.2	8	8	8	8
Anthracene	261	51.8	16	16	16	16	16	2850	16	16	160	160	16	556	16	16	16	16	16	349	128	251	469	556	86.6	16	485	16	16	16	16
Benz(a)anthracene	415	181	14	33	14	14	39	11800	14	64.3	140	140	14	1380	38.5	14	14	14	14	1060	371	554	1080	1580	115	90.3	1530	14	14	14	14
Benzo(a)pyrene	360	121	15	32.4	15	15	37.5	13600	15	59.2	150	150	15	1110	33.5	15	15	15	15	887	332	500	894	1340	93	104	1240	15	15	15	15
Benzo(b)fluoranthene	494	227	15	49.1	15	15	49.6	11300	15	98.7	150	150	15	1840	68.7	15	15	15	15	917	514	858	1490	1200	124	131	2090	15	15	15	15
Benzo(k)fluoranthene	178	69.8	14	14	14	14	20.5	6320	14	30.3	140	140	14	555	22.2	14	14	14	14	395	191	328	451	723	56.6	50.3	715	14	14	14	14
Benzo(g,h,i)perylene	297	86.3	24	24	24	24	42.8	12700	24	37.7	0.24	0.24	24	732	29.9	24	24	24	24	644	244	353	641	902	66.7	82.7	812	24	24	24	24
Chrysene	451	200	10	34.1	10	10	41.2	10700	10	51.5	0.1	117	10	1260	42.6	10	10	10	10	893	350	570	1050	1190	123	100	1230	10	10	10	10
Dibenzo(a,h)anthracene	50.7	0.023	0.023	0.023	0.023	0.023	0.023	2820	0.023	0.023	0.23	0.23	0.023	209	0.023	0.023	0.023	0.023	0.023	131	0.115	84.7	145	159	0.023	0.023	220	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	264	79.1	0.018	29.4	0.018	0.018	33.4	12800	0.018	51.2	180	180	0.018	1030	40.2	0.018	0.018	0.018	0.018	807	254	409	723	922	63.7	73.3	1220	0.018	0.018	0.018	0.018
Fluoranthene	1110	400	0.017	73.2	0.017	0.017	88.7	20800	0.017	106	200	292	0.017	3100	89.8	0.017	0.017	0.017	0.017	2470	744	1360	2710	3900	239	147	3200	0.017	0.017	0.017	0.017
Fluorene	108	31.4	10	10	10	10	10	903	10	10	0.1	0.1	10	264	10	10	10	10	10	168	62.5	110	243	351	20.2	10	143	10	10	10	10
Naphthalene	236	94.9	9	9	9	9	13.2	4240	9	42.6	90	90	9	577	21.8	13	9	9	9	333	211	329	896	1210	106	13.6	262	9	9	9	9
Phenanthrene	821	294	15	30.9	15	15	50.6	6540	15	51.4	150	150	15	1680	56	24.1	15	15	15	1410	437	675	1680	2190	122	40.9	1460	15	15	15	15
Pyrene	0.774	0.293	0.015	0.0549	0.015	0.015	0.0667	16.3	0.015	0.0864	0.191	0.37	0.0209	2.34	0.07	0.015	0.015	0.015	0.015	1.73	0.529	0.958	1.94	2.76	0.188	0.154	2.54	0.0163	0.015	0.015	0.015
PAH, Total Detected USEPA 16	5.93	2.16	0.118	0.337	0.118	0.118	0.483	137	0.118	0.695	1.18	1.18	0.118	17.1	0.513	0.118	0.118	0.118	0.118	12.5	4.46	7.53	14.8	19.5	1.43	0.987	17.6	0.118	0.118	0.118	0.118
Naphthalene-d8 % recovery**	82.6	91.2	92.7	91.3	83.2	89.5	83.8	86.9	80	93.2	92.3	79.8	86.7	91.9	88.2	54.5	97.8	78.4	93.1	97.6	89.4	91.2	90.5	97	86.8	85.4	91.7	91	94.2	90	82.2
Acenaphthene-d10 % recovery**	88.6	96.6	89.3	94.2	82.1	86.6	84.4	81.4	80.9	96.1	88.6	87.7	84.6	101	91.7	57.7	93.7	81.3	87.8	94.8	85.9	86.6	88.4	91.5	86.3	82.8	101	100	85.1	85.6	83.9
Phenanthrene-d10 % recovery**	88.1	95.4	92.5	97.7	83.7	87	81	84.8	80.3	97.7	98.7	93.6	83.2	106	97.2	33.6	102	83	97.4	105	83.2	83.3	85.6	106	86.8	82.3	106	97.7	86.1	85.5	85.2
Chrysene-d12 % recovery**	80.3	90.6	83.5	107	74.1	76.5	76.7	78.7	75	103	92.1	79.5	73.3	98	87.2	8.09	100	73.6	93.8	107	76.3	71.1	81.7	112	77.8	72.4	87.1	90	79.5	83.7	77.2
Perylene-d12 % recovery**	75.7	79.6	85.2	104	78.4	83.2	72.6	79.4	76.9	99.6	99.4	81.5	77.1	86	81.1	3.46	103	70.7	88.7	107	73.8	72.2	78.8	108	73.3	70.5	88.6	84.9	78.7	82.9	70.5
Total Aliphatics >C12-C44	18.1	9.95	0.1	4.1	0.1	0.1	4.87	196	0.754	0.1	122	119	47.8	66.7	23.3	26.2	0.1	0.1	3.15	34.9	6.86	22.7	89.3	108	44.1	19.7	40.8	3.53	0.1	0.1	4.83
Total Aromatics >EC12-EC44	40	16.2	1.37	13.3	8.85	7.69	41.4	886	3.63	6.23	128	129	24.5	83.6	11.5	5.27	0.1	4.29	1.5	56.2	20.1	38.9	154	113	27.1	25	82.9	0.12	4.24	1.11	5.77
Total Aliphatics & Aromatics >C5-C44	58	26.2	1.37	17.4	8.85	7.69	46.2	1080	4.38	6.23	250	248	72.3	151	34.8	31.7	0.1	4.29	4.66	91.2	27	61.6	243	220	71.2	44.7	124	3.65	4.24	1.11	10.6
Metals - (Solid)																															
Iron	22800	28600	40000	31700	34300	23500	29200	99100	27100	34800	215000	276000	454000	77300	144000	19600	43900	36300	38000	166000	131000	124000	245000	120000	432000	456000	59400	45500	32900	30500	42800
Manganese	724	1130	1220	342	724	746	283	5290	355	1220	3540	15300	2930	3470	4840	367	399	321	561	8780	5570	4580	8050	9350	10700	3460	12500	4300	372	821	389
Metals - (Liquid)																															
Calcium	72000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	76100	-	87800	-	-	-	-	-	-	38900	-	139000	-	-	137000
Magnesium	34900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35500	-	15700	-	-	-	-	-	-	6090	-	13800	-	-	19900
Phenols																															
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.01	0.01	0.0246	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0224	0.01	0.01	0.01	0.01	0.01	0.0123	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.185	0.015	0.015	0.015	0.0448	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.185	0.035	0.035	0.035	0.0784	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																															
Soluble Sulphate 2:1 extract as SO4 BRE	0.0588	-	-	-	-	-	-	-	-	-																					
pH	10	8.26	7.99	7.55	7.83	8.39	7.92	8.64	8.1	8																					
Sulphate, Total																															
Sulphur, Total	0.0301	-	-	-	-	-	-	-	-	-																					
Sulphate, Total potential	0.0903	-	-	-	-	-	-	-	-	-																					
Sulphate, acid soluble (total)	0.0998	-	-	-	-	-	-	-	-	-																					
Cyanide, Total	1	1	1	1.33	1	1	1	1	1	1																					
Exchangeable Ammonia as N	12	12	65.5	12	77	31.5	228	12	158	111																					
Asbestos																															
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	05/11/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17/08/2018	-	03/08/2018	-	-	-	-	-	-	17/08/2018	-	03/08/2018	-	-	01/08/2018
Analysed By	Marcin Magdziarek	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	James Richards	-	Andrzej Ferfecki	-	-	-	-	-	-	Andrzej Ferfecki	-	Lucy Caroe	-	-	Lucy Caroe
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-																					
Analysts Comments	-	-	-	-	-	-	-	-	-	-																					
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Amosite (Brown) Asbestos	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Fibrous Anthophyllite	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Fibrous Tremolite	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Fibrous Actinolite	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected
Non-Asbestos Fibre	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	-	-	-	-	Trace	-	Detected	-	-	Not Detected
Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Fibre bundles in soil	-	0	-	-	-	-	-	-	0	-	0	-	-	0
Volatile Organic Compounds (VOCs)																															
Dibromofluoromethane**	117	117	125	133	107	103	116	107	112	109	104	101	109	113	109	108	106	111	102	112	116	105	106	109	106	105	103	99	101	105	101
Toluene-d8**	102	102	103	104	95.8	96.5	99.5	97	100	102	100	99.6	98.6	99.2	99	95.3	93.3	99.4	97.5	98.7	98.4	100	99.4	99.1	96.5	97.3	97.3	96.6	97.2	99.7	96
4-Bromofluorobenzene**	75	79.9	92	87.1	107	109	93.9	78.8	99.4	100	101	98.5	98	97.4	95.1	83.5	75.7	92.4	89.9	94	97.7	103	94.1	94.8	93.5	84.9	89.8	89.3	88.7	94.5	86.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.166	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.84	0.149	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																															
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.82	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.41	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.68	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.09	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.51	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.51	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	4CB9V	4CC5	4CC5	4CC6	4CC6	4CC7	4CC7	4CC8	4CC8	4CC5V	4CC6V	4CC7V	4CC8V
Depth	2.3	0.6	1.2	0.6	1.2	0.5	1	0.5	1.3	2	2.3	3	2.2
Sampled Date	04/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	03/10/2018	04/10/2018	04/10/2018	03/10/2018	03/10/2018	03/10/2018	04/10/2018
Carbon													
Soil Organic Matter (SOM)	0.898	1.19	0.764	0.984	0.384	1.66	0.662	2.93	1.27	10.1	7.95	6.62	1.12
Metals (Solids)													
Arsenic	14.8	9.3	4.21	9.79	8.96	17.9	20	14.4	11.7	17.3	17.3	32.3	16.2
Cadmium	0.02	0.02	0.02	0.02	0.2	1.79	0.2	1.49	2.23	0.207	0.02	0.168	0.02
Chromium	30	0.9	193	0.9	9	15.3	9	18.1	0.9	37.2	37.5	32.6	31.9
Copper	12.1	60.4	165	130	29.8	348	65.5	25.3	37	19.7	17.8	19.6	10.3
Lead	23.3	22.3	11.6	21.7	7.57	22.8	32.4	41.8	27.9	54.5	36.6	50.8	26.2
Mercury	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14
Nickel	36.5	22.5	9.69	47.1	24.3	45	36.8	28.4	6.97	30	29.7	28.7	37.7
Selenium	1	1.92	26.2	1	10	5.78	10	10	1	1	1	1	1
Vanadium	51.7	246	812	207	108	128	128	91.5	38.3	59.6	59.9	59.8	56
Zinc	100	108	26.2	113	43.3	135	145	127	55.8	155	125	175	108
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0243	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0194	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01
Aliphatics >C12-C16	0.1	0.1	0.237	0.1	0.1	0.614	2.06	2.09	1.91	0.1	0.702	0.1	0.1
Aliphatics >C16-C21	1.54	2.62	1.99	0.1	2.27	4.39	6.59	9.52	7.01	0.1	0.1	0.1	0.1
Aliphatics >C21-C35	2.23	28.3	6.71	14.1	14	26	23.4	58	49.2	4.25	0.1	0.1	0.1
Aliphatics >C35-C44	1.07	2.59	0.1	5.38	5.39	9.22	8.55	19.3	4.57	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.013	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	0.188	0.324	0.1	0.1	0.1	0.763	0.94	2.01	0.1	0.248	0.1	0.1	0.1
Aromatics >EC16-EC21	0.1	1.55	0.555	1.99	0.255	5.44	3.43	7.98	2.64	1.17	0.1	0.1	0.1
Aromatics >EC21-EC35	0.669	11.7	3.06	15.1	6.64	29.3	15	51.7	14.7	51.9	11.6	11.2	0.1
Aromatics >EC35-EC44	0.248	4.44	0.1	9.39	3.56	15.7	6.32	35.7	3.19	7.11	0.934	0.649	0.1
Aromatics >EC40-EC44	0.121	1.97	0.1	3.91	1.32	6.61	2.35	14.5	0.983	1.58	0.1	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	12	12	12	42	12	92.5	40.5	101	12	12	12	12	12
Acenaphthene	8	8	8	8	8	17.1	8	17.5	18	8	8	8	8
Anthracene	16	16	16	58.8	16	113	53	77	85.1	16	16	16	16
Benz(a)anthracene	14	43	40.8	234	54.1	498	168	580	770	32.7	36.3	14	14
Benzo(a)pyrene	15	42	40.9	200	49.6	475	156	639	740	33.4	35.8	15	15
Benzo(b)fluoranthene	15	67.8	64.1	271	63.3	618	272	827	1000	48.2	80.5	36	15
Benzo(k)fluoranthene	14	25.4	27.9	130	28	217	97	308	434	14	23.6	14	14
Benzo(g,h,i)perylene	24	45.1	52.5	155	38.5	385	119	460	525	24	24	24	24
Chrysene	10	53.3	51.7	224	47.2	426	171	563	692	41.2	49.6	25.2	10
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	69	28.8	76.6	130	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	0.018	40.5	41.1	165	38.2	406	115	553	475	0.018	30	0.018	0.018
Fluoranthene	0.017	68.5	106	451	98.6	1080	346	828	1070	92.7	90	46.9	0.017
Fluorene	10	10	10	24.5	10	48.3	27.7	19	10	10	10	10	10
Naphthalene	9	20.9	9	118	25	157	80.9	88.4	14.1	9	9	9	9
Phenanthrene	15	54.6	68.9	199	46.9	470	204	256	386	50	45.3	25.6	15
Pyrene	0.015	0.0581	0.0886	0.478	0.0969	0.818	0.255	0.949	1.01	0.0708	0.0665	0.0348	0.015
PAH, Total Detected USEPA 16	0.118	0.519	0.583	2.75	0.586	5.89	2.13	6.34	7.35	0.369	0.457	0.169	0.118
Naphthalene-d8 % recovery**	85.7	90.1	98.8	98.8	98	98.8	95.1	98.8	88.1	97.6	90.8	87.3	84.8
Acenaphthene-d10 % recovery**	95.1	90.7	94.9	93.4	92.9	96	90.8	89.2	86.1	89.7	89.8	89.9	82.4
Phenanthrene-d10 % recovery**	98.5	98.4	105	103	104	105	92	96.5	85.2	93.9	91.2	90.6	81.3
Chrysene-d12 % recovery**	87	101	109	107	101	110	85.4	98.6	90.7	85.2	85.7	76.1	82.1
Perylene-d12 % recovery**	76.5	93.8	102	102	101	108	83.7	97.7	92	85.7	85.9	70.6	81.3
Total Aliphatics >C12-C44	4.84	33.6	8.94	19.5	21.7	40.3	40.6	88.9	62.7	4.25	0.702	0.1	0.1
Total Aromatics >EC12-EC44	1.1	18	3.61	26.4	10.5	51.2	25.7	97.4	20.5	60.4	12.6	11.8	0.1
Total Aliphatics & Aromatics >C5-C44	5.95	51.6	12.5	45.9	32.2	91.5	66.3	186	83.3	64.7	13.3	11.8	0.1
Metals - (Solid)													
Iron	36700	284000	196000	436000	487000	570000	386000	228000	591000	27500	28800	29600	32500
Manganese	1040	6880	59800	2910	2180	6150	4300	8700	6140	224	208	362	644
Metals - (Liquid)													
Calcium	-	-	-	-	-	-	-	6080	-	145000	101000	-	184000
Magnesium	-	-	-	-	-	-	-	796	-	17100	16400	-	11900
Phenols													
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0888	0.0523	0.129	0.0805
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0234	0.0115
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.0888	0.0523	0.152	0.092
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potential													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	17/08/2018	-	03/08/2018	01/08/2018	-	01/08/2018
Analysed By	-	-	-	-	-	-	-	Lucy Caroe	-	Andrzej Ferfecki	James Richards	-	Marcin Magdziarek
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Anthophyllite	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Tremolite	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Actinolite	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Non-Asbestos Fibre	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Comments	-	-	-	-	-	-	-	0	-	0	0	-	0
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	99.1	116	106	104	110	105	113	109	103	99.1	109	104	102
Toluene-d8**	96.6	97.6	99.3	99.9	99.7	97.7	97	96.1	97.3	94.9	97.1	97.7	98.3
4-Bromofluorobenzene**	80.2	99.5	96	95.8	97.4	93.1	88.6	78.7	89.2	86.9	95.3	86.1	83.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.548	0.34	0.13	0.13	0.13	0.13	0.13	0.13	0.151	0.13	0.13	0.275	0.221
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	28.1	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	21	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	27.9	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	20.3	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	0.5	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	25.3	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	25.3	-	-	-	-	-

Sample ID	4CD4	4CD5	4CD5	4CD6	4CD6	4CD7	4CD4V	4CD5V	4CD6V	4CE4	4CE4	4CF2	4CF4
Depth	0.4	0.5	1	0.5	1	0.5	2.2	2.2	2.8	0.5	0.9	0.5	0.5
Sampled Date	03/10/2018	04/10/2018	04/10/2018	04/10/2018	04/10/2018	04/10/2018	03/10/2018	04/10/2018	04/10/2018	03/10/2018	03/10/2018	11/10/2018	03/10/2018
Carbon													
Soil Organic Matter (SOM)	1.17	4.02	0.812	5.55	1.22	5.28	4.81	3.47	1.74	5	2.52	1.55	12.6
Metals (Solids)													
Arsenic	15.9	11.3	10.9	14.5	6.46	14.9	14.5	13.8	18.8	11.9	9.43	12	19
Cadmium	0.2	1.89	1.16	0.02	1.26	1.49	0.02	0.02	0.02	0.2	0.02	0.2	0.2
Chromium	9	104	0.9	30.3	9	18.5	43.4	40.3	38.4	560	448	356	212
Copper	49.2	23.6	10.5	18.4	22.2	35.2	18.9	14.4	15.4	14	19.1	42.1	19.9
Lead	20.7	125	26.8	97.2	26.8	176	36.9	32	31.3	25.1	30.4	7	42.1
Mercury	1.4	1.4	0.14	0.14	1.4	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4
Nickel	49.9	29.3	11.2	15	29	96.2	38.7	35.3	42.6	16.8	16.1	16.2	32.6
Selenium	10	10	1	2.46	10	25.2	1	1	1	11	8.99	19.2	10
Vanadium	232	336	56.1	137	126	88.8	71.4	63.5	64.6	666	612	1150	222
Zinc	63.1	455	101	444	89.2	693	142	121	124	119	153	20.6	120
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.0132	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.0121	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	5.12	2.12	3.02	1.25	0.603	0.644	0.1	0.1	0.1	2.76	2.42	0.904	5.37
Aliphatics >C16-C21	18.7	9.27	16.9	11.1	7.44	4.13	0.1	0.388	0.827	20.4	18	4.05	23.2
Aliphatics >C21-C35	96.1	73.1	128	59.7	49.1	36.4	0.1	0.877	0.1	131	100	19.2	127
Aliphatics >C35-C44	10.8	29.8	35.3	25.6	17	12.3	0.1	0.1	0.1	44.4	32.6	7.56	54.9
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	0.795	4.47	1.51	1.51	0.888	0.662	0.1	0.1	0.131	5.76	5.93	0.1	6.46
Aromatics >EC16-EC21	4.68	11.5	5.82	9.18	5.81	4.72	0.1	0.1	1.38	70	77.2	3.06	19.8
Aromatics >EC21-EC35	26.7	74.5	58.2	44.7	32.5	30.9	3.8	7.94	5.15	204	212	25.4	99.7
Aromatics >EC35-EC44	5.17	39.3	37.8	27.7	27.9	16	0.1	0.602	9.46	65.3	61.4	10.1	91.5
Aromatics >EC40-EC44	1.53	16	15.4	12.2	12.1	6.16	0.1	0.1	4.87	23.2	21	3.9	41.2
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	19.5	80.5	20.1	60	96.3	101	12	12	12	1240	2010	12	120
Acenaphthene	8	139	10	40	12.1	16	8	8	8	205	127	9.93	80
Anthracene	30.3	265	30.5	80	155	116	16	16	16	3250	5500	22.5	160
Benz(a)anthracene	91.2	1480	119	288	414	343	14	14	14	7740	11900	311	461
Benzo(a)pyrene	89.5	1990	121	255	356	344	15	15	15	6400	10400	459	398
Benzo(b)fluoranthene	188	2600	154	312	486	567	15	15	15	8080	12300	917	539
Benzo(k)fluoranthene	65	942	65.8	113	195	214	14	14	14	3240	5040	275	215
Benzo(g,h,i)perylene	84.8	1360	101	176	231	274	24	24	24	4650	7230	499	348
Chrysene	114	1660	116	254	370	318	10	10	10	6980	10800	395	402
Dibenzo(a,h)anthracene	0.023	301	0.023	0.115	41.7	63.8	0.023	0.023	0.023	875	1710	78.7	0.23
Indeno(1,2,3-cd)pyrene	77.2	1820	99.2	188	234	370	0.018	0.018	0.018	5510	6400	367	312
Fluoranthene	178	2430	214	589	665	808	0.017	0.017	0.017	19500	28600	550	1070
Fluorene	10	88	13.8	50	34.1	51.4	10	10	10	612	983	10	0.1
Naphthalene	43.1	193	51.8	45	101	190	9	9	9	946	1540	13.1	542
Phenanthrene	89.6	1100	122	262	256	482	15	15	15	7980	8910	170	836
Pyrene	0.172	2.18	0.18	0.52	0.648	0.6	0.015	0.015	0.015	14.5	20.1	0.515	0.869
PAH, Total Detected USEPA 16	1.24	18.6	1.42	2.96	4.3	4.86	0.118	0.118	0.118	91.7	134	4.58	5.99
Naphthalene-d8 % recovery**	89.1	86.6	89.5	88.8	87	87.3	82.3	93.9	71.3	91.8	87.9	94.2	91.4
Acenaphthene-d10 % recovery**	85.8	94.1	82.2	79.5	85.6	92.1	81.9	88.4	74.4	82.4	80.7	91.6	83.6
Phenanthrene-d10 % recovery**	83.6	101	84.2	81.7	86.3	91.4	83.2	99	78.8	84.2	84.5	92.1	86.9
Chrysene-d12 % recovery**	72.9	90.1	72.9	74.4	85.1	78.1	79.2	93.2	71.1	94.4	85.4	96	90.6
Perylene-d12 % recovery**	72.4	85.1	75	71.4	83.7	77.4	75.3	87.9	70.3	89.3	84.8	109	77.6
Total Aliphatics >C12-C44	131	114	183	97.6	74.1	53.5	0.1	1.26	0.827	199	154	31.8	211
Total Aromatics >EC12-EC44	37.3	130	103	83.1	67.1	52.3	3.8	8.54	16.1	345	357	38.5	218
Total Aliphatics & Aromatics >C5-C44	168	244	287	181	141	106	3.8	9.81	16.9	544	510	70.3	428
Metals - (Solid)													
Iron	440000	231000	315000	130000	255000	169000	33700	33900	39400	285000	215000	423000	165000
Manganese	14000	14600	4400	7640	6880	91300	262	400	355	26400	25200	32600	9350
Metals - (Liquid)													
Calcium	-	-	-	8780	-	141000	-	97000	-	-	159000	-	-
Magnesium	-	-	-	1700	-	17400	-	11700	-	-	13000	-	-
Phenols													
Phenol	0.01	0.01	0.01	0.0118	0.01	0.0228	0.01	0.0565	0.106	0.01	0.196	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.0114	0.01	0.0113	0.0118	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.0228	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.057	0.035	0.0678	0.118	0.035	0.196	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potential													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	17/08/2018	-	08/08/2018	-	01/08/2018	-	-	02/08/2018	-	-
Analysed By	-	-	-	Andrzej Ferfecki	-	Lucy Caroe	-	Lucy Caroe	-	-	Lucy Caroe	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	Not Detected	-	Trace	-	Not Detected	-	-	Not Detected	-	-
Amosite (Brown) Asbestos	-	-	-	Not Detected	-	Detected	-	Not Detected	-	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-
Fibrous Anthophyllite	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-
Fibrous Tremolite	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-
Fibrous Actinolite	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-
Non-Asbestos Fibre	-	-	-	Trace	-	Not Detected	-	Detected	-	-	Not Detected	-	-
Comments	-	-	-	0	-	Loose fibres in soil	-	0	-	-	0	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	111	105	108	106	102	100	95.3	105	105	107	94.7	106	114
Toluene-d8**	100	98.8	97.4	98	98.3	97.7	95.8	98	98.5	99	95.9	98.3	95.6
4-Bromofluorobenzene**	97.1	95.6	82.6	97.1	91.7	88.4	78.3	92.6	90.4	99.2	72.5	94.9	88.5
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.176	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.146	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.199	0.185	0.474	0.13	0.13	0.13	0.459	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	25.1	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	20.9	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	24.9	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	20.3	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	0.71	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	16.1	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	16.7	-	-	-	-	-	-	-	-	-

Sample ID	4CF4	4CF4	4CF4	4CF5	4CF5	4CF5	4CF6	4CF6	4CF7	4CF7	4CF4V	4CF6V	4CG4
Depth	1	1.5	2	0.5	1	1.5	0.6	1.2	0.6	1.2	2.3	2.3	0.5
Sampled Date	03/10/2018	03/10/2018	03/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	03/10/2018	02/10/2018	11/10/2018
Carbon													
Soil Organic Matter (SOM)	2.76	3.03	1.81	3.57	3.69	1.76	5.33	2.74	4.71	4.62	1.43	5.17	5.05
Metals (Solids)													
Arsenic	20	25.6	15.7	21	8.09	7.04	9.91	6.6	10.1	9.87	8.27	12.3	7.22
Cadmium	0.02	0.2	3.38	0.2	0.353	0.708	0.2	0.0287	0.2	2.58	0.02	0.02	0.944
Chromium	0.9	70.4	9	120	101	78.3	109	46.7	89.8	320	0.9	37.2	232
Copper	31.5	19.9	14	29.8	18.9	18	21.2	10.8	19.5	22.7	33.7	16	18.3
Lead	30.4	38.1	35.6	45.7	20.7	31	65.1	19.7	91.3	143	13.5	33.9	17.9
Mercury	0.14	1.4	1.4	1.4	0.14	0.14	1.4	0.14	1.4	1.4	0.14	0.14	0.14
Nickel	13.2	32.2	22.8	23.9	14.4	11	25.8	14.4	24.1	37.7	11.6	25.8	14.8
Selenium	1.85	10	10	16.3	12.7	8.96	10	7.11	10	10	1.07	1	7.09
Vanadium	143	401	84.5	562	454	298	642	124	357	258	18	53.6	911
Zinc	78.3	114	57.2	168	86.9	127	235	92.6	329	1380	50.8	126	73.6
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.012	0.01	0.01	0.01	0.01	0.01	0.0224	0.01
Aliphatics >C6-C8	0.01	0.01	0.01	0.0208	0.0234	0.04	0.0112	0.0133	0.01	0.01	0.01	0.0714	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.0219	0.0468	0.036	0.0162	0.0102	0.01	0.01	0.01	0.581	0.01
Aliphatics >C10-C12	0.01	0.01	0.01	0.0658	0.166	0.091	0.0122	0.0265	0.01	0.01	0.01	1.66	0.01
Aliphatics >C12-C16	3.92	10.9	0.645	7.79	17.4	2.83	0.1	4.37	2.53	3.85	0.96	0.659	1.29
Aliphatics >C16-C21	13.4	33.2	6.93	17.2	31.2	7.7	8.44	11	10.2	14.2	4.15	0.1	6.63
Aliphatics >C21-C35	109	320	57.1	78.8	86.1	50.8	76.7	61.9	123	118	48.8	2.29	73.7
Aliphatics >C35-C44	20.7	71.9	7.13	13.7	27.5	8.2	21.6	9.28	64.5	65.6	7.31	0.132	55.5
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.0142	0.0316	0.024	0.0101	0.01	0.01	0.01	0.01	0.388	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.0438	0.111	0.061	0.01	0.0173	0.01	0.01	0.01	1.11	0.01
Aromatics >EC12-EC16	0.951	3.21	0.1	4.13	3.47	2.32	2.19	3.7	4.5	2.67	0.1	3.66	1.98
Aromatics >EC16-EC21	4.94	14.4	0.1	15.6	13.7	8.98	12	14.8	12.6	11.7	0.785	1.4	9.97
Aromatics >EC21-EC35	37.8	103	8.01	91.5	93.6	59.1	65.5	99.3	92.8	91.7	19.9	23.8	113
Aromatics >EC35-EC44	14.1	46.8	1.53	43.7	46.3	29.4	38.6	38	92.4	79.8	3.09	2.63	109
Aromatics >EC40-EC44	5.07	18.5	0.1	16.2	17.7	11.1	14.9	13.1	41.8	35	0.555	0.1	46.7
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	12	94.3	12	52.6	125	25.9	79.3	59.6	81	102	12	12	120
Acenaphthene	8	22.9	8	40.2	35.5	22.6	15.5	18.8	40	21.6	8	8	80
Anthracene	23.6	180	16	128	357	62.5	120	87.2	104	148	16	16	160
Benz(a)anthracene	87.4	459	42.4	809	1080	412	324	365	360	523	14	14	140
Benzo(a)pyrene	96.9	429	41.5	907	1150	461	310	413	347	505	15	15	150
Benzo(b)fluoranthene	159	695	47.5	1140	1260	591	358	638	720	645	15	15	150
Benzo(k)fluoranthene	52.8	244	21.5	502	460	233	146	237	293	236	14	14	140
Benzo(g,h,i)perylene	77.9	323	34.8	777	991	413	246	328	282	377	24	24	0.24
Chrysene	95	431	42	848	1060	456	291	395	379	552	10	10	0.1
Dibenzo(a,h)anthracene	0.023	76.3	0.023	115	157	62.7	44.2	71.9	0.115	63.9	0.023	0.023	0.23
Indeno(1,2,3-cd)pyrene	86	320	40.3	829	859	333	227	332	368	325	0.018	0.018	180
Fluoranthene	147	957	65.3	1440	2270	729	720	647	756	1050	0.017	0.017	0.17
Fluorene	11.6	86.1	10	37.5	150	22.4	50.7	32.9	50.9	54.5	10	10	0.1
Naphthalene	52.4	212	20.5	104	71.1	63.2	185	133	166	245	9	21.1	90
Phenanthrene	103	680	38.7	593	1370	306	459	331	438	563	15	15	150
Pyrene	0.126	0.714	0.0627	1.3	1.85	0.669	0.537	0.54	0.612	0.89	0.015	0.015	0.15
PAH, Total Detected USEPA 16	1.12	5.92	0.457	9.62	13.2	4.86	4.11	4.63	4.96	6.3	0.118	0.118	1.18
Naphthalene-d8 % recovery**	82.3	93.8	90.2	81	95.5	80.4	80.9	82	81.7	95	92	94	90.8
Acenaphthene-d10 % recovery**	92.2	91	87.1	85.8	93.7	78.4	78	79.3	89.7	88.7	89.7	93.4	78
Phenanthrene-d10 % recovery**	94.8	94	95.3	91.1	91.8	78.3	77	80	88.5	89.5	91.1	93.4	82.4
Chrysene-d12 % recovery**	81.2	87.3	98.2	84	89.9	76.6	72.2	74.5	83.6	83.3	88.4	88.9	88.8
Perylene-d12 % recovery**	84.1	85.2	91.9	81.6	91.3	74.6	70.9	74.3	79	79.3	89.9	89.4	90.8
Total Aliphatics >C12-C44	147	436	71.8	117	162	69.6	107	86.6	200	201	61.3	3.08	137
Total Aromatics >EC12-EC44	57.8	167	9.54	155	157	99.9	118	156	202	186	23.8	31.5	234
Total Aliphatics & Aromatics >C5-C44	205	603	81.3	273	320	170	225	242	402	387	85	38.4	371
Metals - (Solid)													
Iron	418000	380000	639000	302000	240000	273000	158000	189000	226000	206000	58500	24300	133000
Manganese	8190	13000	11400	28500	24900	16600	10700	11600	10400	10900	1610	175	21100
Metals - (Liquid)													
Calcium	-	-	-	-	-	-	38700	158000	-	69600	102000	-	-
Magnesium	-	-	-	-	-	-	6400	9980	-	6500	14200	-	-
Phenols													
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0222	0.0113	0.0605	0.0666	0.0113	0.01
Cresols	0.01	0.01	0.01	0.01	0.0294	0.01	0.01	0.01	0.0113	0.0363	0.01	0.01	0.0147
Xylenols	0.015	0.015	0.015	0.015	1.16	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	1.19	0.035	0.035	0.035	0.035	0.0968	0.0666	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potential													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	17/08/2018	06/08/2018	-	07/08/2018	02/08/2018	-	-
Analysed By	-	-	-	-	-	-	James Richards	Andrzej Ferfecki	-	Renata Bozhkov	Andrzej Ferfecki	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	Not Detected	Not Detected	-	Detected	Not Detected	-	-
Amosite (Brown) Asbestos	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-
Fibrous Anthophyllite	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-
Fibrous Tremolite	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-
Fibrous Actinolite	-	-	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-
Non-Asbestos Fibre	-	-	-	-	-	-	Not Detected	Trace	-	Not Detected	Not Detected	-	-
Comments	-	-	-	-	-	-	0	0	-	Loose fibres in soil	0	-	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	111	101	104	107	108	97.3	107	104	102	95.1	103	101	116
Toluene-d8**	100	99.3	99.7	99.7	92.5	95.8	96.7	95.7	98.2	94.2	98.6	98.1	100
4-Bromofluorobenzene**	97	94.3	100	94.3	81.8	74.5	75.8	85.7	91.7	79.9	98.1	96.8	102
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.574	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	2.39	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.651	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	689	1.59	0.165	0.994	0.13	2.65	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	3.61	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	16	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	14.1	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	15.7	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	13.6	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	0.5	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	12.1	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	12.1	-	-	-	-	-	-

Sample ID	4CG4	4CG4	4CG5	4CG5	4CG5	4CG6	4CG6	4CG6	4CG4V	4CG5V	4CG6V	4CH1	4CH1
Depth	1.2	1.8	0.5	1	1.5	0.3	1	1.5	2.4	2.8	2.9	0.5	1
Sampled Date	11/10/2018	11/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	11/10/2018	02/10/2018	02/10/2018	11/10/2018	11/10/2018
Carbon													
Soil Organic Matter (SOM)	6.62	0.436	5.45	7.9	2.21	2.83	0.974	1.44	2.69	1.72	43.6	9.78	7.02
Metals (Solids)													
Arsenic	8.6	6.66	8.55	12.1	10.4	6.4	9.75	13.4	16.7	13.3	27.4	10.1	12.2
Cadmium	0.02	1.18	0.261	0.2	0.711	0.154	0.966	0.02	0.432	0.02	0.02	0.2	0.02
Chromium	348	467	127	342	7.82	19.1	8.19	38.7	49.5	35.8	12.1	103	106
Copper	27.7	29.7	14.6	23.1	20.8	10.3	24.7	14.9	11.9	17.1	20.7	16.1	32.5
Lead	15.1	15.6	57.4	31.2	25	14.9	20.5	4.47	26.1	29.6	20.2	45.3	45.8
Mercury	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14
Nickel	15.6	12.8	13.7	57.8	15.1	41.5	14.3	4.71	33	42.8	27.3	23.7	22.1
Selenium	7.8	12.3	7.04	12.8	5.22	4.66	7.14	5.1	1	1.45	1.81	10	1.71
Vanadium	941	1890	363	894	169	250	143	121	84.6	57	37.6	148	143
Zinc	50.6	61.4	275	131	99.4	344	126	53.7	102	135	130	133	184
TPH Criteria Working Group (TPH CWG)													
Benzene													
Toluene													
Ethylbenzene													
sum of detected mpo xylene by GC													
Aliphatics >C5-C6	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	0.01	0.01	0.0132	0.01	0.0239	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	0.01	0.01	0.01	0.01	0.0239	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	0.01	0.01	0.0121	0.01	0.0559	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	0.1	0.1	21	29.2	43.3	1.99	2.24	1.34	0.1	0.1	0.459	3.2	3.06
Aliphatics >C16-C21	0.767	2.02	46.4	67.6	73.5	10.2	11.9	6.8	0.1	1.13	2.49	14.6	22.8
Aliphatics >C21-C35	20.6	33.6	165	199	141	82.6	87.6	46.4	0.1	3.84	111	88.6	49.5
Aliphatics >C35-C44	11.1	18.2	42.5	49.3	30.2	30.7	15.5	4.23	0.1	0.405	2.3	32.9	11.9
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	0.01	0.01	0.01	0.01	0.016	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	0.01	0.01	0.01	0.01	0.0365	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	0.449	0.1	7.9	9.11	7.91	2.98	0.967	1.88	0.1	0.746	6.3	3.61	2.37
Aromatics >EC16-EC21	2.7	4.35	23.9	27.7	22.2	10.5	5.39	6.94	0.1	1.38	13.1	15.1	12.9
Aromatics >EC21-EC35	19.7	41.1	112	143	75.2	63.5	42.8	31.5	0.186	13.9	546	91.6	62.6
Aromatics >EC35-EC44	9.57	21.5	60.9	65.5	30.6	48.9	22.6	15.2	0.1	4.3	367	59.6	23.8
Aromatics >EC40-EC44	3.58	8.09	23.7	24.6	11.6	20.8	9.07	5.96	0.1	1.49	50	24.3	8.52
Polyaromatic Hydrocarbons (PAHs)													
Acenaphthylene	34	12	55.2	60	12	12	12	17.1	12	12	12	112	102
Acenaphthene	19	50.7	18.7	46.3	15	12.7	8	8	8	8	8	22.8	75.1
Anthracene	59	64.1	92.7	80	26.9	46.5	22.3	40.2	16	16	16	171	254
Benz(a)anthracene	507	1090	490	1070	152	222	114	196	14	14	48.4	561	1210
Benzo(a)pyrene	550	1670	654	1590	178	274	122	139	15	15	15	582	1510
Benzo(b)fluoranthene	723	2160	566	1700	206	300	148	306	15	15	82.2	1080	2020
Benzo(k)fluoranthene	301	734	277	633	93.7	123	53.1	111	14	14	14	358	645
Benzo(g,h,i)perylene	412	1170	539	1160	155	206	115	111	24	24	24	477	1000
Chrysene	500	1280	502	1120	159	250	129	228	10	10	59.4	583	1140
Dibenzo(a,h)anthracene	80.6	190	89	193	0.023	40.4	0.023	28.8	0.023	0.023	0.023	114	210
Indeno(1,2,3-cd)pyrene	329	1220	509	1110	176	210	100	115	0.018	0.018	0.018	461	1070
Fluoranthene	581	1280	746	1160	248	274	181	269	0.017	0.017	155	1100	1840
Fluorene	22.8	16.5	56.9	50	17.3	18.1	10	10	10	10	10	73.2	95.1
Naphthalene	159	21.1	215	117	49.5	25.5	37	23.8	9	9	9	414	274
Phenanthrene	278	290	457	384	140	151	94	127	15	15	49.2	754	1010
Pyrene	0.526	1.35	0.737	1.31	0.252	0.251	0.215	0.256	0.015	0.015	0.0943	0.768	1.55
PAH, Total Detected USEPA 16	5.08	12.6	6	11.6	1.87	2.4	1.33	1.97	0.118	0.118	0.488	7.63	14
Naphthalene-d8 % recovery**	95.3	87.1	86.9	83.3	79.7	17	83.4	79.2	85.4	75.8	83.6	91.3	85.2
Acenaphthene-d10 % recovery**	88.9	88.1	78.5	82.8	85.9	16.2	77.8	77.2	89.2	82.9	89.8	83.6	89.6
Phenanthrene-d10 % recovery**	89	95.3	79.9	78.6	83.2	16	78.9	75.5	92.5	87.9	94.7	91.4	94.2
Chrysene-d12 % recovery**	98.3	88.5	76.2	77.3	81.8	15.7	73.4	72.4	82.1	91.6	82.8	93.9	82.4
Perylene-d12 % recovery**	101	89.2	72.7	71.9	80.6	15.1	76.7	71.2	95.8	90.6	76.7	101	81.5
Total Aliphatics >C12-C44	32.5	53.8	275	345	288	125	117	58.8	0.1	5.37	117	139	87.3
Total Aromatics >EC12-EC44	32.4	66.9	205	245	136	126	71.8	55.5	0.186	20.3	933	170	102
Total Aliphatics & Aromatics >C5-C44	64.9	121	480	590	424	251	189	114	0.186	25.6	1050	309	189
Metals - (Solid)													
Iron	121000	154000	157000	155000	299000	249000	352000	96500	32400	32300	23500	189000	150000
Manganese	26500	46100	13100	22000	6530	6670	10000	10400	915	967	708	9020	10600
Metals - (Liquid)													
Calcium	-	-	-	-	98300	130000	-	157000	146000	-	13600	86300	-
Magnesium	-	-	-	-	11500	19500	-	44000	24200	-	7080	11800	-
Phenols													
Phenol	0.01	0.01	0.01	0.01	0.01	0.0784	0.01	0.0112	0.01	0.01	0.01	0.01	0.0319
Cresols	0.01	0.01	0.01	0.01	0.01	0.0112	0.01	0.0112	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.0896	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics													
Soluble Sulphate 2:1 extract as SO4 BRE													
pH													
Sulphate, Total													
Sulphur, Total													
Sulphate, Total potential													
Sulphate, acid soluble (total)													
Cyanide, Total													
Exchangeable Ammonia as N													
Asbestos													
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	17/08/2018	07/08/2018	-	07/08/2018	01/08/2018	-	29/10/2018	09/10/2018	-
Analysed By	-	-	-	-	Lucy Caroe	Renata Bozhkov	-	Renata Bozhkov	James Richards	-	Christian Hallam	Andrzej Ferfecki	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)													
Analysts Comments													
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	-	-	-	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	-	-	-	-	Detected	Not Detected	-	Detected	Not Detected	-	Not Detected	Not Detected	-
Comments	-	-	-	-	0	0	-	0	0	-	0	0	-
Volatile Organic Compounds (VOCs)													
Dibromofluoromethane**	102	113	102	114	104	104	105	97.9	106	106	104	90.5	100
Toluene-d8**	99.8	99.2	98.9	98.7	95.4	99.8	96.8	97.1	98.9	98.8	98.3	91.7	93.8
4-Bromofluorobenzene**	96.1	102	102	92	80.4	101	86.7	90.8	91.6	92	94.9	81.2	82.1
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.156	0.13	0.232	0.37	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics													
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	4CH2	4CH2	4CH4	4CH4	4CH4	4CH5	4CH5	4CH5	4CH6	4CH6	4CH6	4CH7	4CH7	4CH7	4CH8	4CH8	4CH8	4CH1V	4CH2V	4CH4V	4CH5V	4CH6V	4CH7V	4CH8V	4CI1	4CI1	4CI2	4CI2	4CI2	4CI3	4CI3	4CI4	4CI4	4CI5	4CI5	4CI6	4CI6	4CI7	4CI7	4CI8	4CI8	4CI2V	4CI4V	4CI6V	4CI7V	4CI8V	4CJ1	4CJ1	4CJ1	4CJ2	4CJ2	4CJ2	4CJ3
											Depth	0.5	1	0.5	1	1.6	0.5	1	1.8	0.5	1	1.5	0.5	1	1.7	0.5	1	1.5	1.6	1.8	2	2.5	3.3	3.3	3	0.5	1.1	0.5	1	1.5	0.5	0.8	0.5	1	0.5	1	0.5	1	0.5	1	0.5	1	1.7	2.5	2.2	1.8	1.9	0.5	1	2	0.5	1	2	0.5
											Sampled Date	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	02/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	02/10/2018	02/10/2018	02/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	11/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	11/10/2018	11/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**WQS**	**Percentage of exceedances**																																																							
Carbon																																																																
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	26	10.9	5.71	4.29	4.31	4.59	6.15	4.21	4.9	29.8	8.22	5.95	7.17	4.43	3.88	6.05	5	1.07	1.33	5.5	7.98	3.81	1.95	5.1	47.8	7.83	26.4	27.1	10.1	4.19	4.22	4.38	3.78	0.94	1.68	1.66	3.26	6.47	5.14	3.26	19.5	1.26	1.02	3.88	1.61	1.91	15.4	11.7	19.3	32.1	10.2	12.3	9.79
Metals (Solids)																																																																
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	11.2	15.7	13.9	14.8	10	16.8	13.8	12.4	16.1	10.7	11.1	75.5	30.8	89.2	5.32	9.16	8.37	17.8	18.4	14.2	16.1	12.3	9.62	12.8	8.45	6	21.3	10.1	8.37	11.6	16.1	9.11	21.6	4.13	6.28	9.64	7.28	7.39	5.68	5.03	6.83	12.6	14.3	13.6	14.9	12.4	8.54	5.87	11.4	9.25	8.72	10.5	9.31
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	0.998	0.2	0.2	0.2	0.02	0.2	0.2	0.2	0.558	0.2	0.174	1.03	0.513	0.2	0.02	2.38	0.534	0.02	0.541	0.475	0.219	0.02	0.02	0.02	1.19	0.2	0.2	1.56	0.774	1.46	1.86	0.2	3.48	0.02	0.02	0.02	0.2	0.149	0.02	0.02	0.2	0.397	0.02	0.02	0.02	0.02	0.155	0.0664	0.2	0.184	0.02	0.2	0.02
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	0.9	9	23.8	9.03	30.5	115	101	34.4	99.3	369	49.5	37.5	25.9	165	0.9	135	434	27.8	32.7	35	39.8	36.3	34.6	37.8	36.4	109	214	12.5	171	91.8	116	52.1	54.4	19.6	22.3	21.7	462	41.5	207	32.4	30	28.5	30.1	33.1	31.6	35.8	39.8	14.9	9	40.1	81.7	47.2	18.2
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	19.5	23.9	20.6	19.1	12.5	38.8	25.9	28.6	43.4	42.6	17.7	38.4	26	32.5	5.56	74.6	25.7	10.5	11.2	14.6	17.6	16	14	17.9	21.7	17	27.8	36	22.6	17.8	17.4	25.7	32.7	4.45	22.2	12.1	18.8	11.1	10.4	3.88	17.6	9.96	11.6	15.4	12.6	17.9	17.3	11.2	21.2	17.9	14.5	25.7	43.6
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	35.8	47.2	64.3	51.3	26	55.9	66.2	36.1	67.6	26.7	41.6	76.3	97.4	56.1	37.4	112	65.8	25.4	28.7	33.7	45	52.2	28.8	34.5	76.9	25	113	127	25.5	53.1	34.4	49.9	96.7	3.53	8.16	29.1	24.4	45.8	23.2	10.7	48.2	23.5	24.1	30.4	25.5	26.3	60.4	12.5	28.5	67.1	62.1	56.4	84.5
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	1.4	1.4	1.4	1.4	0.14	1.4	1.4	1.4	0.14	1.4	0.14	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	1.4	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	27.1	33.7	49.7	28	13.3	47.3	27.5	27.2	27	238	18	38.9	64	36	13.9	29.8	15.1	34.3	43	27.1	29.7	37.2	37.2	25.8	25.1	11.5	28.6	22.6	15.1	18.7	19.3	19.6	37.9	2.96	18.6	16	13.1	8.84	6.72	5.19	20.8	37.3	39.5	31.6	30.9	30.4	19.1	6.66	15.7	15	13.3	35.2	14.3
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	1	10	10	10	1.25	10	10	10	6.15	10	3.89	20.9	7.99	25	1.7	10	9.23	1	1	1	1	1	1	1.16	1.02	10	10	1.37	4.02	1.76	10	10	10	4.58	2.93	1	13.7	2.56	4.94	3.8	10	1	1	1	1	1	2.66	3.1	10	1.87	3.76	10	1.25
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	56.4	49.4	142	132	87.5	205	176	104	309	281	92.1	137	75.8	166	54.9	143	322	48.4	62.1	56.1	60.6	57.3	57.2	61.3	50.8	134	375	72.3	124	143	129	116	162	64.3	59.3	79	330	72.4	223	109	114	54.2	57.6	53.3	57	55.7	49.6	42	129	72.9	124	86.2	65.9
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	221	185	179	174	103	195	251	114	301	138	180	384	433	240	193	366	223	115	128	111	153	143	133	136	261	68.3	394	593	117	223	137	163	315	32.8	49.4	154	60	203	138	57.7	118	117	118	113	107	136	187	50	81.8	258	248	448	302
TPH Criteria Working Group (TPH CWG)																																																																
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00																																																						
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00																																																						
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00																																																						
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00																																																						
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0274	0.0116	0.01	0.01	0.01	0.0167	0.011	0.01	0.01	0.01	0.01	0.01	0.012	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0129	0.0138	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0231	0.01	0.0117	0.0119	0.0107	0.0104	0.022	0.01	0.01	0.01	0.0638	0.0231	0.01	0.01	0.01	0.0622	0.0594	0.01	0.01	0.01	0.0344	0.0343	0.0469	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0247	0.0357	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0147	0.01	0.01	0.01	0.01	0.01	0.012	0.01	0.01	0.01	0.0851	0.0182	0.01	0.01	0.01	0.0544	0.0583	0.01	0.01	0.01	0.025	0.231	0.0992	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0418	0.0575	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0274	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.01	0.0623	0.0198	0.01	0.01	0.01	0.0866	0.0759	0.01	0.01	0.01	0.0594	1.48	0.306	0.01	0.01	0.01	0.01	0.01	0.0236	0.01	0.19	0.208	0.01	0.01	0.0138	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	1.2	1.98	2.1	2.21	1.96	0.453	1.39	0.1	4.72	37.2	2.05	0.1	1.5	1.24	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.983	0.49	46.4	22.4	6.49	5.67	2.64	3.95	23.3	9.62	2.77	0.1	0.1	2.54	11.5	41	12	4.4	38.2	0.1	0.1	0.1	0.1	0.1	3.35	4.65	4.31	4.25	2.46	2.22	0.685
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	5	2.79	12.8	10.7	19.3	4.12	6.57	0.1	18.9	114	11.9	5.8	7.05	5.53	4.61	2.81	5.01	0.1	0.1	0.1	0.1	0.1	0.77	0.31	194	83.7	18.7	13.9	11.2	13.9	15.4	11.8	11.2	2.1	4.18	11.4	27	116	59	9.62	157	0.1	0.1	0.1	0.1	0.1	19.5	32.6	86.9	10.7	9.21	15.5	4.74
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	52.1	34.7	129	126	339	53.4	57.3	11.8	83.8	92.5	60.5	64.2	49.4	34.9	64.5	33.8	40.7	0.1	0.1	0.1	4.21	1.99	1.53	6.53	154	543	394	215	89.1	135	78.8	93.1	83.7	30.9	28.9	110	85.1	821	388	109	915	0.1	0.1	5.78	3.64	2.95	91.8	134	80.6	45.4	30.7	39.2	27.1
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	25.5	26.1	69	82.2	203	23.2	33.6	4.98	56.4	5.85	10.9	12.2	20.7	11.6	20	9.01	2.32	0.1	0.1	0.1	0.1	0.1	0.1	0.1	58.5	330	417	205	43.8	54.9	44.1	60.6	28.8	33.9	8.43	38.2	26.2	226	98.3	129	258	0.1	0.1	0.1	0.1	0.1	25.4	23.5	3.84	12.6	12	13.7	12.1
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0253	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0154	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0173	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0562	0.0116	0.01	0.01	0.01	0.0355	0.0385	0.01	0.01	0.01	0.0167	0.154	0.0665	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0279	0.038	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0179	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.041	0.0132	0.01	0.01	0.01	0.0577	0.0506	0.01	0.01	0.01	0.0396	0.984	0.204	0.01	0.01	0.01	0.01	0.01	0.015	0.01	0.126	0.139	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	1.51	1.07	0.765	1.22	1.36	2.51	1.63	0.691	3.51	5.95	4.3	5.52	2.78	1.97	2.68	1.57	0.682	0.1	0.1	0.1	0.1	0.1	0.1	0.1	13.3	6.54	7.45	6.21	2.04	4.27	10.2	6.33	1.46	0.1	0.198	2.76	3.35	15.8	6.8	11.1	15.9	0.1	0.1	0.1	0.1	0.1	4.88	2.42	6.68	0.583	2.3	0.1	0.1
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	6.38	5.42	7.79	7.41	18.7	16.9	9.08	3.86	14.8	26	16.7	27.6	10.4	7.78	15.5	8.02	4.24	0.1	0.1	0.248	0.1	0.1	0.1	2.34	109	34.8	34.3	20.8	12.5	18.4	10.9	15.3	6.65	2.16	1.92	8.29	15.7	53.7	31.9	15.1	72.5	0.1	0.1	1.97	0.1	0.332	21.2	13.1	57.4	7	10.2	5.42	4.23
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	58.5	52.9	145	146	460	54.7	51.8	21.6	104	66.6	71.6	79.1	46.2	33.7	74.4	38.3	25.8	0.1	0.1	21.8	22.5	12.6	4.87	50.5	159	488	527	247	90.7	65.7	40.8	84.8	42.4	29.9	19	60.1	77.6	252	165	146	356	0.1	0.1	38.5	9.17	16	90.9	85.1	80.4	30.3	53.5	15.4	10.7
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	51.1	58.9	130	150	443	30.5	42.3	10.3	107	35.2	46.4	35.9	29.2	17.8	46.2	20.5	10.5	0.1	0.1	4.28	3.36	1.19	1.11	11.8	62.6	346	597	272	54.3	35.6	40.4	75.9	26.3	42.5	9.94	39.1	37.4	103	78	210	137	0.1	0.1	7.74	3.64	3.99	35.4	39	18.7	2.97	28.6	1.61	1.21
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	22.2	26.8	55.3	66.1	190	12.5	18.8	3.97	44.9	15.3	19.2	13.6	12.7	7.18	18.5	7.83	3.77	0.1	0.1	1.46	0.1	0.1	0.1	4.23	24.5	136	258	119	22.2	14.3	21.5	33.4	11	20.2	3.55	16.7	14.9	40.3	31.4	93.7	50.7	0.1	0.1	2.6	1.28	0.802	13.4	16	7.33	0.1	12.7	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)																																																																
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	0.24	120	60	182	120	458	271	74.5	120	115	179	287	172	45.9	196	158	42	12	12	12	12	12	12	12	535	120	600	453	60	153	108	120	89.3	12	60	23.8	20.1	145	75.5	120	134	12	12	12	12	12	205	26.5	142	291	101	137	132
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	160	80	40	40	80	160	40	16.3	80	24	26.1	81.9	26.6	11.2	37.6	40	11.7	8	8	8	8	8	8	8	80	107	160	160	40	114	210	80	40	8	40	17.4	42.7	43	28.2	94.3	403	8	8	8	8	8	39.5	15.3	485	58.7	33.5	27.6	15.7
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	<0.32	160	150	428	160	596	368	123	160	165	229	553	206	90.5	376	214	67.6	16	16	16	16	16	16	16	492	160	751	535	80	376	189	160	117	16	80	65.6	93.2	225	123	178	358	16	16	16	16	16	352	77.7	158	469	150	219	196
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	280	399	260	682	320	1550	969	288	320	498	708	1430	666	256	1030	703	206	14	14	14	39.1	14	14	14	2320	549	2460	1560	266	900	392	140	398	49.8	87.9	269	571	766	488	140	2470	14	14	22.5	14	14	1550	418	370	1870	851	792	672
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	300	477	350	746	302	1750	1060	330	297	494	654	1220	615	237	923	651	190	15	15	15	39.8	15	15	15	2440	799	1990	1700	408	658	331	150	532	49.5	98.9	333	747	604	520	150	2600	15	15	22.2	23	15	1320	426	330	1660	904	690	559
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	300	720	322	740	410	1550	1020	346	323	662	1040	1500	1060	364	983	1040	325	15	15	23.2	55.7	15	15	15	3890	646	3190	1960	614	913	474	150	474	78.2	93.5	446	779	864	682	150	2750	15	15	32.1	21.1	15	2020	560	446	1990	1220	783	755
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	280	298	129	365	162	825	547	163	154	277	324	588	340	135	468	335	114	14	14	14	14	14	14	14	1380	325	966	865	201	381	158	140	254	27.5	70	141	335	300	230	140	844	14	14	14	14	14	728	188	128	651	389	332	283
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	0.48	364	290	582	0.24	1270	825	201	273	428	537	939	460	206	719	481	140	24	24	24	24	24	24	24	1850	517	1360	1140	474	505	267	0.24	475	51.8	120	260	550	526	404	0.24	1780	24	24	24	24	24	960	366	255	1150	641	469	436
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	0.2	472	308	684	353	1720	909	276	330	435	677	1220	665	248	1020	622	200	10	10	10	44.4	10	10	10	1990	682	2060	1600	294	815	365	0.1	436	50.4	126	286	582	729	459	0.1	2110	10	10	22.1	19	10	1390	398	323	1500	793	750	581
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	0.46	0.23	0.115	0.115	0.23	0.46	151	37.7	0.23	77	102	176	120	34.6	130	0.115	33.2	0.023	0.023	0.023	0.023	0.023	0.023	0.023	430	0.23	0.46	0.46	0.115	112	55.5	0.23	0.115	0.023	0.115	59.1	123	125	74	0.23	423	0.023	0.023	0.023	0.023	0.023	236	82.5	74.8	306	135	107	104
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	0.36	355	305	556	232	1260	956	220	232	510	465	1130	625	221	696	450	140	0.018	0.018	0.018	31.7	0.018	0.018	0.018	2030	427	1440	1170	512	388	263	180	396	33.3	90	173	388	443	566	180	1460	0.018	0.018	0.018	0.018	0.018	846	446	211	1060	967	645	378
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	0.34	513	591	2360	662	4090	2470	696	630	1100	1330	3710	1510	648	2350	1500	419	0.017	0.017	0.017	83.1	0.017	0.017	29.9	4260	1490	5640	3900	539	1940	1030	0.17	898	82.7	146	502	1000	1260	784	339	2850	0.017	0.017	38.9	0.017	0.017	2870	618	685	3270	1500	1750	1310
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	0.2	0.1	50	198	0.1	270	162	54.2	0.1	77.7	83.8	480	129	36.5	168	82.6	31.1	10	10	10	10	10	10	10	0.1	111	253	0.2	50	198	170	0.1	50	10	50	19.4	29.5	166	58	0.1	328	10	10	10	10	10	123	31.5	358	240	62.5	111	61.6
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	180	114	101	140	249	608	459	147	209	268	366	417	236	164	345	324	118	9	9	9	9	9	9	9	460	239	180	781	86.9	1210	456	90	170	17.3	45	106	114	459	167	305	907	9	9	14.5	9	9	463	91.8	348	446	297	198	291
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	300	335	279	1780	451	2120	1330	454	406	638	817	2890	1030	430	1340	751	256	15	15	15	43.3	15	15	15	1800	957	2790	1980	239	1810	870	150	485	43.9	75	385	560	1010	545	439	1730	15	15	26.4	15	15	1310	366	870	1800	534	999	724
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09	0.3	0.456	0.484	1.68	0.476	2.82	1.62	0.49	0.491	0.814	0.999	2.52	1.1	0.505	1.88	1.18	0.346	0.015	0.015	0.015	0.064	0.015	0.015	0.0231	3.35	1.23	4.05	2.81	0.387	1.35	0.72	0.15	0.709	0.0697	0.148	0.423	0.908	1.42	0.833	0.292	2.55	0.015	0.015	0.0314	0.015	0.015	2.21	0.495	0.478	2.61	1.35	1.28	1
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	2.36	4.5	3.57	11.1	3.62	20.9	13.1	3.92	3.67	6.58	8.53	19.1	8.95	3.63	12.7	8.49	2.64	0.118	0.118	0.118	0.401	0.118	0.118	0.118	27.2	8.08	27.6	20.4	4.02	11.8	6.06	1.18	5.43	0.554	0.7	3.51	6.84	9.09	6.04	1.65	23.7	0.118	0.118	0.21	0.118	0.118	16.6	4.6	5.66	19.4	9.92	9.29	7.5
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	92.8	86.6	91.3	90.8	88.6	91.6	93	87.2	90.3	77.5	96.4	80.7	80.2	107	84.4	88.6	93.9	89.2	77.6	90.9	98.1	80.7	77.6	77.5	84.3	93.8	84.6	87.4	91.4	95.6	86.8	85.3	91	95.1	94.5	94.9	91	92.4	83.2	89.4	92.2	75.4	91.3	91.2	90.3	84.1	96.2	83.3	93	93.9	80.7	83.4	95.4
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	90.5	88.9	93.4	89.7	90.7	92.8	92.5	94.3	81.6	88.5	94.4	87.2	84.8	88.8	83.1	83.2	88.5	79.1	81.9	90.8	94.5	77.9	85.1	78	74.3	91.7	79.8	94.2	91	94.7	91.6	82.1	94.4	95.5	96.6	94.5	92.2	96.7	85.6	86.4	92.2	77.9	85.3	90.5	91.1	82.1	95.5	84.9	92.9	93.4	82.3	85.7	94
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	92.8	88.9	101	97.8	91.7	98	93.5	102	78.8	84.7	93.4	87.2	86.7	91	80.9	82.4	90.9	95.5	87.3	94.2	92.7	78.1	87.5	80.3	87.7	94.4	84.4	93.8	92.6	94.5	96.2	76	101	99.2	97.8	99.3	95	99.8	93.4	91	95.1	82.8	87.4	94.1	91.1	85.5	94.6	90.6	95.2	95.4	88.5	89.8	94.4
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	78	76.9	95.4	89.8	81.5	96.6	78.2	84.2	70.9	79	89.2	78.9	76.7	83.4	76.1	82.1	91.2	85.6	80.1	91.6	99.2	75.5	78.1	78.7	78	75.8	72.7	85.4	87.6	104	81.3	77.4	96.5	98	95.3	95.3	91.3	97.8	91.9	84.9	97.2	86.9	88.2	96	90.5	82.8	96.7	83.1	98.7	97.6	83.7	82.5	95.1
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	68.6	75.7	107	96	82.2	105	86.1	89.1	70.1	82.4	84.6	77.2	79.1	84.7	71.6	78.8	86.8	86.3	78.8	113	110	76.5	74.8	76.8	76.9	90.6	66	85.4	96.3	101	80.9	79.7	105	92.5	91.4	88.1	86	89	88.9	80.4	89.2	100	92.9	96.5	91.1	82.3	91.4	81.1	94.6	94.1	76.9	85.5	87.9
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	83.8	65.6	213	221	564	81.2	98.8	16.8	164	250	85.3	82.2	78.6	53.2	89.1	45.6	48.1	0.1	0.1	0.1	4.21	1.99	3.28	7.33	452	979	837	439	147	208	162	175	126	66.9	41.5	162	150	1210	557	252	1370	0.1	0.1	5.78	3.64	2.95	140	194	176	72.9	54.4	70.7	44.5
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	118	118	283	305	923	105	105	36.4	229	134	139	148	88.7	61.2	139	68.4	41.2	0.1	0.1	26.3	25.8	13.8	5.98	64.7	344	875	1170	547	160	124	102	182	76.8	74.5	31.1	110	134	424	282	382	581	0.1	0.1	48.2	12.8	20.3	152	140	163	40.9	94.6	22.4	16.1
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00	201	184	496	526	1490	186	204	53.2	393	384	224	230	167	114	228	114	89.3	0.1	0.1	26.7	30.1	15.8	9.26	72	797	1850	2000	986	306	332	267	358	203	141	72.5	273	284	1630	839	634	1950	0.1	0.1	54	16.4	23.3	292	334	339	114	149	93.1	60.7
Metals - (Solid)																																																																
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			136000	73800	187000	196000	127000	206000	164000	83300	226000	132000	166000	238000	135000	167000	79700	224000	194000	34100	38000	28200	24100	28300	30500	26900	108000	83100	134000	134000	63500	169000	90900	95900	281000	22800	43000	93400	98000	57000	108000	28200	174000	36700	39300	29600	29900	33500	40300	19500	217000	90300	73800	93600	78600
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			3490	1690	10400	7880	5960	11800	9890	3000	10500	15500	6130	43000	15000	39900	2460	8710	18800	719	782	271	422	289	353	583	3360	18200	11800	5070	7050	7680	9750	8740	8840	6680	4520	4630	29500	5450	19100	6960	8060	638	1380	575	547	644	3950	4360	14300	4730	10500	4800	4880
Metals - (Liquid)																																																																
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			138000	-	114000	-	151000	-	-	-	-	-	-	-	-	-	-	-	-	131000	-	91600	-	100000	-	8820	-	179000	-	182000	-	-	-	-	-	-	-	-	-	-	-	-	56300	-	230000	-	81100	-	-	126000	-	-	-	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			29800	-	41600	-	12100	-	-	-	-	-	-	-	-	-	-	-	-	17500	-	18300	-	12400	-	6040	-	18300	-	34000	-	-	-	-	-	-	-	-	-	-	-	-	8790	-	13500	-	10100	-	-	16900	-	-	-	-	-
Phenols																																																																
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0115	0.0117	0.01	0.0116	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0268	0.0116	0.01	0.01	0.791	0.0696	0.0103	0.0113	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.01	0.01	0.01	0.0129	0.0875	0.01	0.01	0.01	0.01	0.0973	0.01	0.01	0.01	0.01	0.01	0.0102	0.0117	0.0115	0.0117	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0134	0.0116	0.01	0.01	0.484	0.209	0.01	0.0113	0.0226	0.0116	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0278	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0354	0.441	0.015	0.015	0.0678	0.0348	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.0875	0.035	0.035	0.035	0.035	0.125	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	1.31	0.719	0.035	0.035	0.102	0.0464	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																																																
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42																																																							
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01																																																						
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33																																																						
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32																																																						
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32																																																						
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42																																																					
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90																																																					
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61																																																					
Asbestos																																																																
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		09/10/2018	-	09/10/2018	-	08/10/2018	-	-	-	-	-	-	-	-	-	-	-	-	03/08/2018	-	07/08/2018	-	01/08/2018	-	29/10/2018	-	29/10/2018	-	24/10/2018	-	-	-	-	-	-	-	-	-	-	-	-	17/08/2018	-	17/08/2018	-	17/08/2018	-	-	24/10/2018	-	-	-	-	-
Analysed By	TM048	No units		1371	0	0				0.00		Andrzej Ferfecki	-	Marcin Magdziarek	-	Andrzej Ferfecki	-	-	-	-	-	-	-	-	-	-	-	-	Lucy Caroe	-	Renata Bozhkov	-	Lucy Caroe	-	Christian Hallam	-	Paul Poynton	-	Paul Poynton	-	-	-	-	-	-	-	-	-	-	-	-	James Richards	-	Lucy Caroe	-	James Richards	-	-	Paul Poynton	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00																																																						
Analysts Comments	TM304	No units		1002	0	0				0.00																																																						
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Detected	-	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	-	-	Not Detected	-	-	-	-	-
Comments	TM048	No units		1371	0	0			0	0.00		0	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	Soil containing ACM debris	-	0	-	Fibre bundle in soil	-	0	-	0	-	0	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	-	0	-	-	0	-	-	-	-	-
Volatile Organic Compounds (VOCs)																																																																
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		100	98.5	98	98.2	96.4	107	99.6	108	112	119	118	106	103	107	130	123	104	105	109	95.2	103	107	108	108	105	109	103	107	111	105	99.9	116	121	107	115	105	101	102	104	113	101	84.5	103	101	65.3	102	102	101	104	107	108	116	109
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		97	96.2	95.9	95.2	96.6	100	97.9	95.1	97	88.1	91.2	96.2	99.2	96.3	98.8	98.7	101	98.1	98.4	95.2	96.4	98.3	98.1	97.7	97.4	97.7	93.1	92.7	97.3	99.4	93	96.8	97.9	92.4	99.9	97.9	96.9	99	99.8	99.6	101	85.6	96.2	96.4	70.3	98.9	92.5	91.3	99.6	94.3	99.6	101	96.8
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		87.8	86.5	86.6	83.6	81.6	99.8	95.7	88.5	83.4	70.4	85.4	88.4	91.3	90.6	104	96	103	90.8	86.7	80.4	85.3	89.7	87.9	95.8	96	90.4	97.1	99.8	90	100	82.8	84.9	89.7	95.4	104	95.8	92	93	97.8	95.9	90.9	72.1	94.8	78.5	36.2	104	84.3	88.3	99.9	95	98.6	103	98.8
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.009	0.009	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.009	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.698	0.09	0.18	0.109	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.007	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.334	0.07	0.14	0.07	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.004	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.08	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.51	0.1	0.2	0.1	2	0.1	0.1	0.1	0.194	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		0.13	0.13	0.13	0.13	0.137	1.57	0.26	0.013	0.013	0.013	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.213	0.195	0.13	0.323	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.013	0.013	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	2.6	0.206	2.53	0.13	2.6	0.13	0.13	0.13	0.56	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.04	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	-	0.4	0.4	0.4	0.04	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.54	0.4	0.8	0.4	8	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																																																
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.4	-	-	21.6	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	-	-	18.5	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.9	-	-	21	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18.1	-	-	17.7	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	0.5	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.6	-	-	14.4	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.6	-	-	14.4	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	4CJ3	4CJ3	4CJ4	4CJ4	4CJ4	4CJ5	4CJ5
											Depth	1	1.5	0.5	1	1.4	0.5	1
											Sampled Date	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018	17/10/2018
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**WQS**	**Percentage of exceedances**							
Carbon																		
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	59.1	14.9	2.24	1.65	7.31	8.28	8.03
Metals (Solids)																		
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	9.53	8.6	7.08	6	6	17.2	13.5
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	3.14	0.02	0.168	0.2	0.2	0.2	0.2
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	9.74	121	32.8	810	449	238	115
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	28.8	15.9	10.2	18	30.4	32.7	61.3
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	56.5	41.5	25.6	7	24.3	47.8	70.9
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	0.14	0.14	0.14	1.4	1.4	1.4	1.4
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	19.5	13.6	9.27	8.79	12.9	22.2	25.1
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	1	3.55	3.2	16.5	18.5	14.4	10
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	60.5	126	58.9	354	394	268	171
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	239	188	113	23.3	63.3	110	318
TPH Criteria Working Group (TPH CWG)																		
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00							
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00							
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00							
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00							
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.01	0.01	0.0263	0.01	0.01	0.01	0.01
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	1.45	1.16	9.48	2.27	0.1	1.75	0.1
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	5.54	8.23	21.6	8.96	7.83	9.72	5.82
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	24.8	22.8	55.1	26.7	41.1	77.1	43.8
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	5.51	2.27	29.2	6.27	9.38	42.1	14.7
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.01	0.01	0.0175	0.01	0.01	0.01	0.01
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	3.95	2.27	2.16	1.46	1.15	1.62	2.52
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	47.2	13.3	7.15	13.6	9.86	9.71	11.7
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	114	43	37.6	68.8	46.7	70.7	63.4
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	31.3	13.5	35.4	20.5	17.2	53.4	46.5
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	11.4	5.38	16.3	7.31	6.88	22.7	20.1
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	138	273	60	20.3	12	87.7	25.8
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	21.4	16.1	40	16.8	14.5	40	8
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	195	409	118	193	128	102	42.7
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	719	1370	329	1820	830	492	472
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	702	1180	271	1790	752	530	486
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	1060	1480	313	2610	989	619	523
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	349	530	122	798	366	278	218
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	552	832	197	1370	602	457	405
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	695	1260	313	1690	855	556	439
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	126	159	0.115	325	157	0.115	89.6
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	487	1080	224	1800	517	314	278
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	1550	3820	692	2520	1270	906	410
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	77.6	175	50	27.9	23.9	50	10
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	221	116	52.2	122	123	139	74.8
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	906	2360	282	930	544	465	221
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09	1.17	2.83	0.589	1.86	0.908	0.807	0.637
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	8.97	17.9	3.5	17.9	8.08	5.75	4.32
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	94	81	82	80.6	94.9	90	94.3
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	91.2	83.6	84.2	84.2	93.7	87.2	94.6
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	90.4	87.2	85.1	90.2	93.4	94.1	96.9
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	86.9	85.1	79	85.4	98.1	89.7	96.6
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	79.3	73	79.3	79.6	96	82.6	94.9
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	37.3	34.5	115	44.2	58.3	131	64.3
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	197	72.2	82.3	104	74.9	135	124
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00	234	107	198	149	133	266	188
Metals - (Solid)																		
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			70500	81500	50600	167000	148000	108000	109000
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			3010	9220	4990	34400	43700	31700	14700
Metals - (Liquid)																		
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			-	-	-	-	17700	151000	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			-	-	-	-	11600	24200	-
Phenols																		
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.0112	0.448
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.01	0.0127	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.448
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42							
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01							
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33							
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32							
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32							
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42							
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90							
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61							
Asbestos																		
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		-	-	-	-	19/06/2018	19/06/2018	-
Analysed By	TM048	No units		1371	0	0				0.00		-	-	-	-	Christian Hallam	Christian Hallam	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00								
Analysts Comments	TM304	No units		1002	0	0				0.00								
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		-	-	-	-	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		-	-	-	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		-	-	-	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		-	-	-	-	Not Detected	Not Detected	-
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		-	-	-	-	Not Detected	Not Detected	-
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		-	-	-	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		-	-	-	-	Not Detected	Not Detected	-
Comments	TM048	No units		1371	0	0			0	0.00		-	-	-	-	0	0	-
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		107	126	110	100	116	105	109
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		100	100	96.4	98.8	95.9	96.1	94
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		101	105	90.5	96.6	88.1	94.9	89.6
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-

Sample ID	4CJ1V	4CJ3V	4CJ4V	4CJ5V	4CE2	4CE2	4CE5	4CE5	4CE6	4CE6	4CE7	4CE7	4CE7	3CE1V	3CE3V	3CE4V	3CE5V	4CE5V	4CE6V	4CG8
Depth	2.7	1.9	2	1.7	0.5	0.7	0.5	1	0.5	1	0.5	1	1.4	1.8	2.7	3	3.4	2	2	0.5
Sampled Date	17/10/2018	17/10/2018	17/10/2018	17/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018	23/10/2018	19/10/2018	19/10/2018	18/10/2018	18/10/2018	18/10/2018	18/10/2018
Determinand																				
Carbon																				
Soil Organic Matter (SOM)	0.712	1.95	1.26	5.24	3.55	1.3	4.86	3.09	4.29	0.771	3.28	1.63	1.24	3.26	5.95	4.29	1.26	1.08	1.1	3.62
Metals (Solids)																				
Arsenic	14.8	15.6	20.4	12.1	9.91	6	8.8	8.51	6	6.99	13.7	25.7	20.8	8.95	13.9	13.9	12.8	14.4	12.2	7.92
Cadmium	0.02	0.02	0.02	0.02	0.2	1.3	0.2	1.68	1.62	0.2	1.01	1.25	0.2	0.02	0.137	0.02	0.02	0.02	0.02	0.02
Chromium	27.5	36.4	33.8	49.5	55.2	359	26	9	84.6	9	9	9	9	26.1	37.7	34.7	30.9	34.6	30.8	38.3
Copper	24.6	10.5	11.4	17.4	31.3	14	14.9	17.4	14	14	23.3	103	75.7	13.7	21	18	10.6	10.4	10	9.56
Lead	24.3	27.7	29.9	35.7	165	9.38	42.9	80.1	51.2	7	42	98.4	50.7	18.7	41	35.1	20.9	29	23.4	14.7
Mercury	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	44.9	38.8	42.6	29.5	46.3	9.19	22	32.8	33.4	13.5	26.6	31.7	24.5	29.4	27.3	25.8	35.5	40.6	33.7	11.2
Selenium	1	1	1	1	10	10	10	10	10	10	10	10	10	1	1	1	1	1	1	2.08
Vanadium	51.2	64.3	62.5	68.4	231	1020	109	111	221	51.1	90.4	143	171	43.1	64.9	53.6	58.2	61.4	53.3	169
Zinc	108	111	115	132	574	19	132	202	159	56.1	190	261	190	106	131	112	91.7	123	102	60.7
TPH Criteria Working Group (TPH CWG)																				
Benzene																				
Toluene																				
Ethylbenzene																				
sum of detected mpo xylene by GC																				
Aliphatics >C5-C6	0.0333	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.142	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.662	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	1.8	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	9.35	0.1	0.1	0.1	2.01	0.1	0.1	3.12	1.77	0.308	2.09	0.982	2.47	0.1	0.1	0.1	0.1	0.1	0.1	4.48
Aliphatics >C16-C21	167	0.1	0.1	0.1	11.3	2.03	8.31	13.6	12.2	4.24	5.48	4.31	6.53	0.1	0.1	0.1	0.1	0.1	0.1	23.7
Aliphatics >C21-C35	90.9	0.1	0.1	5.29	98	9.43	78.7	75.4	54.5	23.6	20.5	27.9	48.3	1.45	6.67	1.62	0.1	0.1	1.84	175
Aliphatics >C35-C44	0.1	0.1	0.1	0.1	49.4	0.812	25.1	22.5	22.3	10	5.63	9.4	17.9	0.1	0.1	0.1	0.1	0.1	3.21	42.5
Aromatics >EC5-EC7	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.442	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	1.2	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	14.2	0.1	0.1	0.1	1.62	0.1	2	1.1	1.32	0.1	0.1	0.1	0.762	0.1	0.1	0.1	0.1	0.1	0.1	3.03
Aromatics >EC16-EC21	126	0.1	0.1	0.1	8.37	4.51	11.7	5.39	12.1	0.248	2.05	0.1	3.1	0.1	0.1	0.1	0.1	0.1	0.1	15
Aromatics >EC21-EC35	78.2	0.454	1.57	19.8	64.5	43.6	71.4	41	50.1	0.371	15.2	4.51	21	0.1	21.9	12.9	1.68	2.55	1.2	92.9
Aromatics >EC35-EC44	1.93	0.858	0.1	7.45	38.9	13.2	41.9	23.8	25.3	0.242	3.42	0.614	11.2	0.1	3.29	0.369	0.1	0.426	0.676	53.7
Aromatics >EC40-EC44	1.13	0.496	0.1	2.42	15.1	4.56	16	9.43	10.2	0.111	0.909	0.1	4.12	0.1	0.1	0.1	0.1	0.1	0.1	22.7
Polyaromatic Hydrocarbons (PAHs)																				
Acenaphthylene	132	12	12	12	21.5	12	131	71.6	162	19.1	12	62.9	12	12	12	12	12	12	12	125
Acenaphthene	698	8	8	8	37.1	21.5	34.6	14	28.3	8	14.4	53.2	31.6	8	8	8	8	8	8	40
Anthracene	135	16	16	16	139	37	220	106	191	31.8	22.7	112	35.4	16	16	16	24.9	16	16	231
Benz(a)anthracene	26.9	14	14	14	354	359	776	357	675	114	69.3	508	95.6	57.2	14	14	62.6	14	14	889
Benzo(a)pyrene	15	15	15	15	280	474	670	262	626	94.7	50.3	298	72.6	68.5	15	15	38.4	15	15	703
Benzo(b)fluoranthene	20.5	15	15	15	472	478	857	517	882	172	81.9	542	96.4	107	40.9	15	101	15	15	1240
Benzo(k)fluoranthene	14	14	14	14	194	188	291	170	291	70.9	28.7	188	40.8	28.1	14	14	38.6	14	14	418
Benzo(g,h,i)perylene	24	24	24	24	206	426	493	246	473	71.5	42.8	204	75	86.2	24	24	44.9	24	24	578
Chrysene	23.6	10	10	10	395	369	645	420	632	124	65.3	453	103	64	30.5	10	79.5	10	10	1010
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	38	50	110	42.5	99.6	0.023	0.023	47.5	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.115
Indeno(1,2,3-cd)pyrene	0.018	0.018	0.018	0.018	188	356	749	245	387	85.4	51.1	201	66.2	79.6	0.018	0.018	52.1	0.018	0.018	479
Fluoranthene	213	0.017	0.017	0.017	641	645	1330	803	1140	189	194	1160	372	135	51.1	0.017	206	0.017	0.017	1720
Fluorene	405	10	10	10	47.3	10	77.1	36	83.6	14.4	11.5	58.2	18.4	10	10	10	10	10	10	88
Naphthalene	145	9	9	9	106	10.3	262	150	193	26.1	21.1	50.7	23.6	9	9	9	9	9	9	205
Phenanthrene	948	15	15	15	389	206	768	445	644	91.4	117	739	222	58.7	15	15	188	15	15	791
Pyrene	0.139	0.015	0.015	0.015	0.659	0.604	1.07	0.626	1.01	0.207	0.154	0.8	0.284	0.112	0.0441	0.015	0.146	0.015	0.015	1.54
PAH, Total Detected USEPA 16	2.89	0.118	0.118	0.118	4.17	4.22	8.49	4.51	7.52	1.31	0.923	5.47	1.54	0.796	0.167	0.118	0.982	0.118	0.118	10
Naphthalene-d8 % recovery**	83.2	94.9	95.4	87.7	87.7	81	84.9	82	96.9	84.6	82.8	83.2	81.9	87.2	79.7	92.7	80.1	96.6	79.1	83.7
Acenaphthene-d10 % recovery**	86.9	94	95.3	88.2	91.3	85.4	87.6	89.7	96.7	88.5	86.8	89.5	88	86.9	85	86.3	91	95.9	83.1	88
Phenanthrene-d10 % recovery**	94.6	95.3	94.9	94.1	92.3	86.7	95.7	92.7	99.5	93.4	90.7	93	89.9	85.7	89	95.1	96.7	97.4	85.5	90.3
Chrysene-d12 % recovery**	92.6	102	100	92.1	85.4	79	93.1	83.7	99	98.6	85.6	86.5	84.9	86.1	99.8	100	79.1	101	81.1	88.1
Perylene-d12 % recovery**	86.9	102	99.8	88.8	75.1	80.6	90.7	71.9	97.8	92.8	81.6	74	87.7	84	96.9	101	74.1	96.9	77.6	76.3
Total Aliphatics >C12-C44	267	0.1	0.1	5.29	161	12.3	112	115	90.7	38.2	33.7	42.6	75.2	1.45	6.67	1.62	0.1	0.1	5.05	245
Total Aromatics >EC12-EC44	220	1.31	1.57	27.3	113	61.3	127	71.3	88.8	0.86	20.7	5.13	36.1	0.1	25.2	13.2	1.68	2.97	1.87	165
Total Aliphatics & Aromatics >C5-C44	491	1.31	1.57	32.5	274	73.6	239	186	180	39.1	54.4	47.7	111	1.45	31.9	14.9	1.68	2.97	6.92	410
Metals - (Solid)																				
Iron	41600	27800	38800	28700	174000	225000	159000	184000	193000	387000	212000	315000	395000	22900	27800	22300	33900	43300	32200	87500
Manganese	1630	519	995	1180	8680	40600	13300	11600	12300	3130	10500	6280	11300	392	603	449	892	315	735	8620
Metals - (Liquid)																				
Calcium	121000	150000	-	71100	-	316000	-	64800	116000	51200	49800	54800	-	-	-	-	-	-	-	219000
Magnesium	43300	10000	-	9530	-	11800	-	8770	16100	8960	7810	5970	-	-	-	-	-	-	-	17600
Phenols																				
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0113	0.0111	0.0114	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.0137	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																				
Soluble Sulphate 2:1 extract as SO4 BRE					-	0.046	-	0.317	0.141	0.257	0.471	0.205	-	-	-	-	-	-	-	0.237
pH					11.1	12.1	8.57	9.96	10.1	9.86	10.1	10.5	10.9	8.52	7.9	8.03	9.1	7.82	8.23	11.8
Sulphate, Total																				
Sulphur, Total					-	0.189	-	0.185	0.125	0.262	0.307	0.196	-	-	-	-	-	-	-	0.218
Sulphate, Total potential					-	0.567	-	0.555	0.375	0.786	0.921	0.588	-	-	-	-	-	-	-	0.654
Sulphate, acid soluble (total)					-	0.407	-	0.368	0.412	0.325	0.413	0.433	-	-	-	-	-	-	-	0.537
Cyanide, Total					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N					12	12	12	12	12	12	12	12	12	172	164	198	154	166	81.7	12
Asbestos																				
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	21/06/2018	21/06/2018	-	21/06/2018	-	05/11/2018	-	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	-	-	-	-	-	-	-	05/11/2018
Analysed By	Barbara Urbanek-Walsh	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	-	James Richards	James Richards	Marcin Magdziarek	Christian Hallam	Barbara Urbanek-Walsh	-	-	-	-	-	-	-	Christian Hallam
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected
Amosite (Brown) Asbestos	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected
Fibrous Anthophyllite	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected
Fibrous Tremolite	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected
Fibrous Actinolite	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected
Non-Asbestos Fibre	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected
Comments	Loose fibres in soil.	0	-	0	-	0	-	0	0	0	0	0	-	-	-	-	-	-	-	0
Volatile Organic Compounds (VOCs)																				
Dibromofluoromethane**	102	109	102	107	105	108	110	109	108	113	110	110	111	109	112	109	111	175	129	109
Toluene-d8**	101	95.7	98.8	97.8	97.5	98.7	97.9	98.7	97.4	98.8	99.7	98.9	99	99.3	97.8	97.4	100	100	100	95.5
4-Bromofluorobenzene**	90.7	97.2	99	91.8	81.9	95.7	84.1	97.2	93.6	99.8	99	87.9	95.4	88.7	94.9	94.8	90.5	101	90.9	93.4
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																				
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4CG8	4CG8V	4CK1	4CK1	4CK2	4CK2	W12601	W12602	W12603	W12604	W12605	W12606	W12607	W12608	W12609	W13101	W13102	W13103
Depth	1	2.6	0.5	1	0.5	1	0	0	0	0	0	0	0	0	0	0	0	0
Sampled Date	18/10/2018	18/10/2018	24/10/2018	24/10/2018	18/10/2018	18/10/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	04/01/2018	23/01/2018	23/01/2018	23/01/2018
Determinand																		
Carbon																		
Soil Organic Matter (SOM)	4.76	2	9.15	2.33	4.97	3.33	2.98	3.24	4.47	6.55	2.59	2.31	2.74	2.36	2.88	3.12	13.6	17.9
Metals (Solids)																		
Arsenic	12.1	13.1	9.61	6	9.24	5.93	5.94	9.8	9.2	21.8	7.41	7.89	7.58	6.48	8.63	10.7	10.3	8.36
Cadmium	1.74	0.332	0.2	0.962	0.0834	0.144	0.149	0.869	0.633	0.311	0.309	0.404	0.429	0.351	0.228	0.372	0.44	0.405
Chromium	46.4	30.9	103	476	51.8	8.4	0.9	10.2	9	29.2	0.9	17.1	0.9	8.69	1.83	25.3	32.5	51.3
Copper	40.3	13.6	34.3	14	27.8	8.04	15.1	32	17.1	15	19	12.4	28.5	19.6	17.8	11.3	15.8	21.5
Lead	91.1	50	84.1	19.3	71.3	55.5	15.8	48.9	42.9	37.6	25.8	33.5	23.4	39.1	30.3	35	55.8	78.5
Mercury	1.4	0.14	1.4	1.4	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.299	0.14	0.14	0.14	0.14	1.4
Nickel	28.4	40.6	34.2	54.7	20.2	9.13	9.68	18.8	9.22	13.1	9.35	14.5	12.5	13.7	13.6	13	18.4	23.8
Selenium	10	1	10	10	1	1	1.29	10	10	3.12	2.11	1.82	1.58	1	1.85	2.81	3.62	10
Vanadium	120	59.8	196	290	64.7	21.3	19.3	52.5	26.1	194	13.2	43.7	24.4	21.7	19.4	63.6	87.6	143
Zinc	151	187	287	121	244	90	69.6	183	156	149	64.3	222	116	142	104	128	222	263
TPH Criteria Working Group (TPH CWG)																		
Benzene							0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04
Toluene							0.002	0.002	0.002	0.00348	0.002	0.002	0.002	0.002	0.002	0.008	0.008	0.008
Ethylbenzene							0.003	0.003	0.003	0.00928	0.003	0.003	0.003	0.003	0.003	0.012	0.012	0.012
sum of detected mpo xylene by GC							0.009	0.009	0.009	0.0104	0.009	0.009	0.009	0.009	0.009	0.009	0.009	0.009
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0101	0.01	0.0568	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.0432
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0381	0.01	0.498	0.0146	0.01	0.01	0.01	0.01	0.04	0.0413	0.0597
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0874	0.01	1.57	0.0202	0.01	0.01	0.01	0.01	0.04	0.085	0.0648
Aliphatics >C12-C16	3.53	0.1	1.81	3	1.29	0.1	4.33	5.92	4.16	55	6.8	4.71	4.72	5.61	2.84	0.1	1.07	0.712
Aliphatics >C16-C21	22.6	0.1	10.2	16.6	11.3	1.65	17.7	21.1	13	76.9	22.7	19.3	19.4	22.6	11.6	0.1	5.15	3.58
Aliphatics >C21-C35	182	0.1	71.1	125	105	37.1	56.3	39.9	31.6	42.9	58.8	47.4	66.3	69.1	39	3.52	17.6	27.6
Aliphatics >C35-C44	55.3	0.1	25.7	29.2	30.3	10.1	22.8	13.2	10.9	7.1	16.5	16.8	27	34.4	16.6	0.1	5.12	13.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.028	0.01	0.356	0.0101	0.01	0.01	0.01	0.01	0.04	0.0413	0.0521
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.0582	0.01	1.05	0.0134	0.01	0.01	0.01	0.01	0.04	0.0563	0.0432
Aromatics >EC12-EC16	2.22	0.1	2.46	2.94	0.1	0.444	1.12	2.15	1.57	27	1.72	1.45	1.52	2.39	1.56	0.1	11.6	454
Aromatics >EC16-EC21	11.4	0.1	19.1	12.4	1.82	2.35	7.02	9.37	6.46	31.9	8.72	9.61	8.79	9.39	6.92	1.09	71.2	1020
Aromatics >EC21-EC35	110	3.41	86.2	63.8	22.3	20.4	44	33.2	26.4	37.9	32.1	37.1	51.2	55.8	44	7.98	150	1200
Aromatics >EC35-EC44	87	0.963	42	29.4	3.1	12.5	31.2	21	17.4	20.5	18	21.7	34.8	52.3	29.4	2.56	39.5	267
Aromatics >EC40-EC44	37.8	0.1	17.7	11.6	0.1	7.68	12.5	9.03	7.63	9.35	7.71	9.62	15.6	23.9	12.2	1.14	12.9	81.9
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	60	12	255	70.6	114	39.2	75.4	40	78.6	86.8	90.5	77.7	228	41	96.3	216	1190	4420
Acenaphthene	40	8	40.7	14.2	21.3	8.76	16.6	36.3	31.8	34.9	44.5	21.3	36	9.77	30.6	21.3	124	328
Anthracene	130	16	571	131	123	53.9	93.5	99.4	203	180	166	141	406	53	162	681	3240	6840
Benz(a)anthracene	406	14	1290	385	520	203	508	406	570	577	624	513	774	222	693	1750	4290	10500
Benzo(a)pyrene	392	15	1160	315	458	193	450	358	435	538	538	441	554	174	602	1440	3280	7980
Benzo(b)fluoranthene	517	15	1980	15	863	218	764	599	720	948	800	660	937	249	907	2320	4870	11300
Benzo(k)fluoranthene	185	14	721	199	289	107	283	222	280	300	297	282	363	101	341	728	1830	4120
Benzo(g,h,i)perylene	338	24	875	242	434	193	273	218	238	475	378	382	310	151	445	940	1860	4370
Chrysene	374	10	1410	377	635	194	464	402	522	566	531	454	853	189	581	1630	4160	8790
Dibenzo(a,h)anthracene	0.115	0.023	225	56.3	79.8	31.1	80.7	65.3	76.3	139	104	87.1	99.4	52.6	126	251	636	1490
Indeno(1,2,3-cd)pyrene	355	0.018	986	297	404	158	258	191	215	394	335	302	284	124	395	897	1830	4320
Fluoranthene	802	0.017	2870	771	883	423	881	744	1280	981	1010	1010	2190	323	922	5270	10200	25200
Fluorene	50	10	161	46.5	46.1	20	35.6	56.6	77.3	70.2	62.9	55.6	496	19.1	59.9	283	1930	6380
Naphthalene	111	9	294	306	378	95.7	129	148	155	200	175	183	128	60.9	159	526	5980	14900
Phenanthrene	359	15	1360	504	491	206	278	377	641	547	503	538	2330	160	433	2920	7810	22300
Pyrene	0.778	0.015	2.16	0.601	0.74	0.336												
PAH, Total Detected USEPA 16	4.75	0.118	16.4	4.32	6.48	2.48	5.3	4.55	6.51	6.86	6.46	5.93	11.4	2.2	6.79	23.4	59.8	149
Naphthalene-d8 % recovery**	77.2	88.8	80	83.6	83.9	85.6	104	102	105	104	92.2	90.8	104	86.2	93.6	90.3	91.5	87.4
Acenaphthene-d10 % recovery**	83	92.1	89.1	81.7	88.7	89.9	103	101	104	103	95.7	90.8	102	93.1	96.7	78.2	81.7	79.4
Phenanthrene-d10 % recovery**	85.8	92.1	93.2	87.5	90.7	89.5	101	100	103	103	96.6	95.3	101	95.8	105	73.5	79.6	79.7
Chrysene-d12 % recovery**	78.2	88.4	74.6	86.4	83.9	82.9	96.8	95	98.1	103	116	99.9	96.2	105	116	75.1	85.8	88
Perylene-d12 % recovery**	76.7	83.6	73.1	71.8	70.7	83.6	98.5	96.3	99.7	104	123	105	96.9	113	123	75.7	87.3	91.3
Total Aliphatics >C12-C44	264	0.1	109	174	148	48.9	101	80.2	59.7	182	105	88.2	117	132	70	3.52	28.9	44.9
Total Aromatics >EC12-EC44	211	4.37	150	109	27.2	35.7	83.3	65.8	51.9	117	60.5	69.9	96.3	120	81.9	11.6	273	2940
Total Aliphatics & Aromatics >C5-C44	474	4.37	259	282	175	84.5												
Metals - (Solid)																		
Iron	218000	26800	161000	114000	63600	27900	28900	63200	53100	111000	34400	47100	38300	21300	33100	28800	49700	47000
Manganese	9290	498	8370	19200	3270	873	1130	2450	1380	6000	2770	3410	1270	942	2090	4200	3820	3470
Metals - (Liquid)																		
Calcium	94400	-	95500	167000	181000	-	130000	-	147000	-	165000	-	129000	-	105000	147000	-	77500
Magnesium	10900	-	9130	22800	12400	-	36000	-	18500	-	40700	-	19600	-	28500	18400	-	10900
Phenols																		
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.229
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.47
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.584
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	1.28
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE	0.199	-	0.175	0.0234	0.167	-	0.162	-	0.21	-	0.15	-	0.229	-	0.19	0.302	-	0.326
pH	9.55	7.71	10.9	11.8	11.4	11.2	11.2	11.2	11.3	11.1	11.4	11.7	11.4	11.4	11.2	8.58	9.21	8.73
Sulphate, Total							-	-	-	-	-	-	-	-	-	-	-	-
Sulphur, Total	0.146	-	0.197	0.149	0.14	-	0.145	-	0.217	-	0.193	-	0.156	-	0.132	0.418	-	0.258
Sulphate, Total potential	0.438	-	0.591	0.447	0.42	-	0.435	-	0.651	-	0.579	-	0.468	-	0.396	1.25	-	0.774
Sulphate, acid soluble (total)	0.371	-	0.34	0.214	0.267	-	0.231	-	0.267	-	0.279	-	0.378	-	0.193	0.891	-	0.187
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.01
Exchangeable Ammonia as N	12	188	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Asbestos																		
Asbestos Quantification - Gravimetric - %	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-	0.001
Date of Analysis	05/11/2018	-	29/10/2018	29/10/2018	05/11/2018	-	09/01/2018	-	09/01/2018	-	09/01/2018	-	09/01/2018	-	09/01/2018	03/02/2018	-	03/02/2018
Analysed By	Barbara Urbanek-Walsh	-	Lucy Caroe	Lucy Caroe	Marcin Magdziarek	-	James Richards	-	James Richards	-	James Richards	-	James Richards	-	James Richards	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-	0.001
Additional Asbestos Components (Using TM048)	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-	None	-	None
Analysts Comments	-	-	-	-	N/C	-	-	-	-	-	-	-	-	-	-	N/C	-	N/C
Asbestos Quantification - Total - %	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-	0.001
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Detected	-	Detected
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	Not Detected	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Non-Asbestos Fibre	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected
Comments	0	-	0	0	Loose fibres in soil	-	0	-	0	-	0	-	0	-	0	Loose fibres in soil.	-	Loose fibres in soil.
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	112	109	110	101	110	110	-	-	-	-	-	-	-	-	-	-	-	-
Toluene-d8**	98.7	100	98.7	89.8	92	98.5	-	-	-	-	-	-	-	-	-	-	-	-
4-Bromofluorobenzene**	89.6	93.1	87.2	85.3	84.5	96.7	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	-	-	-	-	-	-	-	-	-	-	-	-
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	-	-	-	-	-	-	-	-	-	-	-	-
Subcontracted: Inorganics																		
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.16	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.51	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.91	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.84	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.02	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.8	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.6	-

Glan Llyn Residential Soil Data

											Sample ID	W13104	W13301	W13302	W13303	W13304	SPJC01	SPJC02	4AB1	4AB1	4AB2	4AB4	4AB4	4AB4	4AB5	4AB5	4AB5	4AB6	4AB6	4AB1V	4AB2V	4AC1	4AC1	4AC2	4AC2	4AC4	4AC4	4AC4	4AC5	4AC5	4AC5	4AC6	4AC6	4AC1V	4AC2V	4AC6V	4AD1	4AD1	4AD2	4AD5	4AD5	4AD5	4AD1V	4AD2V	4AE1	4AE1	4AE2
											Depth	0	0	0	0	0	0	0	0.5	1.3	0.5	0.5	1	2	0.5	1.4	2.5	0.5	1	1.7	1	0.5	1	0.5	1	0.5	1	3	0.5	1.5	3	0.5	1	1.7	1.3	2.6	0.5	1	0.5	0.5	1.2	2	2	0.8	0.5	1	0.5
											Sampled Date	23/01/2018	23/01/2018	23/01/2018	23/01/2018	23/01/2018	01/08/2018	01/08/2018	02/04/2019	02/04/2019	03/04/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	13/03/2019	13/03/2019	02/04/2019	03/04/2019	02/04/2019	02/04/2019	03/04/2019	03/04/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019	02/04/2019	03/04/2019	11/03/2019	02/04/2019	02/04/2019	03/04/2019	11/03/2019	11/03/2019	11/03/2019	02/04/2019	03/04/2019	02/04/2019	02/04/2019	03/04/2019
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**WQS**	**Percentage of exceedances**																																														
Carbon																																																									
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	11.9	11	10.8	15.3	10.2	2.19	2.47	16.7	93.8	25.2	8.79	13.6	6.93	6.14	97.2	10.6	8.91	18.8	7.26	2.93	7.72	6.95	21.6	82.1	21.2	14.3	13.3	11.9	8.24	2.64	19.7	32.1	5.47	0.726	3.72	2.91	5.5	38.1	16.8	46.2	9.55	0.522	0.865	5.45	26.5	18.1
Metals (Solids)																																																								
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	11.1	6.54	11.4	8.85	7.8	4.71	7.31	8.63	3.16	7.15	40.8	37.1	16.5	10.7	6.24	7.98	6	8.33	13.6	13.2	6.66	8	1.92	4.81	38.5	25.7	45.4	14.3	10.4	6	8.04	9.9	14.2	7.45	10	5.32	11.1	6.8	10.4	8.8	6	13.2	10.7	6.6	18.7	11.4
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	1.12	1.6	2.38	1.97	1.04	0.02	0.02	1	0.154	0.186	9.32	11.6	5.25	1.79	0.168	2.22	1.11	1.32	0.79	0.184	0.231	0.22	0.02	0.155	31.3	17.3	20.9	1	0.509	0.432	0.219	1.47	0.384	0.159	0.193	0.338	0.18	0.281	1.29	0.773	0.375	0.21	0.119	0.859	0.623	0.304
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	81.2	80.9	204	222	155	174	113	19.4	8.05	8.93	230	77.1	52.5	192	20.9	599	539	387	30.9	28.8	7.93	10.6	8.42	10.3	10.6	54.5	332	27.4	242	962	159	95.2	37.2	24.9	41.9	6.21	9.8	29.8	69.2	136	1140	39.3	40.6	57.9	5.57	22.2
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	24	20.7	21.8	22.7	103	9.18	11.5	34.5	15.1	16	105	87.3	42.6	29.3	30.6	25.6	18.3	17.3	22.4	12.8	11.7	23.7	3.32	13.9	83.4	62	58.5	111	59.3	24.7	24.7	25.1	19.1	8.24	24.1	14.4	29.7	16.1	39.4	34.9	14	18.1	18.3	14	31.6	17.7
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	87.6	264	199	293	201	21.1	36.1	48	16.3	13.1	1340	1940	703	252	54.4	232	22.3	62.9	41.4	20.2	26.3	25.3	1	13.2	4140	2480	2360	193	115	38.6	63.6	115	31.5	19.1	23	12.7	25.5	26.3	177	83.6	31.2	20.4	18.7	42.8	61.5	29.3
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	1.4	1.4	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	1.4	1.4	1.4	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	0.14	0.14
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	27.7	21.1	22	22.7	28.6	8.02	11.8	20.4	8.05	8.61	161	74.1	56.4	23.9	10.7	19.8	8.71	20.9	31.4	33.8	11.7	21.3	2.67	8.08	64.3	47.4	56.8	27.7	21.2	6.48	20.3	27.4	33	31.2	39.9	13.9	27.8	11.8	25.4	16.3	6.78	35.6	40.4	11.6	36.8	24.9
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	10	10	12	10	10	4.03	2.29	10	1.51	2.47	10.4	10	10	6.7	2.7	16.9	16.4	10	2.28	1.25	3.19	1.34	3.78	1.54	11.3	10.1	19.4	2.04	5.33	21.5	7.52	10	1.32	1	2.05	1.81	2.21	3.4	3.53	4.42	21.9	1.2	1.33	10	1.68	2.15
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	140	148	425	200	181	273	159	53.3	16.7	20	115	120	105	438	25.5	452	401	297	52.1	51.4	32.2	24.8	10.6	18.9	147	214	395	40.5	166	673	236	126	58.2	44	62.2	34.8	29.3	36.6	83.5	116	748	61.3	62.5	54.1	51.2	43.4
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	284	865	683	1070	555	93.5	152	147	63.1	62.7	5560	7140	2470	1240	52.3	865	63.4	201	163	101	95.5	52.9	24.5	44.1	13300	8110	7800	551	531	108	221	425	124	85.9	110	61.5	68.5	247	695	326	45.7	111	118	144	71.5	103
TPH Criteria Working Group (TPH CWG)																																																								
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00	0.04	0.04	0.04	0.04	0.04																																									
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00	0.008	0.0216	0.0118	0.0218	0.0189																																									
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00	0.012	0.012	0.012	0.012	0.012																																									
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00	0.009	0.009	0.009	0.009	0.009																																									
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.02	0.0945	0.02	0.02	0.02	0.02	0.01	0.02	0.0469	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0357	0.0285	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.04	0.04	0.04	0.0557	0.059	0.01	0.01	0.02	0.345	0.02	0.02	0.02	0.02	0.01	0.02	0.15	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.182	0.112	0.02	0.02	0.02	0.02	0.02	0.02	0.0342	0.0309	0.025	0.02	0.02	0.0286	0.02	0.02
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.04	0.04	0.04	0.0424	0.0566	0.01	0.01	0.02	0.155	0.02	0.02	0.02	0.02	0.01	0.02	0.0917	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.299	0.107	0.02	0.02	0.02	0.02	0.02	0.02	0.0403	0.025	0.022	0.02	0.02	0.0201	0.02	0.02
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.04	0.0864	0.04	0.0932	0.114	0.01	0.01	0.02	0.173	0.02	0.02	0.02	0.02	0.01	0.02	0.097	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.235	0.196	0.02	0.02	0.02	0.02	0.02	0.02	0.0403	0.02	0.022	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	0.503	1.56	1.65	1.63	2.92	0.804	1.48	14.1	120	13.5	0.884	1.33	0.1	1.68	32.3	4.48	7.93	1.34	0.1	0.343	2.02	0.662	5.45	17.4	1.02	0.53	2.47	0.771	0.709	1.15	11.6	3.6	0.1	0.115	0.1	1.64	0.1	17.2	5.37	1.64	0.512	0.1	0.1	1.91	1.11	3.28
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	3.4	11.9	27.4	16.2	20.7	6.68	13.8	25.8	182	68.8	28.1	15.8	3.95	6.92	81.8	62	146	11.4	2.23	20	5.62	1.71	13.6	39.3	16.6	9	20.2	2.3	2.63	6.07	54	18	0.1	0.1	0.1	3.9	0.1	33.7	12.1	29.3	7.63	0.1	0.1	8.6	2.16	40.7
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	19.8	23.4	39.6	40.7	47.1	34.2	57.3	110	441	141	96.8	77.9	60.1	75.9	103	108	37.4	21.4	14.2	15.6	37.3	5.21	35.4	82.3	83.9	35.1	73.3	23.5	22.2	21.8	74.5	37.3	4.18	0.221	0.1	19.8	0.1	91.3	38.1	32.2	11.7	2.51	0.1	67.5	8.77	40.8
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	6.07	5.54	9.47	15.3	12.9	12.8	29.4	22.7	50	18.6	15.3	10.7	18.8	21.3	21.1	24.8	3.87	5.47	5.29	0.442	8.45	0.851	3.98	11.5	11.6	3.81	13.5	13.1	9.6	5.67	31.7	9.56	0.1	0.1	0.1	5.37	0.1	16.2	12.8	9.56	3.41	0.209	0.1	15.4	1.42	1.42
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0288	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.02	0.0409	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.038	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.04	0.0576	0.04	0.0641	0.072	0.01	0.01	0.02	0.103	0.02	0.02	0.02	0.02	0.01	0.02	0.0608	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.199	0.0718	0.02	0.02	0.02	0.02	0.02	0.02	0.0268	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.04	0.0576	0.04	0.0629	0.0755	0.01	0.01	0.02	0.116	0.02	0.02	0.02	0.02	0.01	0.02	0.065	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.156	0.131	0.02	0.02	0.02	0.02	0.02	0.02	0.0268	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	7.4	4.91	4.74	3.72	6.49	1.07	1.05	23.1	126	35.4	1.35	2.14	0.339	2.08	34.7	3.92	1.33	9.66	0.1	1.92	2.5	0.351	10.5	25.4	1.85	1.27	1.69	1.39	1.38	0.804	9.78	9.26	0.1	0.1	0.1	2.21	0.1	14.8	4.87	2.93	0.852	1.47	0.1	2.97	0.881	6.13
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	81.7	25.4	38.1	29.7	9.82	6.39	7.61	66.7	290	161	10.1	10.1	5.69	10.4	91.8	39.8	36.6	97.1	1.66	5.61	7.81	1.82	29.1	66.5	10.4	6.38	10.2	8.98	9.5	7.3	36	100	0.1	0.1	0.1	6.04	0.1	63.6	16.2	19.1	11.1	3.02	0.1	17	3.79	24.5
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	160	56.8	93	90.6	36	38	41.6	161	521	402	49.1	43.3	50.2	77.1	161	157	19.9	191	21.5	25.2	31.4	5.54	66.4	172	47.3	22.7	42.2	60.6	63.1	37.2	76.7	265	9.16	1.2	4.29	21	5.57	165	74.2	64.8	54.1	18.1	0.1	71	12.1	49.3
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	46.7	17.2	30.6	35.9	16.7	22.8	35	53.8	136	106	16	12.4	23	40.7	36.7	38.6	3.2	49.1	6.01	0.119	11.2	0.772	17.9	44.4	13	3.77	11.6	37.9	31.4	9.83	43.6	78.1	2.06	0.173	0.1	8.05	0.1	42.6	34.5	26.8	17.8	5	0.1	26.9	2.84	10.7
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	16.2	5.87	11.4	13.6	6.2	9.65	16.2	19.2	46.8	30.2	5.5	4.31	8.16	15.3	12.3	13.3	1.05	15.9	1.98	1.54	4.13	0.165	5.56	14.3	4.39	1.3	4.36	16.5	12.7	3.57	20.2	26.8	0.1	0.156	0.1	3.12	0.1	12.6	13.6	10.9	5.88	1.41	0.1	9.12	0.801	3.49
Polyaromatic Hydrocarbons (PAHs)																																																								
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	1790	900	1050	1280	1610	89.3	110	1180	3460	2140	157	189	122	55.6	72.5	62.4	34	1210	12	44.4	72.8	48.8	12	840	42.1	41	23.6	60	120	24	1070	1670	12	12	79.8	75.6	12	1270	218	42.1	43.7	12	12	179	16.3	246
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	193	154	217	241	280	27.7	24.6	121	416	457	13.6	8	36.2	68.6	112	145	9.46	164	8	8	11.5	10.2	8	8	8	11.4	30.5	198	192	126	143	118	8	8	8	8	8	57.7	233	26.3	54.5	8	8	35.5	8	32.3
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	3480	2020	2160	3460	4070	171	214	1920	4610	4950	157	131	88.9	165	333	239	21.6	2260	16	24.3	99.7	68.9	771	4420	95.8	72.7	109	162	190	201	1050	2630	16	16	88.6	146	16	1130	438	154	206	16	16	319	16	336
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	6120	4740	5200	7510	8260	684	649	2710	6060	8590	474	287	600	633	230	1480	78.4	8890	14	19.9	309	201	1490	2650	205	171	241	1020	1350	862	1650	7490	31.3	14	253	379	14	3070	1960	442	802	45	14	1000	77.9	426
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	4250	4220	4760	6720	7190	700	691	1900	4530	8140	539	337	661	607	109	1280	96.3	7760	15	15	255	232	1250	2280	205	164	198	1090	1250	685	1320	6940	33.1	15	200	344	24.5	2580	2080	433	839	47.6	15	877	65.4	377
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	6160	6180	6340	9610	9830	1080	788	3320	7550	12700	1080	557	1180	1200	261	1220	112	7240	28.3	30.3	501	366	2340	4340	470	334	439	1830	1920	789	2300	10400	61.5	15	316	604	35.6	4940	3280	722	1360	85.5	15	1440	127	624
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	2380	2160	2720	3390	3880	392	345	1160	2800	5260	269	251	384	536	70.5	572	48.5	3990	14	14	173	120	841	1470	162	115	176	728	635	287	963	4430	21.7	14	111	198	14	1620	1460	275	491	31.5	14	585	41.6	242
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	2190	2680	3180	3930	4490	576	545	1290	2570	5560	581	406	520	501	73.3	996	108	5580	24	24	248	185	929	1620	202	140	187	736	987	457	765	4510	33.2	24	127	240	24	2260	1380	309	661	70.2	24	618	49	286
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	5440	4430	5270	6370	7010	716	645	2640	5550	8220	536	379	680	824	498	1670	88.9	7120	29.6	35.3	390	195	1550	2620	289	217	366	1320	1380	891	1730	7590	32.9	10	206	441	32.4	3070	2220	513	837	52.8	10	982	87.1	477
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	787	793	925	1280	1260	140	121	273	741	1340	120	70.4	119	99	32.2	233	0.023	1070	0.023	0.023	46.6	43	252	460	42.7	31	43.2	228	0.23	116	199	1250	0.023	0.023	0.023	60.4	0.023	488	297	89	154	0.023	0.023	124	0.023	67.2
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	2260	2350	2850	3700	4030	629	545	1400	2530	4970	421	294	462	399	42.7	728	63.7	3980	0.018	0.018	238	170	925	1550	145	113	138	637	673	329	743	4220	23.5	0.018	117	225	0.018	2440	1190	250	529	29.4	0.018	559	42.9	256
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	15700	9730	11700	14900	16500	1110	1300	7720	17000	17900	748	496	1020	1540	799	2150	117	20900	53.4	47.4	657	429	3920	5770	411	288	493	1910	2240	1320	4390	18600	74.7	0.017	534	821	31.9	7490	3510	677	1150	109	0.017	2150	160	1290
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	4000	1150	1190	1570	2110	45.7	71.4	1010	2880	1420	38.1	30.7	31.5	71.1	360	99.6	23.2	739	10	32.6	52.4	32.2	284	339	29.3	20	31.9	133	147	93.3	899	750	10	10	25.2	10	10	353	233	45.5	72.8	10	10	156	10	212
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	6450	6950	7980	11900	11200	204	326	6660	21200	4790	192	220	50.8	72.3	1310	233	172	2240	9	173	253	139	2850	3160	82.4	94.2	74.8	80	90	173	4510	1690	9	9	106	243	22.4	4790	359	245	62.5	16.1	9	28.9	27.3	974
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	15900	6220	7070	9370	11400	477	641	6850	19300	11400	419	319	315	730	1920	1280	135	7010	30.6	140	465	274	3860	4580	272	196	399	869	1090	965	3470	5540	46.1	15	194	545	63.3	5680	1640	519	598	61.3	15	1180	141	1270
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09						0.957	1.03	5.23	12.1	13.7	0.52	0.371	0.813	1.13	0.587	2.13	0.114	15.5	0.0395	0.0339	0.461	0.31	2.65	4.14	0.322	0.22	0.412	1.41	1.68	1.21	3.48	13.7	0.0591	0.015	0.372	0.596	0.0246	5.12	2.76	0.523	0.877	0.0822	0.015	1.63	0.112	0.946
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	86.4	61.3	70.9	95.7	105	8	8.05	45.4	113	112	6.26	4.34	7.09	8.63	6.81	14.5	1.22	95.7	0.181	0.581	4.23	2.82	23.9	40.2	2.98	2.23	3.36	12.4	13.7	8.51	28.7	91.6	0.417	0.118	2.73	4.92	0.235	46.3	23.2	5.27	8.73	0.631	0.118	11.9	0.947	8.06
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	91.4	93.1	103	122	104	97.6	90.7	93.4	97.4	101	83.5	90.8	93.3	97.8	93.6	106	92.9	79.3	91	93.4	91	100	102	101	91	90.1	92.9	93	91	104	85	90.3	104	102	93.5	102	103	85.4	94.8	86.9	89.7	105	89.8	103	99.5	100
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	84.3	87.2	101	109	99.2	106	87.4	93	98.7	97.9	86.6	89.3	90.2	96.8	95.4	105	92.5	74.1	88.8	87.1	88	94.9	95.8	94.6	88.3	87.5	92	89.8	86	104	88.9	88.4	98.7	95.3	89.9	96.8	96.4	87.1	92.8	87.7	87.7	99	87	96.4	93.5	94
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	82.9	86.8	103	104	99.1	111	86.5	98	103	103	87.4	92.2	92.8	107	98.3	105	91.9	71.5	92.3	91.7	92.5	102	103	91.9	83.8	85.8	92.4	87.5	93.1	108	98.5	91.7	104	106	90.4	101	103	93	89.3	89.5	90.9	109	85.6	97.6	97.6	103
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	90.6	94.8	105	109	102	105	81	80.7	84.8	84.6	75.6	69.8	92.4	93.1	75.4	109	97.8	96	76.8	78	81.5	91.5	91	85.5	70.5	73.2	79.2	84.5	101	119	89.9	96.7	94.5	100	83.8	98.4	90.3	89.5	89.9	80.7	91.1	108	70.5	93.4	86.5	96.2
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	93.7	98.5	99.2	110	107	94.6	81	75	79.6	77.9	70.3	54.7	87.2	82.8	53.8	106	94.1	77.3	81.2	79	77.3	87.9	82.1	79.2	50.8	56.6	61.4	77.1	93.4	112	81.8	91.6	100	101	81.9	93.7	87.9	75.8	83.9	78.5	85.9	104	73.8	94.5	73.8	93.4
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	29.8	42.4	78.2	74	83.7	54.4	102	173	794	242	141	106	82.8	106	238	199	196	39.7	21.7	36.4	53.4	8.43	58.4	151	113	48.4	110	39.6	35.1	34.7	172	68.5	4.18	0.335	0.1	30.7	0.1	158	68.5	72.8	23.2	2.72	0.1	93.4	13.5	86.2
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	295	104	166	160	69	68.2	85.3	305	1070	705	76.6	67.9	79.2	130	324	240	61.1	347	29.2	32.8	52.8	8.48	124	308	72.5	34.1	65.7	109	105	55.1	166	453	11.2	1.37	4.29	37.3	5.57	286	130	114	83.8	27.6	0.1	118	19.6	90.7
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00						123	187	478	1870	946	218	174	162	236	563	439	257	387	50.9	69.2	106	16.9	182	458	186	82.5	175	148	140	89.8	339	522	15.4	1.7	4.29	68.1	5.57	444	198	186	107	30.3	0.1	211	33.1	177
Metals - (Solid)																																																								
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			58900	85100	108000	95400	93400	70700	75200	67100	4360	23100	214000	305000	149000	99800	6800	158000	131000	94800	22300	34600	31600	22900	5310	8250	335000	275000	277000	38800	85800	136000	70300	116000	30300	27100	30200	39500	22700	24800	66600	49600	173000	32200	35100	71500	41700	15800
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			5510	8440	14900	13600	11100	10700	7870	3110	462	2090	11400	7670	4770	10600	676	25200	31900	16100	253	787	2310	748	2860	1180	10700	9730	29200	1430	8000	37200	10200	5640	357	846	409	2370	1230	2720	4670	5580	36200	375	524	2470	1670	482
Metals - (Liquid)																																																								
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			-	105000	-	108000	-	-	156000	133000	49600	163000	-	-	-	-	-	-	-	-	-	-	133000	27700	179000	-	-	-	-	-	-	-	-	-	-	-	-	-	37600	140000	-	-	-	-	-	180000	-	77700
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			-	16400	-	12700	-	-	25900	19300	2290	25100	-	-	-	-	-	-	-	-	-	-	22200	6550	31300	-	-	-	-	-	-	-	-	-	-	-	-	-	11300	18300	-	-	-	-	-	44900	-	7260
Phenols																																																								
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.0121	0.0118	0.0348	0.01	0.01	0.0141	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.023	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0106	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.01	0.01	0.01	0.0116	0.0106	0.01	0.01	0.01	-	-	-	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	0.01	0.01	-	0.01	0.01	0.01	-	-	-	0.01	0.01	0.0212	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	-	-	-	-	-	-	-	-	0.015	0.015	0.015	0.015	0.015	0.015	-	-	-	-	-	-	-	-	0.015	0.015	-	0.015	0.015	0.015	-	-	-	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.0464	0.035	0.035	0.035	0.035	-	-	-	-	-	-	-	-	0.035	0.035	0.035	0.035	0.035	0.035	-	-	-	-	-	-	-	-	0.035	0.035	-	0.035	0.035	0.035	-	-	-	0.035	0.035	0.035	0.035	0.035
Inorganics																																																								
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	-	0.182	-	0.148	-			0.102	0.109	0.0526	0.0277	-	0.045	0.051	-	0.159	0.116	0.11	-	-	0.0525	0.0422	0.0411	-	-	0.108	-	-	0.08	-	-	0.0769	-	-	-	-	0.0968	0.157	0.048	-	0.0172	-	-	0.0549	-	0.0523
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	8.78	10.6	9.34	10	9.33			8.77	8.47	8.48	8.19	8.28	8.08	8.57	8.03	11.5	11.2	10.7	6.55	8.44	8.86	8.43	8.96	8.18	8.2	8.49	12.2	8.22	8.51	12.7	10.9	9.92	6.71	8.1	7.43	9.35	8.61	8.84	8.98	11.8	12.8	6.8	7.61	10	8.48	8.13
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33	-	-	-	-	-																																									
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	-	0.255	-	0.212	-			0.307	0.272	0.262	0.0861	-	0.0867	0.107	-	0.181	0.512	0.196	-	-	0.238	0.0885	0.412	-	-	0.0954	-	-	0.0927	-	-	0.103	-	-	-	-	0.105	0.34	0.0947	-	0.218	-	-	0.129	-	0.118
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	-	0.765	-	0.636	-			0.921	0.816	0.786	0.258	-	0.26	0.321	-	0.543	1.54	0.588	-	-	0.714	0.266	1.24	-	-	0.286	-	-	0.278	-	-	0.309	-	-	-	-	0.315	1.02	0.284	-	0.654	-	-	0.387	-	0.354
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	-	0.483	-	0.207	-			0.413	0.0643	0.526	0.0876	-	0.0687	0.0816	-	0.328	0.716	0.279	-	-	0.515	0.113	0.574	-	-	0.115	-	-	0.117	-	-	0.131	-	-	-	-	0.198	0.283	0.0869	-	0.259	-	-	0.197	-	0.0969
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	1.04	1.51	1	1.2			1	1	1	20.9	27.6	4.98	5.29	1	2.22	1	1.28	1	1	1	1	1	1	34.3	29.4	19.2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	12	12	31.8	12	12			12	12	12	-	-	-	-	-	-	-	-	99	17.5	12	12	12	12	-	-	-	-	-	-	-	-	75.7	20.1	-	12	12	12	-	-	-	78.8	12	12	12	12
Asbestos																																																								
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		-	03/02/2018	-	01/02/2018	-	-	18/07/2018	16/04/19	16/04/19	16/04/19	18/03/19	-	18/03/2019	18/03/2019	-	18/03/2019	20/03/2019	20/03/19	-	-	17/04/2019	17/04/19	16/04/19	-	-	18/03/19	-	-	18/03/2019	-	-	18/03/19	-	-	-	-	16/04/2019	16/04/2019	18/03/2019	-	18/03/19	-	-	17/04/19	-	16/04/2019
Analysed By	TM048	No units		1371	0	0				0.00		-	James Richards	-	Eva Guerra	-	-	James Richards	Christian Hallam	Christian Hallam	Christian Hallam	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	Lucy Caroe	-	-	Paul Poynton	Christian Hallam	Christian Hallam	-	-	Christian Hallam	-	-	Barbara Urbanek-Walsh	-	-	Christian Hallam	-	-	-	-	Paul Poynton	Paul Poynton	Barbara Urbanek-Walsh	-	Christian Hallam	-	-	Christian Hallam	-	Paul Poynton
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00		-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0				0.00		-	-	-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/C	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	Not Detected	Trace	-	Not Detected	-	-	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	Detected	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	Not Detected	-	-	-	-	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Comments	TM048	No units		1371	0	0			0	0.00		-	0	-	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Loose fibres in soil.	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																																																								
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		-	-	-	-	-	95.5	88.8	99.1	102	89.1	103	103	102	97.7	99.8	101	102	98.8	110	103	100	102	83.6	109	98.1	103	99.3	89	95.4	102	77	102	115	105	104	104	107	81.7	94.6	106	97.2	110	105	101	109	100
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		-	-	-	-	-	91.8	94.8	96.3	96.7	91.5	101	102	101	97.9	95.9	96.8	98.8	96.8	98.9	98.6	93.5	98.4	85.7	99.4	99.2	99.8	100	90.9	95.2	100	91.6	96.9	97.4	96.8	101	97.8	99	90.3	94.1	99.7	97.8	97.7	102	94.8	94.2	94.7
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		-	-	-	-	-	82.8	87.3	85.1	96.4	72.4	93	92.5	95	85	83.9	91.4	86.2	71.2	90	97.4	84.5	88.6	70.1	99.1	84.3	90.2	89.4	72.1	78	94.8	70.6	81.2	94.7	103	95.3	91.7	95.3	76.4	75.7	90.4	85.8	97.5	101	86	84.5	75.4
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		-	-	-	-	-	0.1	0.1	0.1	2	0.2	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	-	0.1	0.1	0.1	0.1	0.2
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		-	-	-	-	-	0.09	0.09	0.09	1.8	0.18	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.18	1.8	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	-	0.09	0.09	0.09	0.09	0.18
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		-	-	-	-	-	0.07	0.07	0.07	1.4	0.14	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.14	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	-	0.07	0.07	0.07	0.07	0.14
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		-	-	-	-	-	0.04	0.04	0.04	0.8	0.08	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	-	0.04	0.04	0.04	0.04	0.08
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		-	-	-	-	-	0.1	0.1	0.1	2	0.2	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	-	0.1	0.1	0.1	0.1	0.2
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		-	-	-	-	-	0.1	0.1	0.1	2	0.2	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	-	0.1	0.1	0.1	0.1	0.2
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		-	-	-	-	-	0.475	0.753	0.13	2.6	0.664	0.13	0.13	0.13	0.13	0.13	2.6	0.13	0.521	0.13	0.13	0.13	0.13	0.26	2.6	0.13	0.13	0.13	0.13	0.13	0.13	1.14	0.462	0.13	0.13	-	0.13	0.13	2.56	0.13	0.13	-	0.13	0.13	0.13	0.13	0.26
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		-	-	-	-	-	0.4	0.4	0.4	8	0.8	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	0.4	0.4	0.4	0.4	0.8	8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	-	0.4	0.4	0.4	0.4	0.8
Subcontracted: Inorganics																																																								
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	2.57	3.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	2.16	2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	2.42	2.93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	1.66	2.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	0.95	1.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	15.3	13.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	16.1	14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	4AE1V	4AE2V	4AF1	4AF1	4AF1	4AF2	4AF2	4AF1V	4AF2V	4AG1	4AG1	4AG1	4AG2	4AG2	4AG1V	4AG2V
Depth	1.7	0.8	0.4	1	1.5	0.5	1.2	2.1	1.6	0.5	1.1	1.4	0.5	1	1.5	1.6
Sampled Date	02/04/2019	03/04/2019	02/04/2019	02/04/2019	02/04/2019	03/04/2019	03/04/2019	02/04/2019	03/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019	02/04/2019
Carbon																
Soil Organic Matter (SOM)	7.1	0.717	4.83	34.1	3.17	14.7	6.79	0.957	0.991	3.14	5.28	4.4	8.45	8.91	8.41	1.15
Metals (Solids)																
Arsenic	16.2	10.6	11.8	7.68	7.03	2.72	8.54	12.8	12.1	11.3	8.18	8.25	6.04	11	19.1	13.6
Cadmium	0.55	0.171	1.99	0.911	0.342	0.0919	0.285	0.122	0.155	1.87	0.676	1.03	0.824	0.415	0.598	0.116
Chromium	41.2	30.9	69.4	94	84.8	60.6	11.8	36.7	41.5	94.2	17.2	15.4	465	66.4	43.7	40.8
Copper	24.4	12.7	18.6	14	10.9	5.83	11.5	17.5	15.4	14	13.7	14.4	14	19.1	22	15.8
Lead	37.6	26.9	98.2	53.4	19	4.9	21.4	19.2	22	33.9	43.5	46.4	15.7	78.9	37.3	23.2
Mercury	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	0.14	0.14	0.14
Nickel	28.5	38.8	32.2	12.1	14.8	6.16	11.8	36.3	39.8	25.5	15.9	14.8	15.6	20.2	28.3	39.1
Selenium	1.65	1	10	10	2.97	4.02	1.53	1.09	1	10	2.23	2.52	10	3.87	1.56	1.26
Vanadium	75.2	54.3	122	103	105	77.8	25.9	53.7	67.2	149	42.3	41.6	281	141	82	66.6
Zinc	120	110	334	115	82	50.7	66.5	106	124	111	70.3	65	137	328	137	119
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.02	0.02	0.02	0.0319	0.0291	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.191	0.0614	0.02	0.02	0.02	0.02	0.02	0.02	0.0459	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.177	0.0701	0.02	0.02	0.0203	0.02	0.02	0.02	0.109	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.253	0.1	0.02	0.02	0.02	0.02	0.02	0.02	0.188	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	0.1	0.1	1.07	35.4	3.85	12.6	4.3	0.321	0.1	2.2	2.66	1.79	2.46	1.47	0.1	0.1
Aliphatics >C16-C21	0.1	0.1	6.56	253	33.4	29	15.4	0.163	0.1	12.3	9.3	4.34	9.22	6.21	0.1	0.1
Aliphatics >C21-C35	3.83	0.1	62.2	482	62	66	39.8	1.04	0.446	78.4	37.6	16.2	31.5	38.9	6.48	0.1
Aliphatics >C35-C44	0.1	0.1	21.2	52.1	8.53	8.9	9.33	0.156	0.172	21.7	6.4	3.09	6.47	20.4	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.072	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.046	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.118	0.0464	0.02	0.02	0.02	0.02	0.02	0.02	0.0717	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.169	0.0668	0.02	0.02	0.02	0.02	0.02	0.02	0.125	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	0.1	0.1	2.37	70	7.5	14.7	6.44	0.1	0.929	4.15	3.12	0.976	4.25	2.19	0.1	0.1
Aromatics >EC16-EC21	0.1	0.1	7.8	253	34.6	45.2	17.7	0.151	1.65	15.9	11.5	3.26	18.1	9.91	1.29	0.1
Aromatics >EC21-EC35	21.2	0.1	47.7	506	79.7	120	43.5	3.84	4.54	62.7	38.1	10.4	58	53	22.3	0.1
Aromatics >EC35-EC44	3.72	0.1	31.2	119	24.8	37.1	14.7	0.577	0.954	33.3	14.4	2.37	17.9	39.7	4.02	0.1
Aromatics >EC40-EC44	0.545	0.1	12.9	38.4	7.99	11.9	4.98	0.1	0.199	13.5	5.3	0.696	5.43	16.6	1.17	0.1
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	12	153	4700	545	455	99.8	12	12	324	410	42.5	304	113	12	12
Acenaphthene	8	8	44.5	682	8	39.1	85	8	8	34.2	48.8	11.5	82.6	11.3	8	8
Anthracene	16	16	268	5760	653	448	143	16	16	426	884	59.8	537	109	16	16
Benz(a)anthracene	37.4	14	759	7250	1040	1310	180	14	14	1370	1550	182	1280	432	28.5	14
Benzo(a)pyrene	39.7	15	725	6780	1080	1120	162	15	15	1290	1440	170	1210	414	25.9	15
Benzo(b)fluoranthene	70.8	15	1280	12000	1750	2280	314	15	15	2210	2300	297	2070	675	58.5	15
Benzo(k)fluoranthene	14	14	505	3550	771	695	95.1	14	14	778	780	117	737	212	21	14
Benzo(g,h,i)perylene	42	24	578	5220	871	1010	137	24	24	1110	1100	122	905	321	32.4	24
Chrysene	38.5	10	722	7430	848	1490	254	10	10	1390	1360	183	1310	456	34.7	10
Dibenzo(a,h)anthracene	0.023	0.023	117	1020	177	224	0.023	0.023	0.023	207	225	32.5	230	59.2	0.023	0.023
Indeno(1,2,3-cd)pyrene	34.2	0.018	536	5810	761	1160	155	0.018	0.018	964	1230	115	876	340	0.018	0.018
Fluoranthene	96.2	0.017	1460	23700	2720	3270	441	0.017	0.017	2710	3920	362	2760	892	67.9	0.017
Fluorene	10	10	126	3650	433	178	135	10	10	186	271	36.2	176	44.2	10	10
Naphthalene	9	9	550	24400	3000	1100	610	9	9	681	1200	182	1180	174	9	9
Phenanthrene	49.5	15	920	21700	2400	2300	718	15	15	1500	2190	278	2000	410	39.6	15
Pyrene	0.0735	0.015	1.18	15.9	1.89	2.2	0.29	0.015	0.015	1.95	2.76	0.261	2.04	0.65	0.053	0.015
PAH, Total Detected USEPA 16	0.482	0.118	9.93	150	19	19.3	3.82	0.118	0.118	17.1	21.7	2.45	17.7	5.31	0.362	0.118
Naphthalene-d8 % recovery**	93	93.7	100	100	103	93.5	96	98.8	91	90.3	90	73.6	97.1	91.5	87.8	101
Acenaphthene-d10 % recovery**	91.9	87.7	95.8	96.9	97.6	89.7	89.3	92.7	85.6	91.9	87.5	68.9	92.4	85.7	0	95
Phenanthrene-d10 % recovery**	97.8	91.1	105	101	94.4	98.3	92.1	103	86.8	110	97.2	70.4	97.9	90	95.8	105
Chrysene-d12 % recovery**	87.3	78.3	93.3	84.1	90.3	94.6	70.6	104	71.5	104	95.1	73	86.1	79.2	91.3	95.7
Perylene-d12 % recovery**	100	82.7	89.3	70.9	91.5	91.3	70.1	99.8	72.5	109	93.7	70.3	86.3	80.6	86.9	97.1
Total Aliphatics >C12-C44	3.83	0.1	91	823	108	116	68.9	1.68	0.618	115	56	25.4	49.7	66.9	6.48	0.1
Total Aromatics >EC12-EC44	25	0.1	89	947	147	216	82.3	4.57	8.07	116	67.1	17.1	98.3	105	27.6	0.1
Total Aliphatics & Aromatics >C5-C44	28.8	0.1	180	1770	255	333	151	6.26	8.69	231	123	43	148	172	34.1	0.1
Metals - (Solid)																
Iron	22400	33000	157000	84300	54600	23600	17400	28000	40200	212000	22500	21600	93000	48400	29400	35000
Manganese	400	635	6120	9550	5650	4470	1310	316	620	8850	1900	1920	15200	4420	376	504
Metals - (Liquid)																
Calcium	-	-	79200	187000	129000	191000	-	-	-	67700	83400	-	-	96100	-	-
Magnesium	-	-	11800	13300	14300	27400	-	-	-	6560	10100	-	-	16000	-	-
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.0826	0.0108	0.025	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.0354	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.118	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	0.0838	0.149	0.0757	0.0721	-	-	-	0.0302	0.122	-	-	0.189	-	-
pH	6.17	8.11	9.38	9.15	9.7	8.51	8.63	7.72	8.1	10.4	9.41	9.5	8.99	8.31	7.32	8.06
Sulphate, Total																
Sulphur, Total	-	-	0.135	0.277	0.141	0.226	-	-	-	0.0889	0.235	-	-	0.174	-	-
Sulphate, Total potential	-	-	0.405	0.831	0.423	0.678	-	-	-	0.267	0.705	-	-	0.522	-	-
Sulphate, acid soluble (total)	-	-	0.131	0.295	0.232	0.197	-	-	-	0.0992	0.657	-	-	0.175	-	-
Cyanide, Total	1	1	1	4.2	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	98.1	12	12	12	12	12	12	110	12	12	12	12	12	12	238	21.4
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	0.0382	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	17/04/19	16/04/19	16/04/19	16/04/19	-	-	-	17/04/19	17/04/19	-	-	17/04/19	-	-
Analysed By	-	-	Christian Hallam	Christian Hallam	Christian Hallam	Christian Hallam	-	-	-	Christian Hallam	Christian Hallam	-	-	Christian Hallam	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	None	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	N/C	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	0.0384	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-
Amosite (Brown) Asbestos	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-
Fibrous Anthophyllite	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-
Fibrous Tremolite	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-
Fibrous Actinolite	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-
Non-Asbestos Fibre	-	-	Not Detected	Not Detected	Not Detected	Not Detected	-	-	-	Not Detected	Not Detected	-	-	Not Detected	-	-
Comments	-	-	Soil containing material typical of asbestos gasket.	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	105	103	101	83.8	86.1	98.9	97.4	104	103	100	94.6	105	89.1	101	107	105
Toluene-d8**	98.2	100	94.8	87.2	92.5	87.5	97.2	99	98.8	93.2	95.1	97.9	86.7	96.2	97.5	98.5
4-Bromofluorobenzene**	95.8	98.7	88.2	70.6	77.2	71.8	80.7	96.9	104	84.1	81.5	91.3	71.6	89.6	94	98.3
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.18	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.14	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.08	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.26	0.532	0.26	0.13	0.13	0.13	0.13	0.198	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.8	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4AH1	4AH1	4AH1	4AH10	4AH10	4AH2	4AH2	4AH3	4AH3	4AH3	4AH3
Depth	0.5	0.8	1.1	0.5	1	0.5	1	0.4	0.9	1.5	2.5
Sampled Date	02/04/2019	02/04/2019	02/04/2019	10/04/2019	10/04/2019	02/04/2019	02/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019
Carbon											
Soil Organic Matter (SOM)	9.72	49.5	1.62	9.67	0.557	19	9.17	14.2	32.9	20	12.9
Metals (Solids)											
Arsenic	4.11	5.92	7.01	6	11.2	7.85	9.55	14.1	6	6	6
Cadmium	0.242	0.0625	0.153	0.205	0.02	0.608	0.229	1.88	0.2	0.619	0.2
Chromium	25.2	130	10.8	311	1050	31.2	111	474	379	276	478
Copper	6.5	11	9.01	22.5	13.7	16.4	17	41.6	32.2	14	16.6
Lead	20.5	16	16	34.6	11	57.6	19.8	31.8	33.6	25.2	17.1
Mercury	0.14	0.14	0.14	1.4	0.14	0.14	0.14	1.4	1.4	1.4	1.4
Nickel	5.22	6.59	18.9	8.72	6.97	14.9	22.1	42.7	16.7	8.84	12.3
Selenium	3.47	4.08	2.26	10	17.7	4.96	2.35	11	10	10	10
Vanadium	30.6	217	31.6	268	617	36.7	81.4	598	467	272	313
Zinc	95.3	78.8	67	190	36.9	289	96.6	98.9	129	101	76.7
TPH Criteria Working Group (TPH CWG)											
Benzene											
Toluene											
Ethylbenzene											
sum of detected mpo xylene by GC											
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0216	0.0297	0.0233	0.0332
Aliphatics >C6-C8	0.02	0.0289	0.02	0.02	0.02	0.02	0.02	0.0625	0.0912	0.0741	0.154
Aliphatics >C8-C10	0.02	0.0233	0.02	0.02	0.02	0.02	0.02	0.0388	0.0692	0.0476	1.63
Aliphatics >C10-C12	0.02	0.0377	0.02	0.02	0.02	0.02	0.02	0.0377	0.0802	0.0434	19.3
Aliphatics >C12-C16	5.38	24.2	0.432	5.36	1.88	6.38	0.1	5.43	11.4	5.32	43.2
Aliphatics >C16-C21	24.6	90.1	1.2	18.2	6.06	28.9	3.43	38.9	113	36.9	236
Aliphatics >C21-C35	59.6	203	7.36	82.1	26.7	53.7	16.3	127	122	59.4	33.6
Aliphatics >C35-C44	8.79	25.7	1.4	25.9	9.16	5.05	2.25	106	24.8	11.3	7.28
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.119
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0119	0.0231	0.018	0.0271
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0259	0.0462	0.0317	1.09
Aromatics >EC10-EC12	0.02	0.0255	0.02	0.02	0.02	0.02	0.02	0.0248	0.0539	0.0296	12.9
Aromatics >EC12-EC16	12.1	58	2.18	9.71	0.386	16.2	1.8	13.3	33.7	12.3	280
Aromatics >EC16-EC21	53.3	291	5.72	58.2	6.47	52.2	7.8	88.3	391	74.1	773
Aromatics >EC21-EC35	136	679	14.7	202	56.5	225	41.1	267	994	200	773
Aromatics >EC35-EC44	40.1	178	4.51	65.3	25	64.4	12.4	161	250	58.3	219
Aromatics >EC40-EC44	12.1	50	1.36	22.1	9.66	19.4	3.69	68	81.7	19.5	77.5
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	1050	8580	35.9	1250	60	1830	104	1050	8090	2420	5240
Acenaphthene	137	1840	8	227	40	702	21.9	90.3	757	194	40600
Anthracene	1900	22600	84.4	2470	80	1540	115	1710	19100	4250	28300
Benz(a)anthracene	3230	42600	169	6590	857	6640	584	5650	23600	9450	56000
Benzo(a)pyrene	3130	41800	154	7480	1230	17100	637	4990	13600	8200	42600
Benzo(b)fluoranthene	5610	63100	264	11000	1680	22600	1030	8200	24800	13500	65000
Benzo(k)fluoranthene	1890	23100	84.3	3910	698	7760	312	3080	9580	5420	19600
Benzo(g,h,i)perylene	2400	28800	125	5400	978	12700	586	3410	8560	5920	26300
Chrysene	2610	37300	156	6510	1110	18900	658	5750	21700	9300	42400
Dibenzo(a,h)anthracene	563	6680	28.3	267	183	3520	125	826	2540	1540	7370
Indeno(1,2,3-cd)pyrene	2130	25600	107	4540	738	14800	556	3600	10500	5090	24600
Fluoranthene	7360	104000	361	12400	953	7560	903	10500	74400	21200	97300
Fluorene	563	5120	27.7	927	50	731	45.2	471	7220	1210	35200
Naphthalene	2990	10900	120	3370	45	7160	284	1560	2750	4570	98800
Phenanthrene	5340	39900	268	7820	240	4780	460	4740	72000	10900	84500
Pyrene	5.28	73.8	0.276	10.2	1.06	9.95	0.655	8.53	48.8	15.9	69.3
PAH, Total Detected USEPA 16	46.2	536	2.26	84.4	9.73	138	7.08	64.1	348	119	743
Naphthalene-d8 % recovery**	100	91.5	102	101	84.2	96.9	90.9	95.9	9.95	104	97.8
Acenaphthene-d10 % recovery**	96.3	79.7	95.8	86.1	72.6	89.9	90.2	94.8	9.98	96.5	106
Phenanthrene-d10 % recovery**	102	85.8	104	105	79.7	96.3	105	96.7	11.1	100	107
Chrysene-d12 % recovery**	91.6	90.3	91.7	85.2	82.3	90.4	104	91.6	9.12	84.7	85.2
Perylene-d12 % recovery**	87.4	83.9	90.2	82.9	79	83.1	107	94.8	6.13	82.4	89.2
Total Aliphatics >C12-C44	98.4	343	10.4	132	43.8	94	22	278	272	113	320
Total Aromatics >EC12-EC44	242	1210	27.1	335	88.4	358	63.1	530	1670	345	2040
Total Aliphatics & Aromatics >C5-C44	340	1550	37.5	467	132	452	85.1	807	1940	458	2400
Metals - (Solid)											
Iron	33800	51600	34500	67500	159000	29500	29200	245000	138000	75400	95800
Manganese	3800	6930	1670	20000	35300	6970	2860	24200	23800	13100	26700
Metals - (Liquid)											
Calcium	190000	-	49800	-	205000	102000	-	142000	-	171000	-
Magnesium	33500	-	6780	-	8000	10800	-	10700	-	24700	-
Phenols											
Phenol	0.01	0.01	0.01	0.0435	0.01	0.01	0.01	0.01	0.011	0.0212	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.0137	0.01	0.01	0.011	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0369
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.0435	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	0.179	-	0.0711	-	0.0845	0.0426	-	0.0928	-	0.0227	-
pH	9.78	6.68	9.02	12.1	12.2	8.13	7.75	11.5	11.7	11.5	10.8
Sulphate, Total											
Sulphur, Total	0.368	-	0.141	-	0.266	0.333	-	0.247	-	0.273	-
Sulphate, Total potential	1.1	-	0.423	-	0.798	0.999	-	0.741	-	0.819	-
Sulphate, acid soluble (total)	0.78	-	0.77	-	0.384	0.125	-	0.225	-	0.327	-
Cyanide, Total	1	1.55	1	1	1	1	1	1.05	11.3	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	15.7	12	12	12	12
Asbestos											
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	17/04/19	-	16/04/2019	-	25/04/19	16/04/19	-	24/04/2019	-	24/04/2019	-
Analysed By	Christian Hallam	-	Paul Poynton	-	Christian Hallam	Christian Hallam	-	James Richards	-	Marcin Magdziarek	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	-
Comments	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	75.4	86	105	90.9	106	95.7	101	87.3	91.6	94.5	103
Toluene-d8**	89.8	88.3	98.7	88.9	98.5	93.4	95.4	82.2	87.6	90.9	95.8
4-Bromofluorobenzene**	70.5	73.2	96.2	77.9	101	81.9	86.6	71.2	74.6	79.5	89.7
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.172
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.259
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.629
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.232
Naphthalene	0.23	0.666	0.13	0.449	0.13	0.13	0.13	0.305	0.527	0.283	167
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.29
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4AH4	4AH4	4AH4	4AH5	4AH5	4AH5	4AH6	4AH6	4AH7	4AH7	4AH7	4AH8	4AH8	4AH8	4AH9	4AH9
Depth	0.4	1	1.7	0.4	1	1.4	0.3	0.8	0.5	1	1.5	0.5	0.8	1.4	0.5	1
Sampled Date	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019
Carbon																
Soil Organic Matter (SOM)	16.9	22.6	6.52	47.6	30.9	29.5	33.6	9.17	25.7	3.02	13.1	6.5	8.03	14.9	0.379	0.593
Metals (Solids)																
Arsenic	6	6	6	6	2.93	6	6	6	6	6	6	3.41	1.43	6	7.74	6.95
Cadmium	0.665	0.2	0.532	0.757	0.26	0.257	0.624	0.2	0.47	0.2	0.626	0.245	0.02	0.2	0.2	1.13
Chromium	358	3090	849	698	250	291	570	691	342	816	829	146	13.3	217	820	915
Copper	14	15.3	14	14	6.87	14	79	21.4	14	24.3	15.3	10.5	1.4	14.8	43.1	24.8
Lead	13.4	7	25.4	21.6	7.91	21.2	17.5	7	12	7	14.5	23	0.7	22.3	21.1	22.4
Mercury	1.4	1.4	1.4	1.4	0.14	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	1.4	1.4	1.4
Nickel	4.01	2	2	5.19	3.8	2.73	7.18	6.46	8.83	2.49	5.9	8.38	1.65	5.53	12.3	15.1
Selenium	10	10	16.9	10	6.89	10	12.2	10.7	10	10	16.4	5.19	4.21	10	19	28.8
Vanadium	344	549	773	319	211	205	338	627	249	827	1250	144	39.1	196	730	694
Zinc	51.2	19	35.7	86.9	29.9	28.7	44.7	50.5	62.4	26.7	44.1	86.7	11	109	88.4	53.3
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.0146	0.0354	0.0439	0.02	0.02	0.058	0.0322	0.02	0.01	0.0132	0.0256	0.111	0.132	0.04	0.02	0.02
Aliphatics >C6-C8	0.0502	0.139	0.0541	0.02	0.0913	0.241	0.0986	0.02	0.0217	0.0265	0.0738	0.551	0.449	0.0703	0.02	0.02
Aliphatics >C8-C10	0.0377	0.0612	0.0316	0.02	0.108	0.469	0.0716	0.02	0.0134	0.0265	0.0472	1.66	0.208	0.0995	0.02	0.02
Aliphatics >C10-C12	0.045	0.0569	0.0214	0.02	1.56	1.36	0.0519	0.02	0.0124	0.0652	0.0451	4.93	0.199	0.293	0.02	0.02
Aliphatics >C12-C16	10.1	13.9	4.04	10.3	32.1	22.2	9.96	9.82	12.1	20.1	7.28	33.3	12	15.3	0.1	0.469
Aliphatics >C16-C21	41.7	29.9	10.6	28.8	575	508	19.6	81.8	18.9	1160	30.5	61.6	42.6	41.3	3.37	2.88
Aliphatics >C21-C35	95.6	167	38.3	79.3	169	131	107	221	61.5	216	138	261	176	254	21.8	22.6
Aliphatics >C35-C44	10.9	25.4	4.52	12.1	16.3	8.42	12.1	56.5	4.41	16	37.9	409	106	296	5.85	9.02
Aromatics >EC5-EC7	0.01	0.01	0.01	0.02	0.02	0.0736	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.01	0.0225	0.0245	0.02	0.02	0.0963	0.0228	0.02	0.01	0.01	0.0246	0.146	0.168	0.0324	0.02	0.02
Aromatics >EC8-EC10	0.0251	0.0408	0.0214	0.02	0.072	0.313	0.0477	0.02	0.01	0.0173	0.0308	1.11	0.139	0.0659	0.02	0.02
Aromatics >EC10-EC12	0.0303	0.0376	0.0143	0.02	1.04	0.907	0.0353	0.02	0.01	0.0438	0.0308	3.29	0.132	0.196	0.02	0.02
Aromatics >EC12-EC16	13.4	14.9	7.07	39.7	585	200	9.55	8.64	18.9	15.2	8.25	177	12.4	45.8	0.342	0.462
Aromatics >EC16-EC21	61.4	38	20.9	221	2590	1130	21.2	63	67.4	407	34.7	272	56	95	6	5.66
Aromatics >EC21-EC35	119	95.8	48.4	356	2530	1310	67.1	194	104	624	104	469	219	330	53.6	51
Aromatics >EC35-EC44	32	29.6	13.8	72.9	513	280	18.6	60.9	23.2	163	34.7	612	132	410	20.3	34.1
Aromatics >EC40-EC44	11	10.7	4.66	23	153	88.5	6.41	22.5	7.5	55.1	12.4	273	51.8	186	6.95	15.8
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	1700	426	85.4	1840	60200	199000	48.2	12	2250	206	186	1330	60	335	60	60
Acenaphthene	89.9	41	52.4	509	5090	193000	10.4	141	243	414	188	6660	275	437	40	40
Anthracene	4960	799	373	5590	87200	192000	80.7	307	3480	1020	482	4190	686	1050	80	103
Benz(a)anthracene	7990	1470	754	8850	124000	190000	328	2120	5040	4420	1450	2330	765	1720	1840	923
Benzo(a)pyrene	5590	1010	610	6110	65100	186000	221	1710	3430	5340	1440	1540	424	1490	2800	1310
Benzo(b)fluoranthene	10000	2040	1030	11400	127000	189000	413	4370	5270	6780	1980	2580	808	2540	3860	1830
Benzo(k)fluoranthene	3130	608	354	3580	51400	196000	129	1500	2210	2760	779	657	212	970	1040	754
Benzo(g,h,i)perylene	3630	634	460	3690	43900	177000	184	1840	1860	2970	860	861	300	1070	2080	897
Chrysene	7380	1590	718	8670	114000	190000	370	3550	4750	4160	1490	2090	747	1850	1940	1190
Dibenzo(a,h)anthracene	793	185	132	914	10400	177000	46.7	455	516	673	183	0.23	0.115	0.23	343	125
Indeno(1,2,3-cd)pyrene	3760	570	480	4010	58500	219000	142	1340	2310	2620	875	766	223	854	1680	960
Fluoranthene	23600	4640	1520	24300	425000	202000	609	4320	14500	6910	2810	8380	3760	4700	0.085	1560
Fluorene	1260	252	145	2330	43000	202000	44	72.1	1930	258	191	3810	104	364	50	50
Naphthalene	3370	1730	517	2950	13200	208000	259	194	3250	555	847	36300	668	8140	84	45
Phenanthrene	18500	4330	1440	18200	566000	203000	577	3310	13300	5410	2370	17600	4990	5640	639	1540
Pyrene	16.1	3.22	1.06	17	252	208	0.495	3.28	9.54	6.2	2.45	7.1	2.5	3.45	2.35	1.42
PAH, Total Detected USEPA 16	112	23.5	9.73	120	2050	3130	3.95	28.5	73.9	50.7	18.6	96.3	16.5	34.6	18.7	12.6
Naphthalene-d8 % recovery**	102	94.2	87.7	96.9	98	9940	87.4	94.7	91.7	96	98.9	94.8	98.8	91.5	93.2	81.2
Acenaphthene-d10 % recovery**	100	90.3	91.2	97.3	100	9830	92.8	91.6	91	93	95.4	103	93.1	86.5	89.6	83
Phenanthrene-d10 % recovery**	99.6	94.3	106	95.4	99	9920	109	95.6	92.7	97.3	103	101	100	96.8	97.9	85.7
Chrysene-d12 % recovery**	87.7	89.8	105	89.2	90	9460	107	93.5	88.9	98	82.5	75.9	87.9	79.3	81.3	74.3
Perylene-d12 % recovery**	85.9	80.4	95.7	82.7	79	8930	95.9	94.3	81.3	97.2	74.7	65.7	84	74.4	83.7	77.5
Total Aliphatics >C12-C44	158	237	57.4	131	793	669	148	369	96.9	1410	213	765	337	606	31	35
Total Aromatics >EC12-EC44	225	178	90.2	690	6220	2910	116	326	214	1210	181	1530	419	881	80.2	91.2
Total Aliphatics & Aromatics >C5-C44	384	415	148	820	7010	3590	265	695	311	2620	395	2310	757	1490	111	126
Metals - (Solid)																
Iron	137000	205000	158000	137000	59500	61800	115000	135000	83300	163000	165000	56900	7680	62800	163000	152000
Manganese	19000	38800	35100	18900	26100	16400	24800	34300	15200	34900	32800	10400	6750	14700	51300	58400
Metals - (Liquid)																
Calcium	192000	-	244000	155000	-	162000	145000	-	98900	-	235000	118000	-	188000	381000	-
Magnesium	34000	-	14900	25200	-	18000	26200	-	15700	-	10900	15500	-	22100	6820	-
Phenols																
Phenol	0.0314	0.0322	0.0102	0.01	0.107	0.05	0.0311	0.032	0.01	0.0102	0.0103	0.27	0.0113	0.0108	0.0417	0.0212
Cresols	0.0105	0.01	0.01	0.01	0.322	0.124	0.01	0.0107	0.01	0.01	0.01	0.659	0.01	0.0108	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.075	0.075	0.015	0.015	0.015	0.015	0.015	0.713	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.0418	0.035	0.035	0.035	0.43	0.124	0.035	0.0427	0.035	0.035	0.035	1.64	0.035	0.035	0.0417	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	0.006	-	0.015	0.0286	-	0.0212	0.0079	-	0.0066	-	0.0051	0.151	-	0.142	0.0074	-
pH	12.5	12.5	12.7	9.21	12.4	12.1	12.4	12.7	12.2	12.6	12.6	11.7	11.4	11.8	12.6	12.7
Sulphate, Total																
Sulphur, Total	0.148	-	0.234	0.13	-	0.524	0.232	-	0.178	-	0.222	0.367	-	0.613	0.0913	-
Sulphate, Total potential	0.444	-	0.702	0.39	-	1.57	0.696	-	0.534	-	0.666	1.1	-	1.84	0.274	-
Sulphate, acid soluble (total)	0.163	-	0.226	0.0866	-	0.918	0.346	-	0.222	-	0.218	0.688	-	1.19	0.244	-
Cyanide, Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Asbestos																
Asbestos Quantification - Gravimetric - %	0.001	-	-	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-
Date of Analysis	24/04/2019	-	24/04/2019	24/04/19	-	24/04/2019	24/04/19	-	24/04/2019	-	24/04/2019	25/04/19	-	26/04/19	25/04/19	-
Analysed By	Barbara Urbanek-Walsh	-	Lucy Caroe	Christian Hallam	-	James Richards	Andrzej Ferfecki	-	Lucy Caroe	-	Marcin Magdziarek	Christian Hallam	-	Christian Hallam	Christian Hallam	-
Asbestos Quantification - PCOM Evaluation - %	0.001	-	-	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-
Additional Asbestos Components (Using TM048)	None	-	-	None	-	-	-	-	-	-	-	-	-	-	None	-
Analysts Comments	N/A	-	-	N/A	-	-	-	-	-	-	-	-	-	-	N/C	-
Asbestos Quantification - Total - %	0.001	-	-	0.001	-	-	-	-	-	-	-	-	-	-	0.001	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Detected	-
Amosite (Brown) Asbestos	Trace	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Detected	Not Detected	-	Not Detected	Not Detected	-	Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Comments	Loose fibres in soil.	-	-	Soil containing asbestos bitumen debris.	-	-	-	-	-	-	-	-	-	-	Fibre bundles in soil.	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	88.7	106	87	83.7	115	103	92.3	102	109	103	96.9	101	94.8	91.6	99.2	94.2
Toluene-d8**	82.2	96.7	84.7	85.2	87.9	92.9	90.9	94.1	98.4	92.9	91.1	97.2	91.6	88.1	99.5	99.6
4-Bromofluorobenzene**	71.6	97.6	71.6	78.2	79.3	88.3	77	90.6	101	91.1	79.6	99	78.8	72.6	102	97.8
Methyl Tertiary Butyl Ether	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	2	0.2	0.1	0.1	0.1
Benzene	0.09	1.8	0.116	0.09	0.09	0.09	0.09	0.09	1.8	0.09	0.09	1.8	0.18	0.09	0.09	0.09
Toluene	0.07	1.4	0.158	0.07	0.07	0.07	0.07	0.07	1.4	0.07	0.07	1.4	0.262	0.0869	0.07	0.07
Ethylbenzene	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.8	0.04	0.04	0.8	0.08	0.04	0.04	0.04
p/m-Xylene	0.1	2	0.187	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	2	0.26	0.1	0.1	0.1
o-Xylene	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	2	0.1	0.1	2	0.2	0.1	0.1	0.1
Naphthalene	0.13	2.6	0.235	0.194	20.5	9.5	0.13	0.13	2.6	0.13	0.13	81.2	0.377	5.98	0.13	0.13
Sum of BTEX	0.4	8	0.461	0.4	0.4	0.4	0.4	0.4	8	0.4	0.4	8	0.8	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	4AH1V	4AH2V	4AH4V	4AH5V	4AH6V	4AH7V	4AH8V	4AH9V	4AH10V	4AI1	4AI1	4AI1	4AI1V	4AJ1	4AJ1	4AJ1V	4AL1	4AL1	4AL2	4AL2	4AL2	4AL2	4AL1V	4AL2V	4AM1	4AM1	4AM1V	4EA7	4EA7	4EA8	4EA8	4EA7V	4EA8V	4EB4	4EB4	4EB7	4EB8	4EB8	4EB9	4EB9	4EB9	4EB7V	4EB8V	4EB9V	4EC1	4EC1	4EC10	4EC10	4EC10	4EC2
											Depth	2	2.8	3.8	3.8	3.8	4	3.4	3.4	3.4	0.4	1	1.5	2.5	0.5	1.2	2.2	0.25	0.8	0.4	0.8	1.2	1.6	2.4	3.4	0.3	0.9	2.2	0.4	0.9	0.5	1	2.1	1.7	0.5	1	0.5	0.5	1	0.5	1	1.5	1.6	2.6	2.2	0.2	0.4	0.5	1	2	0.5
											Sampled Date	02/04/2019	02/04/2019	08/04/2019	08/04/2019	08/04/2019	08/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	10/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	11/04/2019	01/11/2018	01/11/2018	31/10/2018	31/10/2018	01/11/2018	31/10/2018	29/10/2018	29/10/2018	01/11/2018	31/10/2018	31/10/2018	31/10/2018	31/10/2018	31/10/2018	01/11/2018	31/10/2018	31/10/2018	29/10/2018	29/10/2018	26/11/2018	26/11/2018	26/11/2018	29/10/2018
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**WQS**	**Percentage of exceedances**																																																		
Carbon																																																													
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	2.57	1.23	1.27	1.34	0.941	2.57	1.66	3.26	2.12	2.26	95.2	12.8	1.05	74.6	17.1	2.95	4.95	>100	4.71	3.81	11.1	1.97	0.972	2.59	52.2	23.8	0.869	6.81	8.45	51.4	4.91	3.22	0.905	7.59	3.28	1.56	1.68	1.7	8.29	5.28	17.6	1.61	1.3	1.91	36.9	37.1	9.79	3.9	2.67	37.2
Metals (Solids)																																																												
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	13	13.5	13.6	15.2	17.1	9.73	16.4	12.4	15.2	1.66	6	3.46	14.7	7	7.52	12.6	6.15	6	8.77	2.76	7.95	6	12.7	16.5	8.26	6.33	7.87	13.6	6	6	5.52	12.9	18.9	11.5	9.31	10.5	6	8.97	7.07	7.42	8.69	19.1	24	17.1	6.16	6.22	9.99	4.72	10	10
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	0.194	0.147	0.298	0.346	0.361	0.3	0.0712	0.265	0.125	0.0403	0.703	0.12	0.126	0.371	0.392	0.168	0.329	1.17	0.2	0.265	0.0402	0.612	0.119	0.221	0.159	0.279	0.133	0.2	0.2	0.2	0.02	0.37	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.316	0.238	0.02	0.388	0.02	0.2	0.02	0.2	0.893
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	38	35.1	39.2	37.6	37.1	44.4	31.5	41.3	35	64.6	157	20.2	34.8	44.5	94.1	33.9	108	96.6	128	51.2	84.4	347	40.8	70.9	58.5	25	22.6	188	359	9	115	38.2	27	75.9	9	775	987	825	220	255	150	40.8	30.1	36.6	114	30.8	267	3.69	10.3	20.5
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	20.2	12.8	14.5	15.6	10.4	17.8	12.5	22.4	18.2	1.4	17.6	5.02	16.3	30.6	18	22.6	21.5	22.4	16.3	7.16	19.7	14	18.2	21.4	15.4	14.8	8.1	25.1	20	14	11.1	14.6	12.1	26.1	14	34.4	16.2	33.4	19.4	23.5	37	11.4	11.1	12.9	13.2	17.4	54.5	1.4	56.5	31.8
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	19.5	27.8	25.2	27.8	26.7	22.9	28	23.4	25.4	4.66	32.9	9.43	24.8	33.6	70.2	20.4	63.1	36.4	91.2	8.42	22.4	18.8	23.1	22.6	23.7	32.2	15.5	86.7	36	41.9	48.9	33.3	28.8	144	55.6	31.2	16.5	11.1	48.8	48.7	75.1	29.4	30.8	29.8	63.4	36.7	67.5	1.18	54.4	97.6
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.08	1.4	0.14	1.4	1.4	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	1.4	1.4	1.4	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	1.4
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	35	38	38.9	38.8	42.8	32.3	38.5	36	33.3	2.52	9.01	5.57	43	12.9	14	28.5	10.2	13.6	17.6	5.6	12.7	8.17	41	38.5	9.73	12.6	29.2	21.6	14.6	37.5	7.78	34.2	42.1	34.1	20.3	26.4	8.78	21.7	21.9	25.6	26.5	39.3	39.1	39.9	15.7	13.6	34.9	1.66	32.6	30.2
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	1.61	1.02	1	1	1	1	1	1	1	4.68	10	2.97	1	1.93	10	1	10	10	10	1.59	4.5	17	1	1	2.15	3.49	1	10	10.9	10	6.07	1	1	10	10	22	21.1	17.1	12.3	10	10	1	1	1	3.2	1.85	10	6.08	10	10
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	60.2	57.2	58.1	60	65.4	64.3	57	62.8	59.5	58.6	130	31.2	56.4	46	137	56.9	132	88.2	305	53.8	86.7	548	60.1	61.4	73.4	56.6	40.8	276	419	163	117	64	54.2	168	98	591	499	456	269	258	200	66.9	64.2	60.6	132	65	224	23.2	71	45.7
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	96.6	117	113	118	129	96.5	111	113	115	44.1	129	44.1	122	131	272	120	799	205	282	87.2	87.8	81.9	116	284	105	164	83.3	346	85.9	145	201	115	116	467	236	97.6	55.3	75.5	113	169	188	108	137	123	542	260	277	11.3	188	332
TPH Criteria Working Group (TPH CWG)																																																												
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00																																																		
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00																																																		
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00																																																		
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00																																																		
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0244	0.02	0.02	0.02	0.0702	0.02	0.02	0.02	0.02	0.02	0.02	0.0294	0.02	0.02	0.01	0.2	0.02	0.0336	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0495	0.02	0.0219	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0545	0.02	0.02	0.02	0.173	0.02	0.0355	0.02	0.02	0.02	0.02	0.0746	0.0403	0.02	0.172	3.32	0.02	0.137	0.0945	0.02	0.02	0.0361	0.0377	0.02	0.02	0.0627	0.0616	0.198	0.02	0.0876	0.02	0.02	0.02	0.0463	0.02	0.02	0.02
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0534	0.02	0.02	0.02	0.185	0.02	0.0323	0.02	0.02	0.02	0.02	0.102	0.0348	0.02	2.5	46.7	0.02	0.444	0.62	0.02	0.02	0.035	0.0237	0.02	0.02	0.495	1.14	3	0.02	0.299	0.02	0.02	0.02	0.0516	0.02	0.02	0.02
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0824	0.02	0.02	0.02	0.292	0.02	0.025	0.02	0.02	0.02	0.02	0.0859	0.0392	0.02	10.8	168	0.02	2.04	2.55	0.02	0.02	0.0552	0.163	0.02	0.02	2.52	7.01	11.6	0.02	0.945	0.02	0.02	0.02	0.0613	0.02	0.02	0.02
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	0.1	0.6	0.1	0.1	0.195	0.596	0.269	0.168	1.32	0.622	16.1	2.35	1.84	12	6.46	1.8	2.07	4.13	2.08	3.68	0.435	0.1	1.74	0.1	3.48	3.17	0.1	260	471	5.47	34.2	2.24	0.1	0.132	2.13	5.04	0.617	0.1	110	177	292	0.1	0.1	0.1	1.86	3.69	5.69	15	59.4	3.11
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	0.1	0.813	0.1	0.68	0.246	2.68	0.1	0.1	0.66	1.24	43.1	4.52	0.797	40.3	33	1.03	9.34	27.3	8.15	6.1	5.75	0.1	1.72	0.1	19.8	10.7	0.1	351	579	23.9	79.4	4.26	0.1	4.21	9.81	21.3	0.203	0.1	255	210	469	0.1	2.5	0.1	11.9	22.2	31.7	24.5	175	13.6
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	0.229	1.67	0.1	0.1	0.1	2.17	0.1	0.635	1.21	12.9	172	17.9	1.67	70	63	3.43	61.6	95.6	79.9	30.7	5.82	1.43	2.03	0.927	77.4	52.6	0.271	2980	2980	131	404	20.3	0.1	49.6	82.2	136	17.4	37.1	1140	1100	2220	0.1	21.3	0.1	52.3	66.6	200	355	582	52.5
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	0.1	0.281	0.1	0.1	0.1	0.1	0.644	0.198	0.1	2.07	24.9	4.85	0.437	11.5	11.3	0.712	19.6	11.4	28.9	4.56	0.944	0.1	0.312	0.1	8.98	8.43	0.1	513	381	27.3	91.4	5.07	0.1	17.7	35.8	39.3	3.88	6.78	225	237	472	0.1	0.638	0.1	25.2	19.9	56.7	212	138	24.2
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.2	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.065	0.0358	1.73	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0357	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.2	0.02	0.0314	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.398	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.036	0.02	0.02	0.02	0.123	0.02	0.0209	0.02	0.02	0.02	0.02	0.0678	0.0228	0.02	1.67	31.1	0.02	0.296	0.413	0.02	0.02	0.0233	0.02	0.02	0.02	0.33	0.758	2	0.02	0.2	0.02	0.02	0.02	0.0344	0.02	0.02	0.02
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0545	0.02	0.02	0.02	0.194	0.02	0.02	0.02	0.02	0.02	0.02	0.0576	0.0261	0.02	7.19	112	0.02	1.36	1.7	0.02	0.02	0.0371	0.109	0.02	0.02	1.68	4.67	7.75	0.02	0.629	0.02	0.02	0.02	0.0409	0.02	0.02	0.02
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	1.03	0.1	0.339	0.174	0.166	0.532	0.1	0.257	0.171	0.795	22.3	3.45	0.155	49.8	40.4	0.1	5.74	17.1	3.69	3.44	0.913	0.1	0.1	0.1	17.7	19.1	0.1	77.4	177	3.33	22.4	0.1	0.1	2.49	2.8	1.71	1.04	1.65	23.5	41.6	72.4	0.174	1.08	0.1	7.28	8.07	3.37	3.57	24.9	5.84
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	1.04	0.1	0.276	0.635	0.347	1.91	0.185	0.203	0.1	8.18	196	14.1	0.268	619	345	0.388	23.9	124	20.6	15.7	7.91	0.1	0.451	0.1	145	168	1.12	108	170	15.9	213	1.97	0.1	10.7	11.3	10.9	7.05	9.49	75.1	71.3	152	0.1	2.64	0.428	28.1	46.6	13.8	31	95.8	26.1
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	9.63	2.37	1.57	1.61	2.11	3.58	3.12	5.3	3.03	23.1	626	38.8	1.59	1460	609	12.8	79.5	427	72.6	47.4	18.7	0.1	2.62	3.32	430	509	3.74	425	561	65.3	449	24.3	2.3	52.3	61.1	90.5	46	66.9	313	295	561	0.286	10.7	2.07	108	122	76.3	451	302	96
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	3.26	0.661	0.1	0.1	0.1	0.295	3.5	0.332	0.1	7.73	146	23.4	0.1	382	158	3.63	31.4	127	29.7	12.1	5.05	0.1	0.411	0.557	110	133	0.513	86.1	178	28.9	123	13.3	3.01	28.4	44.9	38.7	15.8	26.4	90.5	110	149	0.525	3.55	3.3	61	39.1	39.4	481	134	49.8
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	0.974	0.132	0.1	0.1	0.1	0.1	1.82	0.1	0.1	2.6	44	10.4	0.1	130	50.6	1.59	10.2	39.6	9.64	3.06	1.77	0.1	0.1	0.1	31.9	35.5	0.1	29.5	67	12.2	40.7	5.5	1.66	11.4	19.7	13.9	5.9	9.22	30.9	43.3	50.7	0.379	1.53	1.96	27.1	14.8	15.6	230	56.2	21.1
Polyaromatic Hydrocarbons (PAHs)																																																												
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	12	12	12	12	12	12	12	12	12	68.2	1970	224	12	19700	1340	12	1530	3120	676	334	29.8	12	12	12	3550	8280	12	92.7	12	206	184	12	12	174	142	15.4	12	12	17.6	12	112	12	12	34.2	220	157	66.3	120	50.3	97.6
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	8	8	8	8	8	8	8	8	8	17.1	355	16	8	17100	40	8	560	395	57.9	24.7	8	8	8	8	224	40	8	9.18	244	24.5	40	8	8	29.6	22.5	44.4	21.3	25.4	49.1	164	766	8	8	65.7	43	49.1	14.9	80	49.7	27
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	16	16	16	16	16	16	16	16	16	123	2870	400	16	107000	3050	16	3650	4620	1000	473	86.2	16	16	16	4020	14900	16	144	60.2	478	590	16	16	394	226	66.2	53.7	68.6	120	278	504	16	16	58.9	475	365	99.5	160	110	177
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	18.1	14	39.3	50.5	14	20.1	14	14	14	353	9110	719	14	202000	8220	14	10900	18100	3050	2590	307	14	19.6	14	13700	24800	14	315	116	987	1210	14	25.5	897	837	923	495	629	628	1490	1300	14	23.5	113	1590	1290	262	198	236	736
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	15	15	25.7	28.7	15	15	15	15	15	323	9390	631	15	142000	7800	15	9240	16400	2870	2120	254	15	15	15	12200	20600	15	291	131	817	1040	15	19.8	804	771	1160	593	740	651	1760	1180	15	15	105	1440	1130	223	272	214	623
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	27	15	39.4	54	15	15	15	15	22.5	555	15900	1110	15	207000	13200	28	15700	18600	3370	4100	395	15	25.8	15	21900	33400	22.1	352	389	1360	1230	15	28.2	1290	1250	1090	464	1400	832	2370	1160	15	30.8	179	2370	1910	288	299	253	1120
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	14	14	14	19.4	14	14	14	14	14	198	5630	397	14	98800	4230	14	5480	8050	1220	1400	151	14	14	14	6040	12200	14	157	140	509	491	14	14	521	436	624	297	524	353	723	519	14	14	57.5	860	675	114	140	105	338
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	24	24	24	24	24	24	24	24	24	250	7100	554	24	78500	5600	24	6940	11700	2000	1760	182	24	24	24	8150	14300	24	265	208	515	783	24	24	584	549	895	544	627	679	1250	944	24	24	80	1080	742	187	386	200	465
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	17.7	10	41.7	42.8	10	14.3	10	10	10	353	8610	684	10	172000	8340	17.5	11500	13300	2380	2750	283	10	17.6	10	12500	22200	10	307	311	929	1050	10	22.2	946	792	1020	605	815	611	1590	1330	10	27.7	128	1510	1480	228	153	246	705
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023	54.2	2190	115	0.023	25900	1550	0.023	1560	3280	494	433	50.5	0.023	0.023	0.023	1920	3480	0.023	56.6	38.2	124	187	0.023	0.023	161	130	178	119	135	144	252	206	0.023	0.023	0.023	288	232	39.8	0.23	39.3	124
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	0.018	0.018	0.018	26.5	0.018	0.018	0.018	0.018	0.018	293	6390	471	0.018	73700	4670	0.018	5830	9810	1760	1510	157	0.018	0.018	0.018	10700	12400	0.018	217	174	567	815	0.018	0.018	736	726	743	513	593	634	1130	1040	0.018	0.018	64	1310	890	195	315	185	452
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	0.017	0.017	51	101	0.017	31.6	0.017	0.017	0.017	693	16500	1990	0.017	289000	17700	53.2	20000	37000	6580	4030	634	0.017	56.1	0.017	33400	75300	0.017	781	330	2160	3380	0.017	68.6	1840	1620	1240	752	1110	1330	2780	3720	0.017	70.8	297	3030	2460	531	393	605	1230
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	10	10	10	10	10	10	10	10	10	43.4	770	183	10	34900	608	10	1190	1690	516	87.3	10	10	10	10	1660	7630	10	78.4	95.7	193	252	10	10	182	78	21.1	13	11.7	32.7	10	236	10	10	53.8	114	101	44.8	0.1	54.1	52.8
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	13.1	9	33.1	9	9	9	9	9	9	172	2800	347	9	11400	1080	105	2640	3470	717	654	63.1	9	9	9	2190	2270	9	181	31.2	556	290	9	25.9	299	228	62.1	32.6	51.3	193	470	1760	9	55.3	118	279	378	229	90	205	219
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	15	15	37.6	83.5	15	30.2	15	15	15	415	8550	1510	15	219000	4950	41.5	9410	15200	4110	1650	380	15	15	15	13400	45600	15	511	583	1330	2830	15	33.3	1290	848	427	291	431	955	1870	4050	15	44.6	193	1470	1510	425	213	429	685
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09	0.0324	0.015	0.0379	0.0669	0.015	0.022	0.015	0.015	0.015	0.504	12.2	1.39	0.015	258	12.9	0.0391	15	27	4.67	3.05	0.437	0.015	0.0416	0.015	24	52.2	0.015	0.798	0.564	1.68	2.27	0.015	0.0474	1.38	1.3	1.39	0.689	0.946	1.15	2.29	2.9	0.015	0.0519	0.253	2.25	1.95	0.444	0.31	0.564	0.932
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	0.118	0.118	0.306	0.473	0.118	0.118	0.118	0.118	0.118	4.41	110	10.7	0.118	1950	95.2	0.284	121	192	35.5	27	3.41	0.118	0.161	0.118	170	350	0.118	4.56	3.42	12.4	16.6	0.118	0.271	11.5	9.95	9.91	5.48	8.1	8.38	18.4	21.7	0.118	0.304	1.8	18.3	15.3	3.39	2.54	3.55	7.98
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	101	89	102	90.9	91.2	89.9	98.2	97.5	96.1	86.5	87	101	86.4	95.8	86.1	97.9	108	86.5	87.9	93.3	90	92.5	83.2	92.8	79.7	88.9	93.4	93.2	89.5	92.5	83.8	88.4	94.1	86.1	87	94.5	82	96.6	84.4	94	84.1	86.9	92.7	90.7	90.3	88.6	91	89.4	93.2	91.1
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	96.6	86.9	96.8	93.1	93.2	94.4	92.1	94.7	91.8	83.4	86	91.8	83.7	97.2	78.4	90.4	100	77.2	77.3	85.8	87.3	83.3	80.9	87.2	76.5	86.9	88.8	82.2	98.9	95	81.5	88.7	87.6	90.3	89.1	95.4	87	82.8	88.7	95.1	97.1	88.7	86.3	86.3	92.6	94.1	86.4	80.5	94.8	88.9
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	108	90.6	104	108	106	110	100	104	100	87.5	86.7	101	86.9	102	86.5	98	104	84.9	89.9	89.3	84	90.2	84.2	90.8	80.6	90	94.4	103	104	92.6	89.8	90.8	90.2	98.3	95.6	101	91.4	85.9	92.3	91	92.8	90.7	88.1	89.1	96	95.2	89.7	77.5	90.7	87.3
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	103	79	95.1	114	110	115	89.2	92	84.2	80.6	83	87	77.2	64.3	81.8	87.7	109	85.2	89.8	96.4	71.4	83.9	78.7	86.9	74.6	73.7	87.5	98.9	102	77.7	92.5	92.7	87.7	95.1	108	100	97.1	86.3	96.9	76.6	78.2	90.7	83.5	85	103	94.7	80.4	72.2	80.8	72.5
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	96.6	82.7	94.6	110	108	112	86.9	91.5	83.7	84.8	77.2	82.5	82.4	88.2	84.3	86.8	102	82.8	95.7	89.9	66.8	87	83.7	88.8	78.6	74.1	88.3	87.1	95.3	70.4	83.3	91	86.1	89.4	99.5	92.8	89.3	82.1	88.6	86.1	71.5	89.1	81.2	85.1	91.9	79.8	75.8	72.4	78.3	70.1
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	0.229	3.36	0.1	0.68	0.441	5.45	0.913	1	3.2	16.8	256	29.6	4.75	134	114	6.97	92.6	138	119	45	12.9	1.43	5.8	0.927	110	74.9	0.271	4100	4410	188	609	31.8	0.1	71.7	130	202	22.1	43.9	1730	1720	3450	0.1	24.5	0.1	91.3	112	294	606	954	93.5
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	14.9	3.03	2.19	2.42	2.62	6.32	6.81	6.09	3.2	39.8	990	79.8	2.01	2510	1150	16.8	140	695	127	78.6	32.6	0.1	3.48	3.88	703	829	5.37	696	1090	113	808	39.5	5.32	94	120	142	69.9	104	502	518	935	0.986	18	5.8	204	216	133	967	557	178
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00	15.2	6.39	2.19	3.1	3.07	11.8	7.72	7.09	6.4	56.7	1250	109	6.76	2650	1270	23.8	233	835	246	124	45.6	1.43	9.28	4.8	813	904	5.64	4820	5850	301	1420	76.8	5.32	166	250	344	92.1	148	2240	2250	4410	0.986	44.6	5.8	295	328	427	1570	1510	271
Metals - (Solid)																																																												
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			32000	33800	28200	37900	30800	27000	27400	27400	28500	29200	63400	13100	33400	25500	60200	42500	62500	60400	165000	29500	31700	96000	37600	39100	32300	38500	31800	183000	134000	133000	66500	37600	38900	210000	216000	220000	172000	194000	123000	118000	135000	38200	42000	35000	47600	57700	179000	4940	170000	80100
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			433	597	399	489	583	331	409	549	791	10500	8520	3390	738	2610	9620	859	6880	4430	20100	4340	8950	29200	315	419	4390	3660	1070	11500	26600	2070	13100	854	1750	9030	3260	33000	31900	33200	19000	21800	15900	523	397	367	6110	3690	10600	3730	3660	2780
Metals - (Liquid)																																																												
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			-	-	-	-	-	-	-	-	-	352000	-	152000	-	-	111000	-	129000	-	152000	-	186000	-	-	-	-	106000	-	-	160000	-	191000	-	-	82200	-	233000	271000	-	223000	196000	-	-	-	-	151000	-	153000	-	75800	97700
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			-	-	-	-	-	-	-	-	-	30200	-	48700	-	-	19000	-	24700	-	15600	-	38700	-	-	-	-	15000	-	-	4470	-	16600	-	-	6840	-	12100	7450	-	9730	16400	-	-	-	-	27100	-	26200	-	9830	14300
Phenols																																																												
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.0325	0.01	0.01	0.01	0.01	0.0108	0.0104	0.0107	0.0336	0.0112	0.0115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0113	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0217	0.0139	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.0326	0.015	0.055	0.015	0.015	0.0217	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.066	0.035	0.035	0.0759	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																																												
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	-	-	-	-	-	-	-	-	-	0.1	-	0.0525	-	-	0.0849	-	0.126	-	0.0694	-	0.395	-	-	-	-	0.109	-	-	0.133	-	0.178	-	-	0.0679	-	0.104	0.004	-	0.442	0.604	-	-	-	-	0.0845	-	0.0853	-	0.475	0.0521
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	7.89	8.53	7.68	7.79	7.77	7.64	7.37	6.88	7.37	10	8.95	9.33	7.21	8.08	10.3	7.03	9.61	10.2	9.62	11.3	11.5	11.8	7.28	8.35	9.8	9.8	8.08	10.3	11.6	10.8	12.5	8.09	8.14	9.45	9.15	12.7	12.8	12.8	12.8	12.6	12.8	7.89	8.12	8.02	9.04	9.51	10.5	8.39	10.1	8.98
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33																																																		
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	-	-	-	-	-	-	-	-	-	0.427	-	0.209	-	-	0.221	-	0.246	-	0.396	-	0.274	-	-	-	-	0.223	-	-	0.189	-	0.559	-	-	0.192	-	0.506	0.186	-	0.409	0.834	-	-	-	-	0.284	-	0.0983	-	0.524	0.282
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	-	-	-	-	-	-	-	-	-	1.28	-	0.627	-	-	0.663	-	0.738	-	1.19	-	0.822	-	-	-	-	0.669	-	-	0.567	-	1.68	-	-	0.576	-	1.52	0.558	-	1.23	2.5	-	-	-	-	0.852	-	0.295	-	1.57	0.846
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	-	-	-	-	-	-	-	-	-	1.46	-	0.647	-	-	0.311	-	0.327	-	0.709	-	0.814	-	-	-	-	0.473	-	-	0.549	-	0.533	-	-	0.184	-	0.671	0.315	-	1.01	1.27	-	-	-	-	0.21	-	0.185	-	0.382	0.13
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	1	1	1	1	1	1	1	1	1	1	1	1	127	7.88	1	1	2.41	1	4.79	1	7.86	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15.1	1	1	1	1.58	1	1	1	1	2.28	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	25.4	12	91.5	118	90.3	210	192	333	201	12	12	12	203	12	12	219	12	12	12	12	12	12	134	202	12	12	32.7	12	12	12	12	218	76.4	12	12	21	117	12	12	12	12	130	65.2	193	12	12	12	12	12	12
Asbestos																																																												
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	0.001	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		-	-	-	-	-	-	-	-	-	25/04/19	-	25/04/19	-	-	26/04/19	-	26/04/19	-	26/04/19	-	26/04/2019	-	-	-	-	26/04/2019	-	-	08/11/2018	-	09/11/2018	-	-	08/11/2018	-	14/11/2018	09/11/2018	-	06/11/2018	09/11/2018	-	-	-	-	09/11/2018	-	11/12/2018	-	11/12/2018	09/11/2018
Analysed By	TM048	No units		1371	0	0				0.00		-	-	-	-	-	-	-	-	-	Christian Hallam	-	Christian Hallam	-	-	Christian Hallam	-	Christian Hallam	-	Christian Hallam	-	Paul Poynton	-	-	-	-	Paul Poynton	-	-	Christian Hallam	-	Marcin Magdziarek	-	-	Lucy Caroe	-	Andrzej Ferfecki	Lucy Caroe	-	Andrzej Ferfecki	Renata Bozhkov	-	-	-	-	Andrzej Ferfecki	-	Marcin Magdziarek	-	Paul Poynton	Andrzej Ferfecki
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	0.001	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	None	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0				0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-	N/A	-	-	-	-	-	N/A	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	0.001	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Detected	-	-	Detected	-	Not Detected	Not Detected	-	Not Detected	Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		-	-	-	-	-	-	-	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-	-	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected
Comments	TM048	No units		1371	0	0			0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	Fibre bundles in soil	-	-	Soil containing ACM debris	-	0	0	-	0	Loose fibres in soil.	-	-	-	-	0	-	0	-	0	0
Volatile Organic Compounds (VOCs)																																																												
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		107	104	109	105	105	106	105	108	107	103	85.1	96	107	96	98.7	108	84.1	92.9	98.8	94.7	106	104	103	105	96.8	101	113	107	105	109	105	105	106	105	104	106	104	80	104	107	104	104	108	109	98.7	107	108	116	114	104
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		96.9	99.2	96.8	97.5	95.6	97.2	98.8	97	97.9	97.1	91	87.6	98.8	92.9	95.3	99.3	92.9	90.3	93.6	91.9	98.7	99.8	98.8	99.8	88.2	95.3	97.3	95.8	91.8	92.8	97.8	99.9	101	99.5	97.5	99.4	101	95.9	94.8	97.3	91.3	99.7	101	97.2	95	90.2	95.6	90.7	92.4	95.8
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		96.9	99.7	99.1	95.9	98.2	99.7	99.3	102	98.7	95.1	74.1	72.1	99.5	81.5	86.3	99.8	77	75	80.9	79.4	96.7	100	100	96.4	73.2	86.4	102	89.5	86.2	75.8	93.1	98.8	100	88.2	86.4	97.5	94	95	92.7	93.5	86.4	97.9	100	95.7	80.3	74	85	82.1	88.5	75
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.18	0.09	0.09	0.009	0.11	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.869	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.14	0.07	0.07	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.135	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.193	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.08	0.04	0.04	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.102	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.211	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.16	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.232	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.119	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.26	0.13	0.13	1.21	0.169	0.13	0.157	0.959	0.13	0.13	0.13	0.13	0.13	0.13	0.3	0.257	0.13	0.13	0.13	0.13	0.691	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.229	0.835	0.13	0.13	0.13	0.13	0.13	0.275	0.13	0.13	0.167
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.8	0.4	0.4	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.68	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.34	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																																												
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

											Sample ID	4EC2	4EC4	4EC4	4EC7	4EC7	4EC8	4EC8	4EC9	4EC10V	4EC2V	4EC4V	4EC7V	4ED1	4ED1	4ED10	4ED10	4ED2	4ED2	4ED4	4ED4	4ED7	4ED8	4ED8	4ED9	4ED9	4ED10V	4ED1V	4ED4V	4ED7V	4ED8V	4ED9V	4EE1	4EE1	4EE1	4EE10	4EE10	4EE2	4EE2	4EE2	4EE4	4EE4	4EE4	4EE5	4EE5
											Depth	1	0.5	1	0.5	1	0.5	1	0.5	2.5	1.65	2.25	1.8	0.5	1	0.5	1	0.25	1	0.5	1.2	0.5	0.5	0.9	0.5	1	2.8	1.8	2.1	1.9	1.7	2	0.5	1	2	0.4	1.5	0.2	0.5	1.3	0.5	1	1.5	0.2	0.8
											Sampled Date	29/10/2018	30/10/2018	30/10/2018	01/11/2018	01/11/2018	01/11/2018	01/11/2018	31/10/2018	26/11/2018	29/10/2018	30/10/2018	01/11/2018	29/10/2018	29/10/2018	26/11/2018	26/11/2018	29/10/2018	29/10/2018	30/10/2018	30/10/2018	01/11/2018	01/11/2018	01/11/2018	31/10/2018	31/10/2018	26/11/2018	29/10/2018	30/10/2018	01/11/2018	01/11/2018	31/10/2018	01/11/2018	01/11/2018	01/11/2018	26/11/2018	26/11/2018	29/10/2018	29/10/2018	29/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Determinand	**Method**	**Units**	**LOD**	**No. of Samples**	**No. of Samples >LOD**	**No. of Samples > WQS**	**Min**	**Max**	**Average**	**WQS**	**Percentage of exceedances**																																												
Carbon																																																							
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	10.7	7.28	2.64	6.84	27.1	84.8	9.86	4.84	4.91	0.852	1.48	9.19	11.8	48.8	2.47	3.45	44	4.19	29	8.4	2.78	21.6	12.3	4.05	1.23	5.28	1	1.15	5.07	1.55	3.29	10.7	19.3	6.6	6.74	3.21	6.72	59.8	43.4	32.2	45.2	31.7	7.36	27.8
Metals (Solids)																																																						
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	12.3	9.76	12.8	15.3	9.98	4.99	8.49	10.5	17.2	11.1	16.1	15.5	5.35	6.63	11	4.97	8.33	7.33	10.4	8.56	12.2	8.99	8.83	3.68	6	17.7	13.7	15.2	15	20.7	13.3	7.22	8.25	6.69	10.9	6.05	14.8	4.96	7.34	10.5	12.1	11.2	6	6
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47	2.07	0.2	0.2	0.2	0.2	0.02	1.14	0.2	0.269	0.02	0.02	0.02	0.02	0.02	0.562	0.281	0.02	0.342	0.02	0.02	0.2	1.11	0.2	0.02	0.2	0.271	0.02	0.02	0.2	0.394	0.02	0.02	0.877	0.02	0.2	0.2	0.02	0.02	0.462	0.02	0.02	0.02	0.2	0.2
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09	36.8	150	388	63.2	168	3.33	161	76.4	33.9	25.6	46.6	115	16.5	32	137	24.5	126	732	16.2	480	9	190	732	53.4	567	34.4	28.1	36.4	39.8	55.9	35.7	37	115	143	129	525	48	95.8	187	34	37.7	69.8	454	369
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00	67.5	14	286	25.3	24.9	13.7	22.1	34.6	15.9	9.52	14.2	23.3	7.2	20	19.8	6.71	19.5	30	14.7	23.9	14	22.3	36.5	2.48	15.4	18.5	10.5	10.6	14	12.7	13.7	14.6	29.2	15.4	19.7	18.3	36.2	12.8	15.9	17.9	26.2	21.1	19	14
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66	113	38.2	31.2	116	91.6	29.2	46	77.3	41.1	22.5	29.3	45.3	15.7	30.5	52.8	105	28.8	24.1	23.5	19.6	94.4	43.7	11.4	11.5	21	41.4	24.5	27.8	39.8	27.7	30.5	29.2	35.4	26.2	29.9	9.99	79.8	23.7	30.2	33	24.7	58.6	16.6	21.8
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82	0.14	1.4	1.4	1.4	1.4	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	0.14	1.4	0.14	1.4	0.14	1.4	0.14	0.14	0.14	1.4	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	1.4	1.61	2.17	0.757	1.4	1.4
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87	35	17.1	36.3	31.6	24.2	12	15.4	39.8	33.4	32	43.7	22.1	7.56	14.7	22	6.8	13.5	22.2	18.4	14.4	14.3	14.9	26.3	4.31	9.49	34.4	36.9	43	29.4	38.1	36.4	17.1	16	10.1	56.6	13.4	17.6	9.88	14.7	13.3	15.5	18	13.5	6.83
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93	1.47	10	16.4	10	10	2.17	5.34	10	1.7	1	1	2.88	1.13	2.57	7.47	3.59	3.53	17.9	1.72	13.1	10	2.91	18	5.93	22	1.88	1	1	10	1	1	1.44	4.09	5.45	10	21	1.86	4.92	10	2.36	2.91	3.3	19.3	12
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57	37.6	179	405	226	140	17.7	177	113	57.5	45.3	71.4	108	33.7	45.6	163	77.5	96.4	397	52.3	443	43.7	138	507	115	397	54.5	50.4	61.6	63.9	81	58.1	47	155	247	123	416	86.8	116	190	59.2	92.1	84.3	508	335
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57	395	164	122	422	323	112	183	238	136	96.5	129	149	47.6	293	234	572	329	69.1	109	92.3	270	165	45.5	58.8	60.3	156	104	117	106	103	128	128	130	83.5	236	38.6	454	77	107	97.9	103	156	43.3	45.1
TPH Criteria Working Group (TPH CWG)																																																						
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00																																												
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00																																												
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00																																												
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00																																												
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.0697	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.0532	0.0187	0.01	0.02	0.02	0.02	0.923	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.02	0.01	0.01	0.0314	0.02	0.01	0.02	0.07	0.02	0.02	0.01	0.219	0.02	0.02	0.051	0.0582	0.02	0.02	0.02	0.01	0.02	0.0606	0.0435	0.02	0.0246	0.0581	0.02	0.01	0.0526	0.161	0.0518	0.01	0.0549	0.0418	0.0294	0.363	0.02	0.02	0.02	0.02	0.02	0.02	0.0463	0.0155
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.02	0.01	0.01	0.0238	0.02	0.01	0.02	0.373	0.02	0.02	0.01	0.481	0.02	0.02	0.0632	0.0538	0.02	0.02	0.02	0.01	0.02	0.0412	0.0498	0.02	0.02	0.0969	0.02	0.01	0.092	0.557	0.753	0.01	0.0373	0.0237	0.0272	2.59	0.02	0.02	0.02	0.02	0.02	0.02	0.0328	0.0155
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00	0.02	0.01	0.01	0.02	0.02	0.01	0.02	2.05	0.02	0.02	0.01	1.32	0.02	0.02	0.142	0.483	0.02	0.02	0.02	0.01	0.02	0.231	1.52	0.154	0.108	0.128	0.02	0.01	0.209	1.19	0.657	0.01	0.0461	0.0203	0.0958	651	0.02	0.02	0.02	0.02	0.02	0.02	0.276	0.164
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00	2.48	3.7	4.04	2.48	2.39	7.26	0.1	120	0.1	0.1	0.1	1.15	6.9	5.84	13.9	13.7	3.5	7.19	1.61	8.13	0.1	2.36	2.84	7.49	6.17	1.24	0.1	0.1	1.31	0.1	0.107	5.78	2.61	2.01	0.1	2.85	2.26	5.52	7.21	5.28	3.06	4.72	5.34	1.38
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00	10.8	35.9	21.7	17	21.9	42.4	0.808	290	0.947	0.1	1.14	3.98	26.7	22.1	36.9	52.2	20.8	59.4	19	29.4	9.87	10.5	15.8	20.1	20.5	1.53	0.1	0.1	2.88	0.1	11.1	23.7	39.4	12.1	1.5	7.05	22.7	28.9	26.2	20.9	21.4	21.6	28.6	11.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00	40.6	64.9	83.4	143	80.3	241	109	2010	13.8	0.1	1.79	17.1	70.4	64.3	74.8	151	65.3	118	80.5	65.9	158	81.7	79.5	275	133	6.38	0.1	0.1	14.7	2.43	4.58	94.5	77.6	45.5	30.6	36.9	123	77.6	111	51.3	33.7	43	61.1	35.4
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00	20.1	16.2	27.7	92.4	15.3	71.6	32.6	590	1.03	0.1	0.1	14.9	25.9	18.1	25.8	96.7	20.5	43.3	14.8	7.3	37.1	28.1	27.5	150	61.7	0.1	0.1	0.1	1.14	0.1	0.1	43.7	16.7	14.2	6.9	9.07	36.3	12	38.1	7.89	4.55	8.94	18.7	8.93
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.0956	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.0213	0.0504	0.01	0.02	0.02	0.02	0.427	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.01	0.0308	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.0259	0.01	0.02	0.02	0.02	0.2	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00	0.02	0.01	0.01	0.02	0.02	0.01	0.02	0.249	0.02	0.02	0.01	0.321	0.02	0.02	0.0418	0.0358	0.02	0.02	0.02	0.01	0.02	0.0271	0.0329	0.02	0.02	0.0641	0.02	0.01	0.0613	0.371	0.503	0.01	0.0253	0.02	0.02	1.73	0.02	0.02	0.02	0.02	0.02	0.02	0.0215	0.01
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07	0.02	0.01	0.01	0.02	0.02	0.01	0.02	1.36	0.02	0.02	0.01	0.881	0.02	0.02	0.0949	0.323	0.02	0.02	0.02	0.01	0.02	0.154	1.02	0.102	0.0717	0.0849	0.02	0.01	0.139	0.793	0.438	0.01	0.0307	0.02	0.0643	434	0.02	0.02	0.02	0.02	0.02	0.02	0.184	0.11
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	2.72	2.98	0.856	4.01	2.92	7.02	2.65	43	0.1	0.1	0.23	1.63	7.07	15.2	5.27	3.22	9.33	4.25	5.57	2.76	0.1	2.16	1.92	2.4	3	0.1	0.1	0.1	0.53	0.1	0.472	6.88	10.1	4.05	0.461	17.3	4.35	6.9	6.88	10.4	6.3	7.22	2.3	2.16
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14	12.7	29.3	13.3	14.2	9.06	25.1	12.2	95.3	1.9	0.1	1.42	5.65	20.1	89	17.9	21.2	66	38.2	22.6	18.4	1.25	7.2	9.26	15.5	29.9	1.37	1.38	0.1	1.63	0.1	8.99	28.9	114	29.6	3.93	20.5	18	29.6	34.2	86.9	39.7	55	16.2	17.1
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	69.3	91.2	79.2	97.9	42	144	153	377	26.9	3.49	6.09	55.3	82.9	292	59.2	148	161	150	107	96.4	17.7	51.7	71.8	294	165	28.4	6.82	0.1	16.1	4.96	5.72	133	292	93.2	21.7	91.3	78.7	118	155	358	149	189	80.3	73.3
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00	42.9	33.6	33.6	116	17.3	82.1	94.9	160	6.41	0.173	3.1	10.8	44.9	78.3	43.3	185	54.2	60.6	31.6	35.7	1.63	36.9	43	294	115	3.73	1.06	0.1	3.55	5.54	0.1	79.5	84.9	29.2	13.1	32.3	36.5	34.2	62.5	84.7	36.3	53.5	30.4	25.3
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	17.3	13	12.6	55	7.23	36.3	38.8	58.7	1.86	0.1	1.28	2.82	19.1	21.2	20.2	89.1	20.7	18.6	11.1	12.9	0.1	16.8	18	135	51.1	0.644	0.1	0.1	1.16	2.43	0.1	33.5	28.5	10.2	6.01	12.9	14.1	11.8	24.1	24.8	12.5	18.2	12.1	9.41
Polyaromatic Hydrocarbons (PAHs)																																																						
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	37.9	234	112	43.1	12	60	43.9	41.2	12	12	12	12	132	192	61.2	120	180	80.8	51.6	77.8	35.9	31.2	12	60	12	12	12	12	12	12	68.9	133	616	231	28.6	16.7	198	56.5	44.4	800	1390	571	12	12
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40	12	40	60.9	17.3	8	40	17.4	97.8	8	8	8	21.6	25.8	111	31.1	80	43.4	63.1	28.5	73.9	8	8	8	40	10.2	13.9	8	8	50.5	113	38.4	40	57.2	31.2	8	43.1	63.8	35.9	28.3	221	396	192	47	58.3
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33	102	404	503	74.7	93.8	144	69	82.3	16	16	16	16	223	735	114	160	773	212	158	232	41.1	47.3	27.7	80	75.3	16	16	16	16	28.9	53.5	362	1590	434	295	70.4	668	187	201	1450	2830	1360	112	145
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27	673	1620	3050	247	192	381	700	113	29.4	14	33.6	142	648	3130	488	622	2320	1630	456	1650	98.3	289	583	114	219	14	14	14	103	160	168	1150	4960	1780	129	1170	1840	942	632	6210	8900	4250	787	853
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93	645	1620	3060	238	209	288	898	100	28.8	15	38.7	154	614	2930	510	565	1950	1880	397	2150	81.7	303	760	130	235	15	15	15	103	39.2	161	1000	4090	1160	129	1630	1400	908	591	6780	8460	4060	918	887
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00	976	2620	4820	267	376	545	932	158	35.6	15	62.3	155	1040	4410	708	806	3280	2980	658	3170	160	640	1330	138	269	28.2	15	15	107	78.7	227	1200	5490	1910	151	1750	2350	1490	952	9900	12900	6610	1290	1060
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	338	808	1690	106	14	174	372	60.9	14	14	30	74.6	293	1380	235	177	1150	940	181	1150	49.1	226	451	70	137	14	14	14	54.8	35.7	95.3	553	1960	685	51.7	637	843	594	297	3520	3690	2160	458	462
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51	415	1190	2040	206	167	256	664	109	24	24	35.5	106	458	1980	416	476	1300	1530	315	1690	68.8	320	661	155	209	24	24	24	86.1	24	107	718	2820	792	136	1440	879	603	458	4930	5810	3450	635	608
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	638	1550	3270	256	574	398	699	150	25.3	10	41.6	153	679	3000	481	560	2250	1910	463	1950	110	340	727	112	259	22.6	10	10	115	185	173	1080	4270	1680	140	1210	1720	1020	698	6200	7020	4120	799	828
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63	132	311	598	46.7	33.6	0.115	153	0.023	0.023	0.023	0.023	0.023	119	574	86.8	0.23	370	288	95.8	401	0.023	77.8	142	0.115	35.8	0.023	0.023	0.023	0.023	0.023	0.023	177	686	216	28	288	275	175	98.3	1340	1490	1020	172	146
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93	554	1010	1880	157	190	203	528	93.1	0.018	0.018	32.3	106	388	2540	460	462	1740	1340	242	1750	63	269	566	123	150	0.018	0.018	0.018	77.4	0.018	100	665	3360	679	133	1420	1230	741	408	4160	4800	3580	504	546
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85	1090	3080	6330	492	576	894	815	332	55	0.017	69.4	175	1180	4710	822	804	5470	3100	738	2530	195	368	642	262	740	42.9	0.017	0.017	216	766	387	2550	10400	4250	215	1530	4040	1340	1140	10700	16600	7720	1210	1350
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	18.2	94.5	88.1	29	10	77.9	19.2	260	10	10	10	10	78	256	29.5	0.1	285	50	75	66.5	15.5	14.7	10	50	10	10	10	10	17.8	47.6	19.9	121	607	284	39.2	31.6	209	56.9	46.9	488	1110	464	26.6	26.5
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	77.2	922	471	95.6	9	123	79.2	146	13.6	9	15.6	213	229	465	353	90	360	186	136	102	116	66.6	43.9	45	11.4	458	9	9	1330	545	325	325	715	176	89	411	301	143	105	2460	2240	1550	59.6	102
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	361	1740	2340	291	376	790	277	769	27.9	15	45.2	87.1	605	2740	393	223	4080	968	549	904	150	180	183	132	347	33.5	15	15	141	513	168	1370	6700	2350	180	696	2310	814	596	5810	10300	5030	513	803
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09	0.806	2.43	4.32	0.388	0.43	0.703	0.806	0.419	0.0439	0.015	0.0569	0.224	0.918	3.93	0.732	1.95	3.79	2.88	0.594	2.36	0.171	0.372	0.689	0.218	0.589	0.0326	0.015	0.015	0.192	0.664	0.331	1.96	8.01	2.67	0.17	1.49	2.91	1.3	0.93	8.71	13.1	6.06	1.1	1.23
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00	6.87	19.6	34.6	2.95	3.22	4.98	7.07	2.93	0.259	0.118	0.461	1.61	7.64	33.1	5.92	6.64	29.4	20	5.14	20.3	1.35	3.54	6.8	1.38	3.29	0.632	0.118	0.118	2.6	3.17	2.42	13.4	56.3	19.3	1.92	13.8	21.2	10.4	7.22	73.6	101	52.2	8.63	9.11
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	86.2	87.7	85.3	86	0	91.4	88.1	85.8	92	87.1	93.1	86.9	86.4	87.6	91.7	89.3	86.7	88.1	86.3	94.2	93.6	90.5	86.8	85.4	85	91.2	88.6	92.1	96.2	91.2	93.9	91.9	88.7	89	92.9	90.6	87.6	85.6	91.4	86.3	85	93.6	86.6	94.9
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00	89.8	81.4	77.6	90.1	0	92	89.7	92.6	89.3	89.7	98.5	88.9	85.6	90.2	92.8	83.9	91.1	87.2	86.7	99.8	87.4	89.7	92.5	91.6	88.9	90.3	90.2	94.7	96.1	92.9	86.4	95.3	89.8	91.4	88.6	90.5	91.5	89.6	89.3	82.8	81.7	99.3	80.9	94.4
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00	93.7	78	81.9	98.8	88.4	93.9	99.2	97.9	84.8	97.3	97	89.6	86.8	97.2	88.9	82.8	92.6	84.8	85.8	97.6	86.8	89.4	100	93.5	92.3	87.1	94	92.7	101	94.1	93.4	97.2	94.9	98.5	83.4	86.8	101	93.2	87.1	78.1	77.5	95.4	82	98.8
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	93	75.7	76.5	103	77.2	91.7	104	96.1	77.3	110	84	92.7	82.8	93.5	81.7	79	86.6	76.8	74.7	83.6	81.2	90.6	104	97.8	77.9	79.7	109	80.8	98.7	97.7	91.2	88.7	92	104	72.3	77.7	105	86.8	72.7	72.8	73.1	77.6	78	91.4
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	88.1	77	79.6	97.4	69.5	82.2	98.8	83.1	84.8	105	81	90.3	78.8	81.3	82.4	82.2	76.7	78.8	70.2	79.3	80.4	84.5	99.4	85.1	72.8	86.9	106	76.8	91.8	97	87.7	73	89.4	99.2	72.4	83.6	98.5	72.1	71.8	71.3	70.7	75.6	80.5	77.9
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	74	121	137	255	120	362	142	3010	15.7	0.1	2.93	37.2	130	110	151	314	110	228	116	111	205	123	126	453	222	9.15	0.1	0.1	20.1	2.43	15.8	168	136	73.7	39	55.8	184	124	182	85.5	62.7	78.3	114	56.9
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00	128	157	127	232	71.3	258	263	675	35.2	3.66	10.8	73.4	155	474	126	357	290	253	166	153	20.6	98	126	606	313	33.5	9.25	0.1	21.8	10.5	15.2	249	501	156	39.3	161	138	189	258	540	232	305	129	118
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00	202	278	264	488	191	620	405	3690	51	3.66	13.8	114	285	585	277	672	400	481	282	264	226	221	254	1060	535	43.1	9.25	0.1	42.4	16.1	33.5	417	637	230	78.5	1310	322	313	440	626	294	383	244	175
Metals - (Solid)																																																						
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039			63800	160000	223000	174000	152000	48100	88300	198000	33200	33400	49700	68100	32900	33300	144000	44100	57900	201000	51700	151000	77100	110000	228000	36000	106000	36400	34200	41500	42200	46000	27400	41600	64500	84900	189000	147000	53900	57600	67400	43800	41500	43600	130000	92900
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574			3570	11200	28300	11400	7850	3070	12700	11200	563	1260	1260	6170	2290	3490	11100	5400	7680	45700	3220	35900	1940	11500	42500	12000	37700	477	1640	866	1300	1500	721	3000	10400	17100	7510	32800	4340	9350	15600	3750	4240	5570	28800	22300
Metals - (Liquid)																																																						
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387			-	138000	-	143000	-	104000	-	133000	-	-	-	-	171000	-	-	194000	-	219000	98100	-	196000	-	232000	203000	-	-	-	-	-	-	-	123000	-	171000	101000	226000	122000	-	166000	74600	-	133000	224000	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371			-	9150	-	12000	-	14000	-	24000	-	-	-	-	12800	-	-	31100	-	7260	6120	-	16800	-	13700	33500	-	-	-	-	-	-	-	17000	-	2470	17400	7200	14600	-	12400	7220	-	13500	12600	-
Phenols																																																						
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00	0.01	0.01	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0112	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.011	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0107	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0108	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																																																						
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42	-	0.0774	-	0.196	-	0.0695	-	0.0794	-	-	-	-	0.121	-	-	0.102	-	0.108	0.336	-	0.15	-	0.0476	0.79	-	-	-	-	-	-	-	0.137	-	0.168	0.063	1.46	0.4	-	0.173	0.111	-	0.187	0.244	-
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01	11.6	11.2	12.6	10.4	11.4	8.9	10.8	11.2	7.84	8.46	6.54	8.25	9.62	9.85	11.4	10.7	11	11.7	8.35	11.8	10.3	11.2	12.4	9.94	12.7	7.73	8.35	8.06	7.87	7.99	8.04	9.42	11.2	11.5	9.69	11.6	10.8	11.4	11.3	8.94	8.86	10.9	12.1	12.2
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33																																												
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32	-	0.196	-	0.311	-	0.673	-	0.289	-	-	-	-	0.273	-	-	0.22	-	0.276	0.225	-	0.131	-	0.233	0.852	-	-	-	-	-	-	-	0.383	-	0.3	0.142	1.31	0.338	-	0.663	0.285	-	0.29	0.304	-
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32	-	0.588	-	0.933	-	2.02	-	0.867	-	-	-	-	0.819	-	-	0.66	-	0.828	0.675	-	0.393	-	0.699	2.56	-	-	-	-	-	-	-	1.15	-	0.9	0.426	3.93	1.01	-	1.99	0.855	-	0.87	0.912	-
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	-	0.28	-	0.381	-	0.396	-	0.325	-	-	-	-	0.393	-	-	1.05	-	0.507	0.202	-	0.296	-	0.32	0.868	-	-	-	-	-	-	-	0.548	-	0.42	0.102	3.43	0.494	-	0.53	0.21	-	0.261	0.729	-
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7.46	15.8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.17	1	1	20.9	18.5	12.7	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	12	12	12	13.6	12	12	12	12	223	341	194	269	15.4	19.2	19.4	12	12	12	12	12	28.2	12	19.1	12	12	227	137	164	262	92.4	171	12	12	12	12	12	12	12	12	12	12	12	12	12
Asbestos																																																						
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		-	09/11/2018	-	13/11/2018	-	14/11/2018	-	13/11/2018	-	-	-	-	08/11/2018	-	-	11/12/2018	-	08/11/2018	09/11/2018	-	09/11/2018	-	13/11/2018	09/11/2018	-	-	-	-	-	-	-	14/11/2018	-	09/11/2018	11/12/2018	11/12/2018	08/11/2018	-	08/11/2018	09/11/2018	-	09/11/2018	09/11/2018	-
Analysed By	TM048	No units		1371	0	0				0.00		-	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	-	-	-	-	James Richards	-	-	Paul Poynton	-	Lucy Caroe	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Lucy Caroe	Barbara Urbanek-Walsh	-	-	-	-	-	-	-	Andrzej Ferfecki	-	Renata Bozhkov	Paul Poynton	Paul Poynton	Lucy Caroe	-	James Richards	Lucy Caroe	-	Barbara Urbanek-Walsh	Barbara Urbanek-Walsh	-
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	None	None	-	-	-	-	-	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-
Analysts Comments	TM304	No units		1002	0	0				0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-	-	-	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	N/A	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Detected	Not Detected	-	Not Detected	-	Not Detected	Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	Not Detected	-
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		-	Not Detected	-	Detected	-	Not Detected	-	Not Detected	-	-	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	Not Detected	-	Not Detected	Detected	Not Detected	Not Detected	-	Not Detected	Detected	-	Not Detected	Not Detected	-
Comments	TM048	No units		1371	0	0			0	0.00		-	0	-	0	-	0	-	0	-	-	-	-	0	-	-	0	-	Soil containing Fibre bundles	0	-	0	-	Loose fibres in soil	Fibre bundles in soil.	-	-	-	-	-	-	-	0	-	0	0	0	Fibre bundles in soil	-	0	0	-	0	0	-
Volatile Organic Compounds (VOCs)																																																						
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		106	120	118	101	102	95.6	104	110	108	105	117	103	103	95.6	111	113	106	114	103	117	111	101	109	117	91.3	107	107	122	112	110	105	97.8	107	99.7	107	111	107	109	111	85.9	103	95.8	104	118
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00		100	96.4	97.1	99	98.9	95.5	98.1	94.5	98.8	98.4	99.9	98.8	94.8	91.7	95.2	92.5	98.3	100	97.1	98.1	98.6	98.6	95.6	90.1	93.1	98.8	98.6	99.1	99.3	99.9	96.6	97	96	97.9	95.7	96.2	99.7	95.5	99.9	89.7	90.8	95.3	99.8	98.1
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		92.7	97.7	98	91.5	92.2	79	94.1	86.6	95.3	96	104	95	82.1	73.5	90.8	87.2	83.1	95.2	83.9	94.6	91.9	90	92.6	82.6	96	95.4	95.9	106	97.5	97.9	94.7	81.6	90	87.3	87.8	94.9	90.9	72.7	95.8	69.3	66.6	78.2	95.5	94.3
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.009	0.09	0.09	0.09	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.171	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.007	0.07	0.07	0.07	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.004	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.189	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.01	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.308	0.13	0.13	0.13	1.15	1.25	0.13	0.258	0.13	0.13	0.389	0.13	0.13	0.13	0.159	0.367	0.183	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.04	0.4	0.4	0.4	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																																																						
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.3	-	-	11.2	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13.4	-	-	9.84	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.2	-	-	11	-	-	-
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	9.34	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.08	-	-	0.95	-	-	-
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.6	-	-	11.6	-	-	-
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12.6	-	-	12.5	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	4EE6	4EE6	4EE7	4EE7	4EE8	4EE8	4EE9	4EE9	4EE9	4EE10V	4EE1V	4EE2V	4EE4V	4EE5V	4EE6V	4EE7V
Depth	0.25	0.8	0.3	0.8	0.5	1	0.5	1	1.5	2.5	2.5	2.6	2.1	1.95	1.8	1.75
Sampled Date	30/10/2018	30/10/2018	30/10/2018	30/10/2018	31/10/2018	31/10/2018	31/10/2018	31/10/2018	31/10/2018	26/11/2018	01/11/2018	29/10/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018
Carbon																
Soil Organic Matter (SOM)	1.52	1.14	2.1	1.19	3.93	1.49	4.88	0.803	1.14	2.97	1.81	5.03	1.05	5.78	1.23	5.65
Metals (Solids)																
Arsenic	10.3	8.95	13.4	5.77	7.54	16.3	4.66	6	6	13.6	14	13.3	12.4	13.1	13.6	14
Cadmium	0.2	0.02	0.2	0.02	0.2	0.2	0.02	0.2	0.2	0.0786	0.428	0.02	0.02	0.02	0.02	0.02
Chromium	220	297	60.5	466	46.1	864	62.5	677	361	37	34.4	35	31.7	37.7	33.7	35.9
Copper	26.7	24.8	17.1	12.5	16.5	59.4	8.23	14.3	17.2	12.9	12.1	15.3	10.3	16.3	11.8	22.5
Lead	20	2.92	74.8	0.7	69.2	17.1	22.6	7	14.3	31.5	28.7	31.6	22.7	45.1	24.5	39.1
Mercury	1.4	0.14	1.4	0.14	1.4	1.4	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	22.5	14.2	21.1	5.87	21.5	49.2	6.74	7.52	49.6	35.2	35.7	25.1	34	27.7	38.8	30.4
Selenium	13.3	10.2	10	13.9	10	35.7	5.56	25.3	17.9	1.52	1	1	1	1	1	1
Vanadium	249	360	95	439	104	614	70.3	486	348	58.8	59.9	50.9	53.6	57.8	56.5	58
Zinc	56.1	53.8	239	14.6	249	86.6	115	29.2	54.9	105	113	112	103	129	107	165
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.023	0.0283	0.74	0.02	0.02	0.02	0.01	0.02	0.0311
Aliphatics >C6-C8	0.0391	0.0111	0.02	0.0561	0.045	0.0281	0.0367	0.0513	0.0523	0.66	0.02	0.02	0.0715	0.01	0.02	0.124
Aliphatics >C8-C10	0.0467	0.01	0.02	0.619	0.0364	0.0562	0.04	0.627	0.384	1.77	0.02	0.02	0.195	0.01	0.02	0.891
Aliphatics >C10-C12	0.981	0.0477	0.02	0.74	0.16	1.45	0.638	2.31	3.28	17.4	0.02	0.02	0.542	0.01	0.02	1.53
Aliphatics >C12-C16	23.5	1.25	0.683	8.03	2.54	13.8	0.1	1.66	12.9	0.1	0.59	0.1	70.9	0.1	0.1	0.1
Aliphatics >C16-C21	109	7.31	3.8	13	11.3	31.8	25.9	3.03	36.3	0.1	0.1	0.1	67.6	0.1	0.1	0.1
Aliphatics >C21-C35	119	28.8	41.6	73.8	82.3	254	118	44.4	173	0.1	2.43	4.89	14.1	5.27	0.1	5.15
Aliphatics >C35-C44	52.1	16	16.3	20.4	26.3	124	51.3	29.9	92.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.01	0.02	0.156	0.02	0.01	0.02	0.196	0.0871	1.09	0.02	0.02	0.02	0.01	0.02	0.02
Aromatics >EC7-EC8	0.02	0.01	0.02	0.373	0.02	0.013	0.02	0.349	0.142	0.2	0.02	0.02	0.02	0.01	0.02	0.02
Aromatics >EC8-EC10	0.0315	0.01	0.02	0.412	0.0246	0.0378	0.0259	0.418	0.256	1.18	0.02	0.02	0.13	0.01	0.02	0.593
Aromatics >EC10-EC12	0.654	0.0311	0.02	0.494	0.107	0.964	0.426	1.54	2.18	11.6	0.02	0.02	0.361	0.01	0.02	1.02
Aromatics >EC12-EC16	5.66	1.7	1.97	3.21	3.68	4.93	3.43	0.565	3.23	0.1	0.1	0.1	21.8	0.1	0.1	0.1
Aromatics >EC16-EC21	45.8	8.59	8.5	34.8	11.6	30.2	25.6	12.9	24.4	0.1	0.299	1.3	26.2	0.268	0.1	0.1
Aromatics >EC21-EC35	136	68.6	45.3	216	52.9	208	111	99.3	145	2.19	5.4	39.8	9.14	25.1	0.1	50.5
Aromatics >EC35-EC44	86.9	50.5	28.7	76.5	26.8	139	74.7	60.9	103	0.1	1.76	8.98	1.62	3.81	0.1	7.63
Aromatics >EC40-EC44	39.9	22.9	12.3	27.6	11	55.6	32	25.3	44.1	0.1	0.1	2.98	1.2	0.831	0.1	1.88
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	155	12	116	60	145	32.9	60	60	13.2	12	12	12	12	12	12	12
Acenaphthene	40	29.2	18.6	255	62.3	79.2	61.9	40	38.5	8	8	8	8	8	8	28.2
Anthracene	80	30.2	188	484	289	156	179	113	105	16	16	16	25.8	16	16	16
Benz(a)anthracene	1250	712	551	5400	829	1460	1200	1870	1330	14	14	14	14	14	14	14
Benzo(a)pyrene	1960	1020	464	6200	664	1540	1020	2230	1440	15	31.9	15	15	15	15	15
Benzo(b)fluoranthene	2730	1460	511	8320	1150	2440	1230	3360	1650	15	39.8	15	15	15	15	15
Benzo(k)fluoranthene	1090	496	234	3300	355	762	479	1340	790	14	14	14	14	14	14	14
Benzo(g,h,i)perylene	1480	710	365	4050	518	1150	669	1610	1300	24	24	24	24	24	24	24
Chrysene	1560	831	512	6030	681	1700	1170	1920	1500	10	39.7	10	10	10	10	16.2
Dibenzo(a,h)anthracene	376	181	82.8	822	134	254	143	397	212	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	1200	554	333	5770	479	1100	756	1350	1130	0.018	23.1	0.018	0.018	0.018	0.018	0.018
Fluoranthene	1220	745	1020	7160	1730	2150	1860	2430	2710	0.017	107	0.017	24	0.017	0.017	33.5
Fluorene	50	10	59.7	107	207	50.7	50	50	18.9	23	10	10	34.4	10	10	10
Naphthalene	45	45.4	293	2000	415	152	83	240	709	2450	17.4	9	27.2	9	9	545
Phenanthrene	361	185	659	2930	1420	873	545	943	1280	15	66.7	15	71.8	15	15	24
Pyrene	1.35	0.777	0.727	6.84	1.24	2.68	2.47	2.55	2.72	0.015	0.0834	0.015	0.0201	0.015	0.015	0.0253
PAH, Total Detected USEPA 16	14.7	7.77	6.13	59.7	10.3	16.6	11.9	20.4	16.9	2.47	0.451	0.118	0.203	0.118	0.118	0.672
Naphthalene-d8 % recovery**	89.1	87.8	82.4	76.6	96.3	93.1	86.4	106	90.4	92.8	96.8	83.6	94	79.7	81.4	78.5
Acenaphthene-d10 % recovery**	81.1	84.6	84.6	81.4	90.8	91.7	89.4	85.2	93.8	90.2	96.2	87.8	98.3	82.8	84.3	83.2
Phenanthrene-d10 % recovery**	82.2	87.1	87.1	81.7	90.4	91.5	93.9	92.8	98	87.5	101	93.9	97.4	85.8	86.1	85.6
Chrysene-d12 % recovery**	76	84.6	76.8	81.2	81.4	81.5	96.2	96.9	85.8	91.6	97.9	96.6	82.3	79.5	84.9	77.4
Perylene-d12 % recovery**	79.3	80.3	70.7	77.1	83.1	88.8	86.8	95.2	78.9	86.1	84.3	95.8	77.7	76.4	82.6	74.3
Total Aliphatics >C12-C44	304	53.4	62.4	115	122	424	196	79	314	0.1	3.02	4.89	153	5.27	0.1	5.15
Total Aromatics >EC12-EC44	275	129	84.5	330	95	382	215	174	275	2.19	7.46	50.1	58.8	29.2	0.1	58.2
Total Aliphatics & Aromatics >C5-C44	580	183	147	448	218	809	412	258	596	36.6	10.5	55	213	34.4	0.1	67.5
Metals - (Solid)																
Iron	125000	185000	114000	188000	144000	2390000	64800	181000	114000	34100	37200	24600	40000	34400	41300	39900
Manganese	18000	32400	4850	49400	6740	408000	13500	43600	35500	414	1600	188	1390	267	736	349
Metals - (Liquid)																
Calcium	193000	-	153000	-	173000	-	193000	-	242000	-	-	-	-	-	-	-
Magnesium	14000	-	9950	-	12900	-	26100	-	21600	-	-	-	-	-	-	-
Phenols																
Phenol	0.01	0.0444	0.01	0.0104	0.01	0.01	0.01	0.01	0.0109	0.013	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.0111	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.0555	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	0.174	-	0.0991	-	0.0641	-	0.11	-	0.0942	-	-	-	-	-	-	-
pH	11.8	12.2	9.95	12.6	10.6	11.1	11	12.6	12.3	7.9	8.36	7.2	8.12	6.64	7.63	7.18
Sulphate, Total																
Sulphur, Total	0.631	-	0.153	-	0.115	-	0.671	-	0.739	-	-	-	-	-	-	-
Sulphate, Total potential	1.89	-	0.459	-	0.345	-	2.01	-	2.22	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	0.796	-	0.303	-	0.255	-	0.589	-	0.923	-	-	-	-	-	-	-
Cyanide, Total	1	3.56	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	12	12	126	227	353	205	190	102	378
Asbestos																
Asbestos Quantification - Gravimetric - %	0.0174	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	09/11/2018	-	09/11/2018	-	09/11/2018	-	09/11/2018	-	09/11/2018	-	-	-	-	-	-	-
Analysed By	Lucy Caroe	-	Lucy Caroe	-	Barbara Urbanek-Walsh	-	Marcin Magdziarek	-	Marcin Magdziarek	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	0.0017	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	None	-	None	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	N/A	-	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	0.0191	-	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Detected	-	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Comments	Soil containing debris typical of AIB	-	Fibre bundles in soil	-	0	-	0	-	0	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	122	118	100	123	102	116	105	99.1	109	110	103	110	126	119	128	107
Toluene-d8**	95.7	99	97.4	106	96.7	84.3	99	95.8	98.9	98.4	101	95.1	108	100	107	97.5
4-Bromofluorobenzene**	100	107	85.2	106	82.4	71.6	93.7	94.9	95.9	95.8	98.7	92.1	108	104	106	94.6
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.0991	0.09	1.76	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.102	0.07	0.07	0.07	0.101	0.077	0.153	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.582	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.928	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.297	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	10.6	0.13	0.13	0.13	0.13	0.13	0.436
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.72	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4EE8V	4EE9V	4EF10	4EF10	4EF4	4EF4	4EF6	4EF6	4EF8	4EF8	4EF9A	4EF9A	4EF9AV	4EF10V	4EF4V	4EF6V
Depth	2	2.1	0.4	1	0.5	1	0.3	0.8	0.5	0.9	0.5	1	2	2.5	2.1	1.55
Sampled Date	31/10/2018	31/10/2018	26/11/2018	26/11/2018	30/10/2018	30/10/2018	30/10/2018	30/10/2018	01/11/2018	01/11/2018	31/10/2018	31/10/2018	31/10/2018	26/11/2018	30/10/2018	30/10/2018
Carbon																
Soil Organic Matter (SOM)	6	1.13	2.43	2.57	28.1	30.5	1.25	0.972	0.722	0.76	7.78	0.35	2.78	1.27	1.33	3.78
Metals (Solids)																
Arsenic	14.9	17.3	81.7	4.05	11.7	9.29	4.75	6	6	6	6	6	13	21.8	12.3	11.9
Cadmium	0.02	0.02	0.2	0.02	0.02	0.02	0.02	0.2	0.2	0.2	0.2	0.2	0.02	0.0827	0.02	0.02
Chromium	51	25.6	86.7	52.4	108	59	352	439	528	824	106	734	37.2	34.9	29.8	41.4
Copper	16.8	16.6	41.1	25.8	18.5	18.7	12.4	14	18	14.8	18.2	19.3	12.8	11.5	11.1	13.7
Lead	41.7	22.3	46.2	13.6	45.6	33.2	0.992	10.5	19.7	7	17.3	7	27.6	33.4	24.5	32
Mercury	0.14	0.14	1.4	0.14	0.14	0.14	0.14	1.4	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14
Nickel	25.8	30.3	88.3	8.26	12.9	11.6	6.38	8.31	12.8	4.68	16	9.16	34.9	41	32.6	30.3
Selenium	1	1	24.8	4.12	3.27	3.11	10.8	21.1	20.7	25.1	10	26.8	1	1	1	1
Vanadium	66.9	44.2	183	149	112	128	283	379	380	542	99.4	540	62.6	58.2	52.7	65.9
Zinc	128	83.9	188	94.2	116	96.3	30.9	30.2	89.1	25.6	64.3	19	107	113	102	114
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.0143	0.0494	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.02	0.0201	0.02	0.02	0.01
Aliphatics >C6-C8	0.0445	0.0806	0.0601	0.0396	0.01	0.01	0.02	0.02	0.0645	0.0596	0.01	0.0304	0.0884	0.0683	0.02	0.01
Aliphatics >C8-C10	0.159	0.209	0.0848	0.0451	0.01	0.01	0.02	0.02	0.123	0.565	0.01	0.0933	0.423	0.0898	0.02	0.01
Aliphatics >C10-C12	0.984	1.28	0.392	0.235	0.01	0.01	0.02	0.02	0.421	0.965	0.01	0.405	0.945	0.225	0.02	0.01
Aliphatics >C12-C16	23.6	0.1	0.1	1.47	1.15	1.09	0.718	14.5	0.1	2.78	0.1	1.14	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	27.9	0.1	5.01	10.2	12.2	12.2	5.58	75.1	5.14	9.32	1.06	0.612	0.1	0.1	0.1	0.1
Aliphatics >C21-C35	5.03	0.1	32.8	140	27.1	31.4	18.2	63.1	68.4	64.4	46	13.9	0.1	0.1	0.1	1.71
Aliphatics >C35-C44	0.1	0.1	10.8	31.2	5.28	3.78	8.55	36.3	14.2	14	7.73	4.65	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.01	0.0702	0.02	0.02	0.01	0.01	0.02	0.02	0.0333	0.218	0.01	0.0252	0.02	0.02	0.02	0.01
Aromatics >EC7-EC8	0.01	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.0688	0.561	0.01	0.0566	0.02	0.02	0.02	0.01
Aromatics >EC8-EC10	0.105	0.14	0.0558	0.0297	0.01	0.01	0.02	0.02	0.0817	0.377	0.01	0.0618	0.283	0.059	0.02	0.01
Aromatics >EC10-EC12	0.657	0.853	0.261	0.157	0.01	0.01	0.02	0.02	0.282	0.644	0.01	0.269	0.63	0.15	0.02	0.01
Aromatics >EC12-EC16	9.37	0.1	1.54	1.05	1.69	3.5	0.197	3.18	2.3	6.74	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	17.5	0.1	17.7	16.8	12	29.6	4.06	25.8	28.9	30.6	6.22	3.41	0.1	0.1	0.1	0.1
Aromatics >EC21-EC35	8.02	0.1	101	67.3	48.4	118	24.4	85.4	153	135	29.3	22.5	1.47	0.1	0.282	11.3
Aromatics >EC35-EC44	0.1	0.1	46.1	27.8	15.9	32.8	14.5	51.3	56.1	55.2	14	13.7	0.1	0.1	0.1	1.67
Aromatics >EC40-EC44	0.197	0.1	19	9.49	5.74	10.6	5.98	22.6	19.2	18.8	5.25	6.11	0.1	0.1	0.1	0.523
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	12	364	448	148	124	12	60	30.4	18.5	12	12	12	12	12	12
Acenaphthene	29	19.8	63.8	32.8	28	132	8	40	175	104	21.1	13.7	8	8	8	8
Anthracene	16	16	230	399	177	461	20.6	80	468	246	22.2	29.1	16	16	16	16
Benz(a)anthracene	111	14	2020	3480	737	1940	249	519	4530	2150	195	756	14	42	14	14
Benzo(a)pyrene	98.6	15	2000	3190	788	2210	255	745	5180	2240	214	921	15	52.3	15	15
Benzo(b)fluoranthene	161	15	3460	3920	1310	2960	340	1170	5950	3390	220	944	15	51.6	15	15
Benzo(k)fluoranthene	66	14	1190	1470	457	1030	150	394	2490	1400	96.5	458	14	25	14	14
Benzo(g,h,i)perylene	74.8	24	1470	1720	679	1630	206	604	3640	1570	180	681	24	48	24	24
Chrysene	128	17	1930	2560	716	1880	287	565	4670	2310	215	818	10	45.7	10	10
Dibenzo(a,h)anthracene	0.023	0.023	291	441	189	427	45.1	148	774	366	35.8	137	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	66.1	0.018	1590	1400	531	1480	183	497	3520	1380	200	748	0.018	46.2	0.018	0.018
Fluoranthene	293	49.7	2880	5580	1270	3120	624	648	7660	3690	239	987	0.017	56.9	0.017	0.017
Fluorene	27.7	10	55.4	62.7	68.8	122	10	50	75.6	27.3	10	10	10	10	10	10
Naphthalene	983	524	227	121	382	429	50.3	45	143	222	117	229	639	24.4	9	97.8
Phenanthrene	279	37.9	762	1170	698	1550	220	176	4450	2490	111	259	15	20.9	15	15
Pyrene	0.24	0.0442	2.43	4.98	0.999	2.6	0.546	0.711	7.01	3.28	0.253	0.987	0.015	0.0602	0.015	0.015
PAH, Total Detected USEPA 16	2.56	0.693	21	31	9.17	22.1	3.18	6.17	50.8	24.9	2.12	7.97	0.639	0.473	0.118	0.118
Naphthalene-d8 % recovery**	103	91.8	93.3	87.9	87.7	91	82.2	90.4	92.4	88.6	84.5	84.9	97.1	93.2	84.9	83.1
Acenaphthene-d10 % recovery**	97.1	97.4	92.7	88.6	89.5	86.3	85.1	81.3	92.8	91.2	91.1	91.3	94.8	90.3	81.4	80.1
Phenanthrene-d10 % recovery**	99.8	101	89.7	91.3	85.9	81	86	81.4	99.7	99.4	96.1	96.5	97.7	83.8	75.8	73.7
Chrysene-d12 % recovery**	93.1	90.4	96.8	103	74.5	72.3	77.2	70.8	97.2	105	94.4	93.4	86.2	75	71.6	70.2
Perylene-d12 % recovery**	92.6	82.2	96.6	109	72.8	72.4	73.5	72.3	90.3	96.5	88.6	90.6	91.9	79	70.7	72.8
Total Aliphatics >C12-C44	56.5	0.1	48.6	182	45.7	48.4	33	189	87.8	90.5	54.8	20.3	0.1	0.1	0.1	1.71
Total Aromatics >EC12-EC44	34.9	0.1	167	113	77.9	184	43.1	166	240	228	49.6	39.7	1.47	0.1	0.282	13
Total Aliphatics & Aromatics >C5-C44	93.3	2.68	216	296	124	232	76.1	355	329	322	104	60.9	3.86	0.592	0.282	14.7
Metals - (Solid)																
Iron	33500	27400	61700	45900	36200	37500	129000	112000	150000	184000	91900	186000	38500	42900	37400	39800
Manganese	1390	432	34700	6820	5510	5380	29500	32200	26700	44000	10100	134000	825	311	1220	639
Metals - (Liquid)																
Calcium	-	-	203000	192000	-	192000	-	253000	235000	-	-	288000	-	-	-	-
Magnesium	-	-	23800	21200	-	35200	-	8910	9850	-	-	9480	-	-	-	-
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0215	0.0106	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	0.0706	0.213	-	0.0796	-	0.127	0.0212	-	-	0.0639	-	-	-	-
pH	8.06	8.14	9.92	11.3	10.1	9.64	12.7	12.1	12.7	12.4	10.7	12.3	7.79	7.76	7.97	6.87
Sulphate, Total																
Sulphur, Total	-	-	0.302	0.466	-	0.221	-	0.505	0.141	-	-	0.395	-	-	-	-
Sulphate, Total potential	-	-	0.906	1.4	-	0.663	-	1.52	0.423	-	-	1.19	-	-	-	-
Sulphate, acid soluble (total)	-	-	0.309	0.507	-	0.133	-	0.539	0.37	-	-	0.574	-	-	-	-
Cyanide, Total	1	1	1.25	1.67	1.06	1.84	1	1.02	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	322	152	12	12	12	12	12	12	12	12	12	12	177	169	89.8	216
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	11/12/2018	11/12/2018	-	09/11/2018	-	09/11/2018	09/11/2018	-	-	09/11/2018	-	-	-	-
Analysed By	-	-	Paul Poynton	Paul Poynton	-	Barbara Urbanek-Walsh	-	Barbara Urbanek-Walsh	Lucy Caroe	-	-	Renata Bozhkov	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-
Amosite (Brown) Asbestos	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-
Crocidolite (Blue) Asbestos	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-
Fibrous Anthophyllite	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-
Fibrous Tremolite	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-
Fibrous Actinolite	-	-	Not Detected	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-
Non-Asbestos Fibre	-	-	Detected	Detected	-	Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	-	-	-
Comments	-	-	0	0	-	0	-	0	0	-	-	0	-	-	-	-
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	111	107	110	110	115	114	106	105	101	103	106	107	107	109	122	121
Toluene-d8**	95.2	97.2	97.2	97.3	95.7	95.9	101	99.2	99.3	99.4	97.3	101	97	98	99.3	97.2
4-Bromofluorobenzene**	94.1	94.9	95.2	94.3	87.2	84.9	97.3	96	96.9	99.3	98.2	99.2	95.7	96.5	103	99.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.171	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.121	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.706	0.402	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	1.64	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4EF8V	4EG4	4EG4	4EG4V	4GA4	4GA4	4GA6	4GA6	4GA7	4GA8	4GA8	4GA4V	4GA6V	4GA7V	4GA8V	4GB1
Depth	1.5	0.5	1	1.9	0.2	1	0.5	0.7	0.5	0.4	0.7	1.8	2.8	1.8	2.1	0.2
Sampled Date	01/11/2018	30/10/2018	30/10/2018	30/10/2018	06/11/2018	06/11/2018	05/11/2018	05/11/2018	20/11/2018	20/11/2018	20/11/2018	06/11/2018	05/11/2018	20/11/2018	20/11/2018	02/11/2018
Carbon																
Soil Organic Matter (SOM)	1.23	22.8	28.3	0.953	8.84	11.8	5.69	3.22	24.8	6.1	10.8	9.74	59.8	1.56	4.14	4.43
Metals (Solids)																
Arsenic	13.2	10.8	10.9	14.2	9.63	6.72	13.8	6	6.83	7.85	2.33	10.7	10.2	12.4	11	8.77
Cadmium	0.02	0.129	0.02	0.02	0.0973	0.02	1.19	0.2	0.02	0.686	0.604	0.02	0.222	0.267	0.264	0.372
Chromium	34	38.9	36.2	30.3	33.3	43.3	240	533	33	245	49.4	38.6	3.2	74.3	33.1	81.3
Copper	11.3	31.2	107	12.2	18.9	13.4	32.3	15.9	10.7	19.2	4.82	15.7	15.6	12	14.7	25.9
Lead	28.6	72.6	112	23.8	72.2	21.6	30.1	14.3	32.4	37.2	28.5	32.4	4.61	24.8	29.7	106
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	1.4	0.14	1.4	0.14	0.14	0.14	0.14	0.14	1.4
Nickel	43.7	28.1	33	35.1	13	14.5	22.3	12.7	13.1	18.9	2.88	28.9	9.29	36	30.9	24.4
Selenium	1	2.25	1.6	1	6.06	1.73	6.38	15.5	1.3	10	1	1	1.55	1.04	1	10
Vanadium	59.5	87.9	64.4	52.9	44.3	59.5	430	985	58.8	225	38.8	57.3	10.5	89.4	54.1	89.2
Zinc	115	151	864	104	279	102	99.3	50.6	114	112	109	114	47.1	97.8	108	435
TPH Criteria Working Group (TPH CWG)																
Benzene																
Toluene																
Ethylbenzene																
sum of detected mpo xylene by GC																
Aliphatics >C5-C6	0.0354	0.02	0.02	0.02	0.0242	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.128	0.02	0.02	0.02	0.119	0.0598	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.365	0.02	0.02	0.02	0.366	0.0736	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.199	0.02	0.02	0.02	0.265	0.153	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	0.1	0.233	1.25	0.1	7.62	25.8	2.03	1.5	0.793	2.71	0.593	0.1	0.546	0.1	0.156	1.78
Aliphatics >C16-C21	0.1	9.83	10.3	0.1	25	51.8	8.87	3.86	4.98	26.9	5.21	0.1	0.1	0.1	0.1	9.08
Aliphatics >C21-C35	0.225	46.5	64.8	0.1	112	148	53.5	21.9	60.5	167	24.7	3.1	42.8	0.1	0.692	90.1
Aliphatics >C35-C44	0.1	17.4	29.7	0.1	41.4	37.8	25.2	15.1	17.2	45.8	4.74	0.1	0.1	0.1	0.235	34.4
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.0264	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.244	0.02	0.02	0.02	0.244	0.0495	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.132	0.02	0.02	0.02	0.177	0.102	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	0.1	3.58	1.6	0.1	6.44	0.135	1.41	0.1	1.82	2.11	0.867	0.1	2.52	0.1	0.122	3.14
Aromatics >EC16-EC21	0.5	56.6	16.3	0.1	36.8	9.6	12.4	5.95	7.24	11.8	6.21	0.1	8	0.1	0.1	11.5
Aromatics >EC21-EC35	4.84	174	93.1	1.53	134	41.2	98	57	50.3	109	16.8	21.7	159	4.61	3.67	73.7
Aromatics >EC35-EC44	3.24	64.5	43.7	2.26	63.5	4.58	41	20	22.5	60.2	4.96	5	32.5	0.547	0.395	45.3
Aromatics >EC40-EC44	1.07	23.8	17.3	2.05	26.1	0.354	15	6.7	10.5	27.9	1.75	1.55	11.9	0.1	0.1	18.8
Polyaromatic Hydrocarbons (PAHs)																
Acenaphthylene	12	236	446	12	60	60	27.2	12	40.2	120	12	12	120	12	12	816
Acenaphthene	8	49.4	88	8	40	40	51.1	30.3	15.9	80	11.3	8	80	8	8	70.7
Anthracene	16	475	779	16	195	80	111	46.3	89.7	254	35.7	16	160	16	16	1560
Benz(a)anthracene	14	2170	2960	14	651	70	1460	1040	333	486	178	14	140	38.3	14	2340
Benzo(a)pyrene	15	2290	3480	15	498	75	1960	1390	371	580	214	15	150	66.9	15	1860
Benzo(b)fluoranthene	15	3580	5190	15	412	75	1620	1070	582	950	355	15	150	65.8	15	2390
Benzo(k)fluoranthene	14	1590	1670	14	255	70	914	695	219	318	97.1	14	140	19.8	14	817
Benzo(g,h,i)perylene	24	2000	3610	24	384	120	1320	946	250	435	158	24	0.24	50.2	24	1280
Chrysene	10	2020	2960	10	537	50	1470	1140	375	608	189	10	0.1	44.1	10	1810
Dibenzo(a,h)anthracene	0.023	488	824	0.023	0.115	0.115	283	207	59.9	0.23	39.1	0.023	0.23	0.023	0.023	301
Indeno(1,2,3-cd)pyrene	0.018	1550	2790	0.018	319	90	1340	875	190	328	149	0.018	180	37.8	0.018	1380
Fluoranthene	0.017	3330	5180	0.017	1680	0.085	1790	1200	497	1060	221	0.017	0.17	38.7	0.017	6240
Fluorene	10	123	365	10	50	50	33	13.9	22.3	0.1	17.8	10	0.1	10	10	1040
Naphthalene	9	561	621	9	117	45	83.5	33.2	105	167	26.8	9	90	9	9	361
Phenanthrene	15	1540	2810	15	596	75	464	276	239	432	186	15	150	15	15	6030
Pyrene	0.015	2.64	3.98	0.015	1.26	0.075	1.84	1.26	0.408	0.903	0.216	0.015	0.15	0.0401	0.015	4.16
PAH, Total Detected USEPA 16	0.118	24.6	37.8	0.118	6.91	0.59	14.8	10.2	3.8	6.52	2.09	0.118	1.18	0.402	0.118	32.4
Naphthalene-d8 % recovery**	92.9	87.2	86.9	81.9	84.2	91	97.9	98.5	73.8	71	86.8	94.6	90.7	88.1	68.9	91.2
Acenaphthene-d10 % recovery**	93.2	77.2	88.3	79.9	82.9	83.3	98.1	97.5	73.6	68.2	87.4	91.2	87.2	83	71.2	92.7
Phenanthrene-d10 % recovery**	98.6	83.3	78.7	76	82.2	90.4	99.8	100	74.5	72.8	89.6	93.3	92.7	81.4	69.7	99.7
Chrysene-d12 % recovery**	94.5	74	74.4	73.3	80.9	78.6	101	102	71	72.7	85.4	82.4	87	86.3	72.8	99.1
Perylene-d12 % recovery**	84.5	71.8	72.9	72.6	76.5	76.3	96.4	95.7	72.2	75.1	84.1	82.2	85.2	94.8	74.4	91.5
Total Aliphatics >C12-C44	0.225	73.9	106	0.1	186	263	89.6	42.3	83.5	242	35.2	3.1	43.3	0.1	1.08	135
Total Aromatics >EC12-EC44	8.58	299	155	3.78	241	55.6	153	82.9	81.8	183	28.9	26.7	202	5.16	4.18	134
Total Aliphatics & Aromatics >C5-C44	9.91	373	261	3.78	428	319	242	125	165	425	64.1	29.8	245	5.16	5.27	269
Metals - (Solid)																
Iron	36000	38700	52300	38300	51400	50900	165000	159000	43400	91800	26700	29000	13200	38300	22300	59600
Manganese	803	3590	2860	1710	12600	3880	23700	30100	4350	15700	2950	370	292	2710	328	4370
Metals - (Liquid)																
Calcium	-	-	114000	-	-	145000	-	157000	136000	175000	-	-	-	-	-	147000
Magnesium	-	-	9950	-	-	11800	-	8180	14000	19900	-	-	-	-	-	27500
Phenols																
Phenol	0.01	0.01	0.01	0.01	0.01	0.0345	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.0115	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.046	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	0.141	-	-	0.105	-	0.0858	0.125	0.0917	-	-	-	-	-	0.112
pH	8	10.1	9.46	8.63	10.9	11.2	11.9	11.6	10.7	10.1	11.4	7.47	6.85	8.76	7.48	9.52
Sulphate, Total																
Sulphur, Total	-	-	0.247	-	-	0.263	-	0.208	0.159	0.389	-	-	-	-	-	0.2
Sulphate, Total potential	-	-	0.741	-	-	0.789	-	0.624	0.477	1.17	-	-	-	-	-	0.6
Sulphate, acid soluble (total)	-	-	0.231	-	-	0.54	-	0.316	0.02	0.731	-	-	-	-	-	0.26
Cyanide, Total	1	1	1.98	1	1.29	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	321	12	12	68	12	12	22.7	12	12	12	12	302	97.3	59.7	202	12
Asbestos																
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	-	09/11/2018	-	-	15/11/2018	-	09/11/2018	03/12/2018	03/12/2018	-	-	-	-	-	14/11/2018
Analysed By	-	-	Marcin Magdziarek	-	-	Andrzej Ferfecki	-	Andrzej Ferfecki	Christian Hallam	Christian Hallam	-	-	-	-	-	Andrzej Ferfecki
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected
Amosite (Brown) Asbestos	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected
Crocidolite (Blue) Asbestos	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected
Fibrous Anthophyllite	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected
Fibrous Tremolite	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected
Fibrous Actinolite	-	-	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected
Non-Asbestos Fibre	-	-	Detected	-	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	-	-	-	-	Not Detected
Comments	-	-	0	-	-	0	-	0	0	0	-	-	-	-	-	0
Volatile Organic Compounds (VOCs)																
Dibromofluoromethane**	103	102	101	120	103	107	112	108	107	109	109	114	112	108	108	106
Toluene-d8**	100	98.2	96.9	105	90.9	94.4	98.7	99.8	101	98.2	102	96.7	93.6	97.5	101	96.4
4-Bromofluorobenzene**	99.1	88.9	83.8	107	70.2	74.5	91.2	108	81.1	76.5	85.6	83.5	74.4	100	85.2	96.1
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	4GB1	4GB2	4GB2	4GB3	4GB4	4GB4	4GB5	4GB5	4GB6	4GB6	4GB8	4GB8	4GB9	4GB1V	4GB5V	4GB6V	4GB7V	4GB8V	4GB9V
Depth	0.7	0.7	1.3	0.5	0.3	0.6	0.5	1	0.5	0.9	0.4	0.8	0.5	1.9	2.1	1.8	1.2	1.6	1.6
Sampled Date	02/11/2018	02/11/2018	02/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	06/11/2018	06/11/2018	20/11/2018	02/11/2018	05/11/2018	05/11/2018	06/11/2018	06/11/2018	20/11/2018
Carbon																			
Soil Organic Matter (SOM)	19.8	14.3	0.35	0.35	0.378	3.65	9.03	1.08	6.47	4.26	14.3	0.35	9.64	4.24	0.926	1.86	3.64	6.26	0.85
Metals (Solids)																			
Arsenic	8.72	21.6	7.76	8.77	8.77	27.1	8.81	6	10.7	6	12	6	7.56	16.3	141	11.8	9.92	10.8	8.08
Cadmium	0.2	0.2	0.02	0.2	0.02	1.15	0.245	0.2	0.932	0.2	0.2	0.2	1.84	0.462	0.408	0.317	0.02	0.02	0.02
Chromium	112	9	0.9	22.5	56.3	6.54	21.7	763	79.1	421	65.8	397	403	38.3	26.9	38.6	33.3	31	25.9
Copper	18.9	15.7	3.21	17.6	10.9	31.3	26.5	28.3	23	16.1	84.5	26.4	62.8	18.9	66	11.5	19.6	12.9	7.73
Lead	134	9.11	9.73	46.4	59.6	39.1	25.2	19.4	54.8	18.3	107	26.2	30.4	33.2	29.4	28	32	34.3	20
Mercury	1.4	1.4	0.14	1.4	0.14	0.14	0.14	1.4	0.14	1.4	1.4	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	44.9	31.1	6.59	26.7	10.9	26.5	24.5	12	17.5	12.2	54.3	15.4	24.3	31.2	33	36.1	28	24.3	31.1
Selenium	10	10	1	10	3.23	1	1	24.3	2.33	12	10	20.9	15.6	1	1	1	1	1	1
Vanadium	137	128	17.9	64.8	90.7	43	40.4	702	113	286	106	416	453	62.7	48.4	62.5	47.4	48.6	43.3
Zinc	221	68.5	25.9	200	233	130	45.1	51.8	332	75.2	446	89.5	69.1	139	130	97.7	142	101	83.5
TPH Criteria Working Group (TPH CWG)																			
Benzene																			
Toluene																			
Ethylbenzene																			
sum of detected mpo xylene by GC																			
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.0652	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0	0.02	0.042	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.0576	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0405	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.0489	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0405	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	0.281	0.1	4.97	0.1	2.89	1.18	1.67	1.61	15	2.03	2.6	2.13	1.85	0.1	0.1	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	26	4.52	20.6	6.48	11.6	6.52	4.36	7.42	13.4	9.5	21.8	9.8	9.2	0.861	0.1	0.1	0.1	0.1	0.1
Aliphatics >C21-C35	46.8	42.6	48.3	39.3	79.1	23.3	11.9	51.5	121	74.1	226	60.1	60.7	10.1	0.1	2.07	7.61	6.58	0.1
Aliphatics >C35-C44	3.82	3.13	13.1	7.93	24.9	8.51	1.46	8.9	91.6	47.5	76.7	23.4	13.7	12.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.038	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.027	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.0326	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.027	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	12.1	0.928	0.795	7.26	1.74	0.1	1.18	0.435	5.94	2.16	4.83	0.595	1.44	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	93.2	10.9	4.69	72.8	10.1	1.17	5.16	13.2	13.9	10.7	36.8	6.37	17.7	0.543	0.34	0.1	0.1	0.1	0.1
Aromatics >EC21-EC35	245	26.6	9.07	3310	49.4	19.4	18.6	108	229	108	187	45.2	130	35.7	3.05	5.95	11.5	29.2	0.1
Aromatics >EC35-EC44	67.6	1.5	1.61	74.4	24.8	15.8	6.72	35.5	228	74.8	115	27.6	42.1	5.18	0.95	0.607	1.98	3.75	0.1
Aromatics >EC40-EC44	22	0.1	0.533	24.6	9.64	6.88	2.43	12.6	90.1	32.3	44.3	10.8	17.8	1.58	0.1	0.1	0.1	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)																			
Acenaphthylene	589	51.1	12	47.6	116	12	50.1	12	210	64.8	185	60	32.8	12	12	12	12	12	12
Acenaphthene	105	10.8	8	9.61	44.7	8	8.92	34.2	28.7	18.4	40	40	124	8	8	8	8	8	8
Anthracene	1290	113	25.9	68.6	261	16	82.4	60.2	374	119	235	80	247	16	16	16	16	16	16
Benz(a)anthracene	3660	287	58.7	287	846	94.3	328	1220	1150	662	794	172	2570	14	14	14	14	14	14
Benzo(a)pyrene	3790	216	47.6	347	742	113	316	1630	1130	775	726	187	3190	15	15	15	15	15	15
Benzo(b)fluoranthene	5110	328	59.1	532	658	122	519	1610	1240	747	858	167	4910	15	15	15	15	31.4	15
Benzo(k)fluoranthene	2000	104	21.3	197	398	51.5	201	718	470	373	363	102	1730	14	14	14	14	14	14
Benzo(g,h,i)perylene	3080	194	39.2	279	556	101	240	1110	862	638	566	147	2240	24	24	24	24	24	24
Chrysene	3450	278	55.5	296	779	107	305	1290	1050	714	696	171	2730	10	10	10	10	20.2	10
Dibenzo(a,h)anthracene	700	48.4	0.023	73.6	132	26.6	74.4	264	209	135	123	0.115	539	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	2950	175	39.8	254	474	93.5	227	960	729	614	469	114	2580	0.018	0.018	0.018	0.018	0.018	0.018
Fluoranthene	7210	668	133	431	1670	145	445	1520	2130	966	1900	393	3180	0.017	0.017	0.017	0.017	30.4	0.017
Fluorene	381	50.7	12.8	26.1	93.6	10	35.7	12.6	126	33.7	110	50	57.4	10	10	10	10	10	10
Naphthalene	1220	171	29	115	220	33.7	136	27.2	243	141	288	45	95.1	9	9	9	9	9	9
Phenanthrene	3910	557	98.2	234	778	97.6	306	616	999	393	1030	195	1130	15	15	15	15	15	15
Pyrene	5.65	0.511	0.101	0.358	1.33	0.127	0.379	1.45	1.67	0.88	1.41	0.328	3.43	0.015	0.015	0.015	0.015	0.025	0.015
PAH, Total Detected USEPA 16	45.1	3.76	0.72	3.56	9.1	1.11	3.65	12.5	12.6	7.27	9.75	1.98	28.8	0.118	0.118	0.118	0.118	0.118	0.118
Naphthalene-d8 % recovery**	94.5	94.3	91.1	91.3	86.6	95.7	86.9	86.5	85.7	97	84.9	87.5	84.1	94.6	99.3	93.1	85.1	92.6	86.4
Acenaphthene-d10 % recovery**	95.6	93.2	91.3	85.2	92.5	97.6	83.5	91.9	89.9	96.3	87.2	86.7	90	96.3	97	89.4	88.7	88.2	83.4
Phenanthrene-d10 % recovery**	100	95.8	92.9	91.4	100	96.7	82	98.6	99.2	95.6	88.6	87	98.2	102	97.8	89.7	92.5	91.1	83.8
Chrysene-d12 % recovery**	95.9	86.4	93.2	91	101	94.3	79.3	104	101	97.2	89.4	86.1	90.8	101	99.3	90.5	84.7	87.2	84.9
Perylene-d12 % recovery**	82.3	70.1	88.2	91.5	94	83.5	74.2	99.7	94.7	90.9	81.6	82.4	95.2	93.6	92.9	92.6	81.2	87.1	89.7
Total Aliphatics >C12-C44	76.9	50.2	87	53.7	118	39.5	19.4	69.4	241	133	327	95.5	85.4	23	0.1	2.07	7.61	6.58	0.1
Total Aromatics >EC12-EC44	418	40	16.2	3470	86.1	36.3	31.6	157	476	196	343	79.7	192	41.4	4.34	6.55	13.5	32.9	0.1
Total Aliphatics & Aromatics >C5-C44	495	90.2	103	3520	205	75.8	51.1	226	717	329	671	175	277	64.6	4.34	8.62	21.1	39.5	0.1
Metals - (Solid)																			
Iron	221000	339000	49700	131000	53600	105000	25000	207000	58700	115000	205000	177000	196000	38500	31500	33400	27900	28000	23600
Manganese	9310	10200	467	3380	67.6	3760	1110	4310	6010	2070	7300	413	3380	428	1050	688	277	274	650
Metals - (Liquid)																			
Calcium	-	-	273000	131000	83100	-	-	168000	-	190000	-	219000	190000	-	-	-	-	-	-
Magnesium	-	-	4540	7540	12700	-	-	23000	-	11600	-	10000	10300	-	-	-	-	-	-
Phenols																			
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0323	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																			
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	0.12	0.169	0.172	-	-	0.041	-	0.177	-	0.0446	0.103	-	-	-	-	-	-
pH	10.6	9.72	11.4	11	10.9	9.26	8.81	12.3	10.5	11.9	10.6	12.2	11.7	7.56	8.16	7.58	7.43	7.54	8.48
Sulphate, Total																			
Sulphur, Total	-	-	0.0558	0.31	0.414	-	-	0.177	-	0.667	-	0.293	0.498	-	-	-	-	-	-
Sulphate, Total potential	-	-	0.167	0.93	1.24	-	-	0.531	-	2	-	0.879	1.49	-	-	-	-	-	-
Sulphate, acid soluble (total)	-	-	0.0713	0.381	1.59	-	-	0.454	-	1.2	-	0.703	0.0292	-	-	-	-	-	-
Cyanide, Total	1.95	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	19.9	12	12	12	12	12	12	12	15.6	12	22.5	12	12	720	12	200	235	264	113
Asbestos																			
Asbestos Quantification - Gravimetric - %	-	-	-	0.001	0.0047	-	-	-	-	-	-	0.0028	-	-	-	-	-	-	-
Date of Analysis	-	-	09/11/2018	14/11/2018	14/11/2018	-	-	14/11/2018	-	09/11/2018	-	09/11/2018	03/12/2018	-	-	-	-	-	-
Analysed By	-	-	Renata Bozhkov	Lucy Caroe	James Richards	-	-	Barbara Urbanek-Walsh	-	Andrzej Ferfecki	-	Renata Bozhkov	Christian Hallam	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	0.001	0.001	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	None	None	-	-	-	-	-	-	None	-	-	-	-	-	-	-
Analysts Comments	-	-	-	N/A	N/A	-	-	-	-	-	-	N/A	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	0.001	0.0047	-	-	-	-	-	-	0.0028	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	Not Detected	Detected	Detected	-	-	Not Detected	-	Not Detected	-	Detected	Not Detected	-	-	-	-	-	-
Amosite (Brown) Asbestos	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Fibrous Anthophyllite	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Fibrous Tremolite	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Fibrous Actinolite	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Non-Asbestos Fibre	-	-	Not Detected	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-
Comments	-	-	0	Soil containing ACM debris	Fibre bundles in soil	-	-	0	-	0	-	Loose fibres in soil.	0	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																			
Dibromofluoromethane**	90.9	106	108	105	108	109	105	107	104	104	103	94.6	108	113	110	111	111	109	108
Toluene-d8**	89.9	96.2	101	113	101	97.8	96.9	115	108	101	90.6	95.5	100	96.6	99	98.6	98.9	98.4	102
4-Bromofluorobenzene**	70.2	85.1	102	94.6	97.5	85.2	80.1	100	91.9	93.7	73.4	87.8	82	94.6	91.9	96.7	88.1	89.8	85.2
Methyl Tertiary Butyl Ether	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.534	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																			
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4GC1	4GC1	4GC2	4GC2	4GC3	4GC3	4GC4	4GC4	4GC5	4GC5	4GC6	4GC6	4GC7	4GC7	4GC1V	4GC2V	4GC4V	4GC5V	4GC6V	4GC7V
Depth	0.4	1	0.5	1	0.5	1	0.3	0.8	0.7	1.2	0.5	0.8	0.5	1	2.2	2.3	2.1	1.9	2.5	1.8
Sampled Date	02/11/2018	02/11/2018	02/11/2018	02/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	06/11/2018	06/11/2018	06/11/2018	06/11/2018	02/11/2018	02/11/2018	05/11/2018	05/11/2018	06/11/2018	06/11/2018
Carbon																				
Soil Organic Matter (SOM)	8.29	28.1	4.48	0.35	1.81	3.83	10.1	1.31	34.1	12.6	2.02	5.12	0.521	1.55	1.2	0.957	4.5	1.3	21.4	0.841
Metals (Solids)																				
Arsenic	9.5	6	11.7	7.34	11.6	9.95	9.69	9.25	10.9	6.62	5.67	6.37	7.49	6	11.3	14.5	10.8	13.4	16.1	11.4
Cadmium	1.11	0.2	0.02	0.2	0.2	0.775	0.702	0.02	0.02	0.0249	0.02	0.02	0.2	0.2	0.362	0.377	0.409	0.363	0.0926	0.02
Chromium	139	30.3	116	114	256	99.4	104	12.6	14.4	25.6	14.4	24.2	695	717	34.4	31.7	40.1	33.2	23.5	28.6
Copper	17.7	16.4	15.6	14	21.6	22	32.8	14.1	20	8.24	11.1	18	35.8	26.8	10.8	11.7	24.8	11.4	23	9.1
Lead	44.7	49.8	42.5	7	40.1	41.4	54.6	27.4	38.1	21.6	25.7	18.9	15.9	26.4	27.7	23.9	27	23.8	35	22.2
Mercury	0.14	1.4	0.14	1.4	1.4	0.14	0.268	0.14	0.14	0.14	0.14	0.14	1.4	1.4	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	30.1	39.5	14.6	27.6	12.2	11.5	24.7	17.6	13.4	7.55	10.2	15	27.2	18.5	41.1	36.9	37.8	35.8	27.8	32.3
Selenium	3.67	10	4.15	10	10	3.69	3.92	1	1.5	2.04	3.7	2.13	23	27.3	1	1	1	1	1	1
Vanadium	142	41.3	163	591	226	124	170	33.5	38.7	52.4	35.4	33.7	2400	2400	59.2	56	63.4	58.7	43.2	51.9
Zinc	202	92.5	471	28.1	202	338	165	145	173	46.7	218	63	120	78.2	108	101	119	103	129	96.2
TPH Criteria Working Group (TPH CWG)																				
Benzene																				
Toluene																				
Ethylbenzene																				
sum of detected mpo xylene by GC																				
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0357	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0782	0.02
Aliphatics >C6-C8	0.0755	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.194	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.177	0.02
Aliphatics >C8-C10	0.054	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.115	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.244	0.02
Aliphatics >C10-C12	0.0583	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0656	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	1.73	0.02
Aliphatics >C12-C16	2.61	8.85	4.2	0.1	2.58	1.93	0.267	0.918	5.99	1.21	0.809	0.1	2.27	2.29	0.243	0.1	0.443	0.1	5.06	0.1
Aliphatics >C16-C21	29.4	33.2	42.4	5.33	18.4	17.6	3.07	8.81	27.1	7.45	4.67	1.7	7.03	6.93	0.376	0.1	0.1	0.1	2.5	0.1
Aliphatics >C21-C35	145	131	167	43.1	198	399	18.7	14.9	151	21.3	33.6	17.4	51.5	51.6	2.8	0.1	1.22	0.1	23.3	0.1
Aliphatics >C35-C44	29.4	42.5	48.7	9.87	37.4	46.3	3.25	3.77	43.5	2.38	17	9.3	17.2	14.4	10.4	0.462	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0449	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.0356	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0759	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.161	0.02
Aromatics >EC10-EC12	0.0388	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0437	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	1.16	0.02
Aromatics >EC12-EC16	7.37	21.4	7.44	2.01	4.04	1.7	1.11	0.302	8.94	2.07	1.98	0.1	1.27	1.42	0.1	0.363	0.1	0.1	16.6	0.1
Aromatics >EC16-EC21	28.9	103	54.1	8.83	21.4	10.9	6.46	2.02	35.4	10.2	12.9	1.7	11.7	21.5	0.1	0.866	0.212	0.1	23.8	0.1
Aromatics >EC21-EC35	107	431	168	52.6	133	152	41.3	19.5	135	32.8	84.9	20.6	68.7	114	4.53	10.8	7.47	3.2	230	0.1
Aromatics >EC35-EC44	48.8	128	70.3	26.9	63	40.7	14.2	14.3	40.7	9.99	49.9	17.2	29.5	43.3	0.892	7.35	1.11	0.1	23.3	0.1
Aromatics >EC40-EC44	19	38.9	27.5	9.92	25.4	15.7	5.18	6.23	13.7	3.64	20.2	7.37	10.9	14.2	0.1	3.43	0.1	0.1	5.71	0.1
Polyaromatic Hydrocarbons (PAHs)																				
Acenaphthylene	195	488	297	15.5	212	120	28.9	14.5	218	65.9	113	12	40.5	120	12	12	12	12	33.7	12
Acenaphthene	55.7	148	40	20.2	51.5	80	22.1	8	44.1	9.59	18	8	94.7	80	8	8	8	8	1140	8
Anthracene	437	1320	345	64	400	160	104	34.7	472	215	179	36.4	322	160	16	16	16	16	619	16
Benz(a)anthracene	1300	5810	1470	408	1710	218	646	245	1920	646	750	184	1320	187	14	14	14	14	222	14
Benzo(a)pyrene	1100	5580	1320	465	1850	261	906	364	1800	656	802	181	1510	235	15	15	15	15	130	15
Benzo(b)fluoranthene	1110	7740	2290	718	2040	378	1200	505	2940	762	1330	182	2310	228	15	15	15	15	282	15
Benzo(k)fluoranthene	569	2750	644	292	898	140	465	167	959	292	343	89.7	701	140	14	14	14	14	86.9	14
Benzo(g,h,i)perylene	812	3950	1040	361	1340	0.24	684	278	1370	503	690	149	1190	0.24	24	24	24	24	118	24
Chrysene	1220	4830	1480	481	1540	261	647	261	1720	632	636	198	1260	182	10	10	10	10	278	10
Dibenzo(a,h)anthracene	203	1260	244	77	349	0.23	164	67.3	361	126	161	35.9	246	0.23	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	697	3730	817	296	1150	180	589	240	1300	447	618	116	1040	180	0.018	0.018	0.018	0.018	106	0.018
Fluoranthene	2500	9720	2550	550	3040	391	785	288	3240	1070	1250	300	2300	318	0.017	0.017	0.017	0.017	1450	0.017
Fluorene	153	363	150	16.1	160	0.1	35.8	10	157	34.3	50.8	11.4	74.2	0.1	10	10	10	10	1380	10
Naphthalene	469	855	523	50.1	303	90	131	49.2	909	224	402	60.5	105	90	9	16.7	9	9	300	9
Phenanthrene	1340	4990	1230	244	1410	276	388	130	1920	517	611	198	966	150	15	15	15	15	3610	15
Pyrene	2.02	7.88	2.33	0.599	2.61	0.449	0.707	0.271	2.67	0.882	0.995	0.239	2.1	0.306	0.015	0.015	0.015	0.015	0.942	0.015
PAH, Total Detected USEPA 16	14.2	61.4	16.7	4.66	19.1	2.23	7.5	2.92	22	7.08	8.94	1.98	15.6	1.46	0.118	0.118	0.118	0.118	10.7	0.118
Naphthalene-d8 % recovery**	88.3	88.8	87.5	87.8	85.7	86.5	91.2	87.9	93.3	85.4	94.4	90.2	95.3	88.7	95.1	86.8	99.3	98.7	94.7	95.1
Acenaphthene-d10 % recovery**	89.8	90.8	84.4	90.4	90.8	77.7	89.4	86.8	93.6	89.7	92.3	89.8	91.5	80.9	94.2	89.9	97.6	97.3	93.4	91.6
Phenanthrene-d10 % recovery**	99.4	97.7	95.4	97.6	101	84.6	87.4	87.5	94	97.4	93.7	89.9	92.7	81.7	98.6	95.3	94.6	95.8	96	91.9
Chrysene-d12 % recovery**	105	104	100	102	101	92.7	89.1	91.1	93.8	100	87.9	83.6	90.4	81.2	91.8	98.1	100	98	86.4	85.7
Perylene-d12 % recovery**	99.9	102	94.1	98.2	95.8	93.5	91.7	94.4	87.5	94.3	87	75.6	89.9	75.1	82.4	88.7	89	87	82.7	86.3
Total Aliphatics >C12-C44	207	215	262	58.3	256	465	25.2	28.4	227	32.3	56.1	28.4	78	75.2	13.8	0.462	1.67	0.1	30.9	0.1
Total Aromatics >EC12-EC44	192	683	300	90.3	222	205	63.1	36.1	220	55.1	150	39.6	111	180	5.43	19.4	8.8	3.2	294	0.1
Total Aliphatics & Aromatics >C5-C44	399	899	562	149	478	670	88.4	64.5	448	87.4	206	68	189	255	19.2	19.8	10.5	3.2	328	0.1
Metals - (Solid)																				
Iron	101000	88200	90200	260000	91600	49500	49100	48100	35600	17200	19300	24600	192000	143000	40000	38700	29900	34400	29200	35500
Manganese	12100	3850	10700	13700	1230	9570	10300	2020	2070	2930	4470	2650	4710	48800	1310	1380	535	1270	352	1070
Metals - (Liquid)																				
Calcium	-	97000	-	103000	187000	-	-	121000	-	212000	161000	-	207000	-	-	-	-	-	-	-
Magnesium	-	18600	-	3890	9200	-	-	30400	-	8010	26800	-	7670	-	-	-	-	-	-	-
Phenols																				
Phenol	0.0108	0.01	0.01	0.01	0.0108	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0111	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.0111	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.0217	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																				
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.0411	-	0.0672	0.204	-	-	0.261	-	0.215	0.25	-	0.081	-	-	-	-	-	-	-
pH	11.6	10.7	11.3	11.4	10.9	11.3	11.3	11.2	11.4	12	8.98	8.81	12.4	12.7	7.87	7.84	7	8.12	7.32	8.1
Sulphate, Total																				
Sulphur, Total	-	0.208	-	0.115	0.233	-	-	0.26	-	0.291	0.314	-	0.463	-	-	-	-	-	-	-
Sulphate, Total potential	-	0.624	-	0.345	0.699	-	-	0.78	-	0.873	0.942	-	1.39	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	-	0.166	-	0.231	0.427	-	-	0.812	-	1.37	1.66	-	0.858	-	-	-	-	-	-	-
Cyanide, Total	1	2	1	1	1	1	1.27	1.02	1.64	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	20.3	12	12	12	12	12	12	274	136	134	79.3	155	45.6
Asbestos																				
Asbestos Quantification - Gravimetric - %	-	0.0074	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Date of Analysis	-	14/11/2018	-	09/11/2018	14/11/2018	-	-	09/11/2018	-	09/11/2018	09/11/2018	-	09/11/2018	-	-	-	-	-	-	-
Analysed By	-	Andrzej Ferfecki	-	Marcin Magdziarek	Andrzej Ferfecki	-	-	Andrzej Ferfecki	-	Barbara Urbanek-Walsh	Marcin Magdziarek	-	Renata Bozhkov	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	0.001	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	Chrysotile	-	-	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	Loose fibres in soil	-	-	-	-	-	-	-	N/C	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	0.0077	-	-	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	-	Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Anthophyllite	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Tremolite	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Actinolite	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Non-Asbestos Fibre	-	Not Detected	-	Not Detected	Not Detected	-	-	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Comments	-	loose fibres in soil	-	0	0	-	-	0	-	Loose fibres in soil.	0	-	0	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)																				
Dibromofluoromethane**	99.1	101	106	106	109	108	97.1	108	84.2	103	107	115	82.8	56.7	108	118	108	133	110	112
Toluene-d8**	92.9	96.6	101	99	97	96.8	93.6	98.5	77.4	94.5	95.5	96.5	98.3	96.1	102	95.9	101	91.2	92.3	99.7
4-Bromofluorobenzene**	82.5	79.9	95	85.9	83.1	86.7	70	109	64.7	80	84.2	82.7	86.4	84.9	103	97.1	99.8	103	77.9	89.5
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.108	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.155	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.364	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																				
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4GD1	4GD1	4GD2	4GD2	4GD3	4GD3	4GD4	4GD4
Depth	0.5	1	0.4	0.8	0.2	0.5	0.2	0.5
Sampled Date	06/11/2018	06/11/2018	07/11/2018	07/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018
Carbon								
Soil Organic Matter (SOM)	17.1	4.41	38.1	6.6	20.9	0.459	10.7	3.02
Metals (Solids)								
Arsenic	6	7.6	14.5	8.79	9.39	14.3	8.57	12.3
Cadmium	0.2	0.02	2.07	0.02	0.2	0.2	0.02	0.02
Chromium	12.8	14.2	81.7	56.7	21	360	2.8	24.7
Copper	14	17.4	34.4	23.6	17.2	69.7	17.2	8.2
Lead	43.8	44.8	103	31.2	39.7	89	47.8	21.5
Mercury	1.4	0.14	1.4	0.14	1.4	1.4	0.14	0.14
Nickel	14.2	16.4	40.4	20.6	23.1	32.3	13.1	29.3
Selenium	10	1.83	10	1.7	10	11.6	2.69	1
Vanadium	37.4	31.7	86.4	78.9	50.8	515	27.5	46.1
Zinc	135	86.1	254	70.3	149	289	156	102
TPH Criteria Working Group (TPH CWG)								
Benzene								
Toluene								
Ethylbenzene								
sum of detected mpo xylene by GC								
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	0.765	0.1	0.1	0.1	2.03	0.1	2.21	0.1
Aliphatics >C16-C21	5.69	4.2	10.1	2.95	7.91	2.72	7.77	0.1
Aliphatics >C21-C35	45.2	18.6	86.2	23.3	49	12.1	64.4	0.1
Aliphatics >C35-C44	18.2	6.57	15.9	8.15	12.4	4.06	15.5	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	1.08	0.945	3.46	1.45	2.23	0.447	3.42	0.1
Aromatics >EC16-EC21	4.97	4.11	19	4.41	13.2	6.68	15.4	0.1
Aromatics >EC21-EC35	34	28.5	113	32.7	66.1	24.4	76.4	2.21
Aromatics >EC35-EC44	24.1	21.8	51.2	22	29.1	9.37	36.7	0.566
Aromatics >EC40-EC44	10.1	9.44	18.9	9	10.3	3.32	14.1	0.1
Polyaromatic Hydrocarbons (PAHs)								
Acenaphthylene	216	36.9	234	67.9	194	49	259	12
Acenaphthene	31.5	12.6	52.7	8	10.2	14.4	19.2	8
Anthracene	191	43.6	438	40.9	120	88.3	178	16
Benz(a)anthracene	849	197	1530	214	668	1380	1100	14
Benzo(a)pyrene	906	213	1520	275	836	987	1030	15
Benzo(b)fluoranthene	1550	356	2440	424	1450	2310	1980	15
Benzo(k)fluoranthene	526	117	885	137	472	773	564	14
Benzo(g,h,i)perylene	801	194	1220	215	685	318	982	24
Chrysene	737	207	1380	231	863	1450	1140	10
Dibenzo(a,h)anthracene	195	47.3	339	57.8	158	102	230	0.023
Indeno(1,2,3-cd)pyrene	758	168	1120	206	726	395	1050	0.018
Fluoranthene	1630	311	3140	310	973	1150	1600	0.017
Fluorene	47.6	13.3	84.3	18.8	29.3	16.2	82.3	10
Naphthalene	360	91.8	220	266	87.3	35.6	245	9
Phenanthrene	776	182	1780	167	343	189	709	15
Pyrene	1.21	0.251	2.28	0.266	0.78	0.826	1.18	0.015
PAH, Total Detected USEPA 16	10.8	2.44	18.7	2.89	8.4	10.1	12.4	0.118
Naphthalene-d8 % recovery**	94.9	94.4	93.7	95.5	75.4	76.2	74.1	83.2
Acenaphthene-d10 % recovery**	92.8	89.7	90	90	81.2	79.6	79.9	90.8
Phenanthrene-d10 % recovery**	93	89.8	90.8	89.5	89.8	86.8	86	90.3
Chrysene-d12 % recovery**	90.3	82.3	82.1	84.2	99.6	102	97.5	88.4
Perylene-d12 % recovery**	88.8	80.9	74.7	83.9	91.8	95.6	90.2	73.6
Total Aliphatics >C12-C44	69.8	29.4	112	34.4	71.4	18.9	89.9	0.1
Total Aromatics >EC12-EC44	64.2	55.4	187	60.5	111	40.9	132	2.78
Total Aliphatics & Aromatics >C5-C44	134	84.8	299	94.9	182	59.8	222	2.78
Metals - (Solid)								
Iron	77000	26400	190000	36800	124000	64700	72200	30400
Manganese	3710	2730	7160	2960	5490	19100	7400	778
Metals - (Liquid)								
Calcium	160000	-	95500	-	-	113000	-	43300
Magnesium	18100	-	13700	-	-	9540	-	9360
Phenols								
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics								
Soluble Sulphate 2:1 extract as SO4 BRE	0.128	-	0.0518	-	-	0.0402	-	0.0211
pH	11.1	10.1	8.85	8.93	9.04	9.2	8.8	7.99
Sulphate, Total								
Sulphur, Total	0.246	-	0.183	-	-	0.128	-	0.02
Sulphate, Total potential	0.738	-	0.549	-	-	0.384	-	0.06
Sulphate, acid soluble (total)	0.671	-	0.149	-	-	0.0815	-	0.0317
Cyanide, Total	1	1	1.96	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	12	12	71.6
Asbestos								
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-
Date of Analysis	09/11/2018	-	09/11/2018	-	-	26/11/2018	-	26/11/2018
Analysed By	Marcin Magdziarek	-	Barbara Urbanek-Walsh	-	-	Marcin Magdziarek	-	Marcin Magdziarek
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Fibrous Tremolite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Fibrous Actinolite	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	-	Not Detected	-	Not Detected
Comments	0	-	0	-	-	0	-	0
Volatile Organic Compounds (VOCs)								
Dibromofluoromethane**	106	109	116	125	106	99.4	95.6	102
Toluene-d8**	94.6	98	97.5	100	99.5	98.2	94.6	98.8
4-Bromofluorobenzene**	77.4	81.4	74.4	76.9	94.4	99.2	84.6	102
Methyl Tertiary Butyl Ether	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.26	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics								
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances
Carbon											
Soil Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00
Metals (Solids)											
Arsenic	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	31	1	0.19	62.47
Chromium	TM181	mg/kg	<0.9	1383	1383	1080	0.90	3090	139	25.08	78.09
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	25	1.20	100.00
Lead	TM181	mg/kg	<0.7	1383	1383	507	0.70	4220	92	41.85	36.66
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	6	1	0.35	43.82
Nickel	TM181	mg/kg	<0.2	1383	1383	427	1.34	313	26	30.61	30.87
Selenium	TM181	mg/kg	<1	1383	1383	815	1.00	52	6	1.87	58.93
Vanadium	TM181	mg/kg	<0.2	1383	1378	1377	<0.2	2880	207	4.27	99.57
Zinc	TM181	mg/kg	<1.9	1383	1383	160	7.15	13300	291	365.79	11.57
TPH Criteria Working Group (TPH CWG)											
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.32	0.00
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.21	0.00
sum of detected mpo xylene by GC	TM089	µg/kg	9	271	271	0	0.01	0	0	0.19	0.00
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	1	0	311.47	0.00
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	987	3	60406.47	0.00
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	5	1198346.52	0.00
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3530	27	###########	0.00
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2980	65	###########	0.00
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	###########	0.00
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	5	0	19.81	0.00
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	20	0	451.11	0.00
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	50	0	380.12	0.00
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	658	2	600.15	0.07
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	9800	57	3783.48	0.14
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1580	41	30052.88	0.00
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00
Polyaromatic Hydrocarbons (PAHs)											
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	296	8.00	193000	466	79.05	21.40
Anthracene	TM218	µg/kg	<0.016	1383	1382	696	<0.016	1860000	3608	90.76	50.33
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	308	14.00	1150000	4645	1613.93	22.27
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.93
Benzo(b)fluoranthene	TM218	µg/kg	<0.015	1383	1383	1383	15.00	1110000	5283	9.09	100.00
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00
Benzo(g,h,i)perylene	TM218	µg/kg	<0.024	1383	1383	989	0.24	333000	2514	35.35	71.51
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26
Dibenzo(a,h)anthracene	TM218	µg/kg	<0.023	1383	1383	64	0.02	177000	740	2227.85	4.63
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.018	1383	1383	898	0.02	374000	2607	67.35	64.93
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11586	17.67	81.85
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64
Pyrene	TM218	µg/kg	15	1008	1008	11	0.02	1950	10	203.18	1.09
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24600	76		0.00
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9830	98		0.00
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	99		0.00
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25500	234		0.00
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00
Metals - (Solid)											
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2390000	103039		
Manganese	TM224	mg/kg	<0.13	1383	1380	0	<0.13	408000	9574		
Metals - (Liquid)											
Calcium	TM224	mg/kg	<21	1371	622	0	<21	398000	131387		
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15371		
Phenols											
Phenol	TM062 (S)	mg/kg	<0.01	1371	1371	1371	0.01	1	0	0.00	100.00
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	5	0	0.00	96.06
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06
Inorganics											
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	425	425	<0.004	2	0	0.00	42.42
pH	TM133	pH Units	<1	1002	972	972	<1	13	10	0.00	97.01
Sulphate, Total	TM221	mg/kg	<48	375	20	20	<48	22900	6520	0.00	5.33
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	9	0	0.00	40.32
Sulphate, Total potential	TM132	%	<0.06	1002	404	404	<0.06	28	1	0.00	40.32
Sulphate, acid soluble (total)	TM221	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61
Asbestos											
Asbestos Quantification - Gravimetric - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Date of Analysis	TM048	No units		1371	0	0				0.00	
Analysed By	TM048	No units		1371	0	0				0.00	
Asbestos Quantification - PCOM Evaluation - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Additional Asbestos Components (Using TM048)	TM304	No units		1002	0	0				0.00	
Analysts Comments	TM304	No units		1002	0	0				0.00	
Asbestos Quantification - Total - %	TM304	%	<0.001	1371	65	65	<0.001	0	0	0.00	
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00	
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00	
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00	
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00	
Fibrous Tremolite	TM048	No units		1371	0	0				0.00	
Fibrous Actinolite	TM048	No units		1371	0	0				0.00	
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00	
Comments	TM048	No units		1371	0	0			0	0.00	
Volatile Organic Compounds (VOCs)											
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00	
Toluene-d8**	TM116	%		1371	1100	1100		115	97	0.00	
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00	
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00	
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	7	0	0.00	
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00	
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	1	0	0.00	
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	62	0	0.00	
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	18	0	0.00	
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00	
Sum of BTEX	TM116	mg/kg	<0.4	1371	1095	1095	<0.4	116	1	0.00	
Subcontracted: Inorganics											
Gross Calorific Value in Dry Matter Q(V/gr/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Gross Calorific Value Original Q(V/gr/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	21	12	0.00	
Net Calorific Value in Dry Matter Q(V/net/d)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	28	14	0.00	
Net Calorific Value in Original Q(V/net/ar)	SUB	MJ/kg	<0.5	1371	16	16	<0.5	20	12	0.00	
Water Analytical M (ad)	SUB	%	<0.5	1371	16	16	<0.5	1	1	0.00	
Water Gross M(ex)	SUB	%	<0.5	1371	16	16	<0.5	25	14	0.00	
Water Total M(ar)	SUB	%	<0.5	1371	16	16	<0.5	25	15	0.00	

Sample ID	4GD5	4GD6	4GD6	4GD7	4GD7	4GD1V	4GD2V	4GD3V	4GD4V	4GD5V	4GD6V	4GD7V
Depth	0.5	0.2	0.6	0.3	0.6	2.1	1.8	1.8	1.7	1.7	1.7	1.7
Sampled Date	13/11/2018	13/11/2018	13/11/2018	20/11/2018	20/11/2018	06/11/2018	07/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	20/11/2018
Carbon												
Soil Organic Matter (SOM)	18.8	7.88	>100	7.57	>100	5.6	0.741	0.56	9.1	4.93	0.765	0.8
Metals (Solids)												
Arsenic	10.5	8.24	7.93	6.99	8.13	16.1	12.8	12.2	10.1	15.9	11.2	15.1
Cadmium	0.2	0.02	0.15	1.39	0.678	0.02	0.02	0.277	0.505	0.02	0.02	0.02
Chromium	18.1	43.3	7.04	210	10.3	32.7	29.5	23.5	10	35	25.2	27.7
Copper	28	9.53	28.6	52.3	22.6	16.7	9.12	10.1	33.2	16.4	8.94	9.05
Lead	82.9	32.6	45.2	151	63	33.5	21	20.6	31.6	40.2	22.2	22.4
Mercury	1.4	0.14	0.575	1.4	0.59	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	27.3	9.47	11.8	36.5	10.9	27.5	33.4	29.3	21.9	29.7	31.9	32.6
Selenium	10	1.7	1	10	2.02	1	1	1	2.57	1	1	1
Vanadium	54.2	73.5	17.5	1080	31.2	57.2	53.7	41.7	34.8	53.1	43.7	46.8
Zinc	320	398	225	440	285	119	100	94.3	78.1	139	90.7	95.2
TPH Criteria Working Group (TPH CWG)												
Benzene												
Toluene												
Ethylbenzene												
sum of detected mpo xylene by GC												
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	2.3	2.24	4.56	3.42	10.8	0.419	0.1	0.1	0.525	0.1	0.1	0.1
Aliphatics >C16-C21	9.98	12.4	103	26.3	373	0.1	0.1	0.1	2.48	0.1	0.1	0.1
Aliphatics >C21-C35	93.6	67.6	63.3	99.7	127	4.58	0.1	0.1	14.2	3.17	0.1	0.1
Aliphatics >C35-C44	34.8	31.5	8.84	26.6	19.3	0.1	0.1	0.1	3.23	0.875	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	2.55	1.04	16.6	3.13	5.52	0.418	0.608	0.1	1.37	0.858	0.1	0.1
Aromatics >EC16-EC21	12.5	8.13	134	24.3	72.5	1.22	1.39	0.1	2.86	0.1	0.1	0.1
Aromatics >EC21-EC35	84.6	41.9	482	86.5	190	44.8	2.42	0.1	9.26	31.8	1.49	2.55
Aromatics >EC35-EC44	56.4	38.2	104	30.5	48.3	3.13	0.267	0.1	3.42	4.3	0.1	0.1
Aromatics >EC40-EC44	23.1	17	29.9	10.7	13.3	0.1	0.1	0.1	1.08	1.1	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)												
Acenaphthylene	130	64.2	277	219	186	12	12	12	42.3	12	12	12
Acenaphthene	21.9	14.4	66.5	30.6	10.2	8	8	8	8	8	8	8
Anthracene	147	97.3	366	409	108	16	16	16	26.3	16	16	16
Benz(a)anthracene	578	601	1740	1410	238	14	14	14	70.3	14	14	14
Benzo(a)pyrene	458	955	1910	1360	337	15	15	15	72.1	15	15	15
Benzo(b)fluoranthene	895	1170	3230	2330	614	27.4	24.4	15	132	15	15	15
Benzo(k)fluoranthene	307	284	981	833	189	14	14	14	44.5	14	14	14
Benzo(g,h,i)perylene	369	882	1580	940	413	24	24	24	86	24	24	24
Chrysene	618	546	2080	1510	313	24.3	10	10	84	10	10	10
Dibenzo(a,h)anthracene	82.3	204	368	213	85.2	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	504	908	1630	735	309	0.018	0.018	0.018	109	0.018	0.018	0.018
Fluoranthene	895	861	2020	2680	315	53	0.017	0.017	145	0.017	0.017	0.017
Fluorene	46.3	31.9	141	131	17.5	10	10	10	10	10	10	10
Naphthalene	131	116	1110	341	1080	22.6	9	9	43.3	9	9	9
Phenanthrene	457	322	1080	1500	215	32.7	15	15	167	15	15	15
Pyrene	0.659	0.83	1.69	2.35	0.249	0.0435	0.015	0.015	0.105	0.015	0.015	0.015
PAH, Total Detected USEPA 16	6.3	7.89	20.3	17	4.68	0.203	0.118	0.118	1.13	0.118	0.118	0.118
Naphthalene-d8 % recovery**	73.4	89.2	67.7	73.2	70.2	85.6	99.4	89.7	90.4	86.3	91.2	85.8
Acenaphthene-d10 % recovery**	78.7	85.7	75.4	74	70.6	89.7	96.3	88	91	88.8	88.1	82.8
Phenanthrene-d10 % recovery**	80.2	86.2	74.4	73.5	66.9	93.8	94.7	86.5	96.5	92.9	87.8	84
Chrysene-d12 % recovery**	73	85.1	71.5	70.8	39.1	86.5	86.3	79.4	85.9	111	78.6	89
Perylene-d12 % recovery**	58.2	82	56.6	70.5	29	83.2	87.1	75.7	81.8	101	76.3	94
Total Aliphatics >C12-C44	141	114	179	156	531	5	0.1	0.1	20.4	4.04	0.1	0.1
Total Aromatics >EC12-EC44	156	89.3	736	144	317	49.6	4.69	0.1	16.9	37	1.49	2.55
Total Aliphatics & Aromatics >C5-C44	297	203	915	300	848	54.6	4.69	0.1	37.3	41	1.49	2.55
Metals - (Solid)												
Iron	95800	48600	23800	161000	18100	38300	37800	25900	38500	25400	31100	32600
Manganese	3770	4370	574	17900	1610	441	1530	917	1850	268	1190	954
Metals - (Liquid)												
Calcium	109000	-	14700	144000	-	-	-	-	-	-	-	-
Magnesium	14400	-	1570	9380	-	-	-	-	-	-	-	-
Phenols												
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics												
Soluble Sulphate 2:1 extract as SO4 BRE	0.0717	-	0.0339	0.0581	-	-	-	-	-	-	-	-
pH	9	11.5	10.4	11.4	8.55	7.61	8.08	8.38	8.69	6.79	8.5	7.99
Sulphate, Total												
Sulphur, Total	0.212	-	0.534	0.187	-	-	-	-	-	-	-	-
Sulphate, Total potential	0.636	-	1.6	0.561	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	0.207	-	0.0633	0.02	-	-	-	-	-	-	-	-
Cyanide, Total	2.8	1	2.41	1.38	7.38	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	141	12	12	12	427	76	29	20.9	271	48.5	47.1
Asbestos												
Asbestos Quantification - Gravimetric - %	0.0034	-	-	-	-	-	-	-	-	-	-	-
Date of Analysis	19/11/2018	-	19/11/2018	03/12/2018	-	-	-	-	-	-	-	-
Analysed By	Lucy Caroe	-	Andrzej Ferfecki	Christian Hallam	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	0.001	-	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	Chrysotile detected.	-	-	-	-	-	-	-	-	-	-	-
Analysts Comments	Loose fibres in soil.	-	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	0.0035	-	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Fibrous Tremolite	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Fibrous Actinolite	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	Not Detected	-	-	-	-	-	-	-	-
Comments	Fibre bundles in soil	-	0	0	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)												
Dibromofluoromethane**	104	102	99.5	105	112	110	126	104	109	102	105	108
Toluene-d8**	96.7	98.5	95.8	99.7	101	99	101	99.2	98.1	98.7	99.8	103
4-Bromofluorobenzene**	89.1	89.5	76.1	75.1	79.2	86.8	84.7	97.6	98.6	93.3	94.5	85.8
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.296	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.311	0.13	0.201	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics												
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4GE1	4GE1	4GE2	4GE3	4GE4	4GE5	4GE5	4GE6	4GE6	4GE1V	4GE2V	4GE3V	4GE4V	4GE5V	4GE6V
Depth	0.5	1	0.8	0.8	0.4	0.2	0.6	0.3	0.5	3.6	1.95	2.2	2.2	3	2.2
Sampled Date	06/11/2018	06/11/2018	07/11/2018	07/11/2018	19/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	06/11/2018	07/11/2018	07/11/2018	19/11/2018	13/11/2018	13/11/2018
Carbon															
Soil Organic Matter (SOM)	23.1	0.521	17.6	9.28	5.81	13.7	>100	24.8		47.9	5.65	1.62	3.88	0.94	1.9
Metals (Solids)															
Arsenic	8.99	9.44	16.5	13.6	6	10.6	6.73	7.12	5.96	3.74	13.1	13.7	14.1	12.8	15.4
Cadmium	0.2	0.2	0.02	0.553	0.2	0.2	0.2	0.2	0.02	0.0218	0.02	16.9	0.02	0.02	0.02
Chromium	9	267	11.2	18.7	137	58.5	9	446	3.08	12.6	36	56.7	31.7	24.9	30.6
Copper	22.9	27.9	42.6	40.8	14	19.6	14	18.6	23.2	16.8	14.9	356	11.4	7.9	11.2
Lead	150	43.7	27.9	33.1	9.62	84.1	8.2	58.6	12.2	4.85	31.5	276	30	23	29.3
Mercury	1.4	1.4	0.14	0.14	1.4	1.4	1.4	1.4	0.81	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	37.4	18	38.8	42.5	44.1	24	11.7	18.1	8.3	13.7	28.5	41.2	34.3	30.3	34.7
Selenium	10	10.3	1	1.11	10	10	10	10.4	1	2.25	1	1	1	1	1
Vanadium	120	271	33.3	38.2	106	85.4	18	327	8.23	20.4	57	60.9	54.2	44.3	55
Zinc	228	125	78.5	137	133	353	25.1	206	23.7	25.5	115	1680	107	95.1	107
TPH Criteria Working Group (TPH CWG)															
Benzene															
Toluene															
Ethylbenzene															
sum of detected mpo xylene by GC															
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.033	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.01	0.0244	0.0694	0.0725	0.02	0.02	0.122	0.02	0.02	0.02	0.05
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.01	0.0267	0.0524	0.069	0.02	0.02	0.137	0.02	0.02	0.02	0.0459
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.01	0.02	0.0301	0.0761	0.02	0.02	0.057	0.02	0.02	0.02	0.023
Aliphatics >C12-C16	1.66	0.1	0.793	0.1	1.13	2.48	4.02	4.32	4.96	0.1	0.216	0.1	0.1	0.1	0.1
Aliphatics >C16-C21	7.21	2.14	0.835	0.195	8.1	15.7	94.9	29.3	140	0.1	0.1	0.1	0.1	0.1	0.1
Aliphatics >C21-C35	25	28	4.1	4.38	70.6	105	46.2	110	44.3	22.9	1.66	0.1	4.06	0.1	1.65
Aliphatics >C35-C44	5.55	8.66	0.1	0.1	15.4	38.3	5.19	46.7	3.7	0.655	0.537	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.01	0.02	0.0341	0.0456	0.02	0.02	0.09	0.02	0.02	0.02	0.0297
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.0503	0.02	0.02	0.0375	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	3.2	1.11	0.782	1.15	0.556	5.86	4.19	10.9	12.4	3	0.1	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	29.5	7.16	1.36	6.67	8.71	35.6	19.4	74.6	108	9.36	0.1	0.1	0.1	0.1	0.1
Aromatics >EC21-EC35	155	57.3	4.57	14.8	37.9	114	55	206	256	217	22.7	3.14	13	0.1	5.68
Aromatics >EC35-EC44	60.7	26.6	0.657	4.75	11.3	54.6	9.53	97.6	37.7	29.3	6.1	0.463	1.26	0.1	0.1
Aromatics >EC40-EC44	20.3	10.1	0.1	1.6	3.79	21.7	2.85	35.3	11.3	11	2.33	0.1	0.1	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)															
Acenaphthylene	120	110	14.6	86.4	28.4	201	51	1200	252	12	12	12	12	12	12
Acenaphthene	80	39.6	8	8	14.6	43.3	20.7	448	24.5	8	8	8	8	8	8
Anthracene	160	81.3	18.7	47.3	132	506	40.2	3030	247	16	16	16	16	16	16
Benz(a)anthracene	259	796	60.9	202	513	1630	173	5330	192	14	14	14	14	14	14
Benzo(a)pyrene	470	1140	53.1	267	506	1410	179	4200	185	15	15	15	15	15	15
Benzo(b)fluoranthene	505	1650	62	467	777	2440	379	6470	402	15	15	15	15	15	23.5
Benzo(k)fluoranthene	201	554	25.1	157	191	772	105	2310	122	14	14	14	14	14	14
Benzo(g,h,i)perylene	467	903	51.2	241	372	971	167	2550	202	24	24	24	24	24	24
Chrysene	213	685	81.8	170	546	1450	270	5370	290	10	10	10	10	10	19.7
Dibenzo(a,h)anthracene	0.23	196	0.023	63.1	82.4	242	39.9	706	71.6	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	391	834	50.5	234	397	847	161	3150	234	0.018	0.018	0.018	0.018	0.018	0.018
Fluoranthene	359	893	97.1	317	1020	3280	211	12800	379	0.017	0.017	0.017	0.017	0.017	23.2
Fluorene	0.1	18.8	10	13	23.6	162	38.5	1840	103	10	10	10	10	10	10
Naphthalene	90	67.8	51	118	96.3	373	407	4730	5100	9	9	9	9	20.5	9
Phenanthrene	150	256	121	287	481	1750	281	9170	1030	15	15	15	15	15	15
Pyrene	0.32	1.04	0.0774	0.261	0.843	2.47	0.187	9.83	0.368	0.015	0.015	0.015	0.015	0.015	0.015
PAH, Total Detected USEPA 16	3.19	9.27	0.765	2.93	6.03	18.5	2.71	73.1	9.21	0.118	0.118	0.118	0.118	0.118	0.118
Naphthalene-d8 % recovery**	85.8	94.6	96.5	85	82.7	88.6	63.9	85.5	82.4	95.5	93.2	89.8	88.7	88	70.3
Acenaphthene-d10 % recovery**	80.1	91.1	95.7	81.2	85.9	88	69.1	91	91.4	89.9	88.7	84.6	86.5	91.4	73.8
Phenanthrene-d10 % recovery**	85	90.3	94.3	75.8	83	95	64.7	96.2	93	92.7	88.5	87.8	85.5	94.7	78.6
Chrysene-d12 % recovery**	84.3	87.8	88.2	69.9	76.9	105	47.4	89.5	57.6	85.1	84.1	83.2	85.7	92.9	89.7
Perylene-d12 % recovery**	78.7	89.1	76.3	65.7	74.1	103	35.5	78.5	43.4	81.4	84.9	82.3	88.1	81.2	88.9
Total Aliphatics >C12-C44	39.5	38.8	5.73	4.57	95.2	161	150	191	193	23.6	2.42	0.1	4.06	0.1	1.65
Total Aromatics >EC12-EC44	249	92.1	7.37	27.4	58.5	210	88.1	389	414	258	28.8	3.6	14.3	0.1	5.68
Total Aliphatics & Aromatics >C5-C44	288	131	13.1	32	154	372	239	580	607	282	31.7	3.6	18.3	0.1	7.48
Metals - (Solid)															
Iron	228000	125000	32900	32300	232000	101000	59400	113000	8800	7810	29700	35700	32700	31300	36700
Manganese	4770	207	661	1520	8590	4010	1060	16700	164	226	228	342	361	1170	472
Metals - (Liquid)															
Calcium	-	152000	3230	16000	95800	130000	-	160000	-	-	-	-	-	-	-
Magnesium	-	6670	2530	4690	17000	17600	-	18700	-	-	-	-	-	-	-
Phenols															
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0117	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.0117	0.01	0.01	0.01	0.01	0.0141	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics															
Soluble Sulphate 2:1 extract as SO4 BRE	-	0.154	0.0394	0.0549	0.104	0.103	-	0.169	-	-	-	-	-	-	-
pH	9.25	11.2	8.34	8.63	11.7	9.99	9.21	11.1	8.61	7.4	6.94	7.32	7.35	8.2	7.14
Sulphate, Total															
Sulphur, Total	-	0.276	0.201	0.155	0.194	0.189	-	0.284	-	-	-	-	-	-	-
Sulphate, Total potential	-	0.828	0.603	0.465	0.582	0.567	-	0.852	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	-	0.995	0.256	0.214	0.39	0.2	-	0.375	-	-	-	-	-	-	-
Cyanide, Total	3.26	1	1	1.56	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	38.4	12	12	12	12	1590	702	133	281	105	331
Asbestos															
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Date of Analysis	-	19/11/2018	09/11/2018	09/11/2018	30/11/2018	19/11/2018	-	27/11/2018	-	-	-	-	-	-	-
Analysed By	-	Renata Bozhkov	Lucy Caroe	Lucy Caroe	Paul Poynton	Lucy Caroe	-	Andrzej Ferfecki	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	None	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	No	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	-	Not Detected	Not Detected	Not Detected	Not Detected	Trace	-	Not Detected	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Anthophyllite	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Tremolite	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Fibrous Actinolite	-	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Non-Asbestos Fibre	-	Detected	Not Detected	Not Detected	Not Detected	Not Detected	-	Not Detected	-	-	-	-	-	-	-
Comments	-	0	0	0	0	Loose fibres in soil	-	0	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)															
Dibromofluoromethane**	108	113	117	115	107	96.8	93.6	132	102	122	125	123	121	107	122
Toluene-d8**	97.9	97.7	99.9	98.6	94.3	95.3	95.5	97.4	96.6	88.1	96.6	101	103	99.9	98.5
4-Bromofluorobenzene**	80.4	87.8	75.7	84	91.9	76.5	75.1	97.7	80.6	70.9	78.7	83.1	85.2	95	100
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	1.8	0.09	0.09	0.09	0.09	0.314	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	1.4	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.8	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	2.6	0.13	0.184	0.423	0.621	0.376	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics															
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	9.54	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	8.52	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	9.41	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	8.16	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	0.69	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	10	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	10.7	-	-	-	-	-	-

Sample ID	4GF1	4GF1	4GF2	4GF3	4GF3	4GF4	4GF4	4GF5	4GF6	4GF6	4GF6	4GF7	4GF7	4GF8	4GF8
Depth	0.5	1	0.5	0.2	0.6	0.2	0.4	0.5	0.4	0.6	1.2	0.4	0.8	0.5	1
Sampled Date	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	19/11/2018	19/11/2018	19/11/2018	13/11/2018	13/11/2018	13/11/2018	19/11/2018	19/11/2018	20/11/2018	20/11/2018
Carbon															
Soil Organic Matter (SOM)	11.7	25	2.95	40.2	2.74	4.17	8	13.7	18.6	4.93	12.5	4.88	15.3	12.2	2.78
Metals (Solids)															
Arsenic	11.6	11.3	6.18	10.2	6	21.9	11.8	11.5	8.24	10.1	11.6	12.8	7.91	11.9	10
Cadmium	0.2	0.821	0.2	0.02	1.62	0.2	0.2	0.634	0.2	0.2	0.2	0.2	0.2	0.2	0.02
Chromium	9	1.56	36.2	0.9	547	47.2	9	9	9	9	19.1	9	9	9	3.57
Copper	31.6	50.8	16.9	14	18	36.9	14	14	15.8	15.2	17.6	22.1	15.9	21.7	11.4
Lead	167	36.7	35.3	20	47.2	76.9	24	37.4	29.3	32.1	40.9	21.4	48.9	21.6	24
Mercury	1.4	0.14	1.4	0.14	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.14
Nickel	60.2	26.3	14.6	15	8.22	36.6	12	52.3	31	32.8	24.2	37.1	17.9	27	13.9
Selenium	10	1.26	10	1	18.4	10	10	10	10	10	10	10	10	10	1
Vanadium	179	41.1	116	38.1	1270	70.2	29.4	28.2	87.7	112	96.1	93.6	46.1	47.1	68.9
Zinc	250	203	106	93.6	91	270	125	95.8	160	195	167	149	89.7	136	59.5
TPH Criteria Working Group (TPH CWG)															
Benzene															
Toluene															
Ethylbenzene															
sum of detected mpo xylene by GC															
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0239	0.0412	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0229	0.039	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0466	0.02	0.02
Aliphatics >C12-C16	0.1	0.1	0.182	0.1	0.1	1.26	0.1	0.1	2.6	2.28	2.54	0.888	4.51	0.1	0.1
Aliphatics >C16-C21	7.64	1.21	1.14	8.35	1.03	11.3	0.1	4.37	13.7	16.4	10.9	5.14	16.3	0.1	3.02
Aliphatics >C21-C35	26.2	6.45	16	34.9	17.2	60.9	0.1	20.7	70.7	118	71	27.7	36.6	13.9	12
Aliphatics >C35-C44	7.35	0.948	5.11	13.5	2.79	19.7	0.1	5.23	30.8	23.7	21.4	4.18	11.5	1.25	3.42
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.026	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.0314	0.02	0.02
Aromatics >EC12-EC16	2.51	1.23	0.711	1.79	1.29	1.58	0.1	1.31	1.94	0.966	0.973	0.216	0.644	0.1	0.1
Aromatics >EC16-EC21	15.3	4.5	5.21	13.9	18.9	8.71	2.14	6.31	8.2	5.67	4.94	1.55	3.9	0.1	0.971
Aromatics >EC21-EC35	93.7	12.5	40.9	64.1	147	48.3	5.55	29	45.7	37.3	33.1	10.8	18.4	6.57	8.16
Aromatics >EC35-EC44	40.7	5.9	16.5	36.7	43.6	24.1	0.824	11.7	30.9	14.5	18.4	1.21	7.79	5.17	3.63
Aromatics >EC40-EC44	14.5	2.8	6.02	15.8	14	9.38	0.1	4.52	13.1	5.3	6.88	0.1	2.56	2.77	1.75
Polyaromatic Hydrocarbons (PAHs)															
Acenaphthylene	913	12	13	108	60	98.7	12	57.1	91.9	12	48.3	12	13.3	20.4	13.6
Acenaphthene	8	8	16.8	13.4	40	19.1	8	8	18.2	13.8	13.8	8	8	9	8
Anthracene	227	16	45.3	161	80	150	16	68.3	137	38.5	113	16	23.1	62	31.3
Benz(a)anthracene	1780	55.8	274	674	70	602	62.8	277	391	95.9	349	27.1	98	161	90.8
Benzo(a)pyrene	3080	53	309	610	75	637	71.8	284	321	75.9	286	24.3	80.2	144	88.3
Benzo(b)fluoranthene	4890	115	539	1140	75	1050	100	474	583	160	511	50.5	163	270	151
Benzo(k)fluoranthene	1350	37.5	170	331	70	343	36.7	163	233	43.5	197	14	81.4	93	46.3
Benzo(g,h,i)perylene	3460	52.7	297	496	120	486	49.5	238	243	75.6	206	26	75	116	77.3
Chrysene	1230	66.9	327	594	50	614	71.5	303	433	134	391	32.2	131	179	96.1
Dibenzo(a,h)anthracene	720	0.023	63.5	143	0.115	129	0.023	59.3	56.3	0.023	46.7	0.023	0.023	28.6	0.023
Indeno(1,2,3-cd)pyrene	3020	44.1	247	449	90	589	53.4	253	292	73.8	257	29.7	76.9	91.9	69.4
Fluoranthene	2010	101	508	1470	0.085	1000	90.6	402	778	219	622	39.4	167	275	172
Fluorene	43.4	10	10.8	36.9	50	39	10	23.1	73.7	20.4	27.1	10	10	12.4	15.5
Naphthalene	240	106	30.4	103	45	167	15	77.8	143	47.9	123	16.1	30.7	35.2	19.1
Phenanthrene	359	179	229	675	75	488	72.6	195	612	168	319	45.4	86.3	148	132
Pyrene	1.95	0.0877	0.443	1.1	0.075	0.943	0.0789	0.322	0.607	0.175	0.487	0.0319	0.148	0.201	0.136
PAH, Total Detected USEPA 16	25.3	0.899	3.52	8.1	0.59	7.35	0.703	3.2	5.01	1.34	4	0.322	1.17	1.85	1.14
Naphthalene-d8 % recovery**	94.5	92	97.3	93.4	92.6	88.9	86.1	85.5	82.8	75.6	84.5	92.4	85.2	77.5	81
Acenaphthene-d10 % recovery**	93.3	89	93.1	92.7	80.9	86.9	64.1	88.9	89.5	78.9	90.5	90.9	87.1	75.7	85.5
Phenanthrene-d10 % recovery**	91.2	83.5	94.1	92.1	88.7	87.5	83.7	85	93.3	84.2	93.5	90.1	92.6	75.5	94.7
Chrysene-d12 % recovery**	89.2	72.4	85.7	77.2	82.1	83	79.3	80.7	86.4	89.8	85.9	84.1	82.6	73.2	83.2
Perylene-d12 % recovery**	88.3	62.4	84.6	72.4	82.9	79.9	73.6	76.8	71.9	85.3	72.8	81.7	78.8	75.1	85.7
Total Aliphatics >C12-C44	41.2	8.6	22.4	56.8	21	93.1	0.1	30.3	118	160	106	37.9	69	15.2	18.5
Total Aromatics >EC12-EC44	152	24.1	63.3	117	211	82.7	8.51	48.3	86.7	58.4	57.4	13.7	30.7	11.7	12.8
Total Aliphatics & Aromatics >C5-C44	193	32.7	85.7	173	232	176	8.51	78.6	205	219	163	51.7	99.9	26.9	31.2
Metals - (Solid)															
Iron	30300	54100	49400	107000	183000	74500	204000	179000	173000	264000	155000	452000	134000	337000	149000
Manganese	4750	1400	2990	3260	39500	4760	2840	7110	3380	3880	3530	4220	3550	4030	3670
Metals - (Liquid)															
Calcium	67200	-	274000	-	222000	-	134000	126000	142000	-	157000	94500	-	44900	-
Magnesium	7520	-	8030	-	6830	-	35200	16100	11000	-	31700	8570	-	5890	-
Phenols															
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics															
Soluble Sulphate 2:1 extract as SO4 BRE	0.0377	-	0.0829	-	0.123	-	0.028	0.0283	0.108	-	0.0796	0.0232	-	0.0188	-
pH	9.95	8.57	10	9.39	12.2	10.7	10.4	9.44	11	12.2	10.7	9.55	10.6	10.3	9.7
Sulphate, Total															
Sulphur, Total	0.14	-	0.154	-	0.495	-	0.0816	0.115	0.182	-	0.265	0.0708	-	0.0711	-
Sulphate, Total potential	0.42	-	0.462	-	1.49	-	0.245	0.345	0.546	-	0.795	0.212	-	0.213	-
Sulphate, acid soluble (total)	0.068	-	0.374	-	1.33	-	0.0473	0.0715	0.213	-	0.212	0.0387	-	0.0319	-
Cyanide, Total	1.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Exchangeable Ammonia as N	12	12	12	12	12	20.8	19	12	12	12	12	30.5	12	12	12
Asbestos															
Asbestos Quantification - Gravimetric - %	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Date of Analysis	09/11/2018	-	09/11/2018	-	09/11/2018	-	30/11/2018	30/11/2018	26/11/2018	-	26/11/2018	30/11/2018	-	03/12/2018	-
Analysed By	Barbara Urbanek-Walsh	-	Lucy Caroe	-	Barbara Urbanek-Walsh	-	Paul Poynton	Paul Poynton	Marcin Magdziarek	-	Marcin Magdziarek	Paul Poynton	-	Christian Hallam	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	None	-	-	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	N/A	-	-	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Amosite (Brown) Asbestos	Not Detected	-	Not Detected	-	Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Crocidolite (Blue) Asbestos	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Fibrous Anthophyllite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Fibrous Tremolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Fibrous Actinolite	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Non-Asbestos Fibre	Not Detected	-	Not Detected	-	Not Detected	-	Not Detected	Not Detected	Not Detected	-	Not Detected	Not Detected	-	Not Detected	-
Comments	0	-	0	-	Loose fibres in soil.	-	0	0	0	-	0	0	-	0	-
Volatile Organic Compounds (VOCs)															
Dibromofluoromethane**	112	115	126	117	133	113	115	110	103	108	105	111	115	109	110
Toluene-d8**	98.6	98.9	100	96.2	100	102	104	102	97.1	96.8	98.5	102	103	102	103
4-Bromofluorobenzene**	79.2	70.4	81.1	70	84.5	79.8	83.3	85.4	94.2	90	91.2	72.8	83.6	86.2	85
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.18	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.08	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.26	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics															
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Sample ID	4GF1V	4GF2V	4GF3V	4GF4V	4GF5V	4GF6V	4GF7V	4GF8V
Depth	2.4	2	2.5	2.4	2.6	2.7	2.6	2.6
Sampled Date	07/11/2018	07/11/2018	07/11/2018	19/11/2018	19/11/2018	13/11/2018	19/11/2018	20/11/2018
Carbon								
Soil Organic Matter (SOM)	1.13	4.02	1.01	0.909	8.41	1.3	0.962	1.21
Metals (Solids)								
Arsenic	9.4	13.7	11.6	13.2	13.4	12.9	11.4	16.5
Cadmium	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Chromium	28.9	34.8	28.4	28.8	31.2	31.9	29.1	34.4
Copper	9.07	15.5	11.3	9.01	20	10.8	9.57	11
Lead	21.2	24.8	23.5	24.7	45.8	26.7	22.4	28.5
Mercury	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Nickel	31.6	32.2	31.8	34.1	24.2	37.3	34.3	40.2
Selenium	1	1	1	1	1	1	1	1
Vanadium	51.8	59.4	51.1	51	46.7	54.6	49.7	58.9
Zinc	122	116	141	104	146	103	102	104
TPH Criteria Working Group (TPH CWG)								
Benzene								
Toluene								
Ethylbenzene								
sum of detected mpo xylene by GC								
Aliphatics >C5-C6	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	0.02	0.02	0.02	0.02	0.022	0.02	0.02	0.02
Aliphatics >C8-C10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	0.1	0.1	0.1	0.1	0.878	0.1	0.1	0.1
Aliphatics >C16-C21	0.1	0.1	0.1	0.1	1.97	0.1	0.1	0.1
Aliphatics >C21-C35	3.44	0.782	0.1	2.16	4.16	0.1	3.39	0.1
Aliphatics >C35-C44	1.53	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aromatics >EC5-EC7	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	0.1	0.1	0.814	0.1	0.1	0.1	0.1	0.1
Aromatics >EC16-EC21	0.1	0.219	1.47	0.1	2.07	0.1	0.1	0.1
Aromatics >EC21-EC35	5.22	10.1	3.65	1.75	29.2	0.1	2.03	0.1
Aromatics >EC35-EC44	4.45	1.09	0.537	0.1	2.02	0.1	0.615	0.1
Aromatics >EC40-EC44	1.76	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Polyaromatic Hydrocarbons (PAHs)								
Acenaphthylene	12	12	12	12	12	12	12	12
Acenaphthene	8	8	8	8	8	8	8	8
Anthracene	16	16	16	16	16	16	16	16
Benz(a)anthracene	32.9	14	14	14	38.7	14	14	14
Benzo(a)pyrene	35.6	15	15	15	35.5	15	15	15
Benzo(b)fluoranthene	58	15	15	15	67	15	15	15
Benzo(k)fluoranthene	14	14	14	14	22.2	14	14	14
Benzo(g,h,i)perylene	24	24	24	24	24	24	24	24
Chrysene	33.5	10	10	10	42.8	10	10	10
Dibenzo(a,h)anthracene	0.023	0.023	0.023	0.023	0.023	0.023	0.023	0.023
Indeno(1,2,3-cd)pyrene	28.4	0.018	0.018	0.018	34.7	0.018	0.018	0.018
Fluoranthene	59.8	0.017	0.017	0.017	77.6	0.017	0.017	0.017
Fluorene	10	10	10	10	10	10	10	10
Naphthalene	94.8	9	9	9	9	9	9	9
Phenanthrene	34.1	15	15	15	41.4	15	15	15
Pyrene	0.0443	0.015	0.015	0.015	0.0633	0.015	0.015	0.015
PAH, Total Detected USEPA 16	0.421	0.118	0.118	0.118	0.423	0.118	0.118	0.118
Naphthalene-d8 % recovery**	92.5	93.8	99.5	91.5	83.7	84.4	91.9	71.4
Acenaphthene-d10 % recovery**	86.5	88.4	101	92.8	85.8	89.7	93.9	73.4
Phenanthrene-d10 % recovery**	88.7	89.5	104	101	85.4	94.6	93.9	69.7
Chrysene-d12 % recovery**	85.1	85.4	106	113	81.3	90.3	84.5	70.8
Perylene-d12 % recovery**	83.7	85.6	98.5	102	80.7	78.6	78	74
Total Aliphatics >C12-C44	4.98	0.782	0.1	2.16	7.01	0.1	3.39	0.1
Total Aromatics >EC12-EC44	9.66	11.5	6.47	1.75	33.3	0.1	2.65	0.1
Total Aliphatics & Aromatics >C5-C44	14.6	12.2	6.47	3.91	40.3	0.1	6.04	0.1
Metals - (Solid)								
Iron	41100	34200	35400	34200	19800	32900	32500	33500
Manganese	1820	590	723	1150	282	626	960	459
Metals - (Liquid)								
Calcium	-	-	-	-	-	-	-	-
Magnesium	-	-	-	-	-	-	-	-
Phenols								
Phenol	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	0.035	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics								
Soluble Sulphate 2:1 extract as SO4 BRE	-	-	-	-	-	-	-	-
pH	8.52	7.39	8.18	8.01	7.14	7.88	7.76	6.96
Sulphate, Total								
Sulphur, Total	-	-	-	-	-	-	-	-
Sulphate, Total potential	-	-	-	-	-	-	-	-
Sulphate, acid soluble (total)	-	-	-	-	-	-	-	-
Cyanide, Total	5.64	1	1	1	1	1	1	1
Exchangeable Ammonia as N	573	661	19.6	317	412	115	123	140
Asbestos								
Asbestos Quantification - Gravimetric - %	-	-	-	-	-	-	-	-
Date of Analysis	-	-	-	-	-	-	-	-
Analysed By	-	-	-	-	-	-	-	-
Asbestos Quantification - PCOM Evaluation - %	-	-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	-	-	-	-	-	-	-	-
Analysts Comments	-	-	-	-	-	-	-	-
Asbestos Quantification - Total - %	-	-	-	-	-	-	-	-
Chrysotile (White) Asbestos	-	-	-	-	-	-	-	-
Amosite (Brown) Asbestos	-	-	-	-	-	-	-	-
Crocidolite (Blue) Asbestos	-	-	-	-	-	-	-	-
Fibrous Anthophyllite	-	-	-	-	-	-	-	-
Fibrous Tremolite	-	-	-	-	-	-	-	-
Fibrous Actinolite	-	-	-	-	-	-	-	-
Non-Asbestos Fibre	-	-	-	-	-	-	-	-
Comments	-	-	-	-	-	-	-	-
Volatile Organic Compounds (VOCs)								
Dibromofluoromethane**	125	115	128	122	111	121	137	110
Toluene-d8**	101	99.3	100	103	99	97.8	102	101
4-Bromofluorobenzene**	88	82.1	82.3	86.6	80.8	107	85.2	86.1
Methyl Tertiary Butyl Ether	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics								
Gross Calorific Value in Dry Matter Q(V/gr/d)	-	-	-	-	-	-	-	-
Gross Calorific Value Original Q(V/gr/ar)	-	-	-	-	-	-	-	-
Net Calorific Value in Dry Matter Q(V/net/d)	-	-	-	-	-	-	-	-
Net Calorific Value in Original Q(V/net/ar)	-	-	-	-	-	-	-	-
Water Analytical M (ad)	-	-	-	-	-	-	-	-
Water Gross M(ex)	-	-	-	-	-	-	-	-
Water Total M(ar)	-	-	-	-	-	-	-	-

Glan Llyn Residential Soil Data

										Sample ID	4GG51	4GG52	4GG61	4GG62	4GG71	4GG72	4GG73V
										Depth	0.4	0.7	0.3	0.5	0.5	1	3.2
										Sampled Date	19/11/2018	19/11/2018	13/11/2018	13/11/2018	19/11/2018	19/11/2018	19/11/2018
Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > WQS	Min	Max	Average	WQS	Percentage of exceedances							
Carbon																		
Mod Organic Matter (SOM)	TM132	%	0.35	1382	1370	0	0.35	99	9		0.00	7.1	7.03	0.712	1.72	45.3	10.5	0.91
Metals (Solids)																		
Aluminium	TM181	mg/kg	<0.6	1383	1383	1064	0.65	397	12	6.74	76.93	11.4	5.48	2.38	14.2	11.9	8.44	11.6
Cadmium	TM181	mg/kg	<0.02	1383	1383	864	0.02	91	1	0.19	62.47	1.6	0.524	0.122	0.2	0.2	0.2	0.129
Chromium	TM181	mg/kg	<0.9	1383	1383	1081	0.90	3090	139	25.08	78.09	9	5.37	17.8	9	9	9	27.1
Copper	TM181	mg/kg	<1.4	1383	1383	1383	1.40	1790	20	1.20	100.00	64	6.69	1.4	14	22.1	16	7.1
Lead	TM181	mg/kg	<0.7	1383	1383	1383	0.70	4240	94	41.20	29.95	27.6	25.4	1.4	25.4	22.1	14	2.51
Mercury	TM181	mg/kg	<0.14	1383	1383	606	0.14	4.2	1	0.93	43.92	-	1.4	0.14	1.4	1.4	1.4	0.14
Nickel	TM181	mg/kg	<0.7	1383	1383	427	1.34	313	26	30.67	58.97	15.6	9.91	1.4	23.7	45.4	35.6	39.2
Selenium	TM181	mg/kg	<1.2	1383	1383	410	1.00	53	1	0.67	58.93	1	93	1.97	2.2	1.5	1.5	2.2
Vanadium	TM181	mg/kg	<5.2	1383	1378	1377	<0.2	2680	207	4.27	99.67	38.3	36.7	40	76.2	155	87.3	49.4
Zinc	TM181	mg/kg	<1.9	1383	1383	1383	7.15	13300	291	365.79	11.57	72.8	57.3	11.8	134	170	129	105
TPH Criteria Working Group (TPH CWG)																		
Benzene	TM089	mg/kg	<0.01	271	271	271	0.01	0	0	0.01	100.00							
Toluene	TM089	mg/kg	<0.002	271	271	0	0.00	0	0	0.01	0.00							
Ethylbenzene	TM089	mg/kg	<0.003	271	271	0	0.00	0	0	0.01	0.00							
sum of detected mpo xylene by GC	TM089	ug/kg		271	271	0	0.00	0	0	0.03	0.00							
Aliphatics >C5-C6	TM089	mg/kg	<0.01	1383	1383	0	0.01	0	0	317.47	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C6-C8	TM089	mg/kg	<0.01	1383	1382	0	<0.01	3	0	1134.98	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C8-C10	TM089	mg/kg	<0.01	1383	1383	0	0.01	74	0	7844.34	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C10-C12	TM089	mg/kg	<0.01	1383	1383	0	0.01	647	1	60406.52	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aliphatics >C12-C16	TM173	mg/kg	<0.1	1383	1383	0	0.10	514	10	1198346.52	0.00	1.1	1.09	0.1	6.29	2.35	1.33	0.1
Aliphatics >C16-C21	TM173	mg/kg	<0.1	1383	1383	0	0.10	3520	27	##########	0.00	3.53	3.45	0.63	9.4	5.3	4.68	0.1
Aliphatics >C21-C35	TM173	mg/kg	<0.1	1383	1383	0	0.10	2580	60	##########	0.00	34.2	33.2	15.9	125	58.9	24.5	2.26
Aliphatics >C35-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	913	20	##########	0.00	6.07	6	12.1	77.5	17.9	10.6	0.1
Aromatics >EC5-EC7	TM089	mg/kg	<0.01	1383	1383	0	0.01	3	0	19.81	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC7-EC8	TM089	mg/kg	<0.01	1383	1383	0	0.01	40	0	661.13	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC8-EC10	TM089	mg/kg	<0.01	1383	1383	0	0.01	92	0	380.12	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC10-EC12	TM089	mg/kg	<0.01	1383	1383	1	0.01	458	2	600.25	0.07	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Aromatics >EC12-EC16	TM173	mg/kg	<0.1	1383	1383	1	0.10	5280	14	1196.62	0.07	0.719	1.23	1.13	2.66	1.1	0.1	0.1
Aromatics >EC16-EC21	TM173	mg/kg	<0.1	1383	1383	2	0.10	8605	47	5793.68	0.14	3.48	4.93	1.41	13	6.01	3.45	0.1
Aromatics >EC21-EC35	TM173	mg/kg	<0.1	1383	1383	0	0.10	9010	123	30052.88	0.00	23.5	49.2	10.4	133	38.1	14.8	0.1
Aromatics >EC35-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	1395	41	30052.88	0.00	1.33	13.4	19.5	156	16.1	14.1	0.1
Aromatics >EC40-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	724	15	30052.88	0.00	5.81	34.8	9.66	71.8	9.65	6.05	0.1
Polyaromatic Hydrocarbons (PAHs)																		
Acenaphthylene	TM218	µg/kg	<0.012	1383	1383	664	0.24	2100000	3076	44.45	48.01	12	12	12	60	17	120	12
Acenaphthene	TM218	µg/kg	<0.008	1383	1383	298	0.00	193000	466	75.05	21.45	12.6	54.3	8	67.4	6	80	8
Anthracene	TM218	µg/kg	<0.016	1383	1382	898	<0.016	1860000	3626	90.76	52.39	19.5	16	16	80	16	160	16
Benz(a)anthracene	TM218	µg/kg	<0.014	1383	1383	938	14.00	1160000	4445	1613.53	22.27	49.3	150	25.2	95.4	56.7	453	14
Benzo(a)pyrene	TM218	µg/kg	<0.015	1383	1383	898	15.00	714000	3728	91.65	64.83	40.2	121	23.2	81.9	36.3	250	15
Benzo(b)fluoranthene	TM218	µg/kg	<0.013	1383	1383	1383	15.00	1110000	5263	9.09	100.00	79.8	173	39	141	79.7	439	15
Benzo(k)fluoranthene	TM218	µg/kg	<0.014	1383	1383	1383	14.00	373000	2081	13.44	100.00	25.5	64	14	70	19.3	177	14
Benzo(g,h,i)perylene	TM218	µg/kg	<0.008	1383	1383	980	8.24	333000	2514	20.45	11.51	45.8	108	24	120	28.2	245	8
Chrysene	TM218	µg/kg	<0.01	1383	1383	294	0.10	1090000	4217	1651.53	21.26	49.7	158	29.3	139	66.3	372	10
Dibenz(a,h)anthracene	TM218	µg/kg	<0.013	1383	1383	64	0.02	177000	743	2227.55	4.63	0.025	0.063	0.013	0.115	0.053	0.23	0.025
Indeno(1,2,3-cd)pyrene	TM218	µg/kg	<0.019	1383	1383	898	0.02	374000	2607	67.35	64.93	34.5	99.4	19.3	90	36.9	180	0.019
Fluoranthene	TM218	µg/kg	<0.017	1383	1383	1132	0.02	2940000	11686	17.67	81.85	94.2	269	50.1	240	90.6	649	0.017
Fluorene	TM218	µg/kg	<0.01	1383	1383	509	0.10	1890000	2814	72.09	36.80	10.9	34.8	10	90	11.8	0.1	10
Naphthalene	TM218	µg/kg	<0.009	1383	1381	814	<0.009	4680000	10974	72.28	58.86	26.5	40.3	16.4	63.3	45.5	90	9
Phenanthrene	TM218	µg/kg	<0.015	1383	1383	977	15.00	3810000	9794	72.09	70.64	118	209	41.4	207	181	150	15
Pyrene	TM218	µg/kg	15	1008	1008	11	0.00	1950	10	203.18	1.09	0.0905	0.229	0.0374	0.22	0.0824	0.492	0.015
PAH, Total Detected USEPA 16	TM218	mg/kg	<0.118	1383	1380	0	<0.118	24400	76		0.00	0.713	1.7	0.289	1.23	0.763	2.83	0.118
Naphthalene-d8 % recovery**	TM218	%		1383	1378	0		9940	100		0.00	87.6	84.2	84	81.1	85.3	77.2	84.7
Acenaphthene-d10 % recovery**	TM218	%		1383	1377	0		9930	96		0.00	80.9	83	88.5	80.6	89.3	4	87.3
Phenanthrene-d10 % recovery**	TM218	%		1383	1379	0		9920	96		0.00	92.8	84.9	93.6	90.3	92.7	83.4	88.2
Chrysene-d12 % recovery**	TM218	%		1383	1380	0		9460	96		0.00	83.3	79	93.2	98.1	71.2	93.8	83.7
Perylene-d12 % recovery**	TM218	%		1383	1380	0		8930	94		0.00	75	74.2	79.9	83.2	68.4	74.7	82.5
Total Aliphatics >C12-C44	TM173	mg/kg	<0.1	1383	1383	0	0.10	4740	117		0.00	43.6	105	30.9	230	83.3	40.9	2.26
Total Aromatics >EC12-EC44	TM173	mg/kg	<0.1	1383	1383	0	0.10	25600	234		0.00	41.4	123	22.4	303	49.3	31	0.1
Total Aliphatics & Aromatics >C5-C44	TM173	µg/kg	100	1008	1008	0	0.10	27800	416		0.00	85.1	234	53.3	536	133	72	2.26
Metals - (Solid)																		
Iron	TM224	mg/kg	<1000	1383	1381	0	<1000	2350000	102030			164000	51600	13200	231000	243000	216020	28800
Manganese	TM224	mg/kg	<0.13	1383	1380		<0.13	408000	8674			3680	2780	4010	7140	3400	4920	980
Metals - (Liquid)																		
Calcium	TM224	mg/kg	<21	1371	622	0	<21	368000	131387			133000	-	26300	-	63300	-	-
Magnesium	TM224	mg/kg	<8	1371	623	0	<8	55700	15321			27200	-	4160	-	7320	-	-
Phenols																		
Phenol	TM062 (S)	mg/kg	<0.01	1371	1317	1317	0.01	1	0	0.00	100.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Cresols	TM062 (S)	mg/kg	<0.01	1371	1317	1317	<0.01	3	0	0.00	96.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Xylenols	TM062 (S)	mg/kg	<0.015	1371	1317	1317	<0.015	4	0	0.00	96.06	0.015	0.015	0.015	0.015	0.015	0.015	0.015
Phenols, Total Detected monohydric	TM062 (S)	mg/kg	<0.035	1371	1317	1317	<0.035	10	0	0.00	96.06	0.035	0.035	0.035	0.035	0.035	0.035	0.035
Inorganics																		
Soluble Sulphate 2:1 extract as SO4 BRE	TM243	g/l	<0.004	1002	423	420	<0.004	2	0	0.00	42.42	0.254	-	1.51	-	9.14	-	-
pH	TM133	pH Units	>1	1002	972	972	>1	13	10	0.00	97.01	9.82	9.91	10.4	9.82	9.4	9.3	8.98
Sulphate, Total	TM132	mg/kg	<48	1002	420	404	<48	229600	6520	0.00	43.33	-	-	-	-	-	-	-
Sulphur, Total	TM132	%	<0.02	1002	404	404	<0.02	0	0	0.00	40.32	0.26	-	0.016	-	0.238	-	-
Sulphate, Total potential	TM132	%	<0.02	1002	404	404	<0.02	28	1	0.00	40.32	0.26	-	0.016	-	0.238	-	-
Sulphate, acid soluble (total)	TM231	%	<0.02	1002	425	425	<0.02	3	0	0.00	42.42	0.683	-	0.736	-	0.234	-	-
Cyanide, Total	TM153	mg/kg	<1	1002	1001	1001	<1	272	2	0.00	99.90	-	1	-	1	-	1	1
Exchangeable Ammonia as N	TM024	mg/kg	<12	1002	948	948	<12	1590	61	0.00	94.61	12	12	12	12	14.1	12	89
Asbestos																		
Asbestos Quantification - Gravimetric - %	TM004	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-
Date of Analysis	TM048	No units		1371	0	0				0.00		30/11/2018	-	19/11/2018	-	30/11/2018	-	-
Analysed By	TM048	No units		1371	0	0				0.00		Paul Poynton	-	Andrzej Ferlecki	-	Paul Poynton	-	-
Asbestos Quantification - PCOM Evaluation - %	TM004	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-
Additional Asbestos Components (Using TM048)	TM004	No units		1002	0	0				0.00		-	-	-	-	-	-	-
Analysis Comments	TM004	No units		1002	0	0				0.00		-	-	-	-	-	-	-
Asbestos Quantification - Total - %	TM004	%	<0.001	1371	65	65	<0.001	0	0	0.00		-	-	-	-	-	-	-
Chrysotile (White) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-
Amosite (Brown) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-
Crocidolite (Blue) Asbestos	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Anthophyllite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Tremolite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-
Fibrous Actinolite	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-
Non-Asbestos Fibre	TM048	No units		1371	0	0				0.00		Not Detected	-	Not Detected	-	Not Detected	-	-
Comments	TM048	No units		1371	0	0			0	0.00		0	-	0	-	0	-	-
Volatile Organic Compounds (VOCs)																		
Dibromofluoromethane**	TM116	%		1371	1100	1100		175	105	0.00		108	113	114	106	112	105	114
Toluene-d8**	TM116	%		1371	1100	1100		118	97	0.00		96.6	102	104	96.6	93.1	92.6	104
4-Bromofluorobenzene**	TM116	%		1371	1100	1100		111	90	0.00		95.8	85.3	108	97	90.2	94.1	88.2
Methyl Tertiary Butyl Ether	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	2	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benzene	TM116	mg/kg	<0.09	1371	1099	1099	<0.09	0	0	0.00		0.09	0.09	0.09	0.09	0.09	0.09	0.09
Toluene	TM116	mg/kg	<0.07	1371	1099	1099	<0.07	28	0	0.00		0.07	0.07	0.07	0.07	0.07	0.07	0.07
Ethylbenzene	TM116	mg/kg	<0.04	1371	1099	1099	<0.04	0	0	0.00		0.04	0.04	0.04	0.04	0.04	0.04	0.04
p/m-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	47	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1
o-Xylene	TM116	mg/kg	<0.1	1371	1099	1099	<0.1	19	0	0.00		0.1	0.1	0.1	0.1	0.1	0.1	0.1
Naphthalene	TM116	mg/kg	<0.13	1371	1211	1211	<0.13	15500	17	0.00		0.13	0.13	0.13	0.13	0.13	0.13	0.13
Sum of BTEX	TM116	mg/kg	<0.4	1371	1065	1098	<0.4	116	1	0.00		0.4	0.4	0.4	0.4	0.4	0.4	0.4
Subcontracted: Inorganics																		
Gross Calorific Value (v Dry Matter QV(grid))	SUB	MJ/kg	<0.5	1371	18	18	<0.5	28	14	0.00		-	-	-	-	-	-	-
Gross Calorific Value Original QV(grid)	SUB	MJ/kg	<0.5	1371	18	18	<0.5	24	12	0.00		-	-	-	-	-	-	-
Net Calorific Value in Dry Matter QV(metric)	SUB	MJ/kg	<0.5	1371	18	18	<0.5	28	14	0.00		-	-	-	-	-	-	-
Net Calorific Value in Original QV(metric)	SUB	MJ/kg	<0.5	1371	18	18	<0.5	25	12	0.00		-	-	-	-	-	-	-
Water Analytical M (ad)	SUB	%	<0.5	1371	18	18	<0.5	4	1	0.00		-	-	-	-	-	-	-
Water Gross Moist	SUB	%	<0.5	1371	18	18	<0.5	25	14	0.00		-	-	-	-	-	-	-
Water Total Moist	SUB	%	<0.5	1371	18	18	<0.5	25	15	0.00		-	-	-	-	-	-	-

Appendix F: Sampling Location Plans

PHASE 3B

Main Foul Infrastructure to be laid by St. Modwen Developments

Foul Pumping Station #4

Blueway Reen

Blueway Ree

Lake

Greenway

Cycleway

5.5m Road Location tbc

5.5m Road Location tbc

+6.35 FGL

+6.35 FGL

FGL 6.35 +

FGL 6.35 +

FGL 6.35 +

POC

POC

POC

6.50

6.75

6.50

6.75

25

A B C D E F

1 2 3 4 5 6 7 8

A1 B1 C1 D1 E1 F1

A2 B2 C2 D2 E2 F2

A3 B3 C3 D3 E3 F3

B4 C4 D4 E4 F4

B5 C5 D5 E5 F5

B6 C6 D6 E6 F6

C7 D7 E7 F7

B8 C8 D8 E8 F8

N°	M	P
C1	335762.257	186956.550
D1	335787.174	186954.507
E1	335812.090	186952.464
F1	335837.006	186950.422
A2	335710.382	186935.719
B2	335735.298	186933.676
C2	335760.214	186931.633
D2	335785.131	186929.591
E2	335810.047	186927.548
F2	335834.964	186925.505
A3	335708.339	186910.802
B3	335733.255	186908.760
C3	335758.172	186906.717
D3	335783.088	186904.674
E3	335808.005	186902.632
F3	335832.921	186900.589
B4	335731.213	186883.843
C4	335756.129	186881.801
D4	335781.045	186879.758
E4	335805.962	186877.715
F4	335830.878	186875.672
B5	335729.170	186858.927
C5	335754.086	186856.884
D5	335779.003	186854.841
E5	335803.919	186852.799
F5	335828.836	186850.756
C6	335752.044	186831.968
D6	335776.960	186829.925
E6	335801.876	186827.882
F6	335826.793	186825.840
C7	335750.001	186807.091
D7	335774.917	186805.009
E7	335799.834	186802.966
F7	335824.750	186800.923
B8	335723.042	186784.178
C8	335747.958	186782.135
D8	335772.875	186780.092
E8	335797.791	186778.050
F8	335822.707	186776.007

Revision: | Details | Date

Disclaimer:
This plan should only be used for its original purpose. Hawk accepts no responsibility for this plan when used by any party other than the original client.

All dimensions and or level information shown should be checked on site prior to design and construction.

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Reference Grid: Ordnance Survey National Grid (OSGB36) via the Active GNSS Network

Reference Datum: Ordnance Survey National Grid (OSGB36) via the Active GNSS Network

All dimensions in Metres

Client: St Modwen

Project Title:

Drawing Title:

For Information Only

Scale: | Sheet Size: | Drawn: | Date: 13.03.2018

Drawing Number: *XXXX* | Revision: *R1

Sheet Size: A0

AMOUNT OF POSITIONS = 114

North Woods

Phase 3c

Plot 3C
7.50 FGL
6.90 formation

0.0HA

Phase 3d

Plot 3D

Plot 3D

Timber footbridge

Timber footbridge

Timber footbridge

Existing Culvert 1350dia IL 5.10

Gardens to back onto Northern Reen.
Min 1m standoff to top of bank

Footpath to follow Reen

Any Reen crossing to be culverted

Any Reen crossing to be culverted

Up to 2No. Site Entrance's

Pedestrian Crossing

Pedestrian Crossing

6.50 FGL
5.90 formation

6.94 FGL
6.34 formation

7.70 FGL
7.10 formation

6.70 FGL
6.10 formation

1:100

Cut/Fill Summary

If we cut everything up to level 4.50

If we carry out a cleaning, using the levels on blue footprint

For Information Only

Disclaimer:
This plan should only be used for its original purpose. Hawk accepts no responsibility for this plan being used by any party other than the original client.

All dimensions and or level information shown should be checked on site prior to design and construction.

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Reference Grid:	Reference Datum:
Ordnance Survey National Grid (OSGB36) via the Active GNSS Network	Ordnance Survey National Grid (OSGB36) via the Active GNSS Network

All dimensions in metres

Client: St Modwen

Project Title:

Drawing Title:

Scale:	Sheet Size:	Drawn:	Date:
			/_/_

Drawing Number: *XXXX*

Revision: *RXX*

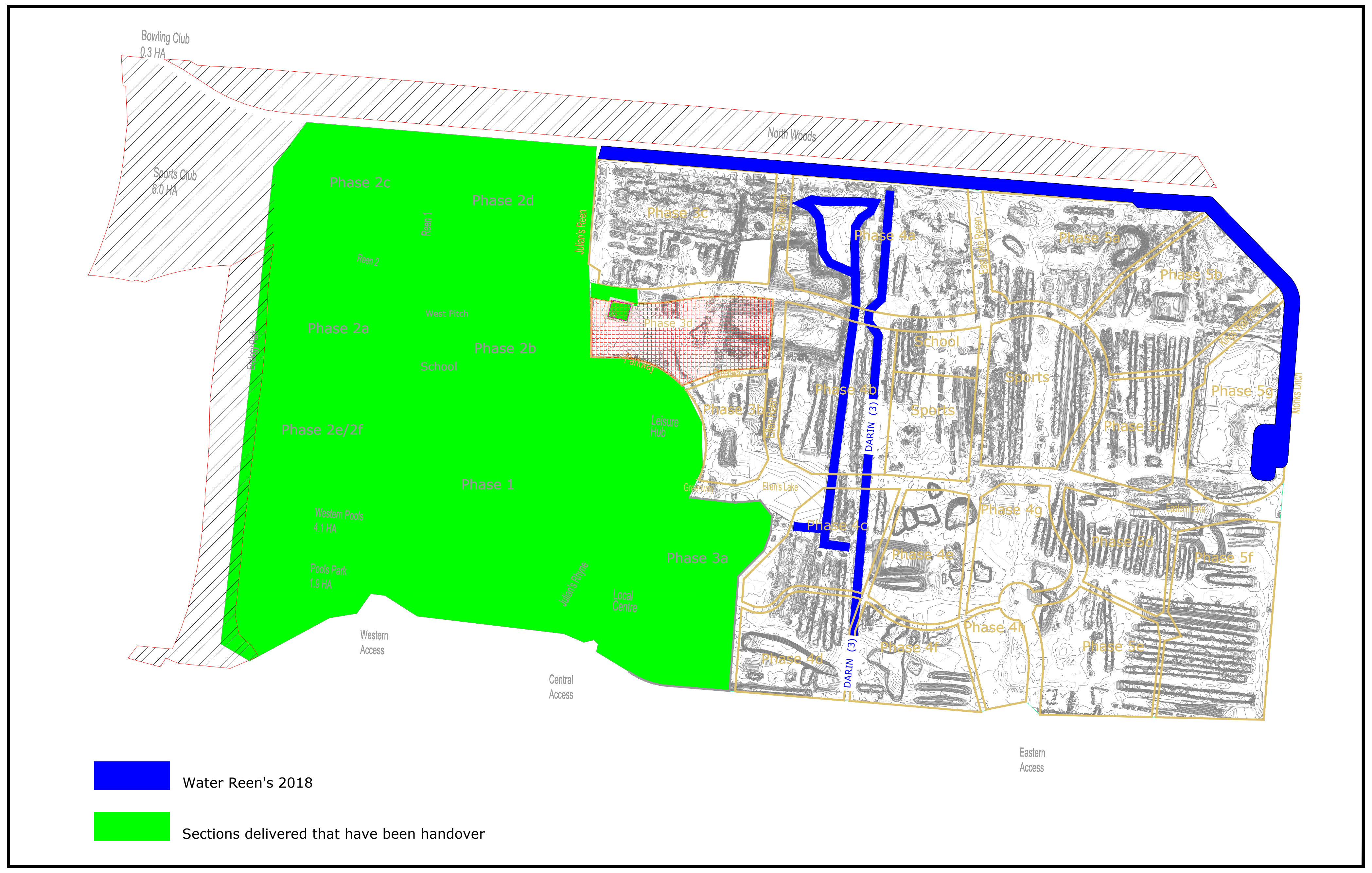
Revision	Details	Date

100

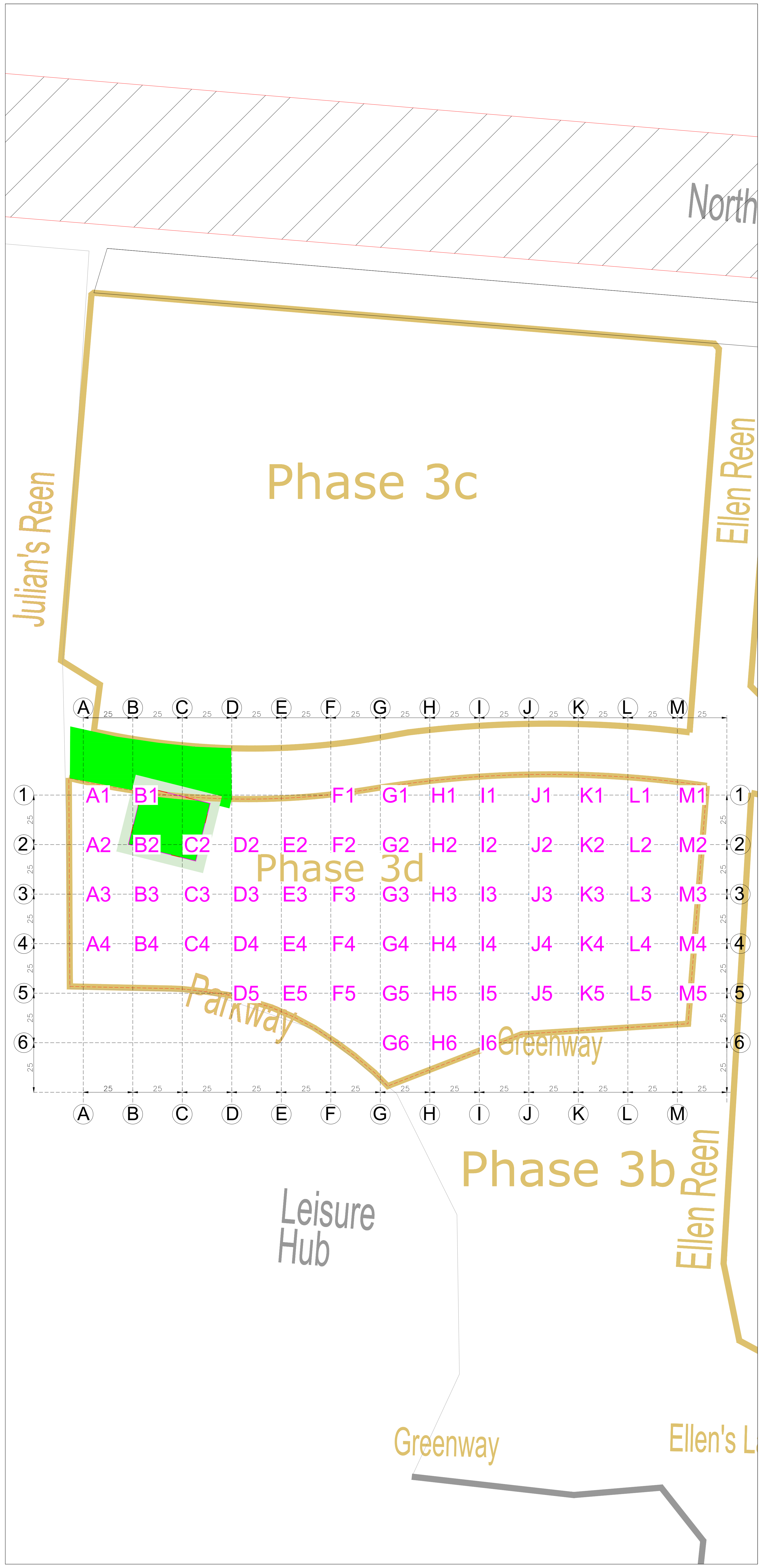
Millimetres

10

0

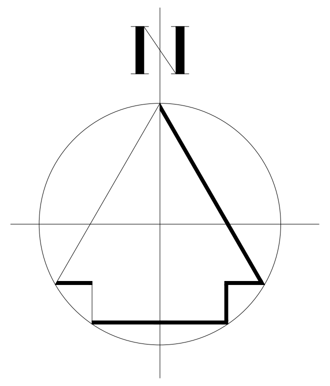






62 POSITIONS

Log	X	y	N'
A1	335536.245	187087.4374	1
A2	335536.245	187062.4374	2
A3	335536.245	187037.4374	3
A4	335536.245	187012.4374	4
B1	335561.245	187087.4374	5
B2	335561.245	187062.4374	6
B3	335561.245	187037.4374	7
B4	335561.245	187012.4374	8
C2	335586.245	187062.4374	9
C3	335586.245	187037.4374	10
C4	335586.245	187012.4374	11
D2	335611.245	187062.4374	12
D3	335611.245	187037.4374	13
D4	335611.245	187012.4374	14
D5	335611.245	186987.4374	15
E2	335636.245	187062.4374	16
E3	335636.245	187037.4374	17
E4	335636.245	187012.4374	18
E5	335636.245	186987.4374	19
F1	335661.245	187087.4374	20
F2	335661.245	187062.4374	21
F3	335661.245	187037.4374	22
F4	335661.245	187012.4374	23
F5	335661.245	186987.4374	24
G1	335686.245	187087.4374	25
G2	335686.245	187062.4374	26
G3	335686.245	187037.4374	27
G4	335686.245	187012.4374	28
G5	335686.245	186987.4374	29
G6	335686.245	186962.4374	30
H1	335711.245	187087.4374	31
H2	335711.245	187062.4374	32
H3	335711.245	187037.4374	33
H4	335711.245	187012.4374	34
H5	335711.245	186987.4374	35
H6	335711.245	186962.4374	36
I1	335736.245	187087.4374	37
I2	335736.245	187062.4374	38
I3	335736.245	187037.4374	39
I4	335736.245	187012.4374	40
I5	335736.245	186987.4374	41
I6	335736.245	186962.4374	42
J1	335761.245	187087.4374	43
J2	335761.245	187062.4374	44
J3	335761.245	187037.4374	45
J4	335761.245	187012.4374	46
J5	335761.245	186987.4374	47
K1	335786.245	187087.4374	48
K2	335786.245	187062.4374	49
K3	335786.245	187037.4374	50
K4	335786.245	187012.4374	51
K5	335786.245	186987.4374	52
L1	335811.245	187087.4374	53
L2	335811.245	187062.4374	54
L3	335811.245	187037.4374	55
L4	335811.245	187012.4374	56
L5	335811.245	186987.4374	57
M1	335836.245	187087.4374	58
M2	335836.245	187062.4374	59
M3	335836.245	187037.4374	60
M4	335836.245	187012.4374	61
M5	335836.245	186987.4374	62



REV.	DATE	NOTES	Ds.	Rev.	Ap.
3D.1	27/11/18	Phase 3D -Geotechnical Engineer Grid 25x25	GF	JF	CR

Disclaimer:
This plan should only be used for its original purpose. Hawk accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions and or level information shown should be checked on site prior to design and construction.

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Reference Grid:	Reference Datum:
Ordnance Survey National Grid (OSGB36) via the Active GNSS Network	Ordnance Survey National Datum (OSGB36) via the Active GNSS Network

All dimensions in metres

Client:

St Modwen

Project Title:

LLANWERN-Glan Llyn Primary
Phase 3D

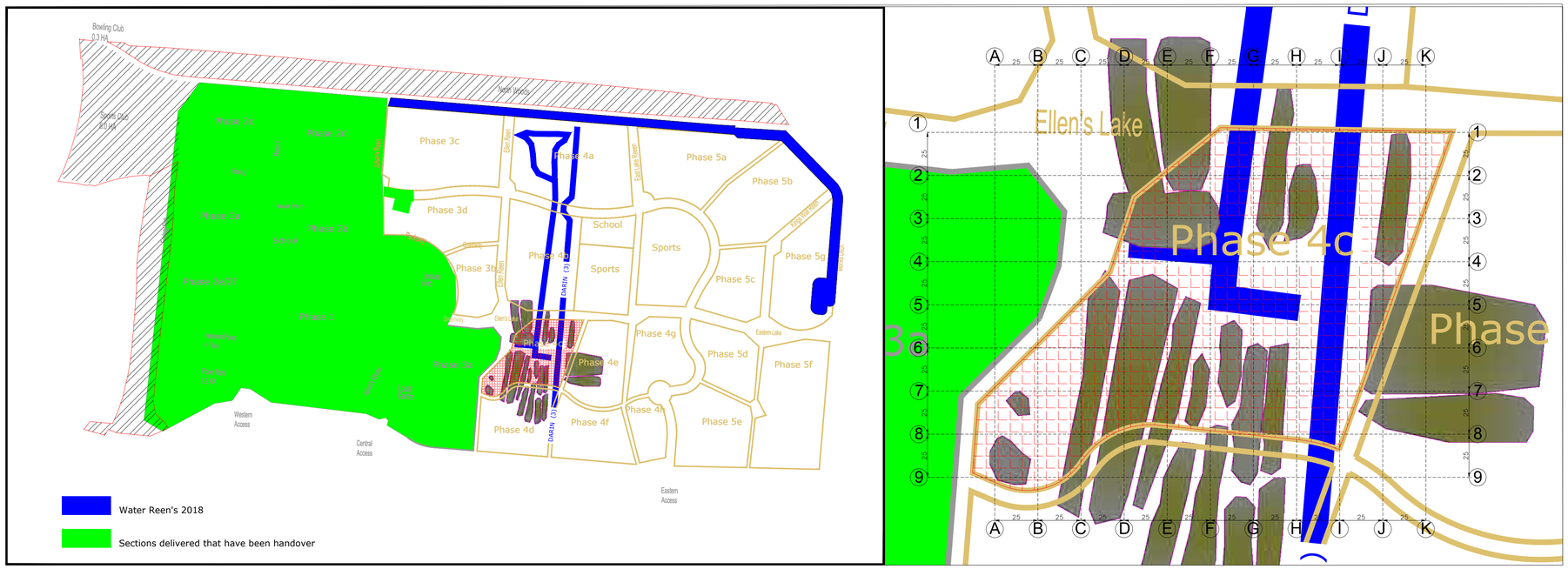
Drawing Title:

Phase 4G -Geotechnical Engineer
Testing Grid
Grid 25x25

Scale:	Sheet Size:	Drawn:	Date:
DO NOT SCALE			27/11/2018

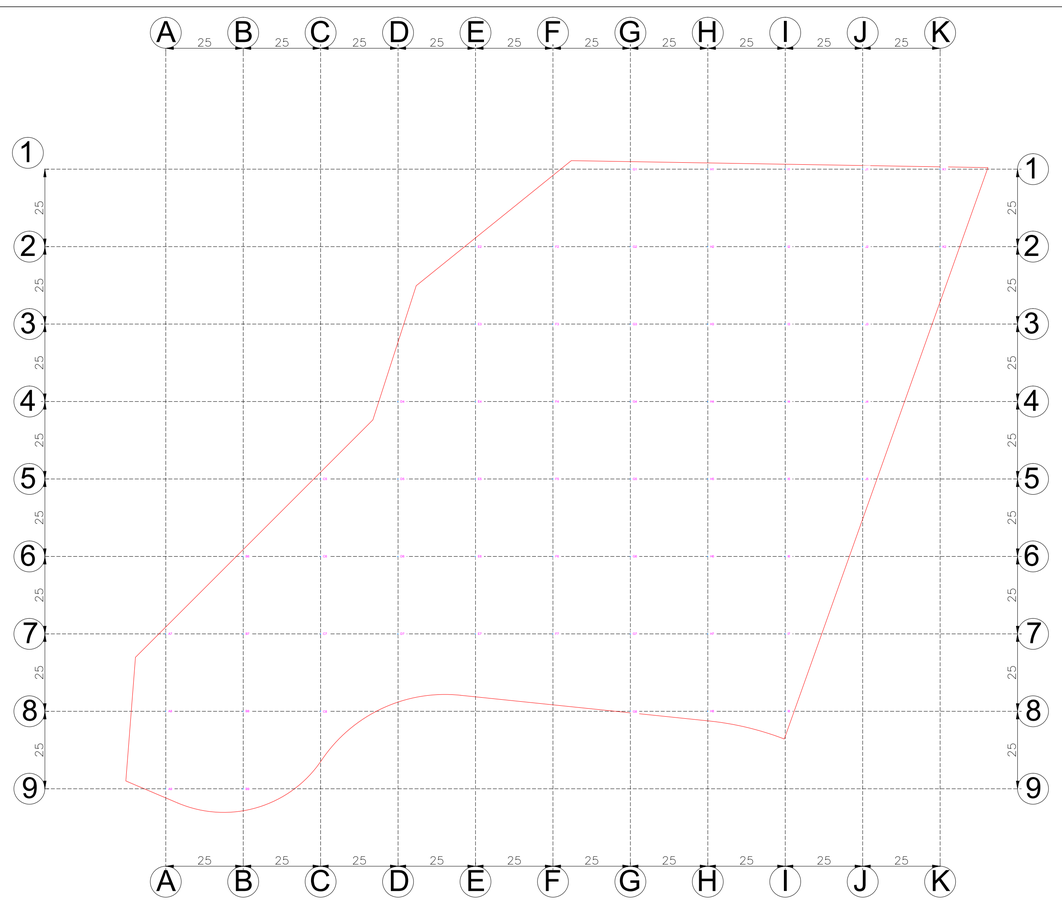
Drawing Number:	Revision:
Geotechnical Grid 25x25	3D.1

For Information Only



58 POSITIONS

Log	X	y
A7	335808.8769	186607.028
A8	335808.8769	186582.028
A9	335808.8769	186557.028
B6	335833.8769	186632.028
B7	335833.8769	186607.028
B8	335833.8769	186582.028
B9	335833.8769	186557.028
C5	335858.8769	186657.028
C6	335858.8769	186632.028
C7	335858.8769	186607.028
C8	335858.8769	186582.028
D4	335883.8769	186682.028
D5	335883.8769	186657.028
D6	335883.8769	186632.028
D7	335883.8769	186607.028
E2	335908.8769	186732.028
E3	335908.8769	186707.028
E4	335908.8769	186682.028
E5	335908.8769	186657.028
E6	335908.8769	186632.028
E7	335908.8769	186607.028
F2	335933.8769	186732.028
F3	335933.8769	186707.028
F4	335933.8769	186682.028
F5	335933.8769	186657.028
F6	335933.8769	186632.028
F7	335933.8769	186607.028
G1	335958.8769	186757.028
G2	335958.8769	186732.028
G3	335958.8769	186707.028
G4	335958.8769	186682.028
G5	335958.8769	186657.028
G6	335958.8769	186632.028
G7	335958.8769	186607.028
G8	335958.8769	186582.028
H1	335983.8769	186757.028
H2	335983.8769	186732.028
H3	335983.8769	186707.028
H4	335983.8769	186682.028
H5	335983.8769	186657.028
H6	335983.8769	186632.028
H7	335983.8769	186607.028
H8	335983.8769	186582.028
I1	336008.8769	186757.028
I2	336008.8769	186732.028
I3	336008.8769	186707.028
I4	336008.8769	186682.028
I5	336008.8769	186657.028
I6	336008.8769	186632.028
I7	336008.8769	186607.028
I8	336008.8769	186582.028
J1	336033.8769	186757.028
J2	336033.8769	186732.028
J3	336033.8769	186707.028
J4	336033.8769	186682.028
J5	336033.8769	186657.028
K1	336058.8769	186757.028
K2	336058.8769	186732.028



N

REV.	DATE	NOTES	Ds.	Rev.	Ap.
4C.1	26/09/18	Phase 4C -Geotechnical Engineer Grid 25x25	GF	JF	CR

Disclaimer:

This plan should only be used for its original purpose. Hawk accepts no responsibility for this plan if applied to any party other than the original client.

All dimensions and or level information shown should be checked on site prior to design and construction.

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Reference Grid:	Reference Datum:
Ordnance Survey National Grid (OSGB36) via the Active GNSS Network	Ordnance Survey National Datum (OSGB36) via the Active GNSS Network

All dimensions in metres

Client:

St Modwen

Project Title:

LLANWERN-Glan Llyn Primary
Phase 4C

Drawing Title:

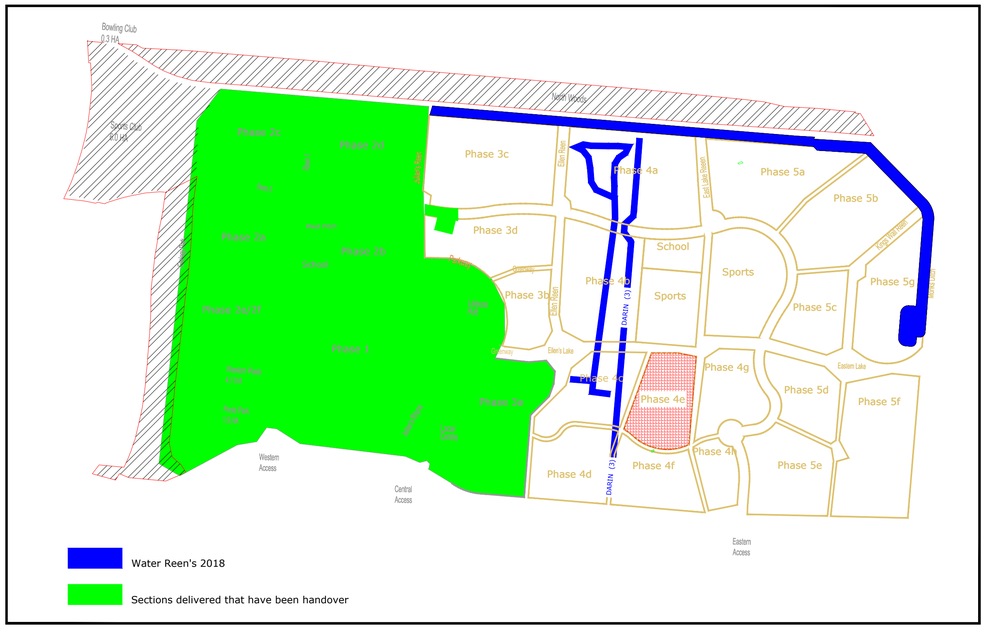
Phase 4C -Geotechnical Engineer Testing - Grid
Grid 25x25

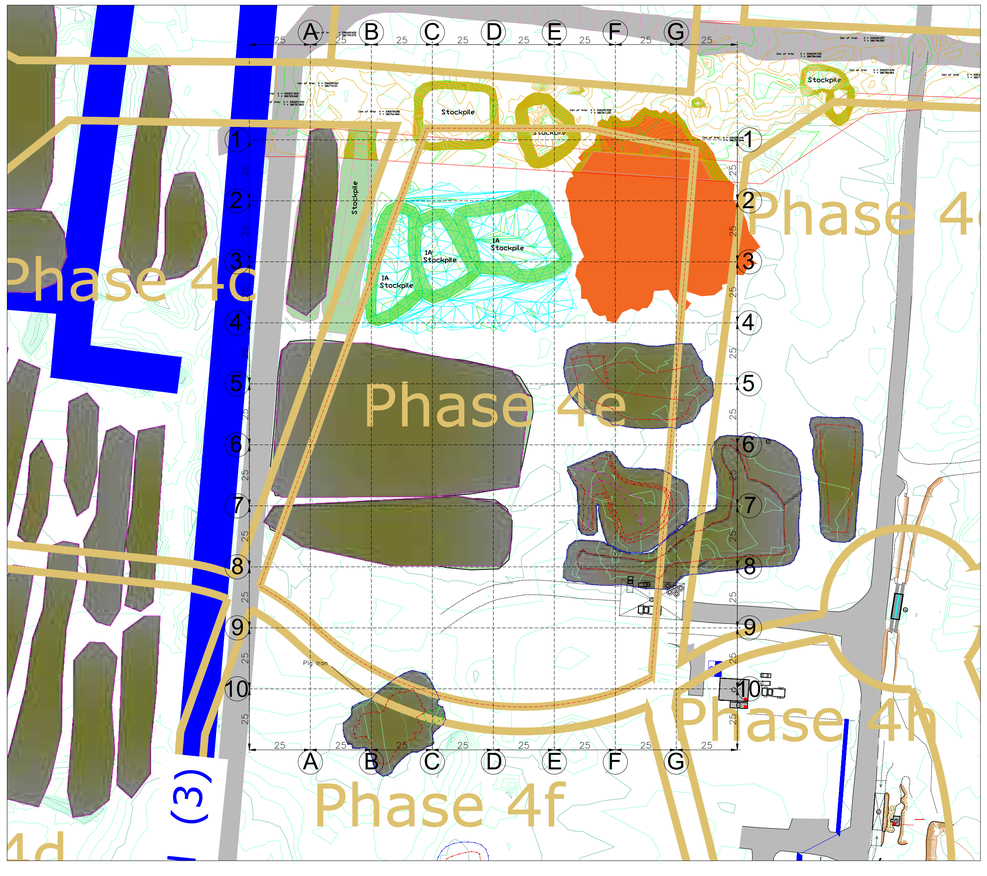
Scale:	Sheet Size:	Drawn:	Date:
DO NOT SCALE			26/09/2018

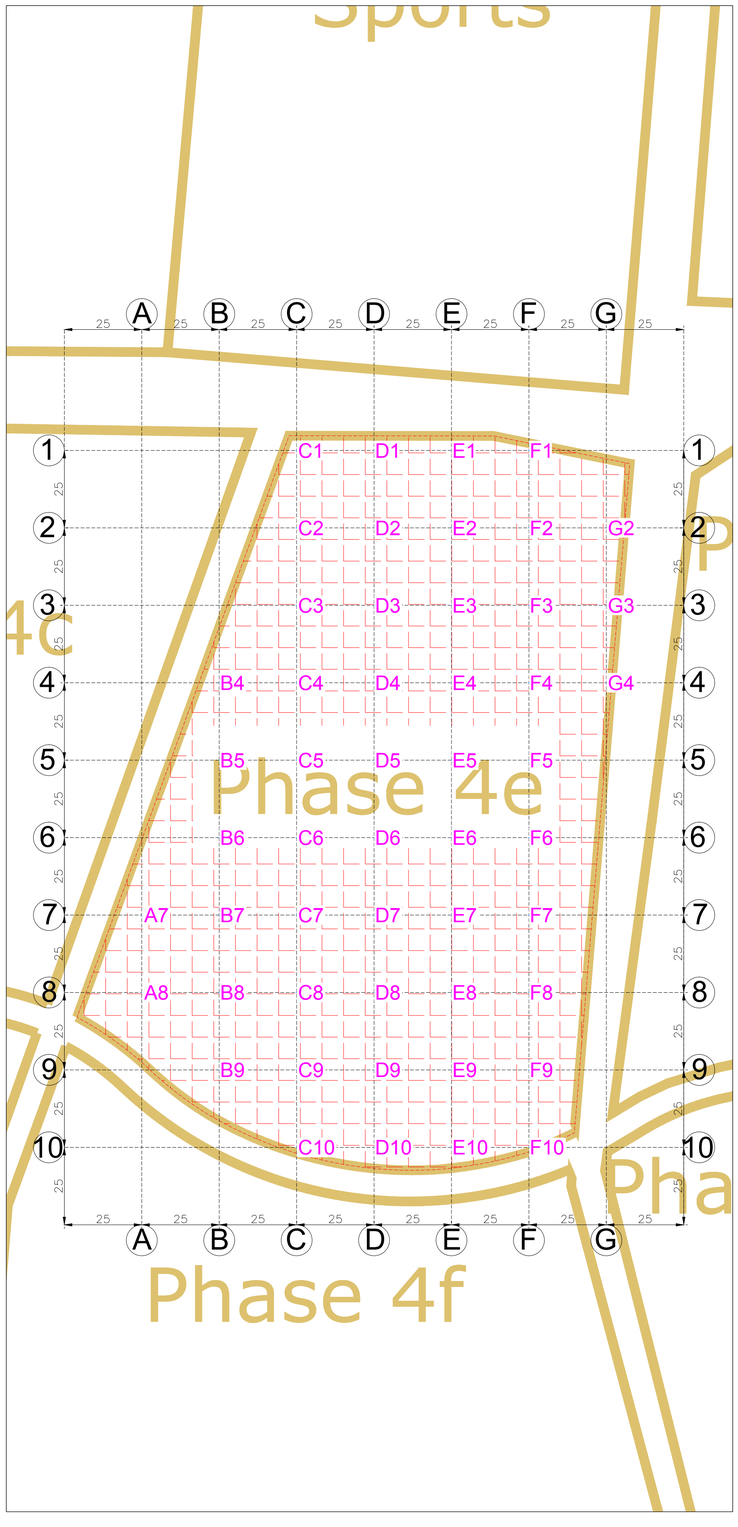
Drawing Number:	Revision:
Geotechnical Grid 25x25	4C.1

For Information Only

Millimetres 100 0 10
User: gfuse
Date: 26/09/18 16:50:43
Plotted: 21 Dec 2018 - 4:04PM
Filename: H:\Projects\Llanwern\Engineering\Phase 4C\Phase 4C -Geotechnical Engineer Grid 25x25_v1_4C.1.dwg







51 POSITIONS

Log	X	y
A7	336039.0603	186601.7624
A8	336039.0603	186576.7624
B4	336064.0603	186676.7624
B5	336064.0603	186651.7624
B6	336064.0603	186626.7624
B7	336064.0603	186601.7624
B8	336064.0603	186576.7624
B9	336064.0603	186551.7624
C1	336089.0603	186751.7624
C2	336089.0603	186726.7624
C3	336089.0603	186701.7624
C4	336089.0603	186676.7624
C5	336089.0603	186651.7624
C6	336089.0603	186626.7624
C7	336089.0603	186601.7624
C8	336089.0603	186576.7624
C9	336089.0603	186551.7624
C10	336089.0603	186526.7624
D1	336114.0603	186751.7624
D2	336114.0603	186726.7624
D3	336114.0603	186701.7624
D4	336114.0603	186676.7624
D5	336114.0603	186651.7624
D6	336114.0603	186626.7624
D7	336114.0603	186601.7624
D8	336114.0603	186576.7624
D9	336114.0603	186551.7624
D10	336114.0603	186526.7624
E1	336139.0603	186751.7624
E2	336139.0603	186726.7624
E3	336139.0603	186701.7624
E4	336139.0603	186676.7624
E5	336139.0603	186651.7624
E6	336139.0603	186626.7624
E7	336139.0603	186601.7624
E8	336139.0603	186576.7624
E9	336139.0603	186551.7624
E10	336139.0603	186526.7624
F1	336164.0603	186751.7624
F2	336164.0603	186726.7624
F3	336164.0603	186701.7624
F4	336164.0603	186676.7624
F5	336164.0603	186651.7624
F6	336164.0603	186626.7624
F7	336164.0603	186601.7624
F8	336164.0603	186576.7624
F9	336164.0603	186551.7624
F10	336164.0603	186526.7624
G2	336189.0603	186726.7624
G3	336189.0603	186701.7624
G4	336189.0603	186676.7624

REV.	DATE	NOTES	Ds.	Rev.	Ap.
4E.1	29/10/18	Phase 4E -Geotechnical Engineer Grid 25x25	GF	JF	CR
4E.2	30/10/18	Phase 4E - Key number of logs (51)	GF	JF	CR

Disclaimer:

This plan should only be used for its original purpose. Hawk accepts no responsibility for this plan if applied to any party other than the original client.

All dimensions and or level information shown should be checked on site prior to design and construction.

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Reference Grid:	Reference Datum:
Ordnance Survey National Grid (OSGB36) via the Active GNSS Network	Ordnance Survey National Datum (OSGB36) via the Active GNSS Network

All dimensions in metres

Client:

St Modwen

Project Title:

LLANWERN-Glan Llyn Primary
Phase 4E

Drawing Title:

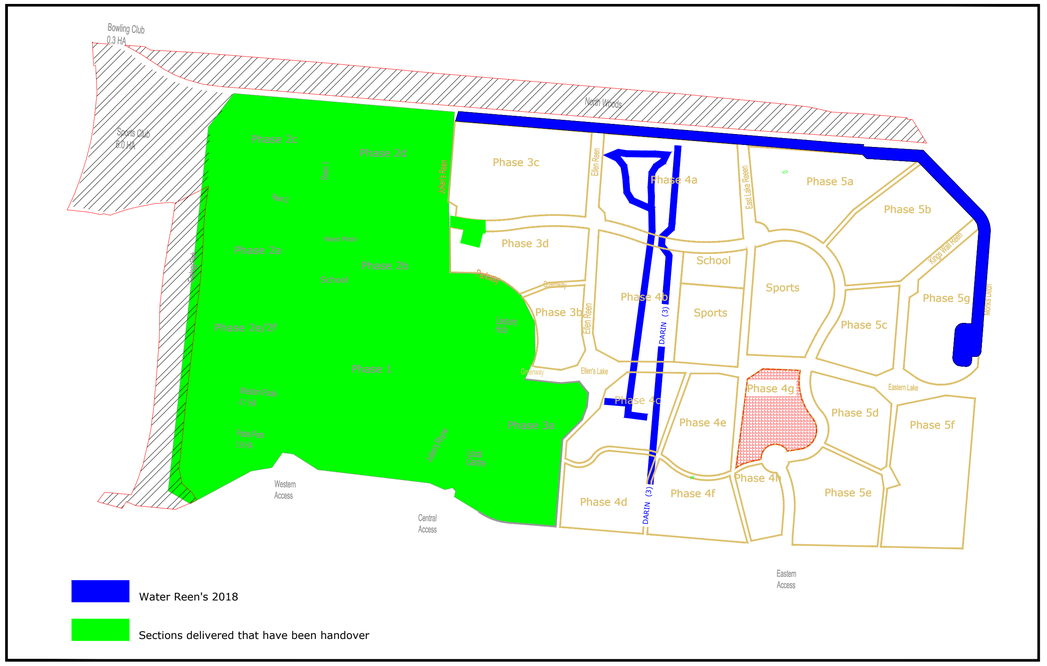
Phase 4E -Geotechnical Engineer
Testing Grid
Grid 25x25

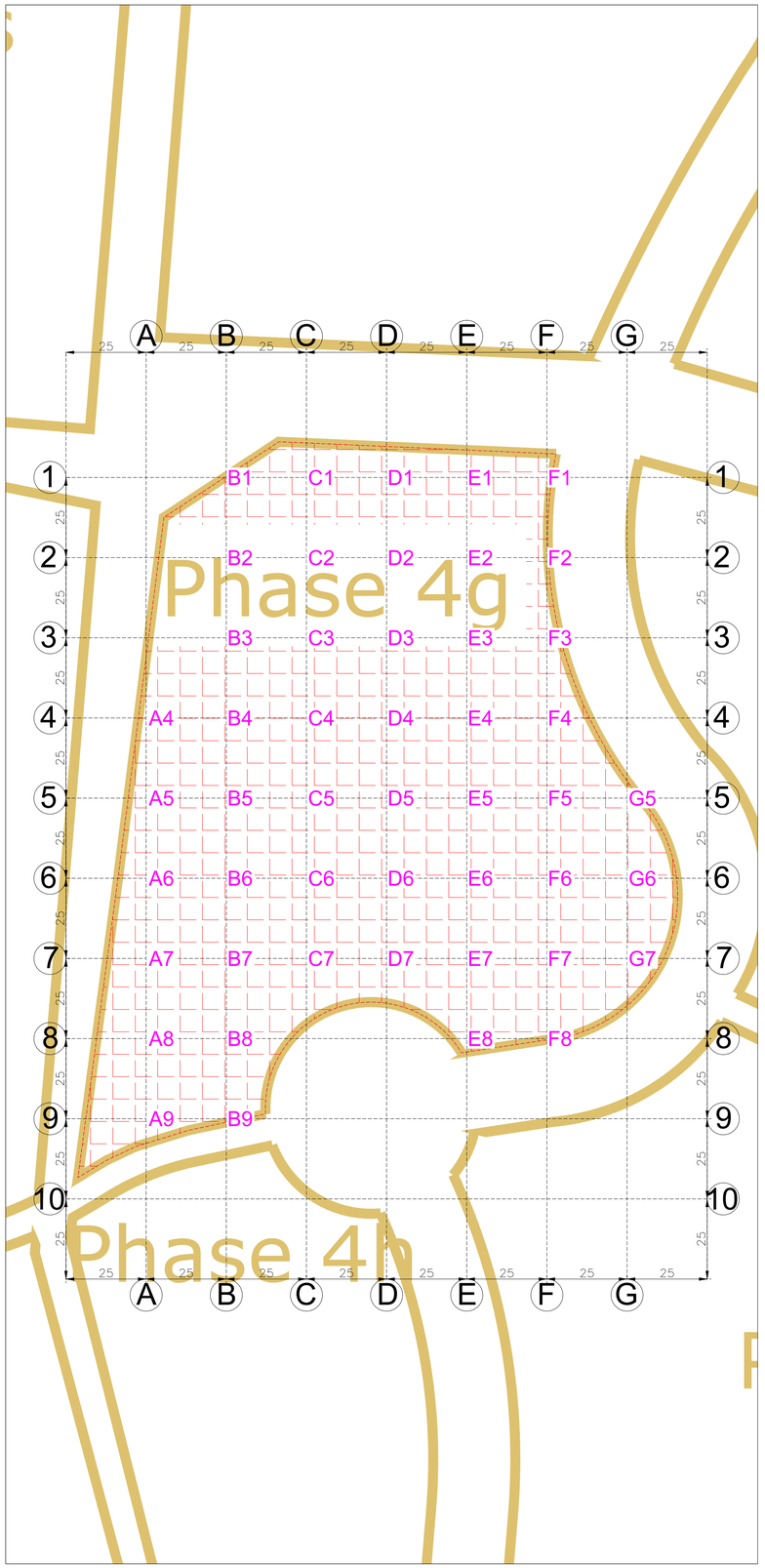
Scale:	Sheet Size:	Drawn:	Date:
DO NOT SCALE			30/10/2018

Drawing Number:	Revision:
Geotechnical Grid 25x25	4E.2

For Information Only

COPYRIGHT RESERVED. THIS DRAWING IS THE PROPERTY OF HAWK ENVIRONMENTAL LTD. IT MUST NOT BE COPIED OR REPRODUCED WITHOUT THE CONSENT OF THE COMPANY.

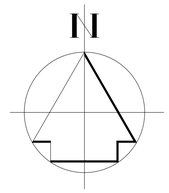






48 POSITIONS

Lag	X	y	N'
A4	336212.3946	186681.2165	1
A5	336212.3946	186656.2165	2
A6	336212.3946	186631.2165	3
A7	336212.3946	186606.2165	4
A8	336212.3946	186581.2165	5
A9	336212.3946	186556.2165	6
B1	336237.3946	186756.2165	7
B2	336237.3946	186731.2165	8
B3	336237.3946	186706.2165	9
B4	336237.3946	186681.2165	10
B5	336237.3946	186656.2165	11
B6	336237.3946	186631.2165	12
B7	336237.3946	186606.2165	13
B8	336237.3946	186581.2165	14
B9	336237.3946	186556.2165	15
C1	336262.3946	186756.2165	16
C2	336262.3946	186731.2165	17
C3	336262.3946	186706.2165	18
C4	336262.3946	186681.2165	19
C5	336262.3946	186656.2165	20
C6	336262.3946	186631.2165	21
C7	336262.3946	186606.2165	22
D1	336287.3946	186756.2165	23
D2	336287.3946	186731.2165	24
D3	336287.3946	186706.2165	25
D4	336287.3946	186681.2165	26
D5	336287.3946	186656.2165	27
D6	336287.3946	186631.2165	28
D7	336287.3946	186606.2165	29
E1	336312.3946	186756.2165	30
E2	336312.3946	186731.2165	31
E3	336312.3946	186706.2165	32
E4	336312.3946	186681.2165	33
E5	336312.3946	186656.2165	34
E6	336312.3946	186631.2165	35
E7	336312.3946	186606.2165	36
E8	336312.3946	186581.2165	37
F1	336337.3946	186756.2165	38
F2	336337.3946	186731.2165	39
F3	336337.3946	186706.2165	40
F4	336337.3946	186681.2165	41
F5	336337.3946	186656.2165	42
F6	336337.3946	186631.2165	43
F7	336337.3946	186606.2165	44
F8	336337.3946	186581.2165	45
G5	336362.3946	186656.2165	46
G6	336362.3946	186631.2165	47
G7	336362.3946	186606.2165	48



REV.	DATE	NOTES	Ds.	Rev.	Ap.
4G.1	01/11/18	Phase 4G -Geotechnical Engineer Grid 25x25	GF	JF	CR

Disclaimer:
This plan should only be used for its original purpose. Hawk accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions and or level information shown should be checked on site prior to design and construction.

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Reference Grid:	Reference Datum:
Ordnance Survey National Grid (OSGB36) via the Active GNSS Network	Ordnance Survey National Datum (OSGB36) via the Active GNSS Network

All dimensions in Metres

Client:

St Modwen

Project Title:

LLANWERN-Glan Llyn Primary
Phase 4G

Drawing Title:

Phase 4G -Geotechnical Engineer Testing Grid
Grid 25x25

Scale:	Sheet Size:	Drawn:	Date:
DO NOT SCALE			01/11/2018

Drawing Number: Geotechnical Grid 25x25

Revision: 4G.1

For Information Only

Millimetres 0 10 100

ATKINS

5111373-LLA-DWG-EG-0422

Phase 4a

Phase 5a

Phase 4b

School

Sports

Sports

East Lake Reen

Pumping Stn

Phase 4b Spoil Stockpile B

Pavilion

KEY

COKING WORKS BOUNDRY

125No. TRIAL PIT - 3m

20No. CABLE PERCUSSIVE BOREHOLE - 10m

10No. DYNAMIC SAMPLING WITH ROTARY FOLLOW-ON BOREHOLE - 20m

WINDOW SAMPLING - 5m (LOCATIONS TO BE DECIDED FOLLOWING TRIAL PITTING)

N

REVISIONS	Drawn By	Checked By	Date

PURPOSE OF ISSUE	Rev.	Authorised for issue	Date

Atkins Ltd
Consulting Engineers
The Axis, 10 Holliday Street
Birmingham West Midlands B1 1TF
Tel 0121 483 5000
Fax 0121 483 5252

© THIS DRAWING IS NOT TO BE SCALED

CLIENT

PROJECT
LLANWERN

DRAWING TITLE
COKING WORKS
EXPLORATORY HOLE LOCATION PLAN

SCALES	DRAWN	CHECKED	CO-ORD CHECK
1:1250	RJ	SD	
	DATE 05/09/18	DATE 05/09/18	DATE

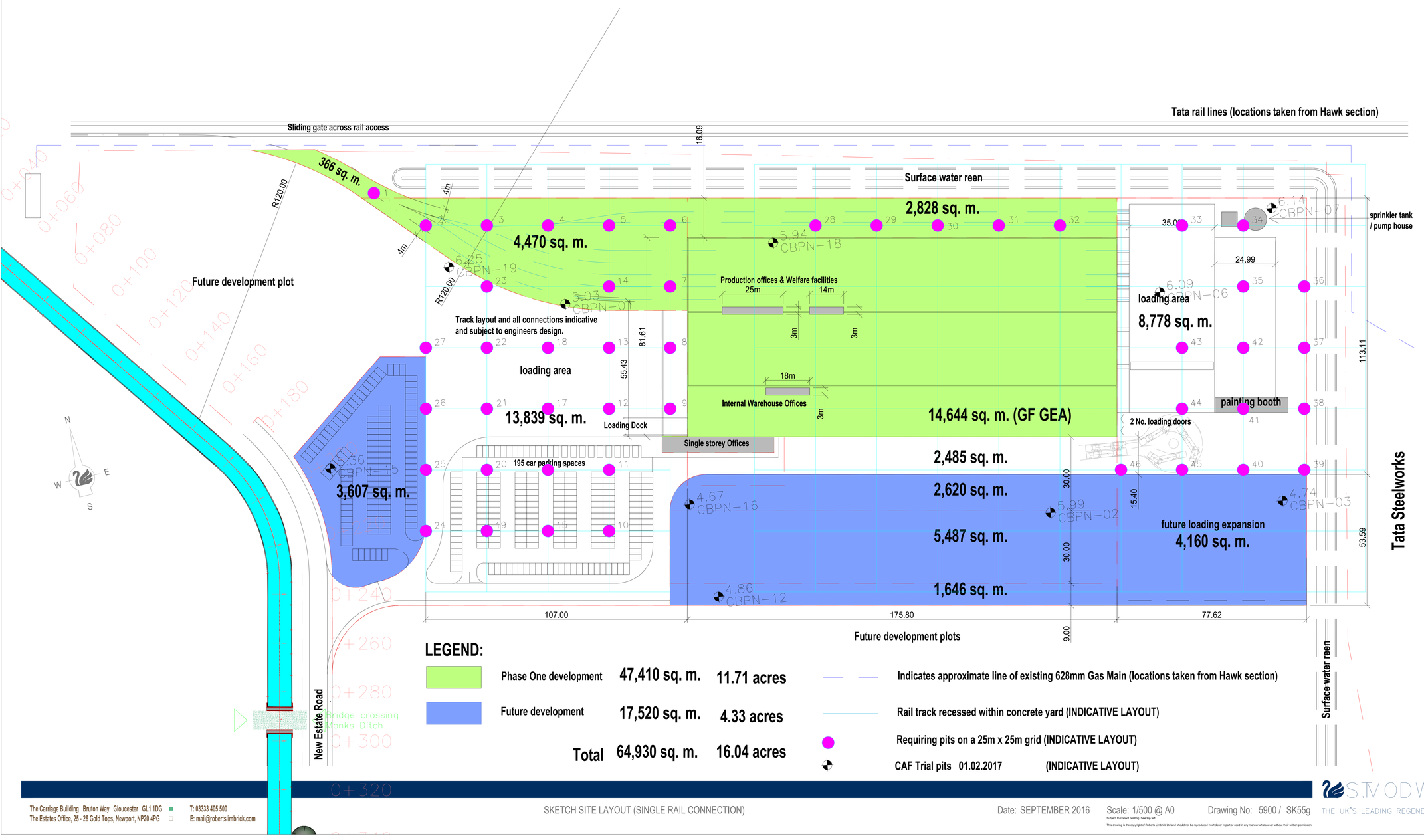
0

SHEET A3 PLOT DATE

DRAWING NO REV

Roberts Limbrick ARCHITECTS

Swansea to Paddington mainline



LEGEND:

Phase One development	47,410 sq. m.	11.71 acres	Indicates approximate line of existing 628mm Gas Main (locations taken from Hawk section)
Future development	17,520 sq. m.	4.33 acres	Rail track recessed within concrete yard (INDICATIVE LAYOUT)
Total	64,930 sq. m.	16.04 acres	Requiring pits on a 25m x 25m grid (INDICATIVE LAYOUT)
			CAF Trial pits 01.02.2017 (INDICATIVE LAYOUT)

POSITIONS OF THE PITS

NAME –N.:	M	P
CAFTP– 1	336841.7298	187239.1315
CAFTP– 2	336861.8005	187224.2262
CAFTP– 3	336886.7157	187222.1686
CAFTP– 4	336911.6309	187220.1110
CAFTP– 5	336936.5461	187218.0534
CAFTP– 6	336961.4612	187215.9958
CAFTP– 7	336959.4036	187191.0806
CAFTP– 8	336957.3460	187166.1654
CAFTP– 9	336955.2884	187141.2502
CAFTP–10	336926.2580	187093.4775
CAFTP–11	336928.3156	187118.3927
CAFTP–12	336930.3732	187143.3078
CAFTP–13	336932.4308	187168.2230
CAFTP–14	336934.4884	187193.1382
CAFTP–15	336901.3428	187095.5351
CAFTP–16	336903.4004	187120.4503
CAFTP–17	336905.4580	187145.3655
CAFTP–18	336907.5156	187170.2806
CAFTP–19	336876.4276	187097.5927
CAFTP–20	336878.4852	187122.5079
CAFTP–21	336880.5428	187147.4231
CAFTP–22	336882.6005	187172.3383
CAFTP–23	336884.6581	187197.2534
CAFTP–24	336851.5124	187099.6503
CAFTP–25	336853.5700	187124.5655
CAFTP–26	336855.6277	187149.4807
CAFTP–27	336857.6853	187174.3959
CAFTP–28	337020.7036	187211.1032
CAFTP–29	337045.6188	187209.0456
CAFTP–30	337070.5340	187206.9880
CAFTP–31	337095.4491	187204.9304
CAFTP–32	337120.3643	187202.8727
CAFTP–33	337170.1947	187198.7575
CAFTP–34	337195.1099	187196.6999
CAFTP–35	337193.0522	187171.7847
CAFTP–36	337217.9674	187169.7271
CAFTP–37	337215.9098	187144.8119
CAFTP–38	337213.8522	187119.8967
CAFTP–39	337211.7945	187094.9815
CAFTP–40	337186.8794	187097.0392
CAFTP–41	337188.9370	187121.9543
CAFTP–42	337190.9946	187146.8695
CAFTP–43	337166.0794	187148.9271
CAFTP–44	337164.0218	187124.0120
CAFTP–45	337161.9642	187099.0968
CAFTP–46	337137.0490	187101.1544

CBPN–01	336916.049	187187.471
CBPN–02	337106.901	187086.047
CBPN–03	337201.924	187083.142
CBPN–06	337158.875	187172.229
CBPN–07	337207.296	187202.742
CBPN–12	336968.688	187062.952
CBPN–15	336814.747	187128.39
CBPN–16	336960.014	187101.55
CBPN–18	337002.866	187205.527
CBPN–19	336869.829	187206.442

The Carriage Building Bruton Way Gloucester GL1 1DG T: 03333 405 500
The Estates Office, 25 - 26 Gold Tops, Newport, NP20 4PG E: mail@robertslimbrick.com

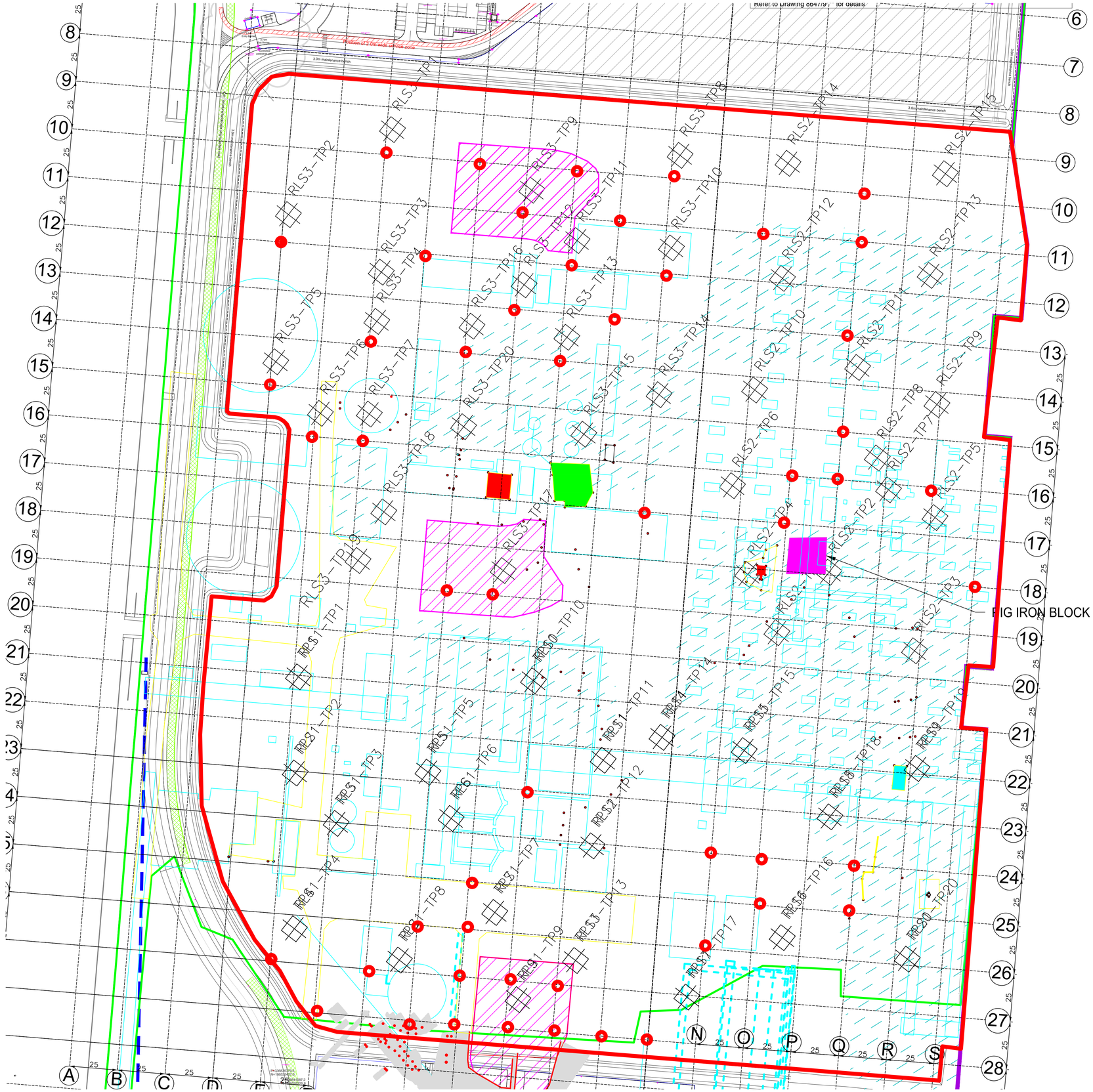
SKETCH SITE LAYOUT (SINGLE RAIL CONNECTION)

Date: SEPTEMBER 2016 Scale: 1/500 @ A0 Drawing No: 5900 / SK55g

Subject to correct printing. See top left.

This drawing is the copyright of Roberts Limbrick Ltd and should not be reproduced in whole or in part or used in any manner whatsoever without their written permission.

S.T.MODWEN THE UK'S LEADING REGENERATION SPECIALIST



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

Key

Boundary

Atkins Trial pit location

Rev	Date	Amendments	By	Chk
B	16/08/18	All trial pits added	ET	
A	22/05/18	First draft	ET	

Client

St Modwen Developments

Project

Llanwern
40 Acre Plot
Trial Pit Location Map

Drawing Title

Trial Pit location

Status

For infomation

Scale	Drawn	Checked	Date
A1@NTS	ET	CW	16/08/18

Drawing No. | Rev.

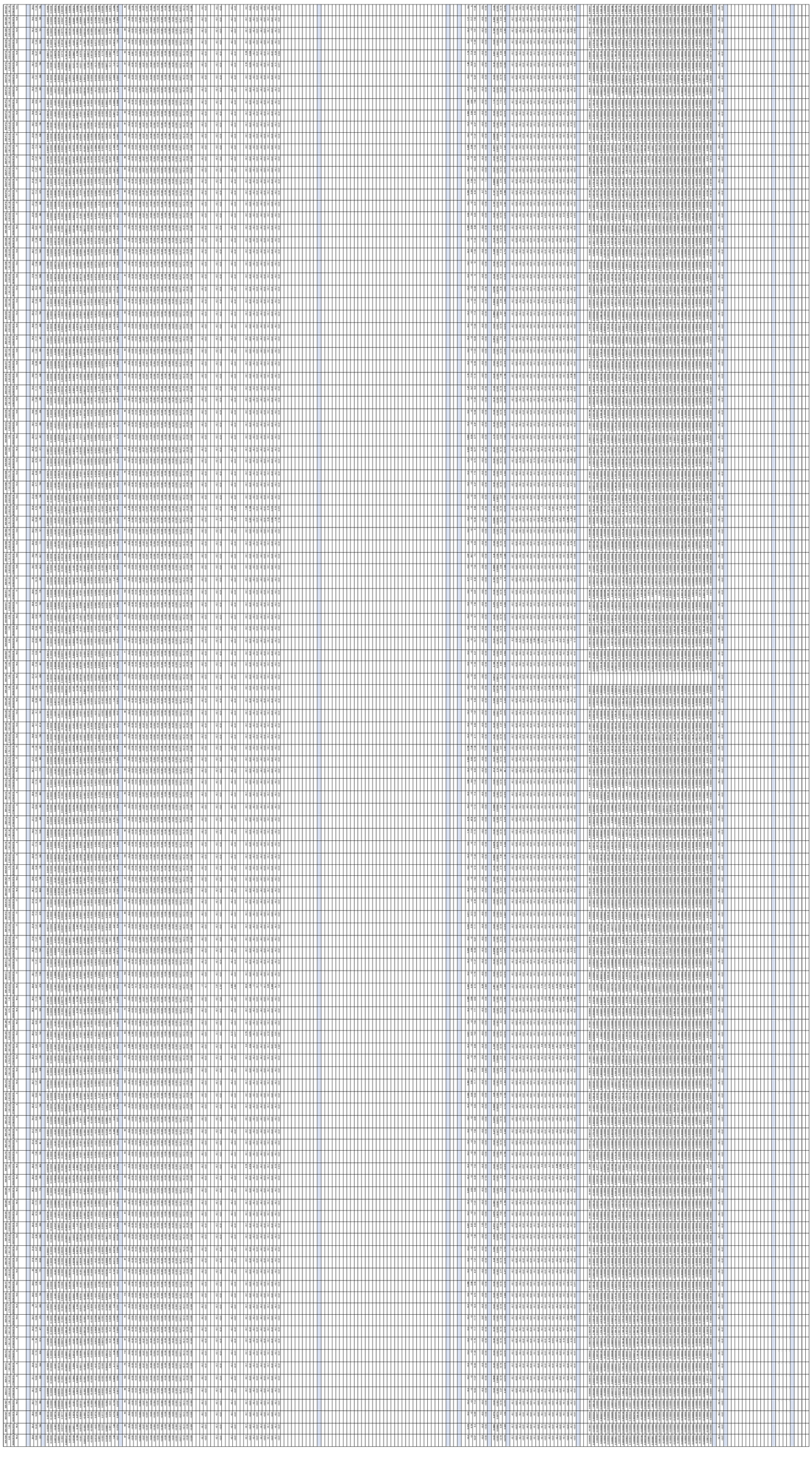
17480-RLE-18-DR-O-1002 | B

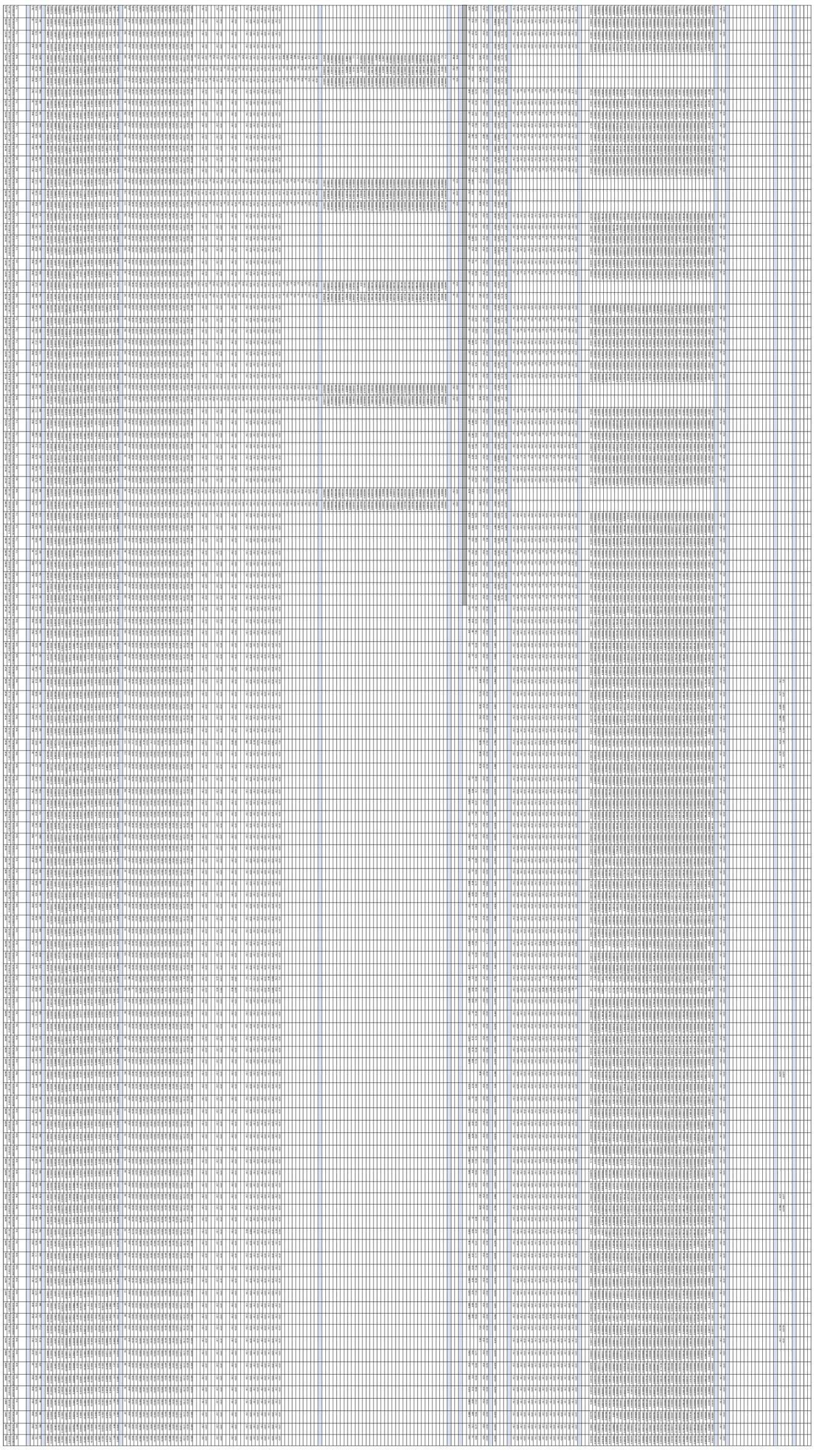
Seven House • 18 High Street • Longbridge • B31 2UQ • Tel: 0121 475 8462 • Fax: 01332 291728 • www.rodgersleask.co.uk

Appendix G: Soil Leachate Analysis

Glan Llyn Leachate Data

Determinand	Method	Units	LOD	No. of samples	No. of Samples >LOD	No. of Samples > EQS	Min	Max	EQS
Waste Acceptance Criteria (WAC)									
CEN 10:1 - Temperature	PM115	°C		1121	1119	0		25.70000	n/a
CEN 10:1 - pH	PM115	pH Units		1121	1119	0		12.75000	n/a
CEN 10:1 - Conductivity @ 20 deg.C	PM115	µS/cm		1121	1119	0		#########	n/a
Filtered (Dissolved) Metals									
CEN 10:1 - Arsenic (diss.filt)	TM152	mg/l	<0.0005	1121	931	1	<0.0005	0.07700	0.05
CEN 10:1 - Cadmium (diss.filt)	TM152	mg/l	<0.00008	1121	16	1	<0.00008	0.00028	0.00025
CEN 10:1 - Chromium (diss.filt)	TM152	mg/l	<0.001	1121	601	601	<0.001	0.07960	0.00047
CEN 10:1 - Copper (diss.filt)	TM152	mg/l	<0.0003	1121	960	843	<0.0003	0.14300	0.001
CEN 10:1 - Lead (diss.filt)	TM152	mg/l	<0.0002	1121	474	164	<0.0002	0.49000	0.0012
CEN 10:1 - Mercury (diss.filt)	TM183	mg/l	<0.00001	1121	230	0	<0.00001	0.00047	0.07
CEN 10:1 - Nickel (diss.filt)	TM152	mg/l	<0.0004	1121	744	26	<0.0004	0.00777	0.004
CEN 10:1 - Selenium (diss.filt)	TM152	mg/l	<0.0005	1121	857	41	<0.0005	0.06640	0.01
CEN 10:1 - Vanadium (diss.filt)	TM152	mg/l	<0.001	1121	1034	711	<0.001	1.01000	0.02
CEN 10:1 - Zinc (diss.filt)	TM152	mg/l	<0.001	1121	742	98	<0.001	2.09000	0.0109
CEN 10:1 - Mercury (diss.filt)	TM183	mg/kg	<0.0001	1121	230	0	<0.0001	0.00471	n/a
CEN 10:1 - Arsenic (diss.filt)	TM152	mg/kg	<0.005	1121	931	0	<0.005	0.77000	n/a
CEN 10:1 - Cadmium (diss.filt)	TM152	mg/kg	<0.0008	1121	16	0	<0.0008	0.00276	n/a
CEN 10:1 - Chromium (diss.filt)	TM152	mg/kg	<0.01	1121	601	0	<0.01	0.79600	n/a
CEN 10:1 - Copper (diss.filt)	TM152	mg/kg	<0.003	1121	960	0	<0.003	1.43000	n/a
CEN 10:1 - Lead (diss.filt)	TM152	mg/kg	<0.002	1121	474	0	<0.002	4.90000	n/a
CEN 10:1 - Nickel (diss.filt)	TM152	mg/kg	<0.004	1121	744	0	<0.004	0.07770	n/a
CEN 10:1 - Selenium (diss.filt)	TM152	mg/kg	<0.005	1121	857	0	<0.005	0.66400	n/a
CEN 10:1 - Vanadium (diss.filt)	TM152	mg/kg	<0.01	1121	1034	0	<0.01	10.10000	n/a
CEN 10:1 - Zinc (diss.filt)	TM152	mg/kg	<0.01	1121	742	0	<0.01	20.90000	n/a
TPH Criteria Working Group (TPH CWG)									
CEN 10:1 - GRO Surrogate % recovery**	TM245	%		1121	1118	0		129.00000	n/a
CEN 10:1 - GRO >C5-C12	TM245	mg/l	<0.05	1121	57	0	<0.05	312.00000	n/a
CEN 10:1 - GRO >C5-C12	TM245	mg/kg	<0.5	1121	57	0	<0.5	96.20000	n/a
CEN 10:1 - Methyl tertiary butyl ether (MTBE)	TM245	mg/l	<0.03	1121	17	0	<0.03	0.12000	n/a
CEN 10:1 - Methyl tertiary butyl ether (MTBE)	TM245	mg/kg	<0.003	1121	17	0	<0.003	0.01200	n/a
CEN 10:1 - Benzene	TM245	mg/l	<0.07	1121	15	15	<0.07	5.21000	0.01
CEN 10:1 - Benzene	TM245	mg/kg	<0.007	1121	15	0	<0.007	0.52100	n/a
CEN 10:1 - Toluene	TM245	mg/l	<0.04	1121	22	7	<0.04	4.90000	0.074
CEN 10:1 - Toluene	TM245	mg/kg	<0.004	1121	22	0	<0.004	0.49000	n/a
CEN 10:1 - Ethylbenzene	TM245	mg/l	<0.05	1121	4	4	<0.05	0.39000	0.02
CEN 10:1 - Ethylbenzene	TM245	mg/kg	<0.005	1121	4	0	<0.005	0.03900	n/a
CEN 10:1 - m,p-Xylene	TM245	mg/l	<0.08	1121	11	0	<0.08	3.15000	n/a
CEN 10:1 - m,p-Xylene	TM245	mg/kg	<0.008	1121	11	0	<0.008	0.31500	n/a
CEN 10:1 - o-Xylene	TM245	mg/l	<0.03	1121	13	0	<0.03	1.02000	n/a
CEN 10:1 - o-Xylene	TM245	mg/kg	<0.003	1121	13	0	<0.003	0.10200	n/a
CEN 10:1 - Sum of detected Xylenes	TM245	mg/kg	<0.011	1121	12	7	<0.011	4.08000	0.03
CEN 10:1 - Sum of detected Xylenes	TM245	mg/l	<0.11	1121	12	0	<0.11	1.31000	n/a
CEN 10:1 - Sum of detected BTEX	TM245	mg/l	<0.28	1121	11	0	<0.28	14.30000	n/a
CEN 10:1 - Sum of detected BTEX	TM245	mg/kg	<0.028	1121	11	0	<0.028	1.43000	n/a
CEN 10:1 - Aliphatics >C12-C16 (diss.filt)	TM174	mg/l	<0.01	590	0	0	<0.01	<0.01	n/a
CEN 10:1 - Aliphatics >C12-C16 (diss.filt)	TM174	mg/kg	<0.1	590	0	0	<0.1	<0.1	n/a
CEN 10:1 - Aliphatics >C5-C6	TM245	mg/l	<0.01	1121	2	0	<0.01	0.33000	n/a
CEN 10:1 - Aliphatics >C5-C6	TM245	mg/kg	<0.1	1121	2	0	<0.1	0.03300	n/a
CEN 10:1 - Aliphatics >C16-C21 (diss.filt)	TM174	mg/l	<0.1	590	2	0	<0.1	0.20000	n/a
CEN 10:1 - Aliphatics >C16-C21 (diss.filt)	TM174	mg/kg	<0.01	590	2	0	<0.01	0.02000	n/a
CEN 10:1 - Aliphatics >C6-C8	TM245	mg/l	<0.1	1121	22	0	<0.1	1.37000	n/a
CEN 10:1 - Aliphatics >C6-C8	TM245	mg/kg	<0.01	1121	22	0	<0.01	0.13700	n/a
CEN 10:1 - Aliphatics >C21-C35 (diss.filt)	TM174	mg/l	<0.1	590	0	0	<0.1	<0.1	n/a
CEN 10:1 - Aliphatics >C21-C35 (diss.filt)	TM174	mg/kg	<0.01	590	0	0	<0.01	<0.01	n/a
CEN 10:1 - Aliphatics >C8-C10	TM245	mg/l	<0.1	1121	36	0	<0.1	8.63000	n/a
CEN 10:1 - Aliphatics >C8-C10	TM245	mg/kg	<0.01	1121	36	0	<0.01	0.86300	n/a
CEN 10:1 - Total Aliphatics >C12-C35 (diss.filt)	TM174	mg/l	<0.1	590	2	0	<0.1	0.27000	n/a
CEN 10:1 - Total Aliphatics >C12-C35 (diss.filt)	TM174	mg/kg	<0.01	590	2	0	<0.01	0.02700	n/a
CEN 10:1 - Aliphatics >C10-C12	TM245	mg/l	<0.1	1121	68	0	<0.1	182.00000	n/a
CEN 10:1 - Aliphatics >C10-C12	TM245	mg/kg	<0.01	1121	68	0	<0.01	18.20000	n/a
CEN 10:1 - Aromatics >EC5-EC7	TM245	mg/l	<0.01	1121	10	0	<0.01	5.21000	n/a
CEN 10:1 - Aromatics >EC5-EC7	TM245	mg/kg	<0.1	1121	10	0	<0.1	0.52100	n/a
CEN 10:1 - Aromatics >EC7-EC8	TM245	mg/l	<0.1	1121	5	0	<0.1	4.90000	n/a
CEN 10:1 - Aromatics >EC7-EC8	TM245	mg/kg	<0.01	1121	5	0	<0.01	0.49000	n/a
CEN 10:1 - Aromatics >EC8-EC10	TM245	mg/l	<0.1	1121	31	0	<0.1	7.00000	n/a
CEN 10:1 - Aromatics >EC8-EC10	TM245	mg/kg	<0.01	1121	31	0	<0.01	0.70000	n/a
CEN 10:1 - Aromatics >EC10-EC12	TM245	mg/l	<0.1	1121	60	0	<0.1	121.00000	n/a
CEN 10:1 - Aromatics >EC10-EC12	TM245	mg/kg	<0.01	1121	60	0	<0.01	12.10000	n/a
CEN 10:1 - Aromatics >EC12-EC16 (diss.filt)	TM174	mg/l	<0.1	590	4	0	<0.1	8.68000	n/a
CEN 10:1 - Aromatics >EC12-EC16 (diss.filt)	TM174	mg/kg	<0.01	590	4	0	<0.01	0.86800	n/a
CEN 10:1 - Aromatics >EC16-EC21 (diss.filt)	TM174	mg/l	<0.01	590	5	0	<0.01	78.80000	n/a
CEN 10:1 - Aromatics >EC16-EC21 (diss.filt)	TM174	mg/kg	<0.1	590	5	0	<0.1	7.88000	n/a
CEN 10:1 - Aromatics >EC21-EC35 (diss.filt)	TM174	mg/l	<0.1	590	1	0	<0.1	5.61000	n/a
CEN 10:1 - Aromatics >EC21-EC35 (diss.filt)	TM174	mg/kg	<0.01	590	1	0	<0.01	0.56100	n/a
CEN 10:1 - Total Aromatics >EC12-EC35 (diss.filt)	TM174	mg/l	<0.01	590	6	0	<0.01	93.10000	n/a
CEN 10:1 - Total Aromatics >EC12-EC35 (diss.filt)	TM174	mg/kg	<0.1	590	6	0	<0.1	9.31000	n/a
CEN 10:1 - Total Aliphatics & Aromatics >C5-35 (diss.filt)	TM174	mg/l	<0.01	590	12	0	<0.01	93.10000	n/a
CEN 10:1 - Total Aliphatics & Aromatics >C5-35 (diss.filt)	TM174	mg/kg	<0.1	590	12	0	<0.1	98.60000	n/a
Polyaromatic Hydrocarbons (PAHs)									
CEN 10:1 - Naphthalene (diss.filt)	TM178	mg/l	<0.0001	590	99	0	<0.0001	#########	n/a
CEN 10:1 - Naphthalene (diss.filt)	TM178	mg/kg	<0.00001	590	99	0	<0.00001	194.00000	n/a
CEN 10:1 - Acenaphthene (diss.filt)	TM178	mg/l	<0.000005	590	77	0	<0.000005	0.79100	n/a
CEN 10:1 - Acenaphthene (diss.filt)	TM178	mg/kg	<0.00005	590	77	0	<0.00005	2.21000	n/a
CEN 10:1 - Acenaphthylene (diss.filt)	TM178	mg/l	<0.000005	590	59	0	<0.000005	0.90100	n/a
CEN 10:1 - Acenaphthylene (diss.filt)	TM178	mg/kg	<0.00005	590	59	0	<0.00005	9.01000	n/a
CEN 10:1 - Fluoranthene (diss.filt)	TM178	mg/l	<0.00005	590	114	0	<0.00005	8.70000	n/a
CEN 10:1 - Fluoranthene (diss.filt)	TM178	mg/kg	<0.000005	590	114	0	<0.000005	0.87000	n/a
CEN 10:1 - Anthracene (diss.filt)	TM178	mg/l	<0.00005	590	88	0	<0.00005	111.00000	n/a
CEN 10:1 - Anthracene (diss.filt)	TM178	mg/kg	<0.000005	590	88	0	<0.000005	11.10000	n/a
CEN 10:1 - Phenanthrene (diss.filt)	TM178	mg/l	<0.00005	590	115	0	<0.00005	7.58000	n/a
CEN 10:1 - Phenanthrene (diss.filt)	TM178	mg/kg	<0.000005	590	115	0	<0.000005	0.75800	n/a
CEN 10:1 - Fluorene (diss.filt)	TM178	mg/l	<0.00005	590	81	0	<0.00005	3.56000	n/a
CEN 10:1 - Fluorene (diss.filt)	TM178	mg/kg	<0.000005	590	81	0	<0.000005	0.35600	n/a
CEN 10:1 - Chrysene (diss.filt)	TM178	mg/l	<0.00005	590	56	0	<0.00005	28.30000	n/a
CEN 10:1 - Chrysene (diss.filt)	TM178	mg/kg	<0.000005	590	56	0	<0.000005	2.83000	n/a
CEN 10:1 - Pyrene (diss.filt)	TM178	mg/l	<0.00005	590	112	0	<0.00005	9.23000	n/a
CEN 10:1 - Pyrene (diss.filt)	TM178	mg/kg	<0.000005	590	112	0	<0.000005	0.92300	n/a
CEN 10:1 - Benzo(a)anthracene (diss.filt)	TM178	mg/l	<0.00005	590	55	0	<0.00005	21.20000	n/a
CEN 10:1 - Benzo(a)anthracene (diss.filt)	TM178	mg/kg	<0.000005	590	55	0	<0.000005	2.12000	n/a
CEN 10:1 - Benzo(b)fluoranthene (diss.filt)	TM178	mg/l	<0.000005	590	54	0	<0.000005	2.11000	n/a
CEN 10:1 - Benzo(b)fluoranthene (diss.filt)	TM178	mg/kg	<0.00005	590	54	0	<0.00005	21.10000	n/a
CEN 10:1 - Benzo(k)fluoranthene (diss.filt)	TM178	mg/l	<0.00005	590	42	0	<0.00005	30.30000	n/a
CEN 10:1 - Benzo(k)fluoranthene (diss.filt)	TM178	mg/kg	<0.000005	590	42	0	<0.000005	3.03000	n/a
CEN 10:1 - Benzo(a)pyrene (diss.filt)	TM178	mg/l	<0.00002	590	56	0	<0.00002	21.10000	n/a
CEN 10:1 - Benzo(a)pyrene (diss.filt)	TM178	mg/kg	<0.000002	590	56	0	<0.000002	2.11000	n/a
CEN 10:1 - Dibenzo(a,h)anthracene (diss.filt)	TM178	mg/l	<0.00005	590	23	0	<0.00005	22.20000	n/a
CEN 10:1 - Dibenzo(a,h)anthracene (diss.filt)	TM178	mg/kg	<0.000005	590	23	0	<0.000005	2.22000	n/a
CEN 10:1 - Benzo(g,h,i)perylene (diss.filt)	TM178	mg/l	<0.00005	590	32	0	<0.00005	32.80000	n/a
CEN 10:1 - Benzo(g,h,i)perylene (diss.filt)	TM178	mg/kg	<0.000005	590	32	0	<0.000005	3.28000	n/a
CEN 10:1 - Indeno(1,2,3-cd)pyrene (diss.filt)	TM178	mg/l	<0.000005	590	35	0	<0.000005	2.49000	n/a
CEN 10:1 - Indeno(1,2,3-cd)pyrene (diss.filt)	TM178	mg/kg	<0.00005	590	35	0	<0.00005	24.90000	n/a
CEN 10:1 - PAH Sum of EPA 16 detected (Diss filt)	TM178	mg/l	<0.00082	590	99	0	<0.00082	#########	n/a
CEN 10:1 - PAH Sum of EPA 16 detected (Diss filt)	TM178	mg/kg	<0.000082	590	99	0	<0.000082	219.00000	n/a
Volatile Organic Compounds (VOCs)									
CEN 10:1 - Aromatics >EC16-EC35 (diss.filt)	TM174	mg/l	<0.01	590	5	0	<0.01	84.40000	n/a
CEN 10:1 - Aromatics >EC16-EC35 (diss.filt)	TM174	mg/kg	<0.1	590	5	0	<0.1	8.44000	n/a
Inorganics									
CEN 10:1 - Ammoniacal Nitrogen as N			<2	145	0	0	<2	<2	
CEN 10:1 - Ammoniacal Nitrogen as N			<0.2	1121	328	0	<0.2	76.90000	
CEN 10:1 - Ammoniacal Nitrogen as N			<2	1121	328	0	<2	590.00000	
CEN 10:1 - pH			<1	1121	1016	0	<1	12.83000	
CEN 10:1 - pH (diss.filt)			<1	1121	103	0	<1	12.75000	
CEN 10:1 - Cyanide, Total			<0.5	1121	78	0	<0.5	70.00000	
CEN 10:1 - Cyanide, Total			<0.05	1121	78	0	<0.05	7.00000	
Filtered (Total) Metals									
CEN 10:1 - Manganese (diss.filt)			<0.01	1121	321	0	<0.01	21.60000	
CEN 10:1 - Manganese (diss.filt)			<0.001	936	249	0	<0.001	2.16000	
CEN 10:1 - Iron (Dis.Filt)			<0.019	936	337	0	<0.019	681.00000	
CEN 10:1 - Iron (Dis.Filt)			<0.19	936	337	0	<0.19	68.10000	
TPH Criteria Working Group (TPH CWG) (aq)									
CEN 10:1 - Aliphatics >C12-C16 (aq)			<0.1	1121	5	0	<0.1	0.30000	
CEN 10:1 - Aliphatics >C12-C16 (aq)			<0.01	1121	6	0	<0.01	0.81000	
CEN 10:1 - Aliphatics >C16-C21 (aq)			<0.01	1121	12	0	<0.01	1.01000	
CEN 10:1 - Aliphatics >C16-C21 (aq)			<0.1	1121	12	0	<0.1	0.81000	
CEN 10:1 - Aliphatics >C21-C35 (aq)			<0.1	1121	11	0	<0.1	0.88000	
CEN 10:1 - Aliphatics >C21-C35 (aq)			<0.01	1121	22	0	<0.01	2.48000	
CEN 10:1 - Total Aliphatics >C12-C35 (aq)			<0.1	1121	26	0	<0.1	1.97000	
CEN 10:1 - Total Aliphatics >C12-C35 (aq)			<0.01	1121	27	0	<0.01	2.00000	
CEN 10:1 - Aromatics >EC12-EC16 (aq)			<0.1	1121	64	0	<0.1	28.10000	
CEN 10:1 - Aromatics >EC12-EC16 (aq)			<0.01	1121	58	0	<0.01	2.81000	
CEN 10:1 - Aromatics >EC16-EC21 (aq)			<0.01	1121	66	0	<0.01	15.20000	
CEN 10:1 - Aromatics >EC16-EC21 (aq)			<0.1	1121	72	0	<0.1	4.14000	
CEN 10:1 - Aromatics >EC21-EC35 (aq)			<0.1	1121	40	0	<0.1	1.33000	
CEN 10:1 - Aromatics >EC21-EC35 (aq)			<0.01	1121	47	0	<0.01	11.50000	
CEN 10:1 - Total Aromatics >EC12-EC35 (aq)			<0.01	1121	94	0	<0.01	42.30000	
CEN 10:1 - Total Aromatics >EC12-EC35 (aq)			<0.1	1070	74	0	<0.1	4.23000	
CEN 10:1 - Total Aliphatics & Aromatics >C5-35 (aq)			<0.01	1070	167	0	<0.01	354.00000	
CEN 10:1 - Total Aliphatics & Aromatics >C5-35 (aq)			<0.1	1070	167	0	<0.1	40.70000	
TPH Criteria Working Group (TPH CWG) (aq)				269	0	0			
CEN 10:1 - Total EPH (C6-C40) (aq)			<1	145	0	0	<1	<1	
CEN 10:1 - Total EPH (C6-C40) (aq)			<0.1	145	0	0	<0.1	<0.1	
CEN 10:1 - Naphthalene (aq)			<0.0001	1121	792	0	<0.0001	119.00000	
CEN 10:1 - Naphthalene (aq)			<0.00001	1121	792	0	<0.00001	11.90000	
CEN 10:1 - Acenaphthene (aq)			<0.00005	1121	583	0	<0.00005	0.81500	
CEN 10:1 - Acenaphthene (aq)			<0.000005	1121	583	0	<0.000005	0.08150	
CEN 10:1 - Acenaphthylene (aq)			<0.00005	1121	450	0	<0.00005	9.37000	
CEN 10:1 - Acenaphthylene (aq)			<0.000005	1121	450	0	<0.000005	0.93700	
CEN 10:1 - Fluoranthene (aq)			<0.00005	1121	898	0	<0.00005	0.37300	
CEN 10:1 - Fluoranthene (aq)			<0.000005	1121	898	0	<0.000005	0.03730	
CEN 10:1 - Anthracene (aq)			<0.00005	1121	664	0	<0.00005	0.23600	
CEN 10:1 - Anthracene (aq)			<0.000005	1121	664	0	<0.000005	0.02360	
CEN 10:1 - Phenanthrene (aq)			<0.00005	1121	882	0	<0.00005	2.35000	
CEN 10:1 - Phenanthrene (aq)			<0.000005	1121	882	0	<0.000005	0.23500	
CEN 10:1 - Fluorene (aq)			<0.00005	1121	592	0	<0.00005	1.99000	
CEN 10:1 - Fluorene (aq)			<0.000005	1121	592	0	<0.000005	0.19900	
CEN 10:1 - Chrysene (aq)			<0.00005	1121	493	0	<0.00005	0.10500	
CEN 10:1 - Chrysene (aq)			<0.000005	1121	493	0	<0.000005	0.01050	
CEN 10:1 - Pyrene (aq)			<0.00005	1121	887	0	<0.00005	0.20600	
CEN 10:1 - Pyrene (aq)			<0.000005	1121	887	0	<0.000005	0.02060	
CEN 10:1 - Benzo(a)anthracene (aq)			<0.00005	1121	483	0	<0.00005	0.09460	
CEN 10:1 - Benzo(a)anthracene (aq)			<0.000005	1121	483	0	<0.000005	0.00946	
CEN 10:1 - Benzo(b)fluoranthene (aq)			<0.00005	1121	485	0	<0.00005	0.15100	
CEN 10:1 - Benzo(b)fluoranthene (aq)			<0.000005	1121	485	0	<0.000005	0.01510	
CEN 10:1 - Benzo(k)fluoranthene (aq)			<0.00005	1121	392	0	<0.00005	0.11800	
CEN 10:1 - Benzo(k)fluoranthene (aq)			<0.000005	1121	392	0	<0.000005	0.01180	
CEN 10:1 - Benzo(a)pyrene (aq)			<0.00002	1121	471	0	<0.00002	0.10400	
CEN 10:1 - Benzo(a)pyrene (aq)			<0.000002	1121	471	0	<0.000002	0.01040	
CEN 10:1 - Dibenzo(a,h)anthracene (aq)			<0.00005	1121	186	0	<0.00005	0.09230	
CEN 10:1 - Dibenzo(a,h)anthracene (aq)			<0.000005	1121	186	0	<0.000005	0.00923	
CEN 10:1 - Benzo(g,h,i)perylene (aq)			<0.00005	1121	284	0	<0.00005	0.09280	
CEN 10:1 - Benzo(g,h,i)perylene (aq)			<0.000005	1121	284	0	<0.000005	0.03000	
CEN 10:1 - Indeno(1,2,3-cd)pyrene (aq)			<0.00005	1121	306	0	<0.00005	0.11100	
CEN 10:1 - Indeno(1,2,3-cd)pyrene (aq)			<0.000005	1121	306	0	<0.000005	0.01110	
CEN 10:1 - PAH, Total Detected USEPA 16 (aq)			<0.00082	1121	760	0	<0.00082	133.00000	
CEN 10:1 - PAH, Total Detected USEPA 16 (aq)			<0.000082	1121	760	0	<0.000082	13.30000	
EPH CWG (Speciated)				1121	0	0			
CEN 10:1 - Aliphatics >C16-C35 Aqueous			<0.1	1121	15	0	<0.1	1.84000	
CEN 10:1 - Aliphatics >C16-C35 Aqueous			<0.01	1121	15	0	<0.01	0.18400	
Volatile Organic Compounds (VOCs)				145	0	0			
CEN 10:1 - Benzene			<0.01	145	23	0	<0.01	0.21100	
CEN 10:1 - Benzene			<0.001	145	23	0	<0.001	0.02110	
CEN 10:1 - Toluene			<0.001	145	14	0	<0.001	0.00983	
CEN 10:1 - Toluene			<0.01	145	14	0	<0.01	0.09830	
CEN 10:1 - Ethylbenzene			<0.01	145	0	0	<0.01	<0.01	
CEN 10:1 - Ethylbenzene			<0.001	145	0	0	<0.001	<0.001	
CEN 10:1 - m,p-Xylene			<0.01	145	6	0	<0.01	0.10300	
CEN 10:1 - m,p-Xylene			<0.001	145	6	0	<0.001	0.01030	
CEN 10:1 - o-Xylene			<0.01	145	2	0	<0.01	0.03470	
CEN 10:1 - o-Xylene			<0.001	145	2	0	<0.001	0.00347	
CEN 10:1 - Sum of detected Xylenes			<0.02	145	3	0	<0.02	0.13800	
CEN 10:1 - Sum of detected Xylenes			<0.002	145	3	0	<0.002	0.01380	
Addition Inorganic									
CEN 10:1 - Ammoniacal Nitrogen as N (low level)	TM099	mg/kg	<0.1	531	20	0	<0.1	78.70000	
CEN 10:1 - Ammoniacal Nitrogen as N (low level)	TM099	mg/l	<0.01	531	20	0	<0.01	7.87000	
CEN 10:1 - Cyanide, Free	TM227	mg/kg	<0.5	976	0	0	<0.5	<0.5	
CEN 10:1 - Cyanide, Free	TM227	mg/l	<0.05	976	0	0	<0.05	<0.05	
Phenols				445	0	0			
CEN 10:1 - Phenol	TM259	mg/kg	<0.02	445	0	0	<0.02	<0.02	
CEN 10:1 - Phenol	TM259	mg/l	<0.002	445	0	0	<0.002	<0.002	

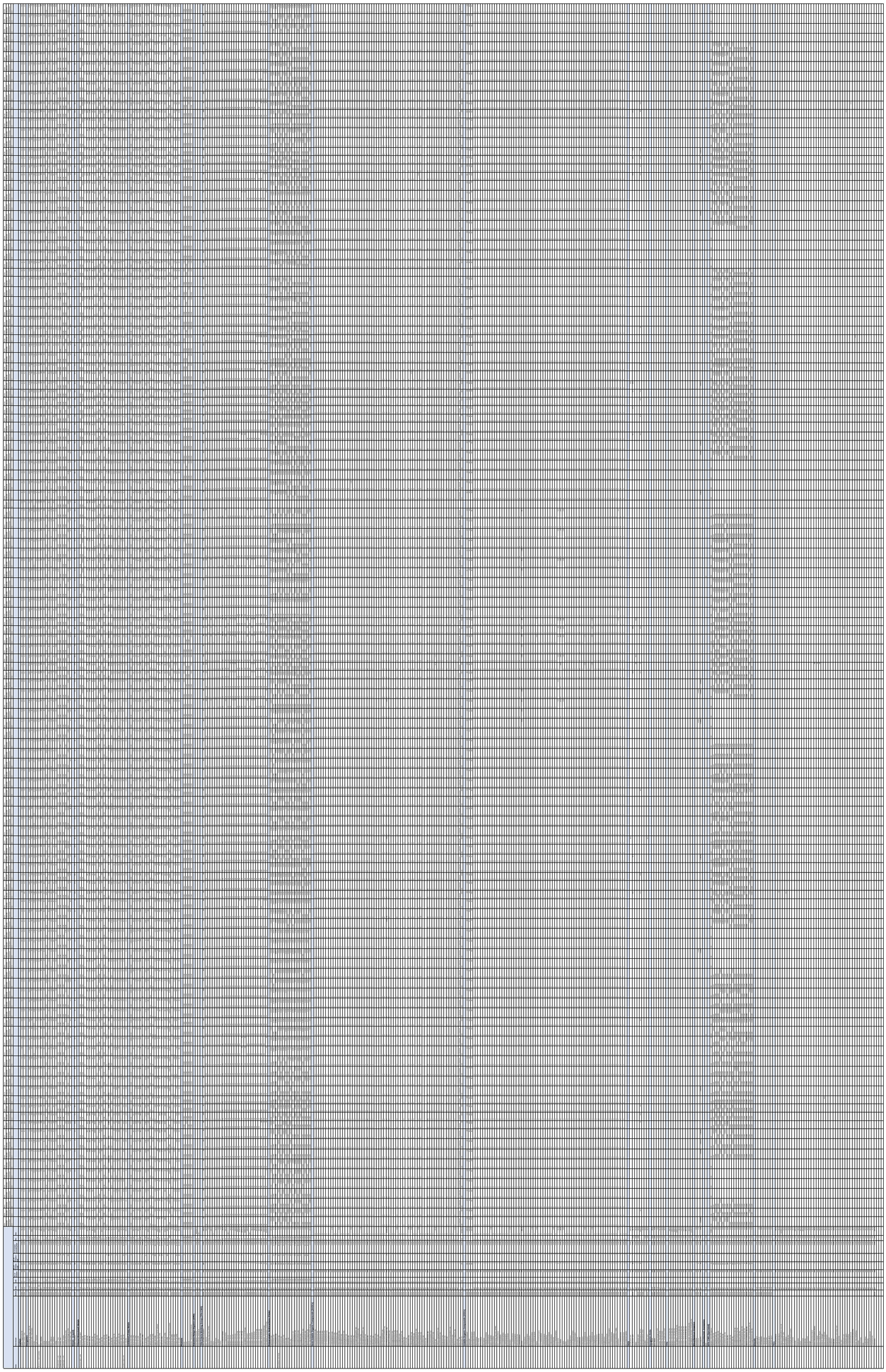




Appendix H: Surface Waters Analysis

Glan Llyn Surface Water Data

Notes	Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > EQS	% of samples exceeding EQS	Min	Max
	Carbon									
	Carbon, Organic (diss.filt)	TM090	mg/l	<3	998	977	0	0.00%	<3	53.40
	Organic Carbon, Total	TM090	mg/l	<3	998	972	0	0.00%	<3	57.80
	Inorganics									
	Conductivity @ 20 deg.C (diss.filt)	TM120	mS/cm	<0.014	998	995	0	0.00%	<0.014	2.43
	Dissolved solids, Total (meter)	TM123	mg/l	<5	998	995	0	0.00%	<5	2080.00
	Fluoride	TM104	mg/l	<0.5	998	787	0	0.00%	<0.5	1.80
	Oxygen, dissolved	TM046	mg/l	<0.3	998	995	0	0.00%	<0.3	13.60
High pH in c. half of samples	pH	TM256	pH Units	<1	998	992	0	0.00%	<1	11.70
	Redox potential	TM110	mV		998	994	0	0.00%		246.00
	Sulphate	TM184	mg/l	<2	998	995	0	0.00%	<2	1220.00
	Sulphide	TM101	mg/l	<0.01	998	95	0	0.00%	<0.01	0.07
	Chloride	TM184	mg/l	<2	998	995	0	0.00%	<2	259.00
	BOD, unfiltered	TM045	mg/l	<1	998	623	0	0.00%	<1	26.60
	COD, unfiltered	TM107	mg/l	<7	998	982	0	0.00%	<7	304.00
	Turbidity	TM195	ntu	<0.1	998	960	0	0.00%	<0.1	1370.00
Cyanide EQS < LOD	Cyanide, Total	TM227	mg/l	<0.05	998	118	118	11.82%	<0.05	0.28
Cyanide EQS < LOD	Cyanide, Free	TM227	mg/l	<0.05	998	34	34	3.41%	<0.05	0.17
Cyanide EQS < LOD	Cyanide, Complex	TM227	mg/l	<0.05	998	86	86	8.62%	<0.05	0.28
	Phosphate (ortho) as PO4	TM184	mg/l	<0.05	998	244	0	0.00%	<0.05	4.91
	Ammoniacal Nitrogen as NH4	TM099	mg/l	<0.3	998	635	628	62.93%	<0.3	18.60
	Suspended solids, Total	TM022	mg/l	<2	998	950	0	0.00%	<2	690.00
	Metals - (Liquid)									
	Sulphur Dissolved	TM228	mg/l	<1	998	995	0	0.00%	<1	411.00
	Filtered (Dissolved) Metals									
Chromium EQS > LOD	Chromium, Hexavalent	TM241	mg/l	<0.03	998	1	1	0.10%	<0.03	0.03
	Mercury (diss.filt)	TM183	µg/l	<0.01	998	115	0	0.00%	<0.01	0.05
	Antimony (diss.filt)	TM152	µg/l	<0.16	998	222	0	0.00%	<0.16	4.35
	Calcium (diss.filt)	TM228	mg/l	<0.012	998	983	0	0.00%	<0.012	371.00
	Arsenic (diss.filt)	TM152	µg/l	<0.12	998	984	0	0.00%	<0.12	28.50
	Barium (diss.filt)	TM152	µg/l	<0.03	998	983	0	0.00%	<0.03	304.00
	Magnesium (diss.filt)	TM228	mg/l	<0.036	998	899	0	0.00%	<0.036	12300.00
	Beryllium (diss.filt)	TM152	µg/l	<0.07	998	2	0	0.00%	<0.07	0.21
	Iron (diss.filt)	TM228	mg/l	<0.019	998	596	5	0.50%	<0.019	2.17
	Boron (diss.filt)	TM152	µg/l	<9.4	998	983	4	0.40%	<9.4	2070.00
	Cadmium (diss.filt)	TM152	µg/l	<0.1	998	9	1	0.10%	<0.1	0.29
	Chromium (diss.filt)	TM152	µg/l	<0.22	998	197	34	3.41%	<0.22	10.70
	Copper (diss.filt)	TM152	µg/l	<0.85	998	848	704	70.54%	<0.85	15.30
	Lead (diss.filt)	TM152	µg/l	<0.02	998	269	31	3.11%	<0.02	12.70
	Manganese (diss.filt)	TM152	µg/l	<0.04	998	983	0	0.00%	<0.04	76.30
	Nickel (diss.filt)	TM152	µg/l	<0.15	998	935	51	5.11%	<0.15	9.06
	Phosphorus (diss.filt)	TM152	µg/l	<6.3	998	866	0	0.00%	<6.3	1630.00
	Selenium (diss.filt)	TM152	µg/l	<0.39	998	750	2	0.20%	<0.39	16.50
Vanadium EQS>LOD	Vanadium (diss.filt)	TM152	µg/l	<0.24	998	943	255	25.55%	<0.24	95.60
	Zinc (diss.filt)	TM152	µg/l	<0.41	998	816	31	3.11%	<0.41	522.00
	Unfiltered (Total) Metals									
	Mercury (tot.unfilt)	TM183	µg/l	<0.02	998	144	13	1.30%	<0.02	0.51
	Calcium (tot.unfilt)	TM228	mg/l	<0.057	998	975	0	0.00%	<0.057	336.00
	Arsenic (tot.unfilt)	TM191	µg/l	<2	998	858	1	0.10%	<2	53.70
	Barium (tot.unfilt)	TM191	µg/l	<0.5	998	994	0	0.00%	<0.5	585.00
	Magnesium (tot.unfilt)	TM228	mg/l	<0.05	998	994	0	0.00%	<0.05	71.20
	Beryllium (tot.unfilt)	TM191	µg/l	<1	998	2	0	0.00%	<1	2.17
	Iron (tot.unfilt)	TM228	mg/l	<0.024	998	964	217	21.74%	<0.024	42.30
	Boron (tot.unfilt)	TM191	µg/l	<135	998	979	4	0.40%	<135	2030.00
	Cadmium (tot.unfilt)	TM191	µg/l	<0.5	998	4	4	0.40%	<0.5	1.79
	Chromium (tot.unfilt)	TM191	µg/l	<3	998	140	82	8.22%	<3	72.80
	Copper (tot.unfilt)	TM191	µg/l	<4	998	859	859	86.07%	<4	42.20
	Hardness, Total as CaCO3 unfiltered	TM228	mg/l	<0.35	998	967	0	0.00%	<0.35	1160.00
	Manganese (tot.unfilt)	TM191	µg/l	<0.5	998	994	393	39.38%	<0.5	12000.00
	Nickel (tot.unfilt)	TM191	µg/l	<0.5	998	943	140	14.03%	<0.5	27.40
	Phosphorus (tot.unfilt)	TM191	µg/l	<20	998	981	0	0.00%	<20	2740.00
	Lead (tot.unfilt)	TM191	µg/l	<0.5	998	730	659	66.03%	<0.5	246.00
	Lead (tot.unfilt) Calculated bioavailable		µg/l		988	720	0	0.00%	0.00	0.25
	Antimony (tot.unfilt)	TM191	µg/l	<4	998	4	0	0.00%	<4	4.84
	Selenium (tot.unfilt)	TM191	µg/l	<1	998	827	3	0.30%	<1	13.70
	Vanadium (tot.unfilt)	TM191	µg/l	<8	998	852	316	31.66%	<8	141.00
	Zinc (tot.unfilt)	TM191	µg/l	<3	998	861	463	46.39%	<3	780.00
	Phenols									
	Phenol	TM259	mg/l	<0.002	998	21	21	2.10%	<0.002	0.04
	Cresols	TM259	mg/l	<0.006	998	12	0	0.00%	<0.006	0.02
	Xylenols	TM259	mg/l	<0.008	998	21	0	0.00%	<0.008	0.03
	Phenols, Total Detected monohydric	TM259	mg/l	<0.016	998	21	21	2.10%	<0.016	0.04
	Gasoline Range Organics (GRO)									
	Total Aliphatics >C5-C12	TM245	µg/l	<10	988	2	0	0.00%	<10	3660000.00
	Total Aromatics >EC5-EC12	TM245	µg/l	<10	988	0	2	0.20%	<10	<10
	TPH Criteria Working Group (TPH CWG)									
	GRO Surrogate % recovery**	TM245	%		998	960	0	0.00%		130.00
	GRO >C5-C12	TM245	µg/l	<50	998	8	0	0.00%	<50	726.00
	Methyl tertiary butyl ether (MTBE)	TM245	µg/l	<3	998	1	0	0.00%	<3	4.00
	Benzene	TM245	µg/l	<7	998	6	6	0.60%	<7	429.00
	Toluene	TM245	µg/l	<4	998	0	0	0.00%	<4	<4
	Ethylbenzene	TM245	µg/l	<5	998	6	1	0.10%	<5	30.00
	m,p-Xylene	TM245	µg/l	<8	998	2	0	0.00%	<8	9.00
	o-Xylene	TM245	µg/l	<3	998	4	0	0.00%	<3	9.00
	Sum of detected Xylenes	TM245	µg/l	<11	998	2	0	0.00%	<11	18.00
	Sum of detected BTEX	TM245	µg/l	<28	998	6	0	0.00%	<28	459.00
	Aliphatics >C5-C6	TM245	µg/l	<10	998	0	0	0.00%	<10	<10
	Aliphatics >C6-C8	TM245	µg/l	<10	998	4	3	0.30%	<10	19.00
	Aliphatics >C8-C10	TM245	µg/l	<10	998	5	5	0.50%	<10	21.00
	Aliphatics >C10-C12	TM245	µg/l	<10	998	8	8	0.80%	<10	134.00
	Aliphatics >C12-C16 (aq)	TM174	µg/l	<10	998	2	2	0.20%	<10	2080.00
	Aliphatics >C16-C21 (aq)	TM174	µg/l	<10	998	13	13	1.30%	<10	8140.00
	Aliphatics >C21-C35 (aq)	TM174	µg/l	<10	998	24	24	2.40%	<10	49700.00
	Total Aliphatics >C12-C35 (aq)	TM174	µg/l	<10	998	29	0	0.00%	<10	59900.00
	Aromatics >EC5-EC7	TM245	µg/l	<10	998	6	6	0.60%	<10	429.00
	Aromatics >EC7-EC8	TM245	µg/l	<10	998	0	0	0.00%	<10	<10
	Aromatics >EC8-EC10	TM245	µg/l	<10	998	9	8	0.80%	<10	56.00
	Aromatics >EC10-EC12	TM245	µg/l	<10	998	8	8	0.80%	<10	89.00
	Aromatics >EC12-EC16 (aq)	TM174	µg/l	<10	998	11	10	1.00%	<10	107.00
	Aromatics >EC16-EC21 (aq)	TM174	µg/l	<10	998	12	12	1.20%	<10	183.00
	Aromatics >EC21-EC35 (aq)	TM174	µg/l	<10	998	46	43	4.31%	<10	919.00
	Total Aromatics >EC12-EC35 (aq)	TM174	µg/l	<10	998	53	0	0.00%	<10	1200.00
	Total Aliphatics & Aromatics >C5-35 (aq)	TM174	µg/l	<10	998	107	0	0.00%	<10	61100.00
	Polyaromatic Hydrocarbons (PAHs)									
	Naphthalene (aq)	TM178	µg/l	<0.1	998	803	3	0.30%	<0.1	87.00
	Acenaphthene (aq)	TM178	µg/l	<0.015	998	716	115	11.52%	<0.015	0.78
	Acenaphthylene (aq)	TM178	µg/l	<0.011	998	580	23	2.30%	<0.011	0.73
Fluoranthene LOD>WQS	Fluoranthene (aq)	TM178	µg/l	<0.017	998	909	904	90.58%	<0.017	5.95
	Anthracene (aq)	TM178	µg/l	<0.015	998	686	27	2.71%	<0.015	1.05
	Phenanthrene (aq)	TM178	µg/l	<0.022	998	887	190	19.04%	<0.022	3.60
	Fluorene (aq)	TM178	µg/l	<0.014	998	731	48	4.81%	<0.014	0.54
	Chrysene (aq)	TM178	µg/l	<0.013	998	599	67	6.71%	<0.013	2.85
	Pyrene (aq)	TM178	µg/l	<0.015	998	907	180	18.04%	<0.015	4.31
	Benzo(a)anthracene (aq)	TM178	µg/l	<0.017	998	547	57	5.71%	<0.017	2.98
	Benzo(b)fluoranthene (aq)	TM178	µg/l	<0.023	998	778	778	77.96%	<0.023	5.09
	Benzo(k)fluoranthene (aq)	TM178	µg/l	<0.027	998	655	655	65.63%	<0.027	1.68
	Benzo(a)pyrene (aq)	TM178	µg/l	<0.009	998	794	794	79.56%	<0.009	3.03
	Dibenzo(a,h)anthracene (aq)	TM178	µg/l	<0.016	998	292	3	0.30%	<0.016	0.56
	Benzo(g,h,i)perylene (aq)	TM178	µg/l	<0.016	998	550	550	55.11%	<0.016	2.89
	Indeno(1,2,3-cd)pyrene (aq)	TM178	µg/l	<0.014	998	603	603	60.42%	<0.014	2.20
	PAH, Total Detected USEPA 16 (aq)	TM178	µg/l	<0.344	998	825	0	0.00%	<0.344	87.20
	Semi-Volatile Organic Compounds (SVOCs)									
	1,2,4-Trichlorobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dichlorobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	1,3-Dichlorobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	1,4-Dichlorobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2,4,5-Trichlorophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2,4,6-Trichlorophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2,4-Dichlorophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2,4-Dimethylphenol (aq)	TM176	µg/l	<1	998	1	0	0.00%	<1	1.73
	2,4-Dinitrotoluene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2,6-Dinitrotoluene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Chloronaphthalene (aq)	TM176	µg/l	<1	998	1	0	0.00%	<1	3.14
	2-Chlorophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Methylnaphthalene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Methylphenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Nitroaniline (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Nitrophenol (aq)	TM176	µg/l	<1	998	2	0	0.00%	<1	2.61
	3-Nitroaniline (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Bromophenylphenylether (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Chloro-3-methylphenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Chloroaniline (aq)	TM176	µg/l	<1	998	1	0	0.00%	<1	1.30
	4-Chlorophenylphenylether (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Methylphenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Nitroaniline (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Nitrophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Azobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Acenaphthylene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Acenaphthene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Anthracene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	bis(2-Chloroethyl)ether (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	bis(2-Chloroethoxy)methane (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	bis(2-Ethylhexyl) phthalate (aq)	TM176	µg/l	<2	998	24	24	2.40%	<2	67700.00
	Butylbenzyl phthalate (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Benzo(a)anthracene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Benzo(b)fluoranthene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Benzo(k)fluoranthene (aq)	TM176	µg/l	<1	998	2	2	0.20%	<1	1.81
	Benzo(a)pyrene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Benzo(g,h,i)perylene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Carbazole (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Chrysene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Dibenzofuran (aq)	TM176	µg/l	<1	998	2	0	0.00%	<1	1.05
	n-Dibutyl phthalate (aq)	TM176	µg/l	<1	998	4	0	0.00%	<1	8.00
	Diethyl phthalate (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Dibenzo(a,h)anthracene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Dimethyl phthalate (aq)	TM176	µg/l	<1	998	1	0	0.00%	<1	6.55
	n-Dioctyl phthalate (aq)	TM176	µg/l	<5	998	0	0	0.00%	<5	<5
	Fluoranthene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Fluorene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Hexachlorobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Hexachlorobutadiene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Pentachlorophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Phenol (aq)	TM176	µg/l	<1	998	3	1	0.10%	<1	21.90
	n-Nitroso-n-dipropylamine (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Hexachloroethane (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Nitrobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Naphthalene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Isophorone (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Hexachlorocyclopentadiene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Phenanthrene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Indeno(1,2,3-cd)pyrene (aq)	TM176	µg/l	<1	998	2	2	0.20%	<1	2.11
	Pyrene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	SVOC TIC (aq)	TM176	-		998	0	0	0.00%		
	Total SVOC TIC	TM176	µg/l	<10	998	155	0	0.00%	<10	107000.00
	Volatile Organic Compounds (VOCs)									
	Dibromofluoromethane**	TM208	%		998	960	0	0.00%		128.00
	Toluene-d8**	TM208	%		998	960	0	0.00%		110.00
	4-Bromofluorobenzene**	TM208	%		998	960	0	0.00%		110.00
	Dichlorodifluoromethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Chloromethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Vinyl chloride	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Bromomethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Chloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Trichlorofluoromethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,1-Dichloroethene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Carbon disulphide	TM208	µg/l	<1	998	1	0	0.00%	<1	1.08
	Dichloromethane	TM208	µg/l	<3	998	0	0	0.00%	<3	<3
	Methyl tertiary butyl ether (MTBE)	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	trans-1,2-Dichloroethene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,1-Dichloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	cis-1,2-Dichloroethene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	2,2-Dichloropropane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Bromochloromethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Chloroform	TM208	µg/l	<1	998	8	0	0.00%	<1	2.37
	1,1,1-Trichloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,1-Dichloropropene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Carbontetrachloride	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dichloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Benzene	TM208	µg/l	<1	998	14	7	0.70%	<1	465.00
	Trichloroethene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dichloropropane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Dibromomethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Bromodichloromethane	TM208	µg/l	<1	998	1	0	0.00%	<1	1.34
	cis-1,3-Dichloropropene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Toluene	TM208	µg/l	<1	998	3	0	0.00%	<1	2.52
	trans-1,3-Dichloropropene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,1,2-Trichloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,3-Dichloropropane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Tetrachloroethene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Dibromochloromethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dibromoethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Chlorobenzene	TM208	µg/l	<1	998	1	0	0.00%	<1	3.59
	1,1,1,2-Tetrachloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Ethylbenzene	TM208	µg/l	<1	998	10	0	0.00%	<1	21.90
	m,p-Xylene	TM208	µg/l	<1	998	9	0	0.00%	<1	10.80
	o-Xylene	TM208	µg/l	<1	998	8	0	0.00%	<1	9.04
	Styrene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Bromoform	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Isopropylbenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,1,2,2-Tetrachloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2,3-Trichloropropane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Bromobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Propylbenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Chlorotoluene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,3,5-Trimethylbenzene	TM208	µg/l	<1	998	2	0	0.00%	<1	2.02
	4-Chlorotoluene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	tert-Butylbenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2,4-Trimethylbenzene	TM208	µg/l	<1	998	5	0	0.00%	<1	3.58
	sec-Butylbenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	4-iso-Propyltoluene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,3-Dichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,4-Dichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	n-Butylbenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dibromo-3-chloropropane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2,4-Trichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Hexachlorobutadiene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	tert-Amyl methyl ether (TAME)	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Naphthalene	TM208	µg/l	<1	998	4	4	0.40%	<1	37.60
	1,2,3-Trichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,3,5-Trichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Sum of detected Xylenes	TM208	µg/l	<2	988	0	0	0.00%	<2	<2
	TICS									
	Octadecanoic acid		µg/l		988	9	0	0.00%		146.00
	Hexadecanoic acid	TM176	µg/l		988	69	0	0.00%	0.00	68.70
	Indane		µg/l		988	3	0	0.00%	0.00	32.40
	Hexadecenoic acid	TM176	µg/l		988	2	0	0.00%	0.00	50.50
	Mixed hydrocarbons (SVOC)	TM176	µg/l		988	99	0	0.00%		2250.00
	Mixed Hydrocarbons (VOC)	TM208	µg/l		988	1	0	0.00%		16.90
	Squalene		µg/l		988	1	0	0.00%	0.00	19.60
	Tetradecanoic acid	TM176	µg/l		988	3	0	0.00%	0.00	29.40
	Inorganics Extra									
	COD, filtered	TM107	mg/l		988	2	0	0.00%	0.00	25.00
	BOD, filtered	TM045	mg/l		988	2	0	0.00%	0.00	3.49
	Ammoniacal Nitrogen as NH3	TM099	mg/l		988	2	0	0.00%	0.00	0.63
	Cyanide, Total (low level)	TM279	µg/l		988	2	0	0.00%	0.00	54.40
	Cyanide, Free (low level)	TM279	µg/l		988	2	0	0.00%	0.00	10.80
	Cyanide, Complex (low level)*	TM279	µg/l		988	2	0	0.00%	0.00	43.60
	TPH									
	Aliphatics >C12-C16 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	299.00
	Aliphatics >C16-C21 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	1200.00
	Aliphatics >C21-C35 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	9280.00
	Total Aliphatics >C12-C35 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	10800.00
	Aromatics >EC12-EC16 (diss.filt)	TM174	µg/l		988	2	0	0.00%	0.00	56.00
	Aromatics >EC16-EC21 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	178.00
	Aromatics >EC21-EC35 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	679.00
	Aromatics >EC16-EC35 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	857.00
	Total Aromatics >EC12-EC35 (diss.filt)	TM174	µg/l		988	2	0	0.00%	0.00	913.00
	Total Aliphatics & Aromatics >C5-35 (diss.filt)	TM174	µg/l		988	2	0	0.00%	0.00	11700.00
	Miscellaneous Organics									
	Fluoranthene	TM355	µg/l		988	1	0	0.00%	0.00	0.02
	Fluoranthene	TM355	µg/l		988	33	0	0.00%	0.00	0.39
	Benzo(a)pyrene	TM355	µg/l		988	93	0	0.00%	0.00	0.05
	Subcontracted: Inorganics									
	BOD*	SUB	mg/l		988	0	0	0.00%	0.00	
	EPH CWG (Speciated)									
	Aliphatics >C16-C35 Aqueous	TM174	µg/l		988	29	0	0.00%	0.00	57800.00
	Naphthalene (diss.filt)	TM178	µg/l		988	481	0	0.00%	0.00	4.82
	Acenaphthene (diss.filt)	TM178	µg/l		988	548	0	0.00%	0.00	0.84
	Acenaphthylene (diss.filt)	TM178	µg/l		988	270	0	0.00%	0.00	0.13
	Fluoranthene (diss.filt)	TM178	µg/l		988	678	0	0.00%	0.00	0.20
	Anthracene (diss.filt)	TM178	µg/l		988	301	0	0.00%	0.00	0.05
	Phenanthrene (diss.filt)	TM178	µg/l		988	604	0	0.00%	0.00	0.30
	Fluorene (diss.filt)	TM178	µg/l		988	458	0	0.00%	0.00	0.22
	Chrysene (diss.filt)	TM178	µg/l		988	64	0	0.00%	0.00	0.04
	Pyrene (diss.filt)	TM178	µg/l		988	668	0	0.00%	0.00	0.15
	Benzo(b)fluoranthene (diss.filt)	TM178	µg/l		988	133	0	0.00%	0.00	0.10
	Benzo(k)fluoranthene (diss.filt)	TM178	µg/l		988	59	0	0.00%	0.00	0.06
	Benzo(a)pyrene (diss.filt)	TM178	µg/l		988	142	0	0.00%	0.00	0.02
	Dibenzo(a,h)anthracene (diss.filt)	TM178	µg/l		988	14	0	0.00%	0.00	0.02
	Benzo(g,h,i)perylene (diss.filt)	TM178	µg/l		988	36	0	0.00%	0.00	0.03
	Indeno(1,2,3-cd)pyrene (diss.filt)	TM178	µg/l		988	38	0	0.00%	0.00	0.03
	PAH Sum of EPA 16 detected (Diss filt)	TM178	µg/l		988	409	0	0.00%	0.00	4.99
	Benzo(a)anthracene (diss.filt)	TM178	µg/l		988	66	0	0.00%	0.00	0.04
	Glycols									
	Propylene glycol	TM194	mg/l		988	0	0	0.00%	0.00	
	Ethylene glycol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	1,3-Propanediol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	1,3-Butanediol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	1,4-Butanediol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	Diethylene glycol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	Triethylene glycol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	TICs									
	(methylethyl)Phenol		µg/l		988	1	0	0.00%	0.00	51.00
	[Hexadecatrienal]-cis		µg/l		988	1	0	0.00%	0.00	30.00
	Collection of Hydrocarbons C12-C35		µg/l		988	1	0	0.00%	0.00	107000.00
	Cyclic octaatomic sulfur		µg/l		988	1	0	0.00%	0.00	67.60
	Cyclooctadiene		µg/l		988	1	0	0.00%	0.00	12.20
	Dimethyldodecane		µg/l		988	1	0	0.00%	0.00	12.00
	Dimethyltetradecenol acetate		µg/l		988	2	0	0.00%	0.00	75.60
	Docosenamide		µg/l		988	4	0	0.00%	0.00	44.00
	Eicosane		µg/l		988	1	0	0.00%	0.00	192.00
	Ethylhexanol		µg/l		988	2	0	0.00%	0.00	40.40
	Farnesol		µg/l		988	1	0	0.00%	0.00	281.00
	Heneicosane		µg/l		988	1	0	0.00%	0.00	221.00
	Hexadecane		µg/l		988	5	0	0.00%	0.00	17.00
	Hexadecatrienal		µg/l		988	2	0	0.00%	0.00	18.40
	Hexagol		µg/l		988	1	0	0.00%	0.00	12.50
	Hexahydromethanoindenol		µg/l		988	1	0	0.00%	0.00	14.40
	Isomer of Bicycloheptene ethenyl		µg/l		988	1	0	0.00%	0.00	15.00
	Isomer of Indenol		µg/l		988	1	0	0.00%	0.00	22.00
	Isomer of Indenol dihydro		µg/l		988	1	0	0.00%	0.00	50.00
	Isomers of Hexagol		µg/l		988	1	0	0.00%	0.00	26.00
	Isomers of Hexadecane		µg/l		988	3	0	0.00%	0.00	30.10
	Methylnonadecane		µg/l		988	3	0	0.00%	0.00	15.50
	Methylparaben		µg/l		988	1	0	0.00%	0.00	65.10
	Nonadecane		µg/l		988	1	0	0.00%	0.00	13.20
	Octadecane		µg/l		988	1	0	0.00%	0.00	12.60
	Octadecatrienoic acid methyl ester		µg/l		988	1	0	0.00%	0.00	11.70
	Octadecenamide		µg/l		988	1	0	0.00%	0.00	22.10
	Oleic Acid		µg/l		988	2	0	0.00%	0.00	44.10
	Pentadecanoic acid		µg/l		988	11	0	0.00%	0.00	29.50
	Pentaethylene glycol		µg/l		988	1	0	0.00%	0.00	15.90
	Phenol(methylethyl)		µg/l		988	1	0	0.00%	0.00	11.10
	Phenol(methylethyl)-bis		µg/l		988	2	0	0.00%	0.00	17.50
	Phenol(methylethylidene)bis-		µg/l		988	1	0	0.00%	0.00	29.00
	Phenol, -bis(-methylethyl)-		µg/l		988	1	0	0.00%	0.00	57.60
	Phthalate		µg/l		988	1	0	0.00%	0.00	92.00
	Sitosterol-beta		µg/l		988	2	0	0.00%	0.00	10.70
	Sulfur		µg/l		988	1	0	0.00%	0.00	14.50
	Tetradecadiene		µg/l		988	2	0	0.00%	0.00	44.70
	Tetradecane		µg/l		988	1	0	0.00%	0.00	10.60
	Tetramethylhexadecenol		µg/l		988	1	0	0.00%	0.00	42.20
	Tricyclodecenone		µg/l		988	2	0	0.00%	0.00	14.30
	Tetracosane	TM176	µg/l		988	1	0	0.00%	0.00	237.00

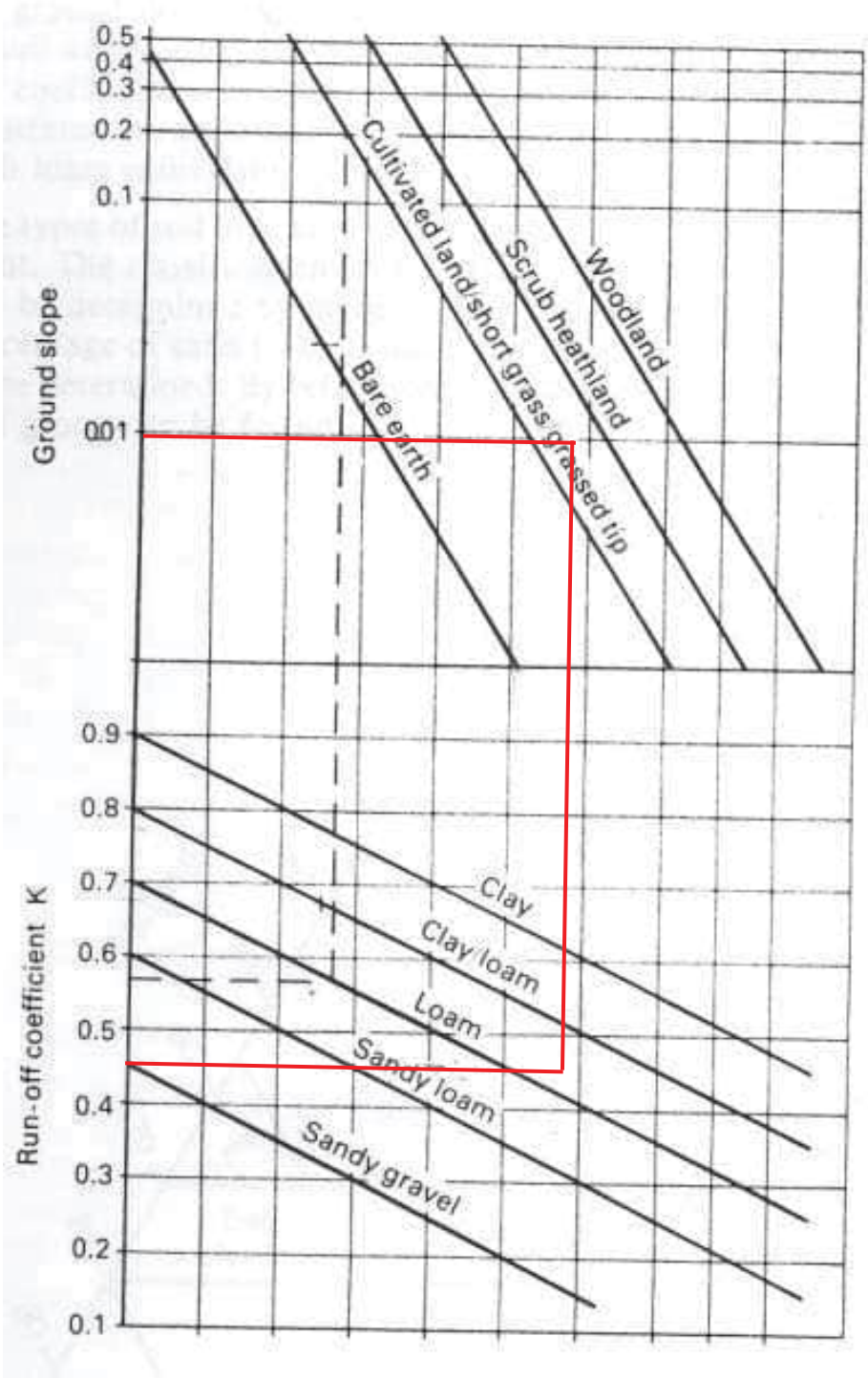


Glan Llyn Surface Water Data

Notes	Determinand	Method	Units	LOD	No. of Samples	No. of Samples >LOD	No. of Samples > EQS	% of samples exceeding EQS	Min	Max
	Carbon									
	Carbon, Organic (diss.filt)	TM090	mg/l	<3	998	977	0	0.00%	<3	53.40
	Organic Carbon, Total	TM090	mg/l	<3	998	972	0	0.00%	<3	57.80
	Inorganics									
	Conductivity @ 20 deg.C (diss.filt)	TM120	mS/cm	<0.014	998	995	0	0.00%	<0.014	2.43
	Dissolved solids, Total (meter)	TM123	mg/l	<5	998	995	0	0.00%	<5	2080.00
	Fluoride	TM104	mg/l	<0.5	998	787	0	0.00%	<0.5	1.80
	Oxygen, dissolved	TM046	mg/l	<0.3	998	995	0	0.00%	<0.3	13.60
High pH in c. half of samples	pH	TM256	pH Units	<1	998	992	0	0.00%	<1	11.70
	Redox potential	TM110	mV		998	994	0	0.00%		246.00
	Sulphate	TM184	mg/l	<2	998	995	0	0.00%	<2	1220.00
	Sulphide	TM101	mg/l	<0.01	998	95	0	0.00%	<0.01	0.07
	Chloride	TM184	mg/l	<2	998	995	0	0.00%	<2	259.00
	BOD, unfiltered	TM045	mg/l	<1	998	623	0	0.00%	<1	26.60
	COD, unfiltered	TM107	mg/l	<7	998	982	0	0.00%	<7	304.00
	Turbidity	TM195	ntu	<0.1	998	960	0	0.00%	<0.1	1370.00
Cyanide EQS < LOD	Cyanide, Total	TM227	mg/l	<0.05	998	118	118	11.82%	<0.05	0.28
Cyanide EQS < LOD	Cyanide, Free	TM227	mg/l	<0.05	998	34	34	3.41%	<0.05	0.17
Cyanide EQS < LOD	Cyanide, Complex	TM227	mg/l	<0.05	998	86	86	8.62%	<0.05	0.28
	Phosphate (ortho) as PO4	TM184	mg/l	<0.05	998	244	0	0.00%	<0.05	4.91
	Ammoniacal Nitrogen as NH4	TM099	mg/l	<0.3	998	635	628	62.93%	<0.3	18.60
	Suspended solids, Total	TM022	mg/l	<2	998	950	0	0.00%	<2	690.00
	Metals - (Liquid)									
	Sulphur Dissolved	TM228	mg/l	<1	998	995	0	0.00%	<1	411.00
	Filtered (Dissolved) Metals									
Chromium EQS > LOD	Chromium, Hexavalent	TM241	mg/l	<0.03	998	1	1	0.10%	<0.03	0.03
	Mercury (diss.filt)	TM183	µg/l	<0.01	998	115	0	0.00%	<0.01	0.05
	Antimony (diss.filt)	TM152	µg/l	<0.16	998	222	0	0.00%	<0.16	4.35
	Calcium (diss.filt)	TM228	mg/l	<0.012	998	983	0	0.00%	<0.012	371.00
	Arsenic (diss.filt)	TM152	µg/l	<0.12	998	984	0	0.00%	<0.12	28.50
	Barium (diss.filt)	TM152	µg/l	<0.03	998	983	0	0.00%	<0.03	304.00
	Magnesium (diss.filt)	TM228	mg/l	<0.036	998	899	0	0.00%	<0.036	12300.00
	Beryllium (diss.filt)	TM152	µg/l	<0.07	998	2	0	0.00%	<0.07	0.21
	Iron (diss.filt)	TM228	mg/l	<0.019	998	596	5	0.50%	<0.019	2.17
	Boron (diss.filt)	TM152	µg/l	<9.4	998	983	4	0.40%	<9.4	2070.00
	Cadmium (diss.filt)	TM152	µg/l	<0.1	998	9	1	0.10%	<0.1	0.29
	Chromium (diss.filt)	TM152	µg/l	<0.22	998	197	34	3.41%	<0.22	10.70
	Copper (diss.filt)	TM152	µg/l	<0.85	998	848	704	70.54%	<0.85	15.30
	Lead (diss.filt)	TM152	µg/l	<0.02	998	269	31	3.11%	<0.02	12.70
	Manganese (diss.filt)	TM152	µg/l	<0.04	998	983	0	0.00%	<0.04	76.30
	Nickel (diss.filt)	TM152	µg/l	<0.15	998	935	51	5.11%	<0.15	9.06
	Phosphorus (diss.filt)	TM152	µg/l	<6.3	998	866	0	0.00%	<6.3	1630.00
	Selenium (diss.filt)	TM152	µg/l	<0.39	998	750	2	0.20%	<0.39	16.50
Vanadium EQS>LOD	Vanadium (diss.filt)	TM152	µg/l	<0.24	998	943	255	25.55%	<0.24	95.60
	Zinc (diss.filt)	TM152	µg/l	<0.41	998	816	31	3.11%	<0.41	522.00
	Unfiltered (Total) Metals									
	Mercury (tot.unfilt)	TM183	µg/l	<0.02	998	144	13	1.30%	<0.02	0.51
	Calcium (tot.unfilt)	TM228	mg/l	<0.057	998	975	0	0.00%	<0.057	336.00
	Arsenic (tot.unfilt)	TM191	µg/l	<2	998	858	1	0.10%	<2	53.70
	Barium (tot.unfilt)	TM191	µg/l	<0.5	998	994	0	0.00%	<0.5	585.00
	Magnesium (tot.unfilt)	TM228	mg/l	<0.05	998	994	0	0.00%	<0.05	71.20
	Beryllium (tot.unfilt)	TM191	µg/l	<1	998	2	0	0.00%	<1	2.17
	Iron (tot.unfilt)	TM228	mg/l	<0.024	998	964	217	21.74%	<0.024	42.30
	Boron (tot.unfilt)	TM191	µg/l	<135	998	979	4	0.40%	<135	2030.00
	Cadmium (tot.unfilt)	TM191	µg/l	<0.5	998	4	4	0.40%	<0.5	1.79
	Chromium (tot.unfilt)	TM191	µg/l	<3	998	140	82	8.22%	<3	72.80
	Copper (tot.unfilt)	TM191	µg/l	<4	998	859	859	86.07%	<4	42.20
	Hardness, Total as CaCO3 unfiltered	TM228	mg/l	<0.35	998	967	0	0.00%	<0.35	1160.00
	Manganese (tot.unfilt)	TM191	µg/l	<0.5	998	994	393	39.38%	<0.5	12000.00
	Nickel (tot.unfilt)	TM191	µg/l	<0.5	998	943	140	14.03%	<0.5	27.40
	Phosphorus (tot.unfilt)	TM191	µg/l	<20	998	981	0	0.00%	<20	2740.00
	Lead (tot.unfilt)	TM191	µg/l	<0.5	998	730	659	66.03%	<0.5	246.00
	Lead (tot.unfilt) Calculated bioavailable		µg/l		988	720	0	0.00%	0.00	0.25
	Antimony (tot.unfilt)	TM191	µg/l	<4	998	4	0	0.00%	<4	4.84
	Selenium (tot.unfilt)	TM191	µg/l	<1	998	827	3	0.30%	<1	13.70
	Vanadium (tot.unfilt)	TM191	µg/l	<8	998	852	316	31.66%	<8	141.00
	Zinc (tot.unfilt)	TM191	µg/l	<3	998	861	463	46.39%	<3	780.00
	Phenols									
	Phenol	TM259	mg/l	<0.002	998	21	21	2.10%	<0.002	0.04
	Cresols	TM259	mg/l	<0.006	998	12	0	0.00%	<0.006	0.02
	Xylenols	TM259	mg/l	<0.008	998	21	0	0.00%	<0.008	0.03
	Phenols, Total Detected monohydric	TM259	mg/l	<0.016	998	21	21	2.10%	<0.016	0.04
	Gasoline Range Organics (GRO)									
	Total Aliphatics >C5-C12	TM245	µg/l	<10	988	2	0	0.00%	<10	3660000.00
	Total Aromatics >EC5-EC12	TM245	µg/l	<10	988	0	2	0.20%	<10	<10
	TPH Criteria Working Group (TPH CWG)									
	GRO Surrogate % recovery**	TM245	%		998	960	0	0.00%		130.00
	GRO >C5-C12	TM245	µg/l	<50	998	8	0	0.00%	<50	726.00
	Methyl tertiary butyl ether (MTBE)	TM245	µg/l	<3	998	1	0	0.00%	<3	4.00
	Benzene	TM245	µg/l	<7	998	6	6	0.60%	<7	429.00
	Toluene	TM245	µg/l	<4	998	0	0	0.00%	<4	<4
	Ethylbenzene	TM245	µg/l	<5	998	6	1	0.10%	<5	30.00
	m,p-Xylene	TM245	µg/l	<8	998	2	0	0.00%	<8	9.00
	o-Xylene	TM245	µg/l	<3	998	4	0	0.00%	<3	9.00
	Sum of detected Xylenes	TM245	µg/l	<11	998	2	0	0.00%	<11	18.00
	Sum of detected BTEX	TM245	µg/l	<28	998	6	0	0.00%	<28	459.00
	Aliphatics >C5-C6	TM245	µg/l	<10	998	0	0	0.00%	<10	<10
	Aliphatics >C6-C8	TM245	µg/l	<10	998	4	3	0.30%	<10	19.00
	Aliphatics >C8-C10	TM245	µg/l	<10	998	5	5	0.50%	<10	21.00
	Aliphatics >C10-C12	TM245	µg/l	<10	998	8	8	0.80%	<10	134.00
	Aliphatics >C12-C16 (aq)	TM174	µg/l	<10	998	2	2	0.20%	<10	2080.00
	Aliphatics >C16-C21 (aq)	TM174	µg/l	<10	998	13	13	1.30%	<10	8140.00
	Aliphatics >C21-C35 (aq)	TM174	µg/l	<10	998	24	24	2.40%	<10	49700.00
	Total Aliphatics >C12-C35 (aq)	TM174	µg/l	<10	998	29	0	0.00%	<10	59900.00
	Aromatics >EC5-EC7	TM245	µg/l	<10	998	6	6	0.60%	<10	429.00
	Aromatics >EC7-EC8	TM245	µg/l	<10	998	0	0	0.00%	<10	<10
	Aromatics >EC8-EC10	TM245	µg/l	<10	998	9	8	0.80%	<10	56.00
	Aromatics >EC10-EC12	TM245	µg/l	<10	998	8	8	0.80%	<10	89.00
	Aromatics >EC12-EC16 (aq)	TM174	µg/l	<10	998	11	10	1.00%	<10	107.00
	Aromatics >EC16-EC21 (aq)	TM174	µg/l	<10	998	12	12	1.20%	<10	183.00
	Aromatics >EC21-EC35 (aq)	TM174	µg/l	<10	998	46	43	4.31%	<10	919.00
	Total Aromatics >EC12-EC35 (aq)	TM174	µg/l	<10	998	53	0	0.00%	<10	1200.00
	Total Aliphatics & Aromatics >C5-35 (aq)	TM174	µg/l	<10	998	107	0	0.00%	<10	61100.00
	Polyaromatic Hydrocarbons (PAHs)									
	Naphthalene (aq)	TM178	µg/l	<0.1	998	803	3	0.30%	<0.1	87.00
	Acenaphthene (aq)	TM178	µg/l	<0.015	998	716	115	11.52%	<0.015	0.78
	Acenaphthylene (aq)	TM178	µg/l	<0.011	998	580	23	2.30%	<0.011	0.73
Fluoranthene LOD>WQS	Fluoranthene (aq)	TM178	µg/l	<0.017	998	909	904	90.58%	<0.017	5.95
	Anthracene (aq)	TM178	µg/l	<0.015	998	686	27	2.71%	<0.015	1.05
	Phenanthrene (aq)	TM178	µg/l	<0.022	998	887	190	19.04%	<0.022	3.60
	Fluorene (aq)	TM178	µg/l	<0.014	998	731	48	4.81%	<0.014	0.54
	Chrysene (aq)	TM178	µg/l	<0.013	998	599	67	6.71%	<0.013	2.85
	Pyrene (aq)	TM178	µg/l	<0.015	998	907	180	18.04%	<0.015	4.31
	Benzo(a)anthracene (aq)	TM178	µg/l	<0.017	998	547	57	5.71%	<0.017	2.98
	Benzo(b)fluoranthene (aq)	TM178	µg/l	<0.023	998	778	778	77.96%	<0.023	5.09
	Benzo(k)fluoranthene (aq)	TM178	µg/l	<0.027	998	655	655	65.63%	<0.027	1.68
	Benzo(a)pyrene (aq)	TM178	µg/l	<0.009	998	794	794	79.56%	<0.009	3.03
	Dibenzo(a,h)anthracene (aq)	TM178	µg/l	<0.016	998	292	3	0.30%	<0.016	0.56
	Benzo(g,h,i)perylene (aq)	TM178	µg/l	<0.016	998	550	550	55.11%	<0.016	2.89
	Indeno(1,2,3-cd)pyrene (aq)	TM178	µg/l	<0.014	998	603	603	60.42%	<0.014	2.20
	PAH, Total Detected USEPA 16 (aq)	TM178	µg/l	<0.344	998	825	0	0.00%	<0.344	87.20
	Semi-Volatile Organic Compounds (SVOCs)									
	1,2,4-Trichlorobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dichlorobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	1,3-Dichlorobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	1,4-Dichlorobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2,4,5-Trichlorophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2,4,6-Trichlorophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2,4-Dichlorophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2,4-Dimethylphenol (aq)	TM176	µg/l	<1	998	1	0	0.00%	<1	1.73
	2,4-Dinitrotoluene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2,6-Dinitrotoluene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Chloronaphthalene (aq)	TM176	µg/l	<1	998	1	0	0.00%	<1	3.14
	2-Chlorophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Methylnaphthalene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Methylphenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Nitroaniline (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Nitrophenol (aq)	TM176	µg/l	<1	998	2	0	0.00%	<1	2.61
	3-Nitroaniline (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Bromophenylphenylether (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Chloro-3-methylphenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Chloroaniline (aq)	TM176	µg/l	<1	998	1	0	0.00%	<1	1.30
	4-Chlorophenylphenylether (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Methylphenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Nitroaniline (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	4-Nitrophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Azobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Acenaphthylene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Acenaphthene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Anthracene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	bis(2-Chloroethyl)ether (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	bis(2-Chloroethoxy)methane (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	bis(2-Ethylhexyl) phthalate (aq)	TM176	µg/l	<2	998	24	24	2.40%	<2	67700.00
	Butylbenzyl phthalate (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Benzo(a)anthracene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Benzo(b)fluoranthene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Benzo(k)fluoranthene (aq)	TM176	µg/l	<1	998	2	2	0.20%	<1	1.81
	Benzo(a)pyrene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Benzo(g,h,i)perylene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Carbazole (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Chrysene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Dibenzofuran (aq)	TM176	µg/l	<1	998	2	0	0.00%	<1	1.05
	n-Dibutyl phthalate (aq)	TM176	µg/l	<1	998	4	0	0.00%	<1	8.00
	Diethyl phthalate (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Dibenzo(a,h)anthracene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Dimethyl phthalate (aq)	TM176	µg/l	<1	998	1	0	0.00%	<1	6.55
	n-Dioctyl phthalate (aq)	TM176	µg/l	<5	998	0	0	0.00%	<5	<5
	Fluoranthene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Fluorene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Hexachlorobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Hexachlorobutadiene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Pentachlorophenol (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Phenol (aq)	TM176	µg/l	<1	998	3	1	0.10%	<1	21.90
	n-Nitroso-n-dipropylamine (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Hexachloroethane (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Nitrobenzene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Naphthalene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Isophorone (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Hexachlorocyclopentadiene (aq)	TM176	µg/l	<1	998	0	0	0.00%	<1	<1
	Phenanthrene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	Indeno(1,2,3-cd)pyrene (aq)	TM176	µg/l	<1	998	2	2	0.20%	<1	2.11
	Pyrene (aq)	TM176	µg/l	<1	988	0	0	0.00%	<1	<1
	SVOC TIC (aq)	TM176	-		998	0	0	0.00%		
	Total SVOC TIC	TM176	µg/l	<10	998	155	0	0.00%	<10	107000.00
	Volatile Organic Compounds (VOCs)									
	Dibromofluoromethane**	TM208	%		998	960	0	0.00%		128.00
	Toluene-d8**	TM208	%		998	960	0	0.00%		110.00
	4-Bromofluorobenzene**	TM208	%		998	960	0	0.00%		110.00
	Dichlorodifluoromethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Chloromethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Vinyl chloride	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Bromomethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Chloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Trichlorofluoromethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,1-Dichloroethene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Carbon disulphide	TM208	µg/l	<1	998	1	0	0.00%	<1	1.08
	Dichloromethane	TM208	µg/l	<3	998	0	0	0.00%	<3	<3
	Methyl tertiary butyl ether (MTBE)	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	trans-1,2-Dichloroethene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,1-Dichloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	cis-1,2-Dichloroethene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	2,2-Dichloropropane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Bromochloromethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Chloroform	TM208	µg/l	<1	998	8	0	0.00%	<1	2.37
	1,1,1-Trichloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,1-Dichloropropene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Carbontetrachloride	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dichloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Benzene	TM208	µg/l	<1	998	14	7	0.70%	<1	465.00
	Trichloroethene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dichloropropane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Dibromomethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Bromodichloromethane	TM208	µg/l	<1	998	1	0	0.00%	<1	1.34
	cis-1,3-Dichloropropene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Toluene	TM208	µg/l	<1	998	3	0	0.00%	<1	2.52
	trans-1,3-Dichloropropene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,1,2-Trichloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,3-Dichloropropane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Tetrachloroethene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Dibromochloromethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dibromoethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Chlorobenzene	TM208	µg/l	<1	998	1	0	0.00%	<1	3.59
	1,1,1,2-Tetrachloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Ethylbenzene	TM208	µg/l	<1	998	10	0	0.00%	<1	21.90
	m,p-Xylene	TM208	µg/l	<1	998	9	0	0.00%	<1	10.80
	o-Xylene	TM208	µg/l	<1	998	8	0	0.00%	<1	9.04
	Styrene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Bromoform	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Isopropylbenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,1,2,2-Tetrachloroethane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2,3-Trichloropropane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Bromobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Propylbenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	2-Chlorotoluene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,3,5-Trimethylbenzene	TM208	µg/l	<1	998	2	0	0.00%	<1	2.02
	4-Chlorotoluene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	tert-Butylbenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2,4-Trimethylbenzene	TM208	µg/l	<1	998	5	0	0.00%	<1	3.58
	sec-Butylbenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	4-iso-Propyltoluene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,3-Dichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,4-Dichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	n-Butylbenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2-Dibromo-3-chloropropane	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,2,4-Trichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Hexachlorobutadiene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	tert-Amyl methyl ether (TAME)	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Naphthalene	TM208	µg/l	<1	998	4	4	0.40%	<1	37.60
	1,2,3-Trichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	1,3,5-Trichlorobenzene	TM208	µg/l	<1	998	0	0	0.00%	<1	<1
	Sum of detected Xylenes	TM208	µg/l	<2	988	0	0	0.00%	<2	<2
	TICS									
	Octadecanoic acid		µg/l		988	9	0	0.00%		146.00
	Hexadecanoic acid	TM176	µg/l		988	69	0	0.00%	0.00	68.70
	Indane		µg/l		988	3	0	0.00%	0.00	32.40
	Hexadecenoic acid	TM176	µg/l		988	2	0	0.00%	0.00	50.50
	Mixed hydrocarbons (SVOC)	TM176	µg/l		988	99	0	0.00%		2250.00
	Mixed Hydrocarbons (VOC)	TM208	µg/l		988	1	0	0.00%		16.90
	Squalene		µg/l		988	1	0	0.00%	0.00	19.60
	Tetradecanoic acid	TM176	µg/l		988	3	0	0.00%	0.00	29.40
	Inorganics Extra									
	COD, filtered	TM107	mg/l		988	2	0	0.00%	0.00	25.00
	BOD, filtered	TM045	mg/l		988	2	0	0.00%	0.00	3.49
	Ammoniacal Nitrogen as NH3	TM099	mg/l		988	2	0	0.00%	0.00	0.63
	Cyanide, Total (low level)	TM279	µg/l		988	2	0	0.00%	0.00	54.40
	Cyanide, Free (low level)	TM279	µg/l		988	2	0	0.00%	0.00	10.80
	Cyanide, Complex (low level)*	TM279	µg/l		988	2	0	0.00%	0.00	43.60
	TPH									
	Aliphatics >C12-C16 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	299.00
	Aliphatics >C16-C21 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	1200.00
	Aliphatics >C21-C35 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	9280.00
	Total Aliphatics >C12-C35 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	10800.00
	Aromatics >EC12-EC16 (diss.filt)	TM174	µg/l		988	2	0	0.00%	0.00	56.00
	Aromatics >EC16-EC21 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	178.00
	Aromatics >EC21-EC35 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	679.00
	Aromatics >EC16-EC35 (diss.filt)	TM174	µg/l		988	1	0	0.00%	0.00	857.00
	Total Aromatics >EC12-EC35 (diss.filt)	TM174	µg/l		988	2	0	0.00%	0.00	913.00
	Total Aliphatics & Aromatics >C5-35 (diss.filt)	TM174	µg/l		988	2	0	0.00%	0.00	11700.00
	Miscellaneous Organics									
	Fluoranthene	TM355	µg/l		988	1	0	0.00%	0.00	0.02
	Fluoranthene	TM355	µg/l		988	33	0	0.00%	0.00	0.39
	Benzo(a)pyrene	TM355	µg/l		988	93	0	0.00%	0.00	0.05
	Subcontracted: Inorganics									
	BOD*	SUB	mg/l		988	0	0	0.00%	0.00	
	EPH CWG (Speciated)									
	Aliphatics >C16-C35 Aqueous	TM174	µg/l		988	29	0	0.00%	0.00	57800.00
	Naphthalene (diss.filt)	TM178	µg/l		988	481	0	0.00%	0.00	4.82
	Acenaphthene (diss.filt)	TM178	µg/l		988	548	0	0.00%	0.00	0.84
	Acenaphthylene (diss.filt)	TM178	µg/l		988	270	0	0.00%	0.00	0.13
	Fluoranthene (diss.filt)	TM178	µg/l		988	678	0	0.00%	0.00	0.20
	Anthracene (diss.filt)	TM178	µg/l		988	301	0	0.00%	0.00	0.05
	Phenanthrene (diss.filt)	TM178	µg/l		988	604	0	0.00%	0.00	0.30
	Fluorene (diss.filt)	TM178	µg/l		988	458	0	0.00%	0.00	0.22
	Chrysene (diss.filt)	TM178	µg/l		988	64	0	0.00%	0.00	0.04
	Pyrene (diss.filt)	TM178	µg/l		988	668	0	0.00%	0.00	0.15
	Benzo(b)fluoranthene (diss.filt)	TM178	µg/l		988	133	0	0.00%	0.00	0.10
	Benzo(k)fluoranthene (diss.filt)	TM178	µg/l		988	59	0	0.00%	0.00	0.06
	Benzo(a)pyrene (diss.filt)	TM178	µg/l		988	142	0	0.00%	0.00	0.02
	Dibenzo(a,h)anthracene (diss.filt)	TM178	µg/l		988	14	0	0.00%	0.00	0.02
	Benzo(g,h,i)perylene (diss.filt)	TM178	µg/l		988	36	0	0.00%	0.00	0.03
	Indeno(1,2,3-cd)pyrene (diss.filt)	TM178	µg/l		988	38	0	0.00%	0.00	0.03
	PAH Sum of EPA 16 detected (Diss filt)	TM178	µg/l		988	409	0	0.00%	0.00	4.99
	Benzo(a)anthracene (diss.filt)	TM178	µg/l		988	66	0	0.00%	0.00	0.04
	Glycols									
	Propylene glycol	TM194	mg/l		988	0	0	0.00%	0.00	
	Ethylene glycol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	1,3-Propanediol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	1,3-Butanediol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	1,4-Butanediol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	Diethylene glycol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	Triethylene glycol	TM194	mg/l		988	0	0	0.00%	0.00	0.00
	TICs									
	(methylethyl)Phenol		µg/l		988	1	0	0.00%	0.00	51.00
	[Hexadecatrienal]-cis		µg/l		988	1	0	0.00%	0.00	30.00
	Collection of Hydrocarbons C12-C35		µg/l		988	1	0	0.00%	0.00	107000.00
	Cyclic octaatomic sulfur		µg/l		988	1	0	0.00%	0.00	67.60
	Cyclooctadiene		µg/l		988	1	0	0.00%	0.00	12.20
	Dimethyldodecane		µg/l		988	1	0	0.00%	0.00	12.00
	Dimethyltetradecenol acetate		µg/l		988	2	0	0.00%	0.00	75.60
	Docosenamide		µg/l		988	4	0	0.00%	0.00	44.00
	Eicosane		µg/l		988	1	0	0.00%	0.00	192.00
	Ethylhexanol		µg/l		988	2	0	0.00%	0.00	40.40
	Farnesol		µg/l		988	1	0	0.00%	0.00	281.00
	Heneicosane		µg/l		988	1	0	0.00%	0.00	221.00
	Hexadecane		µg/l		988	5	0	0.00%	0.00	17.00
	Hexadecatrienal		µg/l		988	2	0	0.00%	0.00	18.40
	Hexagol		µg/l		988	1	0	0.00%	0.00	12.50
	Hexahydromethanoindenol		µg/l		988	1	0	0.00%	0.00	14.40
	Isomer of Bicycloheptene ethenyl		µg/l		988	1	0	0.00%	0.00	15.00
	Isomer of Indenol		µg/l		988	1	0	0.00%	0.00	22.00
	Isomer of Indenol dihydro		µg/l		988	1	0	0.00%	0.00	50.00
	Isomers of Hexagol		µg/l		988	1	0	0.00%	0.00	26.00
	Isomers of Hexadecane		µg/l		988	3	0	0.00%	0.00	30.10
	Methylnonadecane		µg/l		988	3	0	0.00%	0.00	15.50
	Methylparaben		µg/l		988	1	0	0.00%	0.00	65.10
	Nonadecane		µg/l		988	1	0	0.00%	0.00	13.20
	Octadecane		µg/l		988	1	0	0.00%	0.00	12.60
	Octadecatrienoic acid methyl ester		µg/l		988	1	0	0.00%	0.00	11.70
	Octadecenamide		µg/l		988	1	0	0.00%	0.00	22.10
	Oleic Acid		µg/l		988	2	0	0.00%	0.00	44.10
	Pentadecanoic acid		µg/l		988	11	0	0.00%	0.00	29.50
	Pentaethylene glycol		µg/l		988	1	0	0.00%	0.00	15.90
	Phenol(methylethyl)		µg/l		988	1	0	0.00%	0.00	11.10
	Phenol(methylethyl)-bis		µg/l		988	2	0	0.00%	0.00	17.50
	Phenol(methylethylidene)bis-		µg/l		988	1	0	0.00%	0.00	29.00
	Phenol, -bis(-methylethyl)-		µg/l		988	1	0	0.00%	0.00	57.60
	Phthalate		µg/l		988	1	0	0.00%	0.00	92.00
	Sitosterol-beta		µg/l		988	2	0	0.00%	0.00	10.70
	Sulfur		µg/l		988	1	0	0.00%	0.00	14.50
	Tetradecadiene		µg/l		988	2	0	0.00%	0.00	44.70
	Tetradecane		µg/l		988	1	0	0.00%	0.00	10.60
	Tetramethylhexadecenol		µg/l		988	1	0	0.00%	0.00	42.20
	Tricyclodecenone		µg/l		988	2	0	0.00%	0.00	14.30
	Tetracosane	TM176	µg/l		988	1	0	0.00%	0.00	237.00

Appendix I: Chemical Input Parameters and Justifications

Runoff Coefficient Nomogram (National Coal Board, 1982)



Determinand-Specific Parameters

Determinand	Henrys Law Coefficient (H)	Ref.	Soil Organic Carbon-Water Partitioning Coefficient (koc)	Ref.	Solid/Liquid Partition Coefficient (Kd)	Ref.
Units	**(cm^3/cm^3)**		**(-)**		**l/kg**	
Inorganic Metals and Metalloids						
Arsenic	1	-	-	-	134	6
Cadmium	1	-	-	-	776	6
Chromium	1	-	-	-	5,336	6
Copper	1	-	-	-	1,199	6
Iron	1	-	-	-	810	5
Lead	1	-	-	-	34,877	6
Manganese	1	-	-	-	720	5
Mercury	1	-	-	-	5,000	6
Nickel	1	-	-	-	7,652	6
Selenium	1	-	-	-	186	6
Vanadium	1	-	-	-	213	6
Zinc	1	-	-	-	33,558	6
Other Inorganics						
Ammoniacal Nitrogen	1	-	-	-	1	5
Cyanide	1	-	-	-	5	7
Organics						
Benzene	0.182	1	27	5	0.64	koc*foc
Toluene	0.221	1	178	1	4.25	koc*foc
Ethylbenzene	0.3	1	432	1	10.31	koc*foc
Xylene*	0.22	1	260	5	6.20	koc*foc
Phenol	0.000068	1	28.8	1	0.69	koc*foc
TPH Criteria Working Group						
TPH Aliphatic >C5-C6	33	2	794	3	19	koc*foc
TPH Aliphatic >C_6-C_8	50	2	3,981	3	95	koc*foc
TPH Aliphatic >C_8-C_{10}	80	2	31,623	3	755	koc*foc
TPH Aliphatic >C_{10}-C_{12}	120	2	25,1189	3	5,996	koc*foc
TPH Aliphatic >C_{12}-C_{16}	520	2	501,1872	3	119,643	koc*foc

TPH Aliphatic >C_{16}-C_{21}	4,900	2	630,957,344	3	15,062,116	koc*foc
TPH Aliphatic >C_{21}-C_{35}	4,900	2	630,957,344	3	15,062,116	koc*foc
TPH Aliphatic >C_{35}-C_{44}	4,900	2	630,957,344	3	15,062,116	koc*foc
TPH Aromatic >C_5-C_7	0.23	2	79	5	2	koc*foc
TPH Aromatic >C_7-C_8	0.27	2	251	5	6	koc*foc
TPH Aromatic >C_8-C_{10}	0.48	2	1,585	3	38	koc*foc
TPH Aromatic >C_{10}-C_{12}	0.14	2	2,512	3	60	koc*foc
TPH Aromatic >C_{12}-C_{16}	0.05	2	5,012	3	120	koc*foc
TPH Aromatic >C_{16}-C_{21}	0.01	2	15,849	3	378	koc*foc
TPH Aromatic >C_{21}-C_{35}	0.00067	2	125,893	3	3,005	koc*foc
TPH Aromatic >C_{35}-C_{44}	0.00067	2	125,893	3	3,005	koc*foc
TPH Aromatic >C_{40}-C_{44}	0.00067	2	125,893	3	3,005	koc*foc
Polyaromatic Hydrocarbons						
Acenaphthene	0.0049	1	18,621	4	445	koc*foc
Acenaphthylene	0.0034	1	33,113	4	791	koc*foc
Anthracene	0.0016	1	38,019	4	908	koc*foc
Benzo(a)anthracene	0.00024	1	676,083	4	16,139	koc*foc
Benzo(a)pyrene	0.000019	1	426,580	4	10,183	koc*foc
Benzo(b)fluoranthene	0.0002	1	2,238,721	4	53,442	koc*foc
Benzo(k)fluoranthene	0.000034	1	3,311,311	4	79,047	koc*foc
Benzo(g,h,i)perylene	0.00003	1	8,709,636	4	207,915	koc*foc
Chrysene	0.000026	1	691,831	4	16,515	koc*foc
Di-benz(a,h)anthracene	0.0000006	1	933,254	4	22,279	koc*foc
Indeno(1,2,3-cd)pyrene	0.000066	1	16,595,869	4	396,174	koc*foc
Fluoranthene	0.00042	1	117,490	4	2,805	koc*foc
Fluorene	0.0032	1	30,200	4	721	koc*foc
Naphthalene	0.017	1	1,514	4	36	koc*foc
Phenanthrene	0.0013	1	30,200	4	721	koc*foc
Pyrene	0.00037	1	85,114	4	2,032	koc*foc

* Parameterised as total xylene

Determinand-Specific Parameter References:

1 - Environment Agency/Atkins, 2003. Review of the Fate and Transport of Selected Contaminants in the Soil Environment. Tables 2.4, 3.2 & 4.3

2 - Total Petroleum Hydrocarbon Criteria Working Group Series (TPHCWG), 1999. Human Health Risk-Based Evaluation of Petroleum Release Sites: Implementing the Working Group Approach, Volume 5, Table 1

3 - Total Petroleum Hydrocarbon Criteria Working Group Series (TPHCWG), 1997. Selection of representative TPH fractions based on fate & transport considerations, Volume 3, Table 7

4 - Geometric mean of koc values from Physical-Chemical Properties and Environmental Fate for Organic Chemicals, Mackay ET. al. 2006. 2nd Ed.

5 - ConSim Help files

6. Site specific Kd

7. Kow x 0.35 after USEPA FIRST User Manual. Kow value from EA Science Report SC040038/SR6.

Appendix J: Table 5-4 CWDQRA Reuse Criteria for 5% & 40% Infiltration

Table 5.4 CWDQRA Reuse Criteria for 5% Infiltration of Incident Rainfall into Engineered Made Ground - Comparison of Calculated CWDQRA Reuse Criteria against Maximum Soil Concentrations Determined (Soils 2017 onwards)

Determinand	Commercial Area			Residential Area		
	Re-use Criteria C_{mg} (mg/kg)	Maximum Soil Sample Value* (mg/kg)	Average Soil Sample Value* (mg/kg)	Re-use Criteria (mg/kg)	Maximum Soil Sample Value* (mg/kg)	Average Soil Sample Value* (mg/kg)
Inorganic Metals and Metalloids						
Arsenic	65439.545	397	12.11	16578.248	397	12.11
Cadmium	1886.085	31	0.66	477.815	31	0.66
Chromium	243635.930	3090	123.01	61721.958	3090	123.01
Copper	11652.851	1790	25.56	2952.097	1790	25.56
Iron	7871354.891	2390000	92031	1994104.220	2390000	103039
Lead	406523.383	4220	91.58	102987.352	4220	91.58
Manganese	860650.486	408000	8645	218034.479	408000	8645
Mercury	3399.904	6	0.68	861.321	6	0.68
Nickel	297329.948	313	25.73	75324.631	313	25.73
Selenium	18132.616	52	6.09	4593.660	52	6.09
Vanadium	41486.276	2880	206.93	10510.002	2880	206.93
Zinc	3552996.685	13300	291.45	900104.973	13300	291.45
Other Inorganics						
Ammoniacal Nitrogen	3989.985	1590	62.20	1010.810	1590	62.20
Cyanide	52.153	272	2.53	13.212	272	2.53
Organics						
Benzene	98.257	<0.01		24.89205686	<0.01	
Toluene	3318.139	<0.002		840.6068862	<0.002	
Ethylbenzene	2074.757	<0.003		525.6124567	<0.003	
Xylene	1915.601	3.0		485.292	80.0	
Phenol	78.835	1.0	0.2	19.972	1.0	0.2
TPH Criteria Working Group						
Aliphatics >C5-C6	1886.153	1	0.03	477.8320875	1	0.03
Aliphatics >C6-C8	9279.877	4	0.04	2350.934674	4	0.04
Aliphatics >C8-C10	73381.790	74	0.20	18590.31119	74	0.20
Aliphatics >C10-C12	582509.060	987	2.06	147571.008	987	2.06
Aliphatics >C12-C16	11621414.418	1330	7.40	2944132.472	1330	7.40
Aliphatics >C16-C21	1463028965.50	3530	26.11	370639143.4	3530	26.11
Aliphatics >C21-C35	1463028965.50	3580	73.67	370639143.4	3580	73.67
Aliphatics >C35-C44	1463028965.50	1380	24.12	370639143.4	1380	24.12
Aromatics >EC5-EC7	219.848	5	0.04	55.69550796	5	0.04
Aromatics >EC7-EC8	4574.056	20	0.05	1158.777006	20	0.05
Aromatics >EC8-EC10	3710.689	50	0.15	940.0541488	50	0.15
Aromatics >EC10-EC12	5860.058	658	1.38	1484.568497	658	1.38
Aromatics >EC12-EC16	11656.858	5280	11.65	2953.111706	5280	11.65
Aromatics >EC16-EC21	36785.199	9800	46.76	9319.04624	9800	46.76
Aromatics >EC21-EC35	291947.994	9010	113.58	73961.1839	9010	113.58
Aromatics >EC35-EC44	291947.994	1580	40.00	73961.1839	1580	40.00
Aromatics >EC40-EC44	291947.994	724	14.87	73961.1839	724	14.87
Polyaromatic Hydrocarbons						
Acenaphthylene	432.126	*2100*	2.34950	109.4734647	*2100*	2.34950
Acenaphthene	768.164	193	0.37333	194.6042079	193	0.37333
Anthracene	881.917	*1860*	2.77187	223.4221618	*1860*	2.77187
Benz(a)anthracene	15676.980	1150	3.61643	3971.556563	1150	3.61643
Benzo(a)pyrene	890.247	714	2.91263	225.5324461	*714*	2.91263
Benzo(b)fluoranthene	88.248	*1110*	4.13642	22.35644724	*1110*	4.13642
Benzo(k)fluoranthene	130.528	*373*	1.62573	33.06753518	*373*	1.62573
Benzo(g,h,i)perylene	343.322	333	1.97508	86.97622939	*333*	1.97508
Chrysene	16042.135	1090	3.30131	4064.063898	1090	3.30131
Dibenzo(a,h)anthracene	21640.121	177	0.57527	5482.239877	177	0.57527
Indeno(1,2,3-cd)pyrene	654.187	374	2.03839	165.7296497	*374*	2.03839
Fluoranthene	171.652	*2940*	8.95256	43.48587282	*2940*	8.95256
Fluorene	700.605	*1890*	2.16433	177.4890832	*1890*	2.16433
Naphthalene	709.033	*4680*	8.40311	179.6242411	*4680*	8.40311
Phenanthrene	700.605	*3810*	7.54997	177.4890819	*3810*	7.54997
Pyrene	1973.926	15	0.00781	500.0681883	15	0.00781

***Recent analyses carried out from 2017(Master Results)**

Table 5.4 CWDQRA Reuse Criteria for 40% Infiltration of Incident Rainfall into Engineered Made Ground - Comparison of Calculated CWDQRA Reuse Criteria against Maximum Soil Concentrations Determined (Soils 2017 onwards)

Determinand	Commercial Area			Residential Area		
	Re-use Criteria C_{mg} (mg/kg)	Maximum Soil Sample Value* (mg/kg)	Average Soil Sample Value* (mg/kg)	Re-use Criteria (mg/kg)	Maximum Soil Sample Value (mg/kg)	Average Soil Sample Value* (mg/kg)
Inorganic Metals and Metalloids						
Arsenic	11468.786	397	12.11	2902.688	397	12.11
Cadmium	330.551	31	0.66	83.661	31	0.66
Chromium	42699.080	3090	123.01	10806.907	3090	123.01
Copper	2042.252	1790	25.56	516.883	1790	25.56
Iron	1379515.806	*2390000*	92031	349148.010	*2390000*	92031
Lead	71246.366	4220	91.58	18032.071	4220	91.58
Manganese	150835.652	*408000*	8645	38175.690	*408000*	8645
Mercury	595.859	*6*	0.68	150.809	*6*	0.68
Nickel	52109.372	313	25.73	13188.601	313	25.73
Selenium	3177.881	52	6.06	804.305	52	6.09
Vanadium	7270.791	2880	206.93	1840.198	*2880*	206.93
Zinc	622690.141	13300	291.45	157599.516	13300	291.45
Other Inorganics						
Ammoniacal Nitrogen	699.276	*1590*	62.20	176.983	*1590*	62.20
Cyanide	9.140	*272*	2.53	2.313	*272*	2.53
Organics						
Benzene	17.220	<0.01		4.358	<0.01	
Toluene	581.530	<0.002		147.182	<0.002	
Ethylbenzene	363.617	<0.003		92.030	<0.003	
Xylene	335.724	3.0		84.970	80.0	
Phenol	13.816	1.0	0.2	3.497	1.0	0.2
TPH Criteria Working Group						
Aliphatics >C5-C6	330.563	1	0.03	83.664	1	0.03
Aliphatics >C6-C8	1626.370	4	0.04	411.626	4	0.04
Aliphatics >C8-C10	12860.726	74	0.20	3254.980	74	0.20
Aliphatics >C10-C12	102089.217	987	2.06	25838.230	987	2.06
Aliphatics >C12-C16	2036742.733	1330	7.40	515488.601	1330	7.40
Aliphatics >C16-C21	256407138.283	3530	26.11	64895263.78	3530	26.11
Aliphatics >C21-C35	256407138.283	3580	73.67	64895263.78	3580	73.67
Aliphatics >C35-C44	256407138.283	1380	24.12	64895263.78	1380	24.12
Aromatics >EC5-EC7	38.530	5	0.04	9.752	5	0.04
Aromatics >EC7-EC8	801.639	20	0.05	202.890	20	0.05
Aromatics >EC8-EC10	650.327	50	0.15	164.594	50	0.15
Aromatics >EC10-EC12	1027.020	658	1.38	259.933	*658*	1.38
Aromatics >EC12-EC16	2042.955	*5280*	11.65	517.061	*5280*	11.65
Aromatics >EC16-EC21	6446.891	*9800*	46.76	1631.673	*9800*	46.76
Aromatics >EC21-EC35	51166.143	9010	113.58	12949.875	9010	113.58
Aromatics >EC35-EC44	51166.143	1580	40.00	12949.875	1580	40.00
Aromatics >EC40-EC44	51166.143	724	14.87	12949.875	724	14.87
Polyaromatic Hydrocarbons						
Acenaphthylene	75.733	*2100*	2.34950	19.168	*2100*	2.34950
Acenaphthene	134.627	*193*	0.37333	34.073	*193*	0.37333
Anthracene	154.563	*1860*	2.77187	39.119	*1860*	2.77187
Benz(a)anthracene	2747.512	1150	3.61643	695.380	*1150*	3.61643
Benzo(a)pyrene	156.023	*714*	2.91263	39.489	*714*	2.91263
Benzo(b)fluoranthene	15.466	*1110*	4.13642	3.914	*1110*	4.13642
Benzo(k)fluoranthene	22.876	*373*	1.62573	5.790	*373*	1.62573
Benzo(g,h,i)perylene	60.170	*333*	1.97508	15.229	*333*	1.97508
Chrysene	2811.508	1090	3.30131	711.578	*1090*	3.30131
Dibenzo(a,h)anthracene	3792.598	177	0.57527	959.886	177	0.57527
Indeno(1,2,3-cd)pyrene	114.651	*374*	2.03839	29.018	*374*	2.03839
Fluoranthene	30.083	*2940*	8.95256	7.614	*2940*	8.95256
Fluorene	122.786	*1890*	2.16433	31.077	*1890*	2.16433
Naphthalene	124.264	*4680*		31.450	*4680*	
Phenanthrene	122.786	*3810*		31.077	*3810*	
Pyrene	345.946	15		87.557	15	

***Recent analyses carried out from 2017(Master Results)**

Indicates maximum soil concentration exceeds calculated Re-use Criteria

Appendix K: Level 3 Groundwater Excel worksheets

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions).

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	24-Feb-20		Version:	1
Contaminant	Benzo(a)pyrene			
Target Concentration (C_T)	0.00000017	mg/l	Origin of C_T:	Proposed Water Framework Directive EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Benzo(a)pyrene**		
Target concentration	**C_T**	**0.00000017**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.

The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**2.29E-05**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.00000017	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Benzo(a)pyrene**		from Level 1
Target concentration	**C_T**	**0.00000017**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentrati**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Benzo(a)pyrene		from Level 1
Target Concentration	C_T	0.00000017	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_O/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target		**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for ionic organic chemicals (acids)

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction
Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction

Soil water partition coefficient — Kd — 0.00E+00 — l/kg

Define dispersivity (click brown cell and use pull down list)

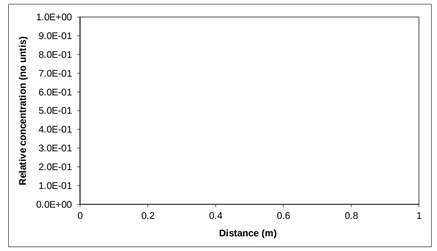
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	**1.0E+00**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

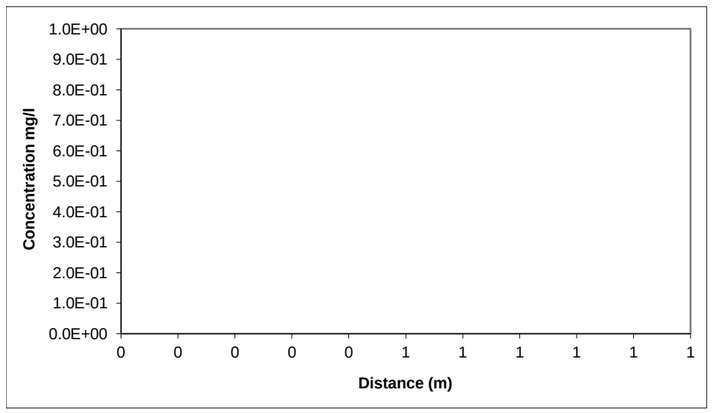
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_W	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu) | **Variable** | **Value** | **Unit** | **Source**

Contaminant		Benzo(a)pyrene		from Level 1
Target Concentration	C_T	1.70E-07	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: **Simulate vertical dispersion in 1 direction**

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: **Apply degradation rate to dissolved pollutants only**

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	2.85E-04	mg/l	*Based on average soil conc of 2.9mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+04	days	*10 year half life estimation*
Calculated decay rate	λ	1.90E-05	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappir*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	*Estimate*
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	1.02E+04	l/kg	*see options*
Longitudinal dispersivity	ax	2.00E+00	m	*see options*
Transverse dispersivity	az	2.00E-01	m	*see options*
Vertical dispersivity	ay	2.00E-02	m	*see options*

Calculated Parameters | **Variable**

Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	1.73E+05	fraction
Decay rate used	λ	1.10E-10	d^{-1}
Rate of contaminant flow due to retardation	u	6.24E-09	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	1.84E-04	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.55E+00**	

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	1.02E+04	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg
pH value	pH		
acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction
Soil water partition coefficient	Kd	1.02E+04	l/kg

Define dispersivity (click brown cell and use pull down list)

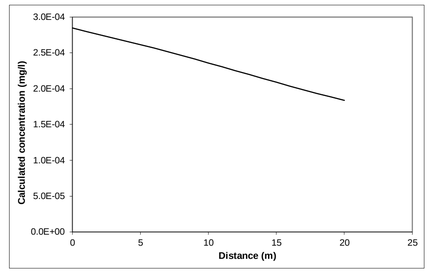
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	m

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	2.8E-04
1.0	2.80E-04
2.0	2.75E-04
3.0	2.71E-04
4.0	2.66E-04
5.0	2.61E-04
6.0	2.57E-04
7.0	2.52E-04
8.0	2.47E-04
9.0	2.41E-04
10.0	2.36E-04
11.0	2.31E-04
12.0	2.25E-04
13.0	2.20E-04
14.0	2.14E-04
15.0	2.09E-04
16.0	2.04E-04
17.0	1.99E-04
18.0	1.94E-04
19.0	1.89E-04
20.0	1.84E-04

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Remedial Targets

Remedial Target		**2.64E-07**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**1.84E-04**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Benzo(a)pyrene**

Parameter (carried over from input sheet)	**Value**	**Units**
C_T	1.70E-07	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **2.29E-05 mg/kg** **for Benzo(a)pyrene**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24/02/2020
Version:	1

Level 2 Calculation Sheet

Contaminant **Benzo(a)pyrene**

Site assessed:	Glan Llyn
Date:	24/02/2020
Version:	1

Parameter	Value	Units
(carried over from input sheet)		
Mz	0.00E+00	m
L	0.00E+00	m
da	0.00E+00	m
Inf	0.00E+00	m/d
K	0.00E+00	m/d
i	0.00E+00	m3/d
A	0.00E+00	m2
Cc	0.00E+00	m3/d mg/l
C_T	1.70E-07	mg/l
Cu	0.00E+00	mg/l
w	0.00E+00	m

Calculated Dilution Factor

Calculation based on target concentration #DIV/0!

Calculation based on observed contaminant concentration #DIV/0!



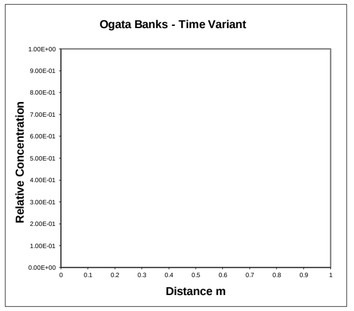
Contaminant **Benzo(a)pyrene**

OGATA BANKS SOLUTION

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.700E-07	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

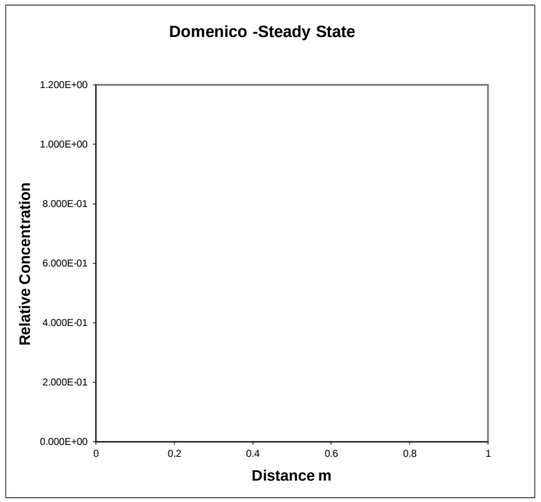
Contaminant **Benzo(a)pyrene**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.700E-07	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!

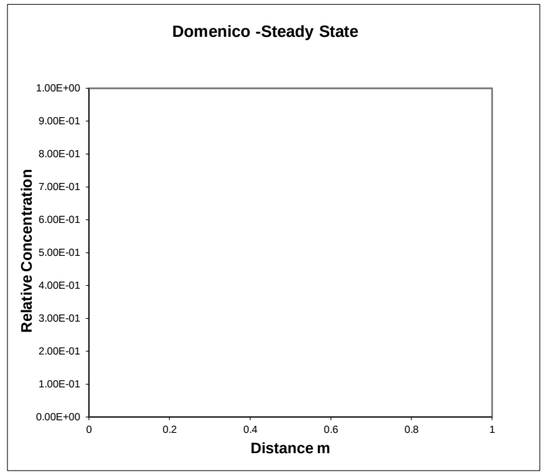


Calc	Value	Units
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

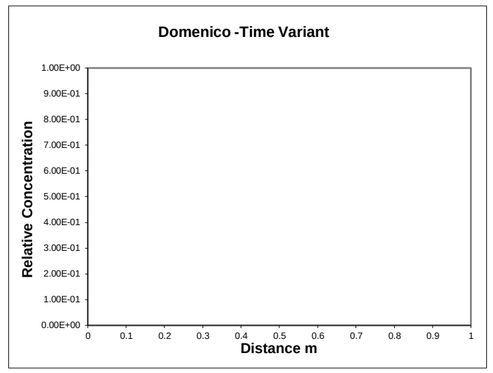
DOMENICO (TIME VARIANT)

Contaminant Benzo(a)pyrene

Input	Value	Units
C_T	0.00000017	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

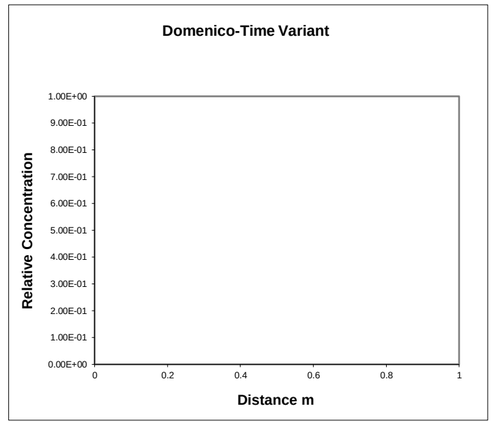
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

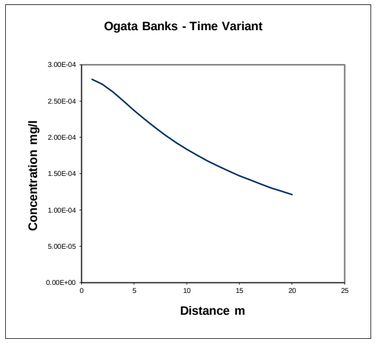
OGATA BANKS SOLUTION

Contaminant	Benzo(a)pyrene	
Input	**Value**	**Units**
C_T	0.00000017	mg/l
Co	2.85E-04	mg/l
λ	1.10E-10	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.02E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	3.6E-05	-1.7E-02	9.8E-01	-3.0E+45	2.000	5.2E-01	1.7E+00	3.0E+45	0.000	2.8E+02	1	-2.8E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	2.80E-04
2	2	3.6E-05	-3.4E-02	9.7E-01	-3.0E+45	2.000	1.0E+00	2.8E+00	3.0E+45	0.000	2.0E+02	1	-2.0E+02	-1	1.9E+00	0.992	-1.9E+00	-0.99199	2.73E-04
3	3	3.6E-05	-5.1E-02	9.5E-01	-3.0E+45	2.000	1.6E+00	4.7E+00	3.0E+45	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	2.62E-04
4	4	3.6E-05	-6.8E-02	9.3E-01	-3.0E+45	2.000	2.1E+00	7.9E+00	3.0E+45	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	2.50E-04
5	5	3.6E-05	-8.5E-02	9.2E-01	-3.0E+45	2.000	2.6E+00	1.3E+01	3.0E+45	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	2.37E-04
6	6	3.6E-05	-1.0E-01	9.0E-01	-3.0E+45	2.000	3.1E+00	2.2E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8742	-1.1E+00	-0.87421	2.25E-04
7	7	3.6E-05	-1.2E-01	8.9E-01	-3.0E+45	2.000	3.6E+00	3.7E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8436	-1.0E+00	-0.84362	2.13E-04
8	8	3.6E-05	-1.4E-01	8.7E-01	-3.0E+45	2.000	4.1E+00	6.3E+01	3.0E+45	0.000	9.9E+01	1	-9.9E+01	-1	9.4E-01	0.8151	-9.4E-01	-0.8151	2.03E-04
9	9	3.6E-05	-1.5E-01	8.6E-01	-3.0E+45	2.000	4.7E+00	1.0E+02	3.0E+45	0.000	9.3E+01	1	-9.3E+01	-1	8.8E-01	0.7887	-8.8E-01	-0.7887	1.93E-04
10	10	3.6E-05	-1.7E-01	8.4E-01	-3.0E+45	2.000	5.2E+00	1.8E+02	3.0E+45	0.000	8.8E+01	1	-8.8E+01	-1	8.4E-01	0.7643	-8.4E-01	-0.76432	1.84E-04
11	11	3.6E-05	-1.9E-01	8.3E-01	-3.0E+45	2.000	5.7E+00	3.0E+02	3.0E+45	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7418	-8.0E-01	-0.7418	1.75E-04
12	12	3.6E-05	-2.0E-01	8.2E-01	-3.0E+45	2.000	6.2E+00	4.9E+02	3.0E+45	0.000	8.1E+01	1	-8.1E+01	-1	7.7E-01	0.721	-7.7E-01	-0.72098	1.67E-04
13	13	3.6E-05	-2.2E-01	8.0E-01	-3.0E+45	2.000	6.7E+00	8.3E+02	3.0E+45	0.000	7.8E+01	1	-7.8E+01	-1	7.4E-01	0.7017	-7.4E-01	-0.70169	1.60E-04
14	14	3.6E-05	-2.4E-01	7.9E-01	-3.0E+45	2.000	7.2E+00	1.4E+03	3.0E+45	0.000	7.5E+01	1	-7.5E+01	-1	7.1E-01	0.6838	-7.1E-01	-0.68377	1.53E-04
15	15	3.6E-05	-2.6E-01	7.7E-01	-3.0E+45	2.000	7.8E+00	2.3E+03	3.0E+45	0.000	7.2E+01	1	-7.2E+01	-1	6.8E-01	0.6671	-6.8E-01	-0.66708	1.47E-04
16	16	3.6E-05	-2.7E-01	7.6E-01	-3.0E+45	2.000	8.3E+00	3.9E+03	3.0E+45	0.000	7.0E+01	1	-7.0E+01	-1	6.6E-01	0.6515	-6.6E-01	-0.6515	1.41E-04
17	17	3.6E-05	-2.9E-01	7.5E-01	-3.0E+45	2.000	8.8E+00	6.6E+03	3.0E+45	0.000	6.8E+01	1	-6.8E+01	-1	6.4E-01	0.6369	-6.4E-01	-0.63692	1.36E-04
18	18	3.6E-05	-3.1E-01	7.4E-01	-3.0E+45	2.000	9.3E+00	1.1E+04	3.0E+45	0.000	6.6E+01	1	-6.6E+01	-1	6.3E-01	0.6232	-6.3E-01	-0.62324	1.31E-04
19	19	3.6E-05	-3.2E-01	7.2E-01	-3.0E+45	2.000	9.8E+00	1.8E+04	3.0E+45	0.000	6.4E+01	1	-6.4E+01	-1	6.1E-01	0.6104	-6.1E-01	-0.61038	1.26E-04
20	20	3.6E-05	-3.4E-01	7.1E-01	-3.0E+45	2.000	1.0E+01	3.1E+04	3.0E+45	0.000	6.3E+01	1	-6.3E+01	-1	5.9E-01	0.5983	-5.9E-01	-0.59826	1.21E-04



Calc	Value	
v	1.08E-03	m/d
Rc	1.73E+05	
u	6.24E-09	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	3.6E-05	-1.7E-02	9.8E-01	-3.0E+45	2.000	5.2E-01	1.7E+00	3.0E+45	0.000	2.8E+02	1	-2.8E+02	-1	5.3E+00	1	-5.3E+00	-1	2.80E-04
2	2	3.6E-05	-3.4E-02	9.7E-01	-3.0E+45	2.000	1.0E+00	2.8E+00	3.0E+45	0.000	2.0E+02	1	-2.0E+02	-1	3.8E+00	1	-3.8E+00	-1	2.75E-04
3	3	3.6E-05	-5.1E-02	9.5E-01	-3.0E+45	2.000	1.6E+00	4.7E+00	3.0E+45	0.000	1.6E+02	1	-1.6E+02	-1	3.1E+00	1	-3.1E+00	-0.99999	2.71E-04
4	4	3.6E-05	-6.8E-02	9.3E-01	-3.0E+45	2.000	2.1E+00	7.9E+00	3.0E+45	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	2.66E-04
5	5	3.6E-05	-8.5E-02	9.2E-01	-3.0E+45	2.000	2.6E+00	1.3E+01	3.0E+45	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9992	-2.4E+00	-0.9992	2.61E-04
6	6	3.6E-05	-1.0E-01	9.0E-01	-3.0E+45	2.000	3.1E+00	2.2E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	2.2E+00	0.9978	-2.2E+00	-0.9978	2.57E-04
7	7	3.6E-05	-1.2E-01	8.9E-01	-3.0E+45	2.000	3.6E+00	3.7E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9954	-2.0E+00	-0.99541	2.52E-04
8	8	3.6E-05	-1.4E-01	8.7E-01	-3.0E+45	2.000	4.1E+00	6.3E+01	3.0E+45	0.000	9.9E+01	1	-9.9E+01	-1	1.9E+00	0.992	-1.9E+00	-0.99199	2.47E-04
9	9	3.6E-05	-1.5E-01	8.6E-01	-3.0E+45	2.000	4.7E+00	1.0E+02	3.0E+45	0.000	9.3E+01	1	-9.3E+01	-1	1.8E+00	0.9876	-1.8E+00	-0.98758	2.41E-04
10	10	3.6E-05	-1.7E-01	8.4E-01	-3.0E+45	2.000	5.2E+00	1.8E+02	3.0E+45	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9823	-1.7E+00	-0.98229	2.36E-04
11	11	3.6E-05	-1.9E-01	8.3E-01	-3.0E+45	2.000	5.7E+00	3.0E+02	3.0E+45	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9763	-1.6E+00	-0.97626	2.31E-04
12	12	3.6E-05	-2.0E-01	8.2E-01	-3.0E+45	2.000	6.2E+00	4.9E+02	3.0E+45	0.000	8.1E+01	1	-8.1E+01	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	2.25E-04
13	13	3.6E-05	-2.2E-01	8.0E-01	-3.0E+45	2.000	6.7E+00	8.3E+02	3.0E+45	0.000	7.8E+01	1	-7.8E+01	-1	1.5E+00	0.9625	-1.5E+00	-0.96249	2.20E-04
14	14	3.6E-05	-2.4E-01	7.9E-01	-3.0E+45	2.000	7.2E+00	1.4E+03	3.0E+45	0.000	7.5E+01	1	-7.5E+01	-1	1.4E+00	0.955	-1.4E+00	-0.95498	2.14E-04
15	15	3.6E-05	-2.6E-01	7.7E-01	-3.0E+45	2.000	7.8E+00	2.3E+03	3.0E+45	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9472	-1.4E+00	-0.94719	2.09E-04
16	16	3.6E-05	-2.7E-01	7.6E-01	-3.0E+45	2.000	8.3E+00	3.9E+03	3.0E+45	0.000	7.0E+01	1	-7.0E+01	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	2.04E-04
17	17	3.6E-05	-2.9E-01	7.5E-01	-3.0E+45	2.000	8.8E+00	6.6E+03	3.0E+45	0.000	6.8E+01	1	-6.8E+01	-1	1.3E+00	0.9311	-1.3E+00	-0.93109	1.99E-04
18	18	3.6E-05	-3.1E-01	7.4E-01	-3.0E+45	2.000	9.3E+00	1.1E+04	3.0E+45	0.000	6.6E+01	1	-6.6E+01	-1	1.3E+00	0.9229	-1.3E+00	-0.9229	1.94E-04
19	19	3.6E-05	-3.2E-01	7.2E-01	-3.0E+45	2.000	9.8E+00	1.8E+04	3.0E+45	0.000	6.4E+01	1	-6.4E+01	-1	1.2E+00	0.9147	-1.2E+00	-0.91468	1.89E-04
20	20	3.6E-05	-3.4E-01	7.1E-01	-3.0E+45	2.000	1.0E+01	3.1E+04	3.0E+45	0.000	6.3E+01	1	-6.3E+01	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	1.84E-04

Date:	24/02/2020
Version:	1

Contaminant **Benzo(a)pyrene**

Input	Value	Units
C_T	0.00000017	mg/l
Co	2.85E-04	mg/l
λ	1.10E-10	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.02E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

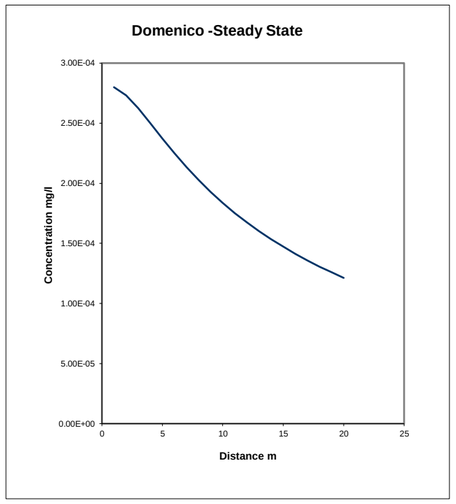
Vertical dispersion optio Simulate vertical dispersion in 1 direction

Calc	Value	Units
v	1.08E-03	m/d
Rc	1.73E+05	
u	6.24E-09	m/d

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

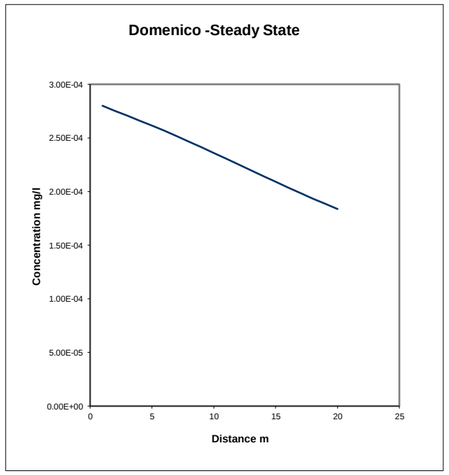
	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	7.1E-05	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	2.80E-04
2	2	7.1E-05	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	2.73E-04
3	3	7.1E-05	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	2.62E-04
4	4	7.1E-05	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	2.50E-04
5	5	7.1E-05	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	2.37E-04
6	6	7.1E-05	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.8742	2.25E-04
7	7	7.1E-05	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.8436	2.13E-04
8	8	7.1E-05	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.8151	2.03E-04
9	9	7.1E-05	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.7887	1.93E-04
10	10	7.1E-05	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.7643	1.84E-04
11	11	7.1E-05	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.7418	1.75E-04
12	12	7.1E-05	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	1.67E-04
13	13	7.1E-05	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.7017	1.60E-04
14	14	7.1E-05	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.6838	1.53E-04
15	15	7.1E-05	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.6671	1.47E-04
16	16	7.1E-05	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.6515	1.41E-04
17	17	7.1E-05	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.6369	1.36E-04
18	18	7.1E-05	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.6232	1.31E-04
19	19	7.1E-05	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.6104	1.26E-04
20	20	7.1E-05	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.5983	1.21E-04



DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	7.1E-05	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	2.80E-04
2	2	7.1E-05	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	2.75E-04
3	3	7.1E-05	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	2.71E-04
4	4	7.1E-05	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	2.66E-04
5	5	7.1E-05	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.9992	2.61E-04
6	6	7.1E-05	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.9978	2.57E-04
7	7	7.1E-05	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.9954	2.52E-04
8	8	7.1E-05	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	2.47E-04
9	9	7.1E-05	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.9876	2.41E-04
10	10	7.1E-05	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.9823	2.36E-04
11	11	7.1E-05	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.9763	2.31E-04
12	12	7.1E-05	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	2.25E-04
13	13	7.1E-05	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.9625	2.20E-04
14	14	7.1E-05	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	2.14E-04
15	15	7.1E-05	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.9472	2.09E-04
16	16	7.1E-05	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	2.04E-04
17	17	7.1E-05	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.9311	1.99E-04
18	18	7.1E-05	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.9229	1.94E-04
19	19	7.1E-05	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.9147	1.89E-04
20	20	7.1E-05	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	1.84E-04



Date:	24/02/2020
Version:	1

DOMENICO (TIME VARIANT)

Contaminant Benzo(a)pyrene

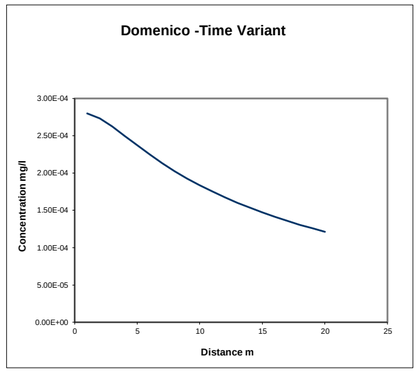
Input	Value	Units
C_T	0.00000017	mg/l
Co	2.85E-04	mg/l
λ	1.10E-10	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.02E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.73E+05	
u	6.24E-09	m/d

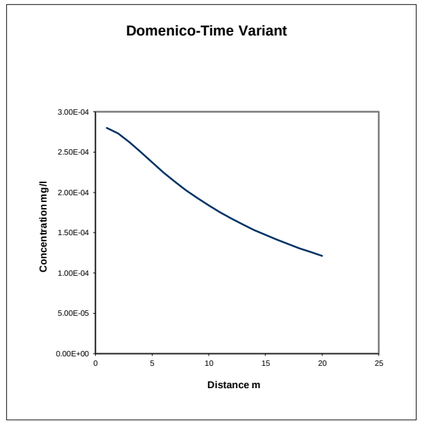
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	3.6E-05	-1.70E-02	9.83E-01	-2.98E+45	2	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	2.80E-04
2	2	3.6E-05	-3.40E-02	9.67E-01	-2.98E+45	2	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	2.73E-04
3	3	3.6E-05	-5.10E-02	9.50E-01	-2.98E+45	2	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.97	2.62E-04
4	4	3.6E-05	-6.80E-02	9.34E-01	-2.98E+45	2	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.939	2.50E-04
5	5	3.6E-05	-8.50E-02	9.18E-01	-2.98E+45	2	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.906	2.37E-04
6	6	3.6E-05	-1.02E-01	9.03E-01	-2.98E+45	2	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.874	2.25E-04
7	7	3.6E-05	-1.19E-01	8.88E-01	-2.98E+45	2	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.844	2.13E-04
8	8	3.6E-05	-1.36E-01	8.73E-01	-2.98E+45	2	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.815	2.03E-04
9	9	3.6E-05	-1.53E-01	8.58E-01	-2.98E+45	2	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.789	1.93E-04
10	10	3.6E-05	-1.70E-01	8.44E-01	-2.98E+45	2	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.764	1.84E-04
11	11	3.6E-05	-1.87E-01	8.29E-01	-2.98E+45	2	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.742	1.75E-04
12	12	3.6E-05	-2.04E-01	8.15E-01	-2.98E+45	2	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	1.67E-04
13	13	3.6E-05	-2.21E-01	8.02E-01	-2.98E+45	2	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.702	1.60E-04
14	14	3.6E-05	-2.38E-01	7.88E-01	-2.98E+45	2	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.684	1.53E-04
15	15	3.6E-05	-2.55E-01	7.75E-01	-2.98E+45	2	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.667	1.47E-04
16	16	3.6E-05	-2.72E-01	7.62E-01	-2.98E+45	2	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.651	1.41E-04
17	17	3.6E-05	-2.89E-01	7.49E-01	-2.98E+45	2	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.637	1.36E-04
18	18	3.6E-05	-3.06E-01	7.36E-01	-2.98E+45	2	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.623	1.31E-04
19	19	3.6E-05	-3.23E-01	7.24E-01	-2.98E+45	2	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.61	1.26E-04
20	20	3.6E-05	-3.40E-01	7.12E-01	-2.98E+45	2	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.598	1.21E-04



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	3.6E-05	-1.70E-02	9.83E-01	-2.98E+45	2	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	2.80E-04
2	2	3.6E-05	-3.40E-02	9.67E-01	-2.98E+45	2	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	2.75E-04
3	3	3.6E-05	-5.10E-02	9.50E-01	-2.98E+45	2	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	2.71E-04
4	4	3.6E-05	-6.80E-02	9.34E-01	-2.98E+45	2	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	2.66E-04
5	5	3.6E-05	-8.50E-02	9.18E-01	-2.98E+45	2	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.999	2.61E-04
6	6	3.6E-05	-1.02E-01	9.03E-01	-2.98E+45	2	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.998	2.57E-04
7	7	3.6E-05	-1.19E-01	8.88E-01	-2.98E+45	2	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.995	2.52E-04
8	8	3.6E-05	-1.36E-01	8.73E-01	-2.98E+45	2	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	2.47E-04
9	9	3.6E-05	-1.53E-01	8.58E-01	-2.98E+45	2	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.988	2.41E-04
10	10	3.6E-05	-1.70E-01	8.44E-01	-2.98E+45	2	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.982	2.36E-04
11	11	3.6E-05	-1.87E-01	8.29E-01	-2.98E+45	2	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.976	2.31E-04
12	12	3.6E-05	-2.04E-01	8.15E-01	-2.98E+45	2	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.97	2.25E-04
13	13	3.6E-05	-2.21E-01	8.02E-01	-2.98E+45	2	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.962	2.20E-04
14	14	3.6E-05	-2.38E-01	7.88E-01	-2.98E+45	2	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	2.14E-04
15	15	3.6E-05	-2.55E-01	7.75E-01	-2.98E+45	2	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.947	2.09E-04
16	16	3.6E-05	-2.72E-01	7.62E-01	-2.98E+45	2	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.939	2.04E-04
17	17	3.6E-05	-2.89E-01	7.49E-01	-2.98E+45	2	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.931	1.99E-04
18	18	3.6E-05	-3.06E-01	7.36E-01	-2.98E+45	2	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.923	1.94E-04
19	19	3.6E-05	-3.23E-01	7.24E-01	-2.98E+45	2	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.915	1.89E-04
20	20	3.6E-05	-3.40E-01	7.12E-01	-2.98E+45	2	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.906	1.84E-04



Date:	24/02/2020
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions).

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	24-Feb-20		Version:	1
Contaminant	Benzo(b)fluoranthene			
Target Concentration (C_T)	0.00000017	mg/l	Origin of C_T:	Proposed Water Framework Directive EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Benzo(b)fluoranthene**	
Target concentration	**C_T**	**0.00000017**	**mg/l**

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_W	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.

The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**2.29E-05**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.00000017	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Benzo(b)fluoranthene**		from Level 1
Target concentration	**C_T**	**0.00000017**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentrati**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters	Variable	Value	Unit	Source
Contaminant		Benzo(b)fluoranthene		from Level 1
Target Concentration	C_T	0.00000017	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	ay	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_O/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target		**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks		**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
		#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point		**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for ionic organic chemicals (acids)

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction
Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

Define dispersivity (click brown cell and use pull down list)

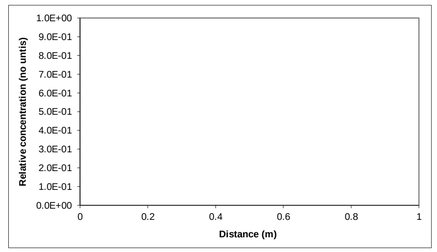
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	**1.0E+00**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**
0.0	**#DIV/0!**	**#DIV/0!**

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

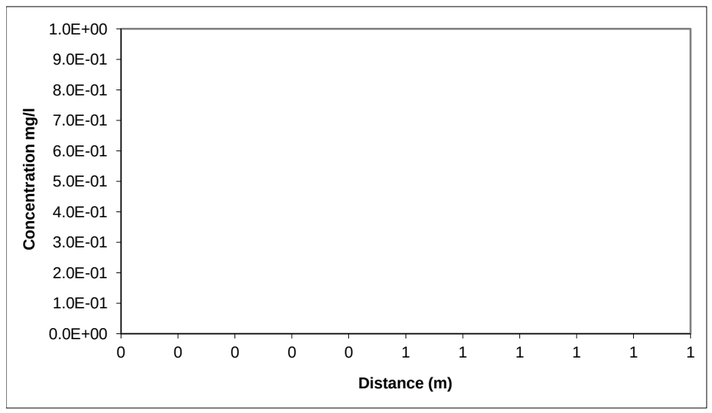
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_W	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Benzo(b)fluoranthene		from Level 1
Target Concentration	C_T	1.70E-07	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	7.67E-02	mg/l	*Based on average soil conc of 4.1mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+04	days	*10 year half life estimation*
Calculated decay rate	λ	1.90E-05	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappir*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	5.34E+04	l/kg	*see options*
Longitudinal dispersivity	ax	2.00E+00	m	*see options*
Transverse dispersivity	az	2.00E-01	m	*see options*
Vertical dispersivity	ay	2.00E-02	m	*see options*

Calculated Parameters

	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	9.09E+05	fraction
Decay rate used	λ	2.09E-11	d^{-1}
Rate of contaminant flow due to retardation	u	1.19E-09	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	4.95E-02	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.55E+00**	

Remedial Targets

Remedial Target		**2.64E-07**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**4.95E-02**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	5.34E+04	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg
pH value	pH		
acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction
Soil water partition coefficient	Kd	5.34E+04	l/kg

Define dispersivity (click brown cell and use pull down list)

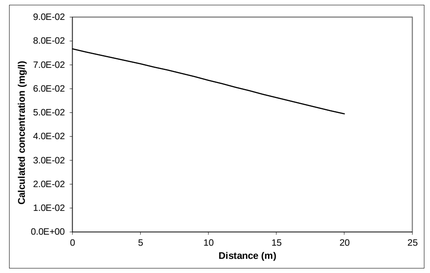
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared
with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	7.7E-02
1.0	7.54E-02
2.0	7.41E-02
3.0	7.29E-02
4.0	7.16E-02
5.0	7.04E-02
6.0	6.91E-02
7.0	6.78E-02
8.0	6.64E-02
9.0	6.50E-02
10.0	6.36E-02
11.0	6.21E-02
12.0	6.06E-02
13.0	5.92E-02
14.0	5.77E-02
15.0	5.63E-02
16.0	5.49E-02
17.0	5.35E-02
18.0	5.21E-02
19.0	5.08E-02
20.0	4.95E-02

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **nzo(b)fluoranthene**

Parameter	Value	Units
(carried over from input sheet)		
C_T	1.70E-07	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **2.29E-05 mg/kg** **for Benzo(b)fluoranthene**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24/02/2020
Version:	1

Level 2 Calculation Sheet

Contaminant **enzo(b)fluoranthene**

Site assessed:	Glan Llyn
Date:	24/02/2020
Version:	1

Parameter	Value	Units
(carried over from input sheet)		
Mz	0.00E+00	m
L	0.00E+00	m
da	0.00E+00	m
Inf	0.00E+00	m/d
K	0.00E+00	m/d
i	0.00E+00	
		m3/d
A	0.00E+00	m2
		m3/d
Cc	0.00E+00	mg/l
C_T	1.70E-07	mg/l
Cu	0.00E+00	mg/l
w	0.00E+00	m

Calculated Dilution Factor

Calculation based on target concentration #DIV/0!

Calculation based on observed contaminant concentration #DIV/0!



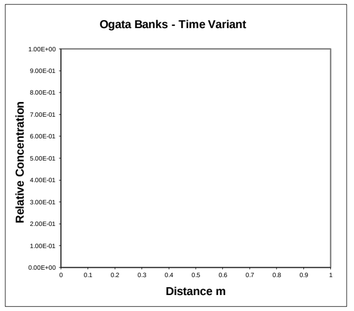
Contaminant **nzo(b)fluoranthene**

OGATA BANKS SOLUTION

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.700E-07	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Date:	24/02/2020
Version:	1

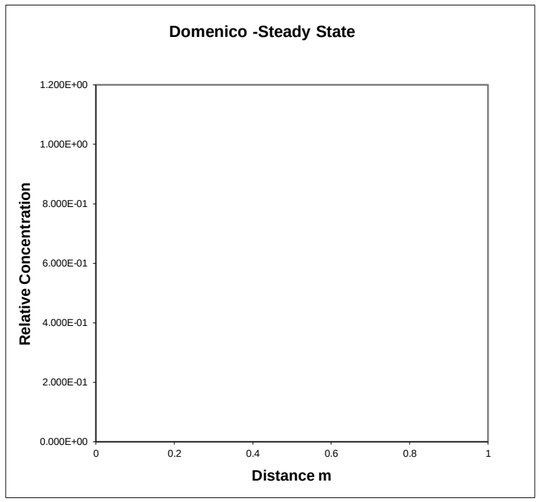
Contaminant **zo(b)fluoranthene**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.700E-07	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



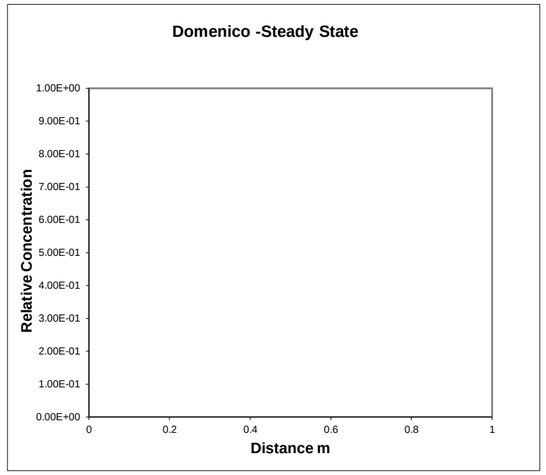
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

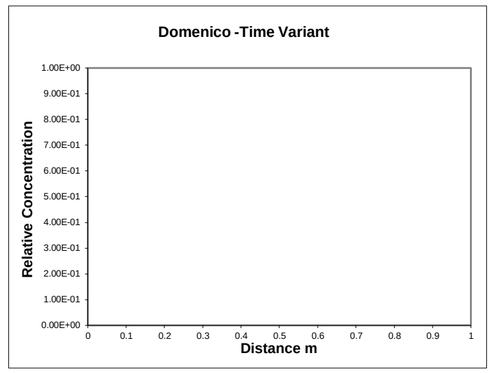
DOMENICO (TIME VARIANT)

Contaminant **zo(b)fluoranthene**

Input	Value	Units
C_T	0.00000017	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

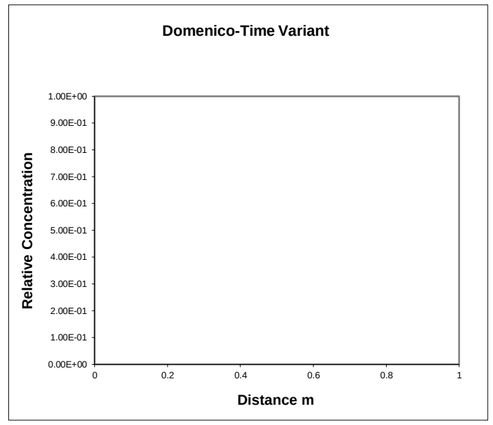
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

OGATA BANKS SOLUTION

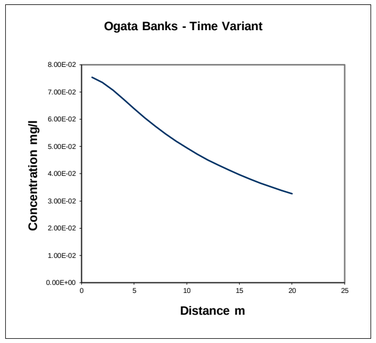
Contaminant **nzo(b)fluoranthene**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.00000017	mg/l
Co	7.67E-02	mg/l
λ	2.09E-11	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	5.34E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	0.00959	-1.7E-02	9.8E-01	-1.3E+45	2.000	5.2E-01	1.7E+00	1.3E+45	0.000	2.8E+02	1	-2.8E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	7.54E-02
2	0.00959	-3.4E-02	9.7E-01	-1.3E+45	2.000	1.0E+00	2.8E+00	1.3E+45	0.000	2.0E+02	1	-2.0E+02	-1	1.9E+00	0.992	-1.9E+00	-0.99199	7.35E-02
3	0.00959	-5.1E-02	9.5E-01	-1.3E+45	2.000	1.6E+00	4.7E+00	1.3E+45	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	7.07E-02
4	0.00959	-6.8E-02	9.3E-01	-1.3E+45	2.000	2.1E+00	7.9E+00	1.3E+45	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	6.73E-02
5	0.00959	-8.5E-02	9.2E-01	-1.3E+45	2.000	2.6E+00	1.3E+01	1.3E+45	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	6.39E-02
6	0.00959	-1.0E-01	9.0E-01	-1.3E+45	2.000	3.1E+00	2.2E+01	1.3E+45	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8742	-1.1E+00	-0.87421	6.05E-02
7	0.00959	-1.2E-01	8.9E-01	-1.3E+45	2.000	3.6E+00	3.7E+01	1.3E+45	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8436	-1.0E+00	-0.84362	5.74E-02
8	0.00959	-1.4E-01	8.7E-01	-1.3E+45	2.000	4.1E+00	6.3E+01	1.3E+45	0.000	9.9E+01	1	-9.9E+01	-1	9.4E-01	0.8151	-9.4E-01	-0.8151	5.46E-02
9	0.00959	-1.5E-01	8.6E-01	-1.3E+45	2.000	4.7E+00	1.0E+02	1.3E+45	0.000	9.3E+01	1	-9.3E+01	-1	8.8E-01	0.7887	-8.8E-01	-0.7887	5.19E-02
10	0.00959	-1.7E-01	8.4E-01	-1.3E+45	2.000	5.2E+00	1.8E+02	1.3E+45	0.000	8.8E+01	1	-8.8E+01	-1	8.4E-01	0.7643	-8.4E-01	-0.76432	4.95E-02
11	0.00959	-1.9E-01	8.3E-01	-1.3E+45	2.000	5.7E+00	3.0E+02	1.3E+45	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7418	-8.0E-01	-0.7418	4.72E-02
12	0.00959	-2.0E-01	8.2E-01	-1.3E+45	2.000	6.2E+00	4.9E+02	1.3E+45	0.000	8.1E+01	1	-8.1E+01	-1	7.7E-01	0.721	-7.7E-01	-0.72098	4.51E-02
13	0.00959	-2.2E-01	8.0E-01	-1.3E+45	2.000	6.7E+00	8.3E+02	1.3E+45	0.000	7.8E+01	1	-7.8E+01	-1	7.4E-01	0.7017	-7.4E-01	-0.70169	4.31E-02
14	0.00959	-2.4E-01	7.9E-01	-1.3E+45	2.000	7.2E+00	1.4E+03	1.3E+45	0.000	7.5E+01	1	-7.5E+01	-1	7.1E-01	0.6838	-7.1E-01	-0.68377	4.13E-02
15	0.00959	-2.6E-01	7.7E-01	-1.3E+45	2.000	7.8E+00	2.3E+03	1.3E+45	0.000	7.2E+01	1	-7.2E+01	-1	6.8E-01	0.6671	-6.8E-01	-0.66708	3.96E-02
16	0.00959	-2.7E-01	7.6E-01	-1.3E+45	2.000	8.3E+00	3.9E+03	1.3E+45	0.000	7.0E+01	1	-7.0E+01	-1	6.6E-01	0.6515	-6.6E-01	-0.6515	3.81E-02
17	0.00959	-2.9E-01	7.5E-01	-1.3E+45	2.000	8.8E+00	6.6E+03	1.3E+45	0.000	6.8E+01	1	-6.8E+01	-1	6.4E-01	0.6369	-6.4E-01	-0.63692	3.66E-02
18	0.00959	-3.1E-01	7.4E-01	-1.3E+45	2.000	9.3E+00	1.1E+04	1.3E+45	0.000	6.6E+01	1	-6.6E+01	-1	6.3E-01	0.6232	-6.3E-01	-0.62324	3.52E-02
19	0.00959	-3.2E-01	7.2E-01	-1.3E+45	2.000	9.8E+00	1.8E+04	1.3E+45	0.000	6.4E+01	1	-6.4E+01	-1	6.1E-01	0.6104	-6.1E-01	-0.61038	3.39E-02
20	0.00959	-3.4E-01	7.1E-01	-1.3E+45	2.000	1.0E+01	3.1E+04	1.3E+45	0.000	6.3E+01	1	-6.3E+01	-1	5.9E-01	0.5983	-5.9E-01	-0.59826	3.27E-02

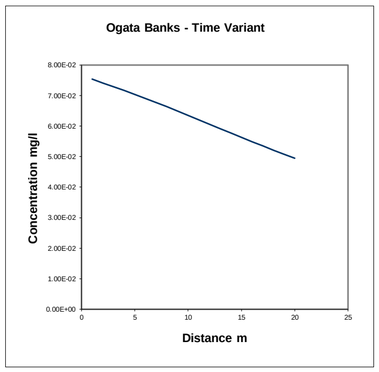


Calc **Value**

v	1.08E-03	m/d
Rc	9.09E+05	
u	1.19E-09	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	0.00959	-1.7E-02	9.8E-01	-1.3E+45	2.000	5.2E-01	1.7E+00	1.3E+45	0.000	2.8E+02	1	-2.8E+02	-1	5.3E+00	1	-5.3E+00	-1	7.54E-02
2	0.00959	-3.4E-02	9.7E-01	-1.3E+45	2.000	1.0E+00	2.8E+00	1.3E+45	0.000	2.0E+02	1	-2.0E+02	-1	3.8E+00	1	-3.8E+00	-1	7.41E-02
3	0.00959	-5.1E-02	9.5E-01	-1.3E+45	2.000	1.6E+00	4.7E+00	1.3E+45	0.000	1.6E+02	1	-1.6E+02	-1	3.1E+00	1	-3.1E+00	-0.99999	7.29E-02
4	0.00959	-6.8E-02	9.3E-01	-1.3E+45	2.000	2.1E+00	7.9E+00	1.3E+45	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	7.16E-02
5	0.00959	-8.5E-02	9.2E-01	-1.3E+45	2.000	2.6E+00	1.3E+01	1.3E+45	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9992	-2.4E+00	-0.9992	7.04E-02
6	0.00959	-1.0E-01	9.0E-01	-1.3E+45	2.000	3.1E+00	2.2E+01	1.3E+45	0.000	1.1E+02	1	-1.1E+02	-1	2.2E+00	0.9978	-2.2E+00	-0.9978	6.91E-02
7	0.00959	-1.2E-01	8.9E-01	-1.3E+45	2.000	3.6E+00	3.7E+01	1.3E+45	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9954	-2.0E+00	-0.99541	6.78E-02
8	0.00959	-1.4E-01	8.7E-01	-1.3E+45	2.000	4.1E+00	6.3E+01	1.3E+45	0.000	9.9E+01	1	-9.9E+01	-1	1.9E+00	0.992	-1.9E+00	-0.99199	6.64E-02
9	0.00959	-1.5E-01	8.6E-01	-1.3E+45	2.000	4.7E+00	1.0E+02	1.3E+45	0.000	9.3E+01	1	-9.3E+01	-1	1.8E+00	0.9876	-1.8E+00	-0.98758	6.50E-02
10	0.00959	-1.7E-01	8.4E-01	-1.3E+45	2.000	5.2E+00	1.8E+02	1.3E+45	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9823	-1.7E+00	-0.98229	6.36E-02
11	0.00959	-1.9E-01	8.3E-01	-1.3E+45	2.000	5.7E+00	3.0E+02	1.3E+45	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9763	-1.6E+00	-0.97626	6.21E-02
12	0.00959	-2.0E-01	8.2E-01	-1.3E+45	2.000	6.2E+00	4.9E+02	1.3E+45	0.000	8.1E+01	1	-8.1E+01	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	6.06E-02
13	0.00959	-2.2E-01	8.0E-01	-1.3E+45	2.000	6.7E+00	8.3E+02	1.3E+45	0.000	7.8E+01	1	-7.8E+01	-1	1.5E+00	0.9625	-1.5E+00	-0.96249	5.92E-02
14	0.00959	-2.4E-01	7.9E-01	-1.3E+45	2.000	7.2E+00	1.4E+03	1.3E+45	0.000	7.5E+01	1	-7.5E+01	-1	1.4E+00	0.955	-1.4E+00	-0.95498	5.77E-02
15	0.00959	-2.6E-01	7.7E-01	-1.3E+45	2.000	7.8E+00	2.3E+03	1.3E+45	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9472	-1.4E+00	-0.94719	5.63E-02
16	0.00959	-2.7E-01	7.6E-01	-1.3E+45	2.000	8.3E+00	3.9E+03	1.3E+45	0.000	7.0E+01	1	-7.0E+01	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	5.49E-02
17	0.00959	-2.9E-01	7.5E-01	-1.3E+45	2.000	8.8E+00	6.6E+03	1.3E+45	0.000	6.8E+01	1	-6.8E+01	-1	1.3E+00	0.9311	-1.3E+00	-0.93109	5.35E-02
18	0.00959	-3.1E-01	7.4E-01	-1.3E+45	2.000	9.3E+00	1.1E+04	1.3E+45	0.000	6.6E+01	1	-6.6E+01	-1	1.3E+00	0.9229	-1.3E+00	-0.9229	5.21E-02
19	0.00959	-3.2E-01	7.2E-01	-1.3E+45	2.000	9.8E+00	1.8E+04	1.3E+45	0.000	6.4E+01	1	-6.4E+01	-1	1.2E+00	0.9147	-1.2E+00	-0.91468	5.08E-02
20	0.00959	-3.4E-01	7.1E-01	-1.3E+45	2.000	1.0E+01	3.1E+04	1.3E+45	0.000	6.3E+01	1	-6.3E+01	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	4.95E-02



Date:	24/02/2020
Version:	1

Contaminant **zo(b)fluoranthene**

Input	Value	Units
C_T	0.00000017	mg/l
Co	7.67E-02	mg/l
λ	2.09E-11	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	5.34E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

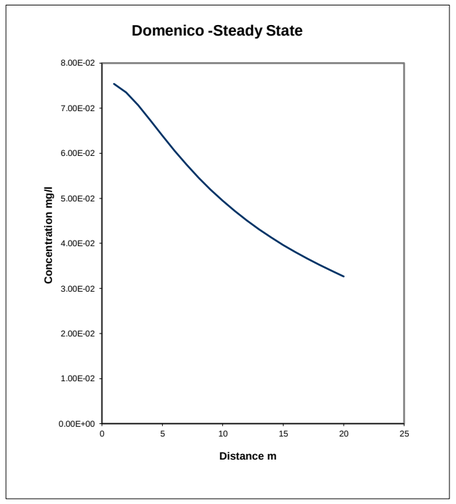
Vertical dispersion optio Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	9.09E+05	
u	1.19E-09	m/d

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

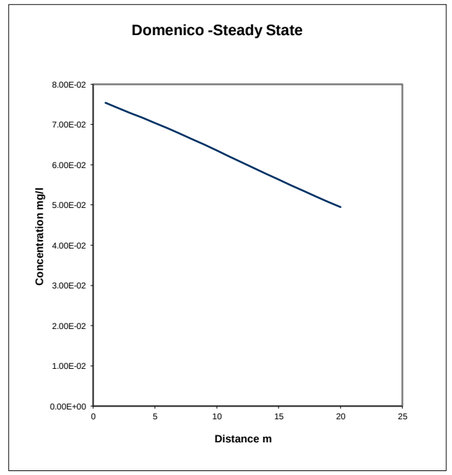
	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.01918	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	7.54E-02
2	2	0.01918	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	7.35E-02
3	3	0.01918	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	7.07E-02
4	4	0.01918	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	6.73E-02
5	5	0.01918	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	6.39E-02
6	6	0.01918	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.8742	6.05E-02
7	7	0.01918	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.8436	5.74E-02
8	8	0.01918	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.8151	5.46E-02
9	9	0.01918	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.7887	5.19E-02
10	10	0.01918	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.7643	4.95E-02
11	11	0.01918	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.7418	4.72E-02
12	12	0.01918	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	4.51E-02
13	13	0.01918	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.7017	4.31E-02
14	14	0.01918	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.6838	4.13E-02
15	15	0.01918	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.6671	3.96E-02
16	16	0.01918	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.6515	3.81E-02
17	17	0.01918	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.6369	3.66E-02
18	18	0.01918	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.6232	3.52E-02
19	19	0.01918	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.6104	3.39E-02
20	20	0.01918	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.5983	3.27E-02



DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.01918	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	7.54E-02
2	2	0.01918	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	7.41E-02
3	3	0.01918	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	7.29E-02
4	4	0.01918	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-0.9998	7.16E-02
5	5	0.01918	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.9992	7.04E-02
6	6	0.01918	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.9978	6.91E-02
7	7	0.01918	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.9954	6.78E-02
8	8	0.01918	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	6.64E-02
9	9	0.01918	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.9876	6.50E-02
10	10	0.01918	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.9823	6.36E-02
11	11	0.01918	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.9763	6.21E-02
12	12	0.01918	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.9696	6.06E-02
13	13	0.01918	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.9625	5.92E-02
14	14	0.01918	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	5.77E-02
15	15	0.01918	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.9472	5.63E-02
16	16	0.01918	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.9392	5.49E-02
17	17	0.01918	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.9311	5.35E-02
18	18	0.01918	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.9229	5.21E-02
19	19	0.01918	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.9147	5.08E-02
20	20	0.01918	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.9065	4.95E-02



Date:	24/02/2020
Version:	1

DOMENICO (TIME VARIANT)

Contaminant **zo(b)fluoranthene**

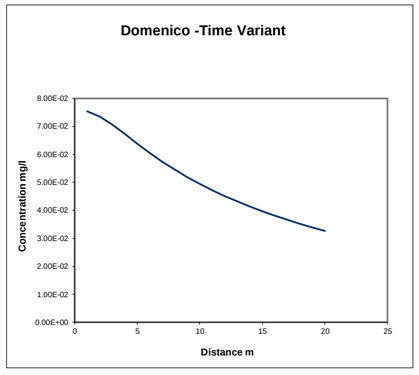
Input	Value	Units
C_T	0.00000017	mg/l
Co	7.67E-02	mg/l
λ	2.09E-11	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	5.34E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	9.09E+05	
u	1.19E-09	m/d

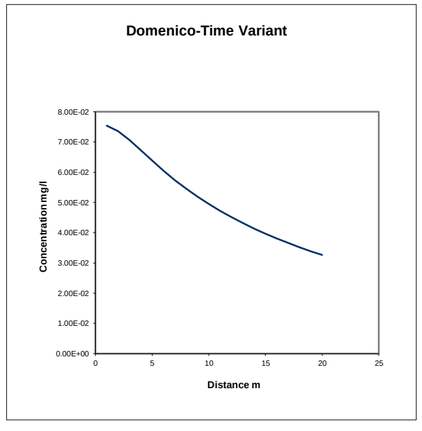
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.00959	-1.70E-02	9.83E-01	-1.30E+45	2	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	7.54E-02
2	2	0.00959	-3.40E-02	9.67E-01	-1.30E+45	2	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	7.35E-02
3	3	0.00959	-5.10E-02	9.50E-01	-1.30E+45	2	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.97	7.07E-02
4	4	0.00959	-6.80E-02	9.34E-01	-1.30E+45	2	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.939	6.73E-02
5	5	0.00959	-8.50E-02	9.18E-01	-1.30E+45	2	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.906	6.39E-02
6	6	0.00959	-1.02E-01	9.03E-01	-1.30E+45	2	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.874	6.05E-02
7	7	0.00959	-1.19E-01	8.88E-01	-1.30E+45	2	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.844	5.74E-02
8	8	0.00959	-1.36E-01	8.73E-01	-1.30E+45	2	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.815	5.46E-02
9	9	0.00959	-1.53E-01	8.58E-01	-1.30E+45	2	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.789	5.19E-02
10	10	0.00959	-1.70E-01	8.44E-01	-1.30E+45	2	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.764	4.95E-02
11	11	0.00959	-1.87E-01	8.29E-01	-1.30E+45	2	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.742	4.72E-02
12	12	0.00959	-2.04E-01	8.15E-01	-1.30E+45	2	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	4.51E-02
13	13	0.00959	-2.21E-01	8.02E-01	-1.30E+45	2	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.702	4.31E-02
14	14	0.00959	-2.38E-01	7.88E-01	-1.30E+45	2	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.684	4.13E-02
15	15	0.00959	-2.55E-01	7.75E-01	-1.30E+45	2	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.667	3.96E-02
16	16	0.00959	-2.72E-01	7.62E-01	-1.30E+45	2	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.651	3.81E-02
17	17	0.00959	-2.89E-01	7.49E-01	-1.30E+45	2	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.637	3.66E-02
18	18	0.00959	-3.06E-01	7.36E-01	-1.30E+45	2	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.623	3.52E-02
19	19	0.00959	-3.23E-01	7.24E-01	-1.30E+45	2	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.61	3.39E-02
20	20	0.00959	-3.40E-01	7.12E-01	-1.30E+45	2	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.598	3.27E-02



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.00959	-1.70E-02	9.83E-01	-1.30E+45	2	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	7.54E-02
2	2	0.00959	-3.40E-02	9.67E-01	-1.30E+45	2	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	7.41E-02
3	3	0.00959	-5.10E-02	9.50E-01	-1.30E+45	2	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	7.29E-02
4	4	0.00959	-6.80E-02	9.34E-01	-1.30E+45	2	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	7.16E-02
5	5	0.00959	-8.50E-02	9.18E-01	-1.30E+45	2	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.999	7.04E-02
6	6	0.00959	-1.02E-01	9.03E-01	-1.30E+45	2	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.998	6.91E-02
7	7	0.00959	-1.19E-01	8.88E-01	-1.30E+45	2	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.995	6.78E-02
8	8	0.00959	-1.36E-01	8.73E-01	-1.30E+45	2	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	6.64E-02
9	9	0.00959	-1.53E-01	8.58E-01	-1.30E+45	2	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.988	6.50E-02
10	10	0.00959	-1.70E-01	8.44E-01	-1.30E+45	2	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.982	6.36E-02
11	11	0.00959	-1.87E-01	8.29E-01	-1.30E+45	2	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.976	6.21E-02
12	12	0.00959	-2.04E-01	8.15E-01	-1.30E+45	2	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.97	6.06E-02
13	13	0.00959	-2.21E-01	8.02E-01	-1.30E+45	2	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.962	5.92E-02
14	14	0.00959	-2.38E-01	7.88E-01	-1.30E+45	2	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	5.77E-02
15	15	0.00959	-2.55E-01	7.75E-01	-1.30E+45	2	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.947	5.63E-02
16	16	0.00959	-2.72E-01	7.62E-01	-1.30E+45	2	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.939	5.49E-02
17	17	0.00959	-2.89E-01	7.49E-01	-1.30E+45	2	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.931	5.35E-02
18	18	0.00959	-3.06E-01	7.36E-01	-1.30E+45	2	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.923	5.21E-02
19	19	0.00959	-3.23E-01	7.24E-01	-1.30E+45	2	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.915	5.08E-02
20	20	0.00959	-3.40E-01	7.12E-01	-1.30E+45	2	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.906	4.95E-02



Date:	24/02/2020
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	**Glan Llyn**			
Site Address:	**Llanwern**			
Completed by:	**Ross Cameron**			
Date:	**24-Feb-20**		**Version:**	**1**
Contaminant	**Iron**			
Target Concentration (C_T)	**1**	**mg/l**	**Origin of C_T:**	**Water Framework Directive EQS**

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Environment Agency

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Iron**		
Target concentration	**C_T**	**1**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_w	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.

The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**1.35E+02**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	1	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Iron**		from Level 1
Target concentration	C_T	**1**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters

	Variable	Value	Unit	Source
Contaminant		Iron		from Level 1
Target Concentration	C_T	1	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value, l

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	av	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters

	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target	**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks	**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
	#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point	**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**fraction** Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for ionic organic chemicals (acids)

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction
Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

Define dispersivity (click brown cell and use pull down list)

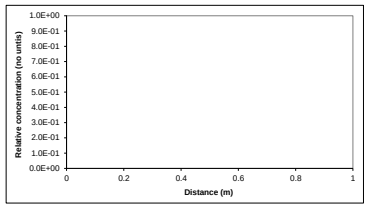
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

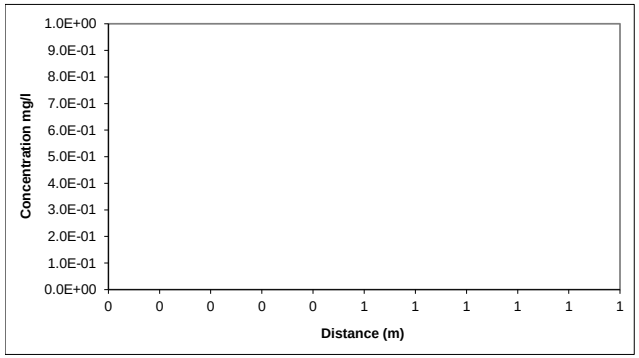
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_w	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu) | **Variable** | **Value** | **Unit** | **Source**

Contaminant		Iron		from Level 1
Target Concentration	C_T	1.00E+00	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	1.14E+02	mg/l	*Based on average soil conc of 92031mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*100 day half life estimation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappir*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	8.10E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.57E+00	m	*see options*
Transverse dispersivity	az	1.57E-01	m	*see options*
Vertical dispersivity	ay	1.57E-02	m	*see options*

Calculated Parameters | **Variable**

Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	1.38E+04	fraction
Decay rate used	λ	5.59E-105	d^{-1}
Rate of contaminant flow due to retardation	u	7.84E-08	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	1.07E+02	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.06E+00**	

Remedial Targets

Remedial Target		**1.06E+00**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**1.07E+02**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.E+99.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	8.10E+02	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg
pH value	pH		
acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction
Soil water partition coefficient	Kd	8.10E+02	l/kg

Define dispersivity (click brown cell and use pull down list)

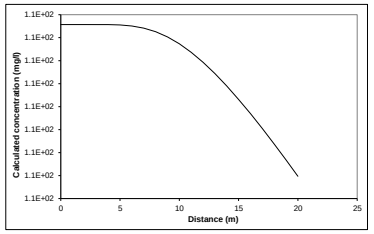
Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+01	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E+00	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-01	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	1.1E+02
1.0	1.14E+02
2.0	1.14E+02
3.0	1.14E+02
4.0	1.14E+02
5.0	1.14E+02
6.0	1.14E+02
7.0	1.13E+02
8.0	1.13E+02
9.0	1.13E+02
10.0	1.13E+02
11.0	1.12E+02
12.0	1.12E+02
13.0	1.11E+02
14.0	1.11E+02
15.0	1.10E+02
16.0	1.10E+02
17.0	1.09E+02
18.0	1.08E+02
19.0	1.08E+02
20.0	1.07E+02

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Iron**

Parameter (carried over from input sheet)	Value	Units
C_T	1.00E+00	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_w	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **1.35E+02 mg/kg** **for Iron**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24/02/2020
Version:	1

Level 2 Calculation Sheet

Contaminant **Iron**

Site assessed:	Glan Llyn
Date:	24/02/2020
Version:	1

Parameter	Value	Units
(carried over from input sheet)		
Mz	0.00E+00	m
L	0.00E+00	m
da	0.00E+00	m
Inf	0.00E+00	m/d
K	0.00E+00	m/d
i	0.00E+00	
		m3/d
A	0.00E+00	m2
		m3/d
Cc	0.00E+00	mg/l
C_T	1.00E+00	mg/l
Cu	0.00E+00	mg/l
w	0.00E+00	m

Calculated Dilution Factor

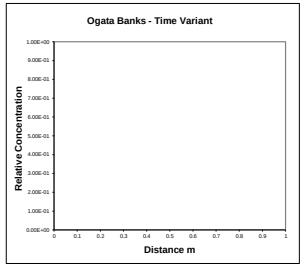
Calculation based on target concentration #DIV/0!

Calculation based on observed contaminant concentration #DIV/0!

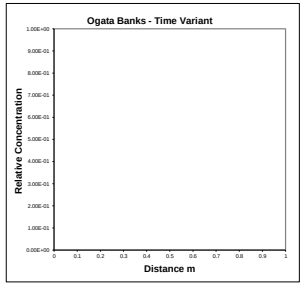


OGATA BANKS SOLUTION

Contaminant	Iron																				
			Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)																		
Input	**Value**	**Units**		X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
C_T	1.000E+00	mg/l	1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DF	#DIV/0!		2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
λ	6.931E-101	$days^{-1}$	5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sz	0.000E+00	m	6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sy	0.000E+00	m	7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Kd	0.000E+00	l/kg	8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ρ	0.000E+00	g/cm3	9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
n	0.000E+00		10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
i	#DIV/0!		11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
K	0.000E+00	m/d	12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
x	0.000E+00	m	13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
z	0.000E+00	m	14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
y	0.000E+00	m	15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
t	1.000E+99	days	16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ax	0.000E+00	m	17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
az	0.000E+00	m	18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ay	0.000E+00	m	19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value																				
			Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT																		
				X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
v	#DIV/0!	m/d																			
Rc	#DIV/0!		1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
u	#DIV/0!	m/d	2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

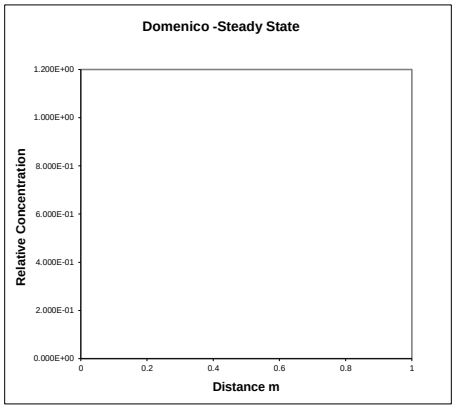
Contaminant **Iron**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.000E+00	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



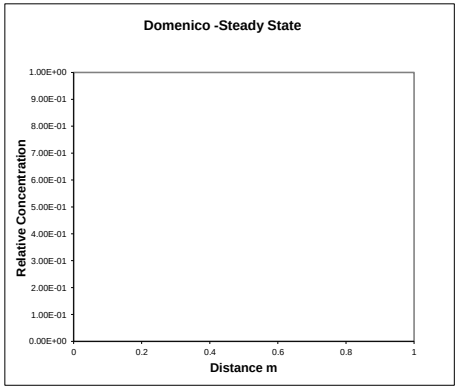
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



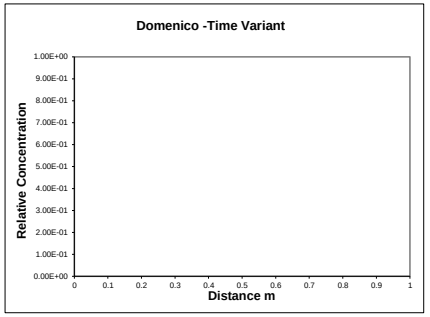
Date:	24/02/2020
Version:	1

DOMENICO (TIME VARIANT)

Contaminant	Iron	
Input	**Value**	**Units**
C_T	1	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

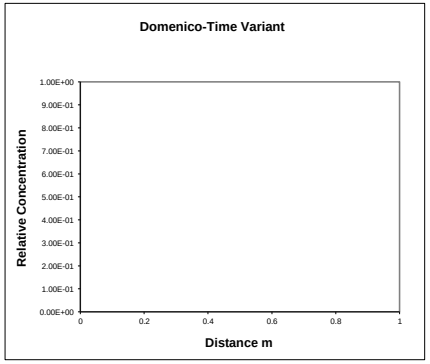
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



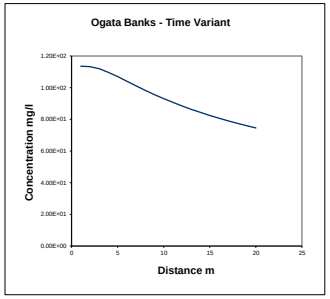
Date:	24/02/2020
Version:	1

OGATA BANKS SOLUTION

Contaminant	Iron	
Input	**Value**	**Units**
C_T	1	mg/l
Co	1.14E+02	mg/l
λ	5.59E-105	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	8.10E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E-01	1.9E+00	1.1E+46	0.000	3.2E+02	1	-3.2E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	1.14E+02
2	2	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+00	3.6E+00	1.1E+46	0.000	2.2E+02	1	-2.2E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	1.13E+02
3	3	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.9E+00	6.8E+00	1.1E+46	0.000	1.8E+02	1	-1.8E+02	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	1.12E+02
4	4	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	2.6E+00	1.3E+01	1.1E+46	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	1.10E+02
5	5	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	3.2E+00	2.4E+01	1.1E+46	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	1.07E+02
6	6	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	3.8E+00	4.6E+01	1.1E+46	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9163	-1.2E+00	-0.91633	1.04E+02
7	7	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	4.5E+00	8.7E+01	1.1E+46	0.000	1.2E+02	1	-1.2E+02	-1	1.1E+00	0.8907	-1.1E+00	-0.89072	1.01E+02
8	8	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	5.1E+00	1.7E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8659	-1.1E+00	-0.86587	9.83E+01
9	9	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	5.7E+00	3.1E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8422	-1.0E+00	-0.84215	9.56E+01
10	10	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E+00	5.9E+02	1.1E+46	0.000	1.0E+02	1	-1.0E+02	-1	9.5E-01	0.8197	-9.5E-01	-0.81971	9.31E+01
11	11	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	7.0E+00	1.1E+03	1.1E+46	0.000	9.5E+01	1	-9.5E+01	-1	9.0E-01	0.7986	-9.0E-01	-0.79858	9.07E+01
12	12	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	7.7E+00	2.1E+03	1.1E+46	0.000	9.1E+01	1	-9.1E+01	-1	8.6E-01	0.7787	-8.6E-01	-0.77872	8.84E+01
13	13	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	8.3E+00	4.0E+03	1.1E+46	0.000	8.8E+01	1	-8.8E+01	-1	8.3E-01	0.7601	-8.3E-01	-0.76006	8.63E+01
14	14	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	8.9E+00	7.6E+03	1.1E+46	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7425	-8.0E-01	-0.74253	8.43E+01
15	15	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	9.6E+00	1.4E+04	1.1E+46	0.000	8.2E+01	1	-8.2E+01	-1	7.7E-01	0.726	-7.7E-01	-0.72604	8.25E+01
16	16	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.0E+01	2.7E+04	1.1E+46	0.000	7.9E+01	1	-7.9E+01	-1	7.5E-01	0.7105	-7.5E-01	-0.71052	8.07E+01
17	17	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	5.2E+04	1.1E+46	0.000	7.7E+01	1	-7.7E+01	-1	7.3E-01	0.6959	-7.3E-01	-0.69588	7.90E+01
18	18	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	9.8E+04	1.1E+46	0.000	7.4E+01	1	-7.4E+01	-1	7.1E-01	0.6821	-7.1E-01	-0.68205	7.75E+01
19	19	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.2E+01	1.8E+05	1.1E+46	0.000	7.2E+01	1	-7.2E+01	-1	6.9E-01	0.669	-6.9E-01	-0.66897	7.60E+01
20	20	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+01	3.5E+05	1.1E+46	0.000	7.1E+01	1	-7.1E+01	-1	6.7E-01	0.6566	-6.7E-01	-0.65658	7.46E+01

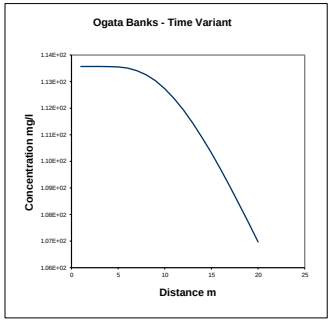


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.38E+04	
u	7.84E-08	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E-01	1.9E+00	1.1E+46	0.000	3.2E+02	1	-3.2E+02	-1	6.0E+00	1	-6.0E+00	-1	1.14E+02
2	2	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+00	3.6E+00	1.1E+46	0.000	2.2E+02	1	-2.2E+02	-1	4.2E+00	1	-4.2E+00	-1	1.14E+02
3	3	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.9E+00	6.8E+00	1.1E+46	0.000	1.8E+02	1	-1.8E+02	-1	3.5E+00	1	-3.5E+00	-1	1.14E+02
4	4	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	2.6E+00	1.3E+01	1.1E+46	0.000	1.6E+02	1	-1.6E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	1.14E+02
5	5	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	3.2E+00	2.4E+01	1.1E+46	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99985	1.14E+02
6	6	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	3.8E+00	4.6E+01	1.1E+46	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9995	-2.4E+00	-0.99946	1.14E+02
7	7	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	4.5E+00	8.7E+01	1.1E+46	0.000	1.2E+02	1	-1.2E+02	-1	2.3E+00	0.9986	-2.3E+00	-0.99864	1.13E+02
8	8	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	5.1E+00	1.7E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	1.13E+02
9	9	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	5.7E+00	3.1E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9953	-2.0E+00	-0.99527	1.13E+02
10	10	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E+00	5.9E+02	1.1E+46	0.000	1.0E+02	1	-1.0E+02	-1	1.9E+00	0.9926	-1.9E+00	-0.99263	1.13E+02
11	11	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	7.0E+00	1.1E+03	1.1E+46	0.000	9.5E+01	1	-9.5E+01	-1	1.8E+00	0.9894	-1.8E+00	-0.98938	1.12E+02
12	12	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	7.7E+00	2.1E+03	1.1E+46	0.000	9.1E+01	1	-9.1E+01	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	1.12E+02
13	13	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	8.3E+00	4.0E+03	1.1E+46	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9812	-1.7E+00	-0.98124	1.11E+02
14	14	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	8.9E+00	7.6E+03	1.1E+46	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9765	-1.6E+00	-0.97647	1.11E+02
15	15	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	9.6E+00	1.4E+04	1.1E+46	0.000	8.2E+01	1	-8.2E+01	-1	1.5E+00	0.9713	-1.5E+00	-0.97133	1.10E+02
16	16	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.0E+01	2.7E+04	1.1E+46	0.000	7.9E+01	1	-7.9E+01	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	1.10E+02
17	17	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	5.2E+04	1.1E+46	0.000	7.7E+01	1	-7.7E+01	-1	1.5E+00	0.9601	-1.5E+00	-0.96015	1.09E+02
18	18	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	9.8E+04	1.1E+46	0.000	7.4E+01	1	-7.4E+01	-1	1.4E+00	0.9542	-1.4E+00	-0.95421	1.08E+02
19	19	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.2E+01	1.8E+05	1.1E+46	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9481	-1.4E+00	-0.94812	1.08E+02
20	20	14.1963	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+01	3.5E+05	1.1E+46	0.000	7.1E+01	1	-7.1E+01	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	1.07E+02



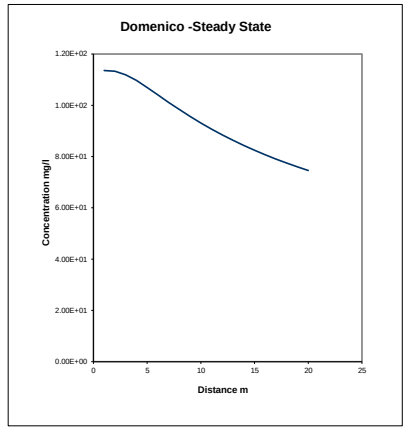
Date:	24/02/2020
Version:	1

Contaminant **Iron**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units		X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
C_T	1	mg/l	1	1	28.3925	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	1.14E+02
			2	2	28.3925	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.997	-2.12E+00	-0.9973	1.13E+02
			3	3	28.3925	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.986	-1.73E+00	-0.9856	1.12E+02
Co	1.14E+02	mg/l	4	4	28.3925	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.966	-1.50E+00	-0.9659	1.10E+02
λ	5.59E-105	$days^{-1}$	5	5	28.3925	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.942	-1.34E+00	-0.9419	1.07E+02
Sz	5.00E+02	m	6	6	28.3925	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.916	-1.22E+00	-0.9163	1.04E+02
Sy	1.50E+00	m	7	7	28.3925	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.891	-1.13E+00	-0.8907	1.01E+02
Kd	8.10E+02	l/kg	8	8	28.3925	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.866	-1.06E+00	-0.8659	9.83E+01
ρ	1.36E+00	g/cm3	9	9	28.3925	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.842	-9.99E-01	-0.8422	9.56E+01
n	8.00E-02		10	10	28.3925	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.82	-9.47E-01	-0.8197	9.31E+01
i	1.00E-02		11	11	28.3925	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.799	-9.03E-01	-0.7986	9.07E+01
K	8.64E-03	m/d	12	12	28.3925	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.779	-8.65E-01	-0.7787	8.84E+01
x	2.00E+01	m	13	13	28.3925	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.76	-8.31E-01	-0.7601	8.63E+01
z	0.00E+00	m	14	14	28.3925	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.743	-8.01E-01	-0.7425	8.43E+01
y	0.00E+00	m	15	15	28.3925	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	8.25E+01
			16	16	28.3925	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.711	-7.49E-01	-0.7105	8.07E+01
ax	1.57E+00	m	17	17	28.3925	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.696	-7.27E-01	-0.6959	7.90E+01
az	1.57E-01	m	18	18	28.3925	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.682	-7.06E-01	-0.6821	7.75E+01
ay	1.57E-02	m	19	19	28.3925	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	7.60E+01
			20	20	28.3925	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.657	-6.70E-01	-0.6566	7.46E+01



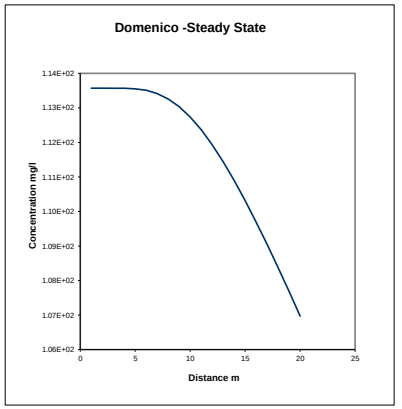
Vertical dispersion optio Simulate vertical dispersion in 1 direction

Calc **Value**

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

				X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
v	1.08E-03	m/d														
Rc	1.38E+04															
u	7.84E-08	m/d	1	1	28.3925	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	1.14E+02
			2	2	28.3925	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	1.14E+02
			3	3	28.3925	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	1.14E+02
			4	4	28.3925	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	1.14E+02
			5	5	28.3925	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	2.68E+00	1	-2.68E+00	-0.9998	1.14E+02
			6	6	28.3925	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.999	-2.45E+00	-0.9995	1.14E+02
			7	7	28.3925	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.999	-2.26E+00	-0.9986	1.13E+02
			8	8	28.3925	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.997	-2.12E+00	-0.9973	1.13E+02
			9	9	28.3925	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.995	-2.00E+00	-0.9953	1.13E+02
			10	10	28.3925	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.993	-1.89E+00	-0.9926	1.13E+02
			11	11	28.3925	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.989	-1.81E+00	-0.9894	1.12E+02
			12	12	28.3925	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.986	-1.73E+00	-0.9856	1.12E+02
			13	13	28.3925	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.981	-1.66E+00	-0.9812	1.11E+02
			14	14	28.3925	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.976	-1.60E+00	-0.9765	1.11E+02
			15	15	28.3925	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.971	-1.55E+00	-0.9713	1.10E+02
			16	16	28.3925	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.966	-1.50E+00	-0.9659	1.10E+02
			17	17	28.3925	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.96	-1.45E+00	-0.9601	1.09E+02
			18	18	28.3925	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.954	-1.41E+00	-0.9542	1.08E+02
			19	19	28.3925	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.948	-1.37E+00	-0.9481	1.08E+02
			20	20	28.3925	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.942	-1.34E+00	-0.9419	1.07E+02



Date:	24/02/2020
Version:	1

DOMENICO (TIME VARIANT)

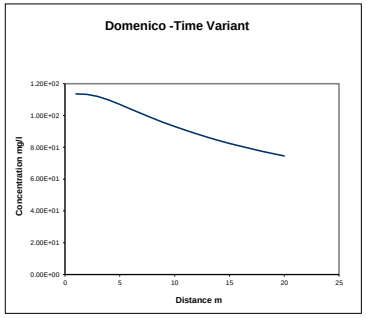
Contaminant	Iron	
Input	**Value**	**Units**
C_T	1	mg/l
Co	1.14E+02	mg/l
λ	5.59E-105	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	8.10E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option: Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.38E+04	
u	7.84E-08	m/d

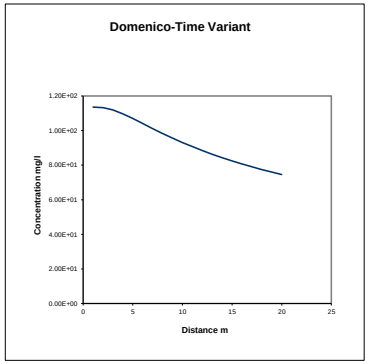
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	1.14E+02
2	2	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	1.13E+02
3	3	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.986	1.12E+02
4	4	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.966	1.10E+02
5	5	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.942	1.07E+02
6	6	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.916	1.04E+02
7	7	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.891	1.01E+02
8	8	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.866	9.83E+01
9	9	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.842	9.56E+01
10	10	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.82	9.31E+01
11	11	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.799	9.07E+01
12	12	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.779	8.84E+01
13	13	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.76	8.63E+01
14	14	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.743	8.43E+01
15	15	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	8.25E+01
16	16	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.711	8.07E+01
17	17	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.696	7.90E+01
18	18	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.682	7.75E+01
19	19	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	7.60E+01
20	20	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.657	7.46E+01



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	1.14E+02
2	2	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	1.14E+02
3	3	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	1.14E+02
4	4	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	1.14E+02
5	5	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-1	1.14E+02
6	6	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.999	1.14E+02
7	7	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.999	1.13E+02
8	8	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	1.13E+02
9	9	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.995	1.13E+02
10	10	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.993	1.13E+02
11	11	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.989	1.12E+02
12	12	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.986	1.12E+02
13	13	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.981	1.11E+02
14	14	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.976	1.11E+02
15	15	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.971	1.10E+02
16	16	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.966	1.10E+02
17	17	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.96	1.09E+02
18	18	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.954	1.08E+02
19	19	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.948	1.08E+02
20	20	14.1963	0.00E+00	1.00E+00	-1.12E+46	2	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.942	1.07E+02



Date:	24/02/2020
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	24-Feb-20		Version:	1
Contaminant	Manganese			
Target Concentration (C_T)	0.123	mg/l	Origin of C_T:	Water Framework Directive (EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Environment Agency

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Manganese**		
Target concentration	**C_T**	**0.123**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_w	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**1.66E+01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.123	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Manganese**		from Level 1
Target concentration	C_T	**0.123**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters

	Variable	Value	Unit	Source
Contaminant		Manganese		from Level 1
Target Concentration	C_T	0.123	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value, lab

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	av	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters

	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target	**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks	**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
	#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point	**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**fraction** Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for ionic organic chemicals (acids)

Entry if specify partition coefficient (option)

Soil water partition coefficient	Kd	l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer	foc	fraction
Organic carbon partition coefficient	Koc	l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

Define dispersivity (click brown cell and use pull down list)

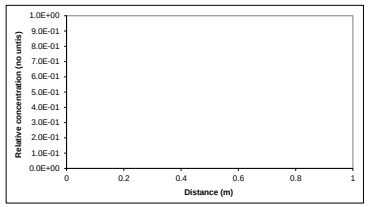
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

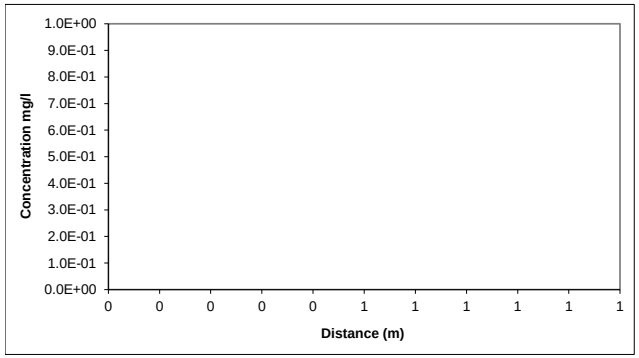
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_w	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu) | **Variable** | **Value** | **Unit** | **Source**

Contaminant		Manganese		from Level 1
Target Concentration	C_T	1.23E-01	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	1.20E+01	mg/l	*Based on average soil conc of 8645mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*Estimation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappir*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	7.20E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.57E+00	m	*see options*
Transverse dispersivity	az	1.57E-01	m	*see options*
Vertical dispersivity	ay	1.57E-02	m	*see options*

Calculated Parameters | **Variable**

Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	1.22E+04	fraction
Decay rate used	λ	6.29E-105	d^{-1}
Rate of contaminant flow due to retardation	u	8.82E-08	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	1.13E+01	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.06E+00**	

Remedial Targets

Remedial Target		**1.31E-01**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**1.13E+01**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	7.20E+02	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg
pH value	pH		
acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction
Soil water partition coefficient	Kd	7.20E+02	l/kg

Define dispersivity (click brown cell and use pull down list)

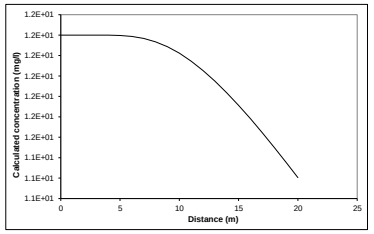
Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+01	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E+00	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-01	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	1.2E+01
1.0	1.20E+01
2.0	1.20E+01
3.0	1.20E+01
4.0	1.20E+01
5.0	1.20E+01
6.0	1.20E+01
7.0	1.20E+01
8.0	1.20E+01
9.0	1.19E+01
10.0	1.19E+01
11.0	1.19E+01
12.0	1.18E+01
13.0	1.18E+01
14.0	1.17E+01
15.0	1.17E+01
16.0	1.16E+01
17.0	1.15E+01
18.0	1.15E+01
19.0	1.14E+01
20.0	1.13E+01

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Manganese**

Parameter (carried over from input sheet)	**Value**	**Units**
C_T	1.23E-01	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_w	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **1.66E+01 mg/kg** **for Manganese**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24/02/2020
Version:	1

Level 2 Calculation Sheet

Contaminant **Manganese**

Site assessed:	Glan Llyn
Date:	24/02/2020
Version:	1

Parameter	Value	Units		
(carried over from input sheet)				
Mz	0.00E+00	m		
L	0.00E+00	m		
da	0.00E+00	m		Calculated Dilution Factor
Inf	0.00E+00	m/d		
K	0.00E+00	m/d		
i	0.00E+00	m3/d	Calculation based on target concentration	#DIV/0!
A	0.00E+00	m2	Calculation based on observed contaminant concentration	#DIV/0!
Cc	0.00E+00	m3/d mg/l		
C_T	1.23E-01	mg/l		
Cu	0.00E+00	mg/l		
w	0.00E+00	m		

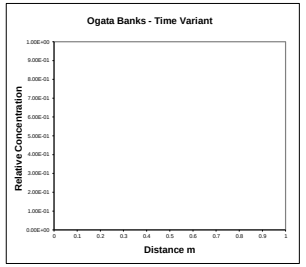


OGATA BANKS SOLUTION

Contaminant	Manganese	
Input	**Value**	**Units**
C_T	1.230E-01	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

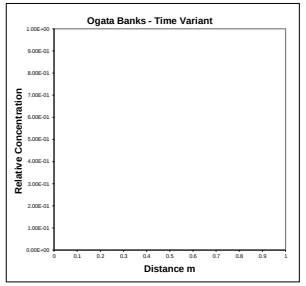
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

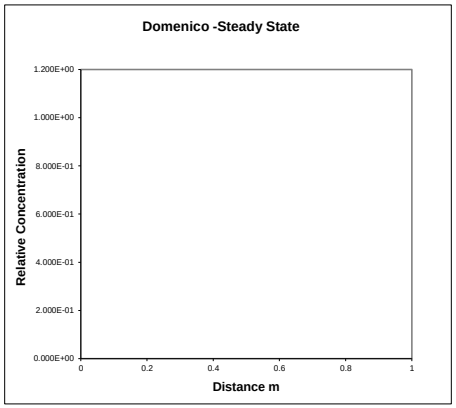
Contaminant **Manganese**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.230E-01	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



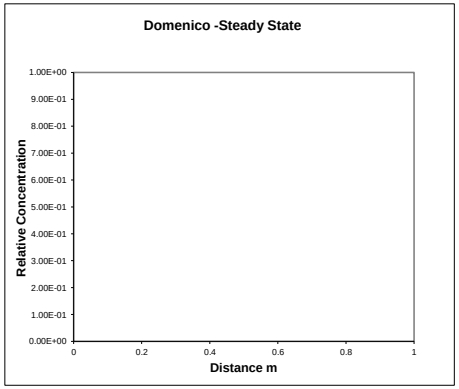
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

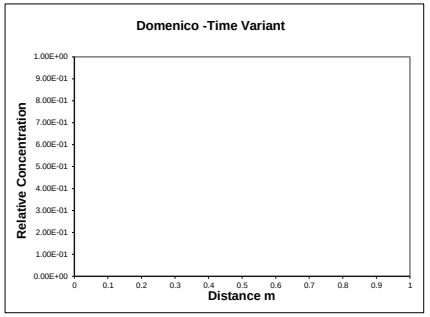
DOMENICO (TIME VARIANT)

Contaminant **Manganese**

Input	Value	Units
C_T	0.123	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

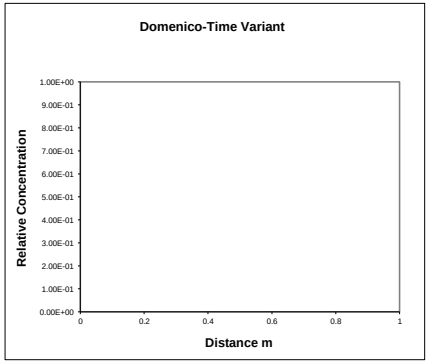


Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



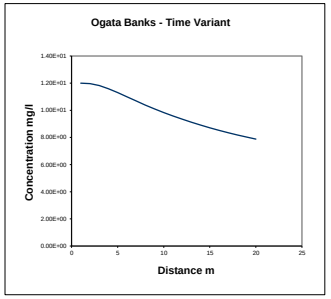
Date:	24/02/2020
Version:	1

OGATA BANKS SOLUTION

Contaminant	Manganese	
Input	**Value**	**Units**
C_T	0.123	mg/l
Co	1.20E+01	mg/l
λ	6.29E-105	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	7.20E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	6.4E-01	1.9E+00	1.2E+46	0.000	3.2E+02	1	-3.2E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	1.20E+01
2	2	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.3E+00	3.6E+00	1.2E+46	0.000	2.2E+02	1	-2.2E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	1.20E+01
3	3	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.9E+00	6.8E+00	1.2E+46	0.000	1.8E+02	1	-1.8E+02	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	1.18E+01
4	4	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	2.6E+00	1.3E+01	1.2E+46	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	1.16E+01
5	5	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	3.2E+00	2.4E+01	1.2E+46	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	1.13E+01
6	6	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	3.8E+00	4.6E+01	1.2E+46	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9163	-1.2E+00	-0.91633	1.10E+01
7	7	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	4.5E+00	8.7E+01	1.2E+46	0.000	1.2E+02	1	-1.2E+02	-1	1.1E+00	0.8907	-1.1E+00	-0.89072	1.07E+01
8	8	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	5.1E+00	1.7E+02	1.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8659	-1.1E+00	-0.86587	1.04E+01
9	9	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	5.7E+00	3.1E+02	1.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8422	-1.0E+00	-0.84215	1.01E+01
10	10	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	6.4E+00	5.9E+02	1.2E+46	0.000	1.0E+02	1	-1.0E+02	-1	9.5E-01	0.8197	-9.5E-01	-0.81971	9.84E+00
11	11	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	7.0E+00	1.1E+03	1.2E+46	0.000	9.5E+01	1	-9.5E+01	-1	9.0E-01	0.7986	-9.0E-01	-0.79858	9.58E+00
12	12	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	7.7E+00	2.1E+03	1.2E+46	0.000	9.1E+01	1	-9.1E+01	-1	8.6E-01	0.7787	-8.6E-01	-0.77872	9.34E+00
13	13	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	8.3E+00	4.0E+03	1.2E+46	0.000	8.8E+01	1	-8.8E+01	-1	8.3E-01	0.7601	-8.3E-01	-0.76006	9.12E+00
14	14	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	8.9E+00	7.6E+03	1.2E+46	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7425	-8.0E-01	-0.74253	8.91E+00
15	15	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	9.6E+00	1.4E+04	1.2E+46	0.000	8.2E+01	1	-8.2E+01	-1	7.7E-01	0.726	-7.7E-01	-0.72604	8.71E+00
16	16	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.0E+01	2.7E+04	1.2E+46	0.000	7.9E+01	1	-7.9E+01	-1	7.5E-01	0.7105	-7.5E-01	-0.71052	8.53E+00
17	17	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.1E+01	5.2E+04	1.2E+46	0.000	7.7E+01	1	-7.7E+01	-1	7.3E-01	0.6959	-7.3E-01	-0.69588	8.35E+00
18	18	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.1E+01	9.8E+04	1.2E+46	0.000	7.4E+01	1	-7.4E+01	-1	7.1E-01	0.6821	-7.1E-01	-0.68205	8.18E+00
19	19	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.2E+01	1.8E+05	1.2E+46	0.000	7.2E+01	1	-7.2E+01	-1	6.9E-01	0.669	-6.9E-01	-0.66897	8.03E+00
20	20	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.3E+01	3.5E+05	1.2E+46	0.000	7.1E+01	1	-7.1E+01	-1	6.7E-01	0.6566	-6.7E-01	-0.65658	7.88E+00

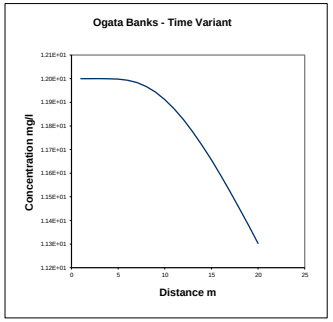


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.22E+04	
u	8.82E-08	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	6.4E-01	1.9E+00	1.2E+46	0.000	3.2E+02	1	-3.2E+02	-1	6.0E+00	1	-6.0E+00	-1	1.20E+01
2	2	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.3E+00	3.6E+00	1.2E+46	0.000	2.2E+02	1	-2.2E+02	-1	4.2E+00	1	-4.2E+00	-1	1.20E+01
3	3	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.9E+00	6.8E+00	1.2E+46	0.000	1.8E+02	1	-1.8E+02	-1	3.5E+00	1	-3.5E+00	-1	1.20E+01
4	4	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	2.6E+00	1.3E+01	1.2E+46	0.000	1.6E+02	1	-1.6E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	1.20E+01
5	5	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	3.2E+00	2.4E+01	1.2E+46	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99985	1.20E+01
6	6	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	3.8E+00	4.6E+01	1.2E+46	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9995	-2.4E+00	-0.99946	1.20E+01
7	7	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	4.5E+00	8.7E+01	1.2E+46	0.000	1.2E+02	1	-1.2E+02	-1	2.3E+00	0.9986	-2.3E+00	-0.99864	1.20E+01
8	8	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	5.1E+00	1.7E+02	1.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	1.20E+01
9	9	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	5.7E+00	3.1E+02	1.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9953	-2.0E+00	-0.99527	1.19E+01
10	10	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	6.4E+00	5.9E+02	1.2E+46	0.000	1.0E+02	1	-1.0E+02	-1	1.9E+00	0.9926	-1.9E+00	-0.99263	1.19E+01
11	11	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	7.0E+00	1.1E+03	1.2E+46	0.000	9.5E+01	1	-9.5E+01	-1	1.8E+00	0.9894	-1.8E+00	-0.98938	1.19E+01
12	12	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	7.7E+00	2.1E+03	1.2E+46	0.000	9.1E+01	1	-9.1E+01	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	1.18E+01
13	13	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	8.3E+00	4.0E+03	1.2E+46	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9812	-1.7E+00	-0.98124	1.18E+01
14	14	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	8.9E+00	7.6E+03	1.2E+46	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9765	-1.6E+00	-0.97647	1.17E+01
15	15	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	9.6E+00	1.4E+04	1.2E+46	0.000	8.2E+01	1	-8.2E+01	-1	1.5E+00	0.9713	-1.5E+00	-0.97133	1.17E+01
16	16	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.0E+01	2.7E+04	1.2E+46	0.000	7.9E+01	1	-7.9E+01	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	1.16E+01
17	17	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.1E+01	5.2E+04	1.2E+46	0.000	7.7E+01	1	-7.7E+01	-1	1.5E+00	0.9601	-1.5E+00	-0.96015	1.15E+01
18	18	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.1E+01	9.8E+04	1.2E+46	0.000	7.4E+01	1	-7.4E+01	-1	1.4E+00	0.9542	-1.4E+00	-0.95421	1.15E+01
19	19	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.2E+01	1.8E+05	1.2E+46	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9481	-1.4E+00	-0.94812	1.14E+01
20	20	1.5	0.0E+00	1.0E+00	-1.2E+46	2.000	1.3E+01	3.5E+05	1.2E+46	0.000	7.1E+01	1	-7.1E+01	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	1.13E+01



Date:	24/02/2020
Version:	1

Contaminant **Manganese**

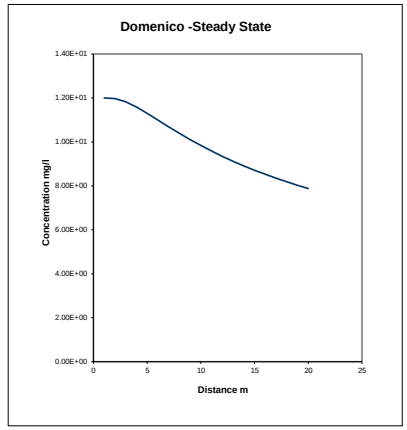
DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.123	mg/l
Co	1.20E+01	mg/l
λ	6.29E-105	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	7.20E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	3	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	1.20E+01
2	2	3	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.997	-2.12E+00	-0.9973	1.20E+01
3	3	3	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.986	-1.73E+00	-0.9856	1.18E+01
4	4	3	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.966	-1.50E+00	-0.9659	1.16E+01
5	5	3	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.942	-1.34E+00	-0.9419	1.13E+01
6	6	3	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.916	-1.22E+00	-0.9163	1.10E+01
7	7	3	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.891	-1.13E+00	-0.8907	1.07E+01
8	8	3	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.866	-1.06E+00	-0.8659	1.04E+01
9	9	3	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.842	-9.99E-01	-0.8422	1.01E+01
10	10	3	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.82	-9.47E-01	-0.8197	9.84E+00
11	11	3	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.799	-9.03E-01	-0.7986	9.58E+00
12	12	3	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.779	-8.65E-01	-0.7787	9.34E+00
13	13	3	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.76	-8.31E-01	-0.7601	9.12E+00
14	14	3	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.743	-8.01E-01	-0.7425	8.91E+00
15	15	3	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	8.71E+00
16	16	3	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.711	-7.49E-01	-0.7105	8.53E+00
17	17	3	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.696	-7.27E-01	-0.6959	8.35E+00
18	18	3	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.682	-7.06E-01	-0.6821	8.18E+00
19	19	3	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	8.03E+00
20	20	3	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.657	-6.70E-01	-0.6566	7.88E+00



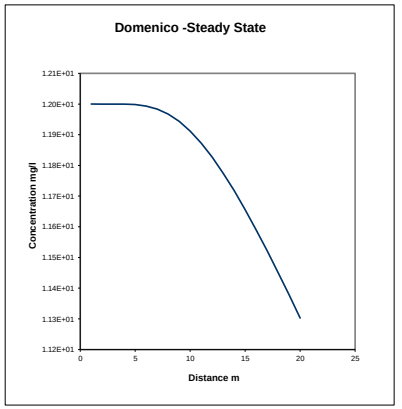
Calc **Value**

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

v	1.08E-03	m/d
Rc	1.22E+04	
u	8.82E-08	m/d

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	3	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	1.20E+01
2	2	3	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	1.20E+01
3	3	3	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	1.20E+01
4	4	3	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	1.20E+01
5	5	3	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	2.68E+00	1	-2.68E+00	-0.9998	1.20E+01
6	6	3	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.999	-2.45E+00	-0.9995	1.20E+01
7	7	3	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.999	-2.26E+00	-0.9986	1.20E+01
8	8	3	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.997	-2.12E+00	-0.9973	1.20E+01
9	9	3	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.995	-2.00E+00	-0.9953	1.19E+01
10	10	3	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.993	-1.89E+00	-0.9926	1.19E+01
11	11	3	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.989	-1.81E+00	-0.9894	1.19E+01
12	12	3	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.986	-1.73E+00	-0.9856	1.18E+01
13	13	3	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.981	-1.66E+00	-0.9812	1.18E+01
14	14	3	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.976	-1.60E+00	-0.9765	1.17E+01
15	15	3	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.971	-1.55E+00	-0.9713	1.17E+01
16	16	3	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.966	-1.50E+00	-0.9659	1.16E+01
17	17	3	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.96	-1.45E+00	-0.9601	1.15E+01
18	18	3	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.954	-1.41E+00	-0.9542	1.15E+01
19	19	3	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.948	-1.37E+00	-0.9481	1.14E+01
20	20	3	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.942	-1.34E+00	-0.9419	1.13E+01



Date:	24/02/2020
Version:	1

DOMENICO (TIME VARIANT)

Contaminant **Manganese**

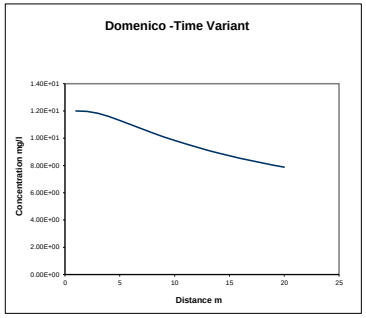
Input	**Value**	**Units**
C_T	0.123	mg/l
Co	1.20E+01	mg/l
λ	6.29E-105	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	7.20E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option: Simulate vertical dispersion in 1 direction

Calc	**Value**	
v	1.08E-03	m/d
Rc	1.22E+04	
u	8.82E-08	m/d

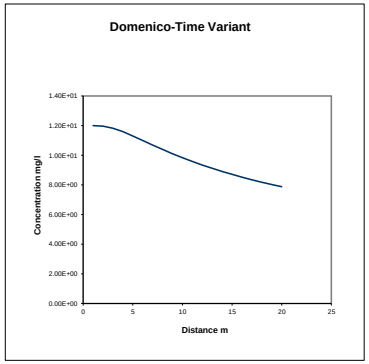
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	1.5	0.00E+00	1.00E+00	-1.19E+46	2	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	1.20E+01
2	2	1.5	0.00E+00	1.00E+00	-1.19E+46	2	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	1.20E+01
3	3	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.986	1.18E+01
4	4	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.966	1.16E+01
5	5	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.942	1.13E+01
6	6	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.916	1.10E+01
7	7	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.891	1.07E+01
8	8	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.866	1.04E+01
9	9	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.842	1.01E+01
10	10	1.5	0.00E+00	1.00E+00	-1.19E+46	2	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.82	9.84E+00
11	11	1.5	0.00E+00	1.00E+00	-1.19E+46	2	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.799	9.58E+00
12	12	1.5	0.00E+00	1.00E+00	-1.19E+46	2	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.779	9.34E+00
13	13	1.5	0.00E+00	1.00E+00	-1.19E+46	2	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.76	9.12E+00
14	14	1.5	0.00E+00	1.00E+00	-1.19E+46	2	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.743	8.91E+00
15	15	1.5	0.00E+00	1.00E+00	-1.19E+46	2	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	8.71E+00
16	16	1.5	0.00E+00	1.00E+00	-1.19E+46	2	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.711	8.53E+00
17	17	1.5	0.00E+00	1.00E+00	-1.19E+46	2	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.696	8.35E+00
18	18	1.5	0.00E+00	1.00E+00	-1.19E+46	2	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.682	8.18E+00
19	19	1.5	0.00E+00	1.00E+00	-1.19E+46	2	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	8.03E+00
20	20	1.5	0.00E+00	1.00E+00	-1.19E+46	2	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.657	7.88E+00



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	1.5	0.00E+00	1.00E+00	-1.19E+46	2	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	1.20E+01
2	2	1.5	0.00E+00	1.00E+00	-1.19E+46	2	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	1.20E+01
3	3	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	1.20E+01
4	4	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	1.20E+01
5	5	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-1	1.20E+01
6	6	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.999	1.20E+01
7	7	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.999	1.20E+01
8	8	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	1.20E+01
9	9	1.5	0.00E+00	1.00E+00	-1.19E+46	2	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.995	1.19E+01
10	10	1.5	0.00E+00	1.00E+00	-1.19E+46	2	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.993	1.19E+01
11	11	1.5	0.00E+00	1.00E+00	-1.19E+46	2	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.989	1.19E+01
12	12	1.5	0.00E+00	1.00E+00	-1.19E+46	2	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.986	1.18E+01
13	13	1.5	0.00E+00	1.00E+00	-1.19E+46	2	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.981	1.18E+01
14	14	1.5	0.00E+00	1.00E+00	-1.19E+46	2	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.976	1.17E+01
15	15	1.5	0.00E+00	1.00E+00	-1.19E+46	2	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.971	1.17E+01
16	16	1.5	0.00E+00	1.00E+00	-1.19E+46	2	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.966	1.16E+01
17	17	1.5	0.00E+00	1.00E+00	-1.19E+46	2	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.96	1.15E+01
18	18	1.5	0.00E+00	1.00E+00	-1.19E+46	2	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.954	1.15E+01
19	19	1.5	0.00E+00	1.00E+00	-1.19E+46	2	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.948	1.14E+01
20	20	1.5	0.00E+00	1.00E+00	-1.19E+46	2	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.942	1.13E+01



Date:	24/02/2020
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions).

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	24-Feb-20		Version:	1
Contaminant	Naphthalene			
Target Concentration (C_T)	0.002	mg/l	Origin of C_T:	Proposed Water Framework Directive EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Environment Agency

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Naphthalene**		
Target concentration	**C_T**	**0.002**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_w	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.

The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**2.69E-01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.002	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Naphthalene**		from Level 1
Target concentration	**C_T**	**0.002**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Environment Agency

Input Parameters

	Variable	Value	Unit	Source
Contaminant		Naphthalene		from Level 1
Target Concentration	C_T	0.002	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value, lab derived value)

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	av	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters

	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target	**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks	**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
	#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This
Distance to compliance point	**0**	**m**	assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**fraction** Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for ionic organic chemicals (acids)

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction
Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

Define dispersivity (click brown cell and use pull down list)

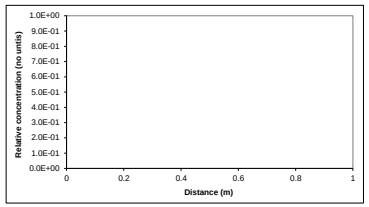
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

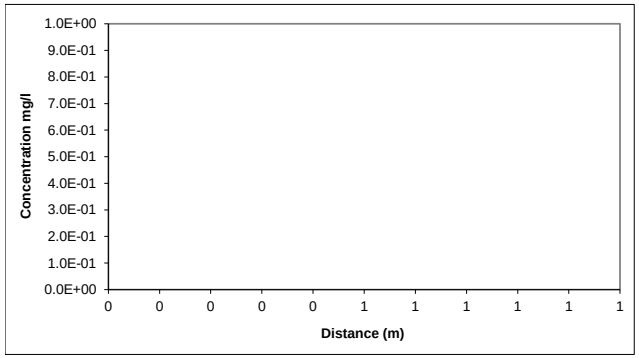
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_w	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Naphthalene		from Level 1
Target Concentration	C_T	2.00E-03	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	2.31E-01	mg/l	*Based on average soil conc of 8.4mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+02	days	*100 day half life estimation*
Calculated decay rate	λ	6.93E-03	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	3.60E+01	l/kg	*see options*
Longitudinal dispersivity	ax	2.00E+00	m	*see options*
Transverse dispersivity	az	2.00E-01	m	*see options*
Vertical dispersivity	ay	2.00E-02	m	*see options*

Calculated Parameters

	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	6.13E+02	fraction
Decay rate used	λ	1.13E-05	d^{-1}
Rate of contaminant flow due to retardation	u	1.76E-06	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	6.05E-15	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**3.82E+13**	

Remedial Targets

Remedial Target		**7.64E+10**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**6.05E-15**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 3.60E+01 l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction

Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — l/kg

Sorption coefficient for ionised species — $K_{oc,i}$ — l/kg

pH value — pH

acid dissociation constant — pKa

Fraction of organic carbon in aquifer — foc — fraction

Soil water partition coefficient — Kd — 3.60E+01 — l/kg

Define dispersivity (click brown cell and use pull down list)

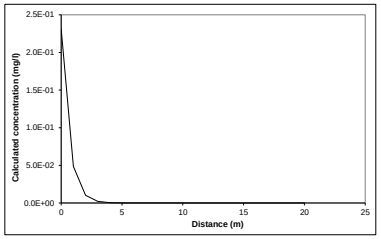
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	2.3E-01
1.0	4.86E-02
2.0	1.02E-02
3.0	2.15E-03
4.0	4.53E-04
5.0	9.52E-05
6.0	2.00E-05
7.0	4.20E-06
8.0	8.80E-07
9.0	1.84E-07
10.0	3.86E-08
11.0	8.06E-09
12.0	1.69E-09
13.0	3.52E-10
14.0	7.35E-11
15.0	1.53E-11
16.0	3.20E-12
17.0	6.67E-13
18.0	1.39E-13
19.0	2.90E-14
20.0	6.05E-15

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Naphthalene**

Parameter	Value	Units
(carried over from input sheet)		
C_T	2.00E-03	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **2.69E-01 mg/kg** **for Naphthalene**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24/02/2020
Version:	1

Level 2 Calculation Sheet

Contaminant **Naphthalene**

Site assessed:	Glan Llyn
Date:	24/02/2020
Version:	1

Parameter	Value	Units
(carried over from input sheet)		
Mz	0.00E+00	m
L	0.00E+00	m
da	0.00E+00	m
Inf	0.00E+00	m/d
K	0.00E+00	m/d
i	0.00E+00	m3/d
A	0.00E+00	m2
Cc	0.00E+00	m3/d mg/l
C_T	2.00E-03	mg/l
Cu	0.00E+00	mg/l
w	0.00E+00	m

Calculated Dilution Factor

Calculation based on target concentration #DIV/0!

Calculation based on observed contaminant concentration #DIV/0!



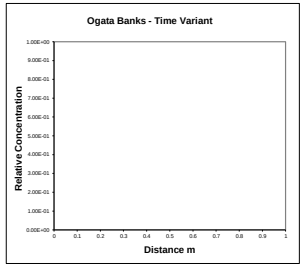
OGATA BANKS SOLUTION

Contaminant **Naphthalene**

Input	Value	Units
C_T	2.000E-03	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

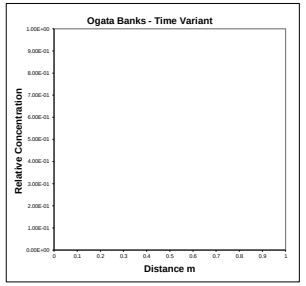
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

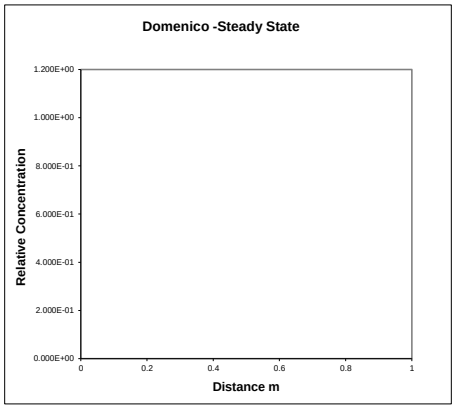
Contaminant **Naphthalene**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	2.000E-03	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 4B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



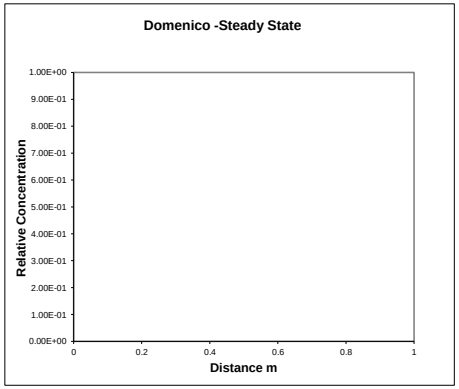
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 4B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

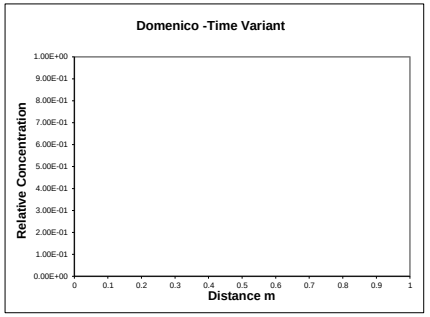
DOMENICO (TIME VARIANT)

Contaminant **Naphthalene**

Input	**Value**	**Units**
C_T	0.002	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

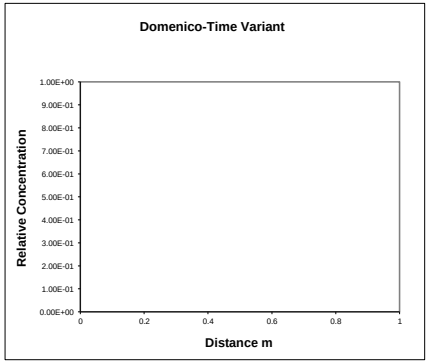


Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

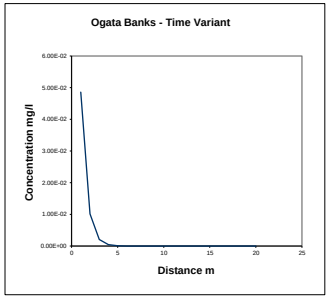
OGATA BANKS SOLUTION

Contaminant **Naphthalene**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.002	mg/l
Co	2.31E-01	mg/l
λ	1.13E-05	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	3.60E+01	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	0.02888	-1.6E+00	2.1E-01	-3.4E+47	2.000	2.1E+00	7.8E+00	3.4E+47	0.000	2.8E+02	1	-2.8E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	4.86E-02
2	2	0.02888	-3.1E+00	4.4E-02	-3.4E+47	2.000	4.1E+00	6.1E+01	3.4E+47	0.000	2.0E+02	1	-2.0E+02	-1	1.9E+00	0.992	-1.9E+00	-0.99199	1.01E-02
3	3	0.02888	-4.7E+00	9.3E-03	-3.4E+47	2.000	6.2E+00	4.8E+02	3.4E+47	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	2.09E-03
4	4	0.02888	-6.2E+00	2.0E-03	-3.4E+47	2.000	8.2E+00	3.8E+03	3.4E+47	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	4.25E-04
5	5	0.02888	-7.8E+00	4.1E-04	-3.4E+47	2.000	1.0E+01	3.0E+04	3.4E+47	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	8.63E-05
6	6	0.02888	-9.4E+00	8.7E-05	-3.4E+47	2.000	1.2E+01	2.3E+05	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8742	-1.1E+00	-0.87421	1.75E-05
7	7	0.02888	-1.1E+01	1.8E-05	-3.4E+47	2.000	1.4E+01	1.8E+06	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8436	-1.0E+00	-0.84362	3.56E-06
8	8	0.02888	-1.2E+01	3.8E-06	-3.4E+47	2.000	1.6E+01	1.4E+07	3.4E+47	0.000	9.9E+01	1	-9.9E+01	-1	9.4E-01	0.8151	-9.4E-01	-0.8151	7.23E-07
9	9	0.02888	-1.4E+01	8.1E-07	-3.4E+47	2.000	1.9E+01	1.1E+08	3.4E+47	0.000	9.3E+01	1	-9.3E+01	-1	8.8E-01	0.7887	-8.8E-01	-0.7887	1.47E-07
10	10	0.02888	-1.6E+01	1.7E-07	-3.4E+47	2.000	2.1E+01	8.7E+08	3.4E+47	0.000	8.8E+01	1	-8.8E+01	-1	8.4E-01	0.7643	-8.4E-01	-0.76432	3.00E-08
11	11	0.02888	-1.7E+01	3.6E-08	-3.4E+47	2.000	2.3E+01	6.8E+09	3.4E+47	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7418	-8.0E-01	-0.7418	6.13E-09
12	12	0.02888	-1.9E+01	7.5E-09	-3.4E+47	2.000	2.5E+01	5.4E+10	3.4E+47	0.000	8.1E+01	1	-8.1E+01	-1	7.7E-01	0.721	-7.7E-01	-0.72098	1.25E-09
13	13	0.02888	-2.0E+01	1.6E-09	-3.4E+47	2.000	2.7E+01	4.2E+11	3.4E+47	0.000	7.8E+01	1	-7.8E+01	-1	7.4E-01	0.7017	-7.4E-01	-0.70169	2.57E-10
14	14	0.02888	-2.2E+01	3.3E-10	-3.4E+47	2.000	2.9E+01	3.3E+12	3.4E+47	0.000	7.5E+01	1	-7.5E+01	-1	7.1E-01	0.6838	-7.1E-01	-0.68377	5.26E-11
15	15	0.02888	-2.3E+01	7.0E-11	-3.4E+47	2.000	3.1E+01	2.6E+13	3.4E+47	0.000	7.2E+01	1	-7.2E+01	-1	6.8E-01	0.6671	-6.8E-01	-0.66708	1.08E-11
16	16	0.02888	-2.5E+01	1.5E-11	-3.4E+47	2.000	3.3E+01	2.0E+14	3.4E+47	0.000	7.0E+01	1	-7.0E+01	-1	6.6E-01	0.6515	-6.6E-01	-0.6515	2.22E-12
17	17	0.02888	-2.6E+01	3.1E-12	-3.4E+47	2.000	3.5E+01	1.6E+15	3.4E+47	0.000	6.8E+01	1	-6.8E+01	-1	6.4E-01	0.6369	-6.4E-01	-0.63692	4.56E-13
18	18	0.02888	-2.8E+01	6.5E-13	-3.4E+47	2.000	3.7E+01	1.2E+16	3.4E+47	0.000	6.6E+01	1	-6.6E+01	-1	6.3E-01	0.6232	-6.3E-01	-0.62324	9.40E-14
19	19	0.02888	-3.0E+01	1.4E-13	-3.4E+47	2.000	3.9E+01	9.7E+16	3.4E+47	0.000	6.4E+01	1	-6.4E+01	-1	6.1E-01	0.6104	-6.1E-01	-0.61038	1.94E-14
20	20	0.02888	-3.1E+01	2.9E-14	-3.4E+47	2.000	4.1E+01	7.6E+17	3.4E+47	0.000	6.3E+01	1	-6.3E+01	-1	5.9E-01	0.5983	-5.9E-01	-0.59826	3.99E-15

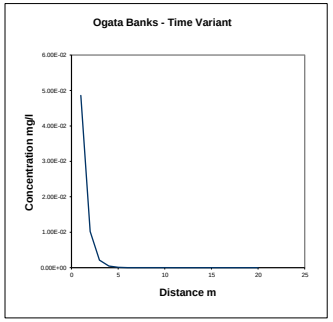


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	6.13E+02	
u	1.76E-06	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	0.02888	-1.6E+00	2.1E-01	-3.4E+47	2.000	2.1E+00	7.8E+00	3.4E+47	0.000	2.8E+02	1	-2.8E+02	-1	5.3E+00	1	-5.3E+00	-1	4.86E-02
2	2	0.02888	-3.1E+00	4.4E-02	-3.4E+47	2.000	4.1E+00	6.1E+01	3.4E+47	0.000	2.0E+02	1	-2.0E+02	-1	3.8E+00	1	-3.8E+00	-1	1.02E-02
3	3	0.02888	-4.7E+00	9.3E-03	-3.4E+47	2.000	6.2E+00	4.8E+02	3.4E+47	0.000	1.6E+02	1	-1.6E+02	-1	3.1E+00	1	-3.1E+00	-0.99999	2.15E-03
4	4	0.02888	-6.2E+00	2.0E-03	-3.4E+47	2.000	8.2E+00	3.8E+03	3.4E+47	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	4.53E-04
5	5	0.02888	-7.8E+00	4.1E-04	-3.4E+47	2.000	1.0E+01	3.0E+04	3.4E+47	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9992	-2.4E+00	-0.9992	9.52E-05
6	6	0.02888	-9.4E+00	8.7E-05	-3.4E+47	2.000	1.2E+01	2.3E+05	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	2.2E+00	0.9978	-2.2E+00	-0.9978	2.00E-05
7	7	0.02888	-1.1E+01	1.8E-05	-3.4E+47	2.000	1.4E+01	1.8E+06	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9954	-2.0E+00	-0.99541	4.20E-06
8	8	0.02888	-1.2E+01	3.8E-06	-3.4E+47	2.000	1.6E+01	1.4E+07	3.4E+47	0.000	9.9E+01	1	-9.9E+01	-1	1.9E+00	0.992	-1.9E+00	-0.99199	8.80E-07
9	9	0.02888	-1.4E+01	8.1E-07	-3.4E+47	2.000	1.9E+01	1.1E+08	3.4E+47	0.000	9.3E+01	1	-9.3E+01	-1	1.8E+00	0.9876	-1.8E+00	-0.98758	1.84E-07
10	10	0.02888	-1.6E+01	1.7E-07	-3.4E+47	2.000	2.1E+01	8.7E+08	3.4E+47	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9823	-1.7E+00	-0.98229	3.86E-08
11	11	0.02888	-1.7E+01	3.6E-08	-3.4E+47	2.000	2.3E+01	6.8E+09	3.4E+47	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9763	-1.6E+00	-0.97626	8.06E-09
12	12	0.02888	-1.9E+01	7.5E-09	-3.4E+47	2.000	2.5E+01	5.4E+10	3.4E+47	0.000	8.1E+01	1	-8.1E+01	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	1.69E-09
13	13	0.02888	-2.0E+01	1.6E-09	-3.4E+47	2.000	2.7E+01	4.2E+11	3.4E+47	0.000	7.8E+01	1	-7.8E+01	-1	1.5E+00	0.9625	-1.5E+00	-0.96249	3.52E-10
14	14	0.02888	-2.2E+01	3.3E-10	-3.4E+47	2.000	2.9E+01	3.3E+12	3.4E+47	0.000	7.5E+01	1	-7.5E+01	-1	1.4E+00	0.955	-1.4E+00	-0.95498	7.35E-11
15	15	0.02888	-2.3E+01	7.0E-11	-3.4E+47	2.000	3.1E+01	2.6E+13	3.4E+47	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9472	-1.4E+00	-0.94719	1.53E-11
16	16	0.02888	-2.5E+01	1.5E-11	-3.4E+47	2.000	3.3E+01	2.0E+14	3.4E+47	0.000	7.0E+01	1	-7.0E+01	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	3.20E-12
17	17	0.02888	-2.6E+01	3.1E-12	-3.4E+47	2.000	3.5E+01	1.6E+15	3.4E+47	0.000	6.8E+01	1	-6.8E+01	-1	1.3E+00	0.9311	-1.3E+00	-0.93109	6.67E-13
18	18	0.02888	-2.8E+01	6.5E-13	-3.4E+47	2.000	3.7E+01	1.2E+16	3.4E+47	0.000	6.6E+01	1	-6.6E+01	-1	1.3E+00	0.9229	-1.3E+00	-0.9229	1.39E-13
19	19	0.02888	-3.0E+01	1.4E-13	-3.4E+47	2.000	3.9E+01	9.7E+16	3.4E+47	0.000	6.4E+01	1	-6.4E+01	-1	1.2E+00	0.9147	-1.2E+00	-0.91468	2.90E-14
20	20	0.02888	-3.1E+01	2.9E-14	-3.4E+47	2.000	4.1E+01	7.6E+17	3.4E+47	0.000	6.3E+01	1	-6.3E+01	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	6.05E-15



Date:	24/02/2020
Version:	1

Contaminant **Naphthalene**

Input	Value	Units
C_T	0.002	mg/l
Co	2.31E-01	mg/l
λ	1.13E-05	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	3.60E+01	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

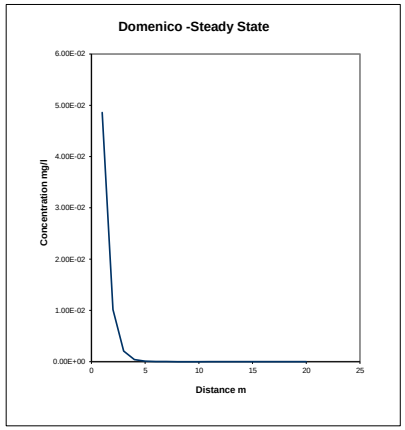
Vertical dispersion optio Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	6.13E+02	
u	1.76E-06	m/d

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

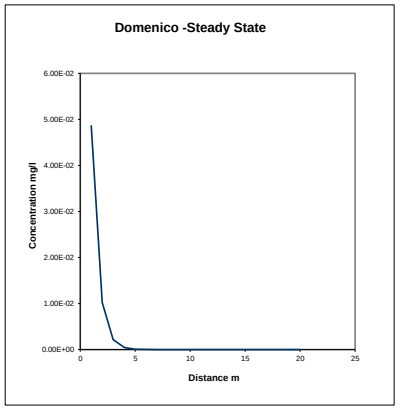
	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.05775	-1.56E+00	2.10E-01	2.80E+02	1	-2.80E+02	-1	2.65E+00	1	-2.65E+00	-0.9998	4.86E-02
2	2	0.05775	-3.12E+00	4.43E-02	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	1.01E-02
3	3	0.05775	-4.68E+00	9.31E-03	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.97	-1.53E+00	-0.9696	2.09E-03
4	4	0.05775	-6.24E+00	1.96E-03	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.939	-1.33E+00	-0.9392	4.25E-04
5	5	0.05775	-7.79E+00	4.12E-04	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.906	-1.19E+00	-0.9065	8.63E-05
6	6	0.05775	-9.35E+00	8.67E-05	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.874	-1.08E+00	-0.8742	1.75E-05
7	7	0.05775	-1.09E+01	1.82E-05	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.844	-1.00E+00	-0.8436	3.56E-06
8	8	0.05775	-1.25E+01	3.84E-06	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.815	-9.38E-01	-0.8151	7.23E-07
9	9	0.05775	-1.40E+01	8.08E-07	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.789	-8.84E-01	-0.7887	1.47E-07
10	10	0.05775	-1.56E+01	1.70E-07	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.764	-8.39E-01	-0.7643	3.00E-08
11	11	0.05775	-1.71E+01	3.58E-08	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.742	-8.00E-01	-0.7418	6.13E-09
12	12	0.05775	-1.87E+01	7.52E-09	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	1.25E-09
13	13	0.05775	-2.03E+01	1.58E-09	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.702	-7.35E-01	-0.7017	2.57E-10
14	14	0.05775	-2.18E+01	3.33E-10	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.684	-7.09E-01	-0.6838	5.26E-11
15	15	0.05775	-2.34E+01	7.01E-11	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.667	-6.85E-01	-0.6671	1.08E-11
16	16	0.05775	-2.49E+01	1.47E-11	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.651	-6.63E-01	-0.6515	2.22E-12
17	17	0.05775	-2.65E+01	3.10E-12	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.637	-6.43E-01	-0.6369	4.56E-13
18	18	0.05775	-2.81E+01	6.53E-13	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.623	-6.25E-01	-0.6232	9.40E-14
19	19	0.05775	-2.96E+01	1.37E-13	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.61	-6.08E-01	-0.6104	1.94E-14
20	20	0.05775	-3.12E+01	2.89E-14	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.598	-5.93E-01	-0.5983	3.99E-15



DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.05775	-1.56E+00	2.10E-01	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	4.86E-02
2	2	0.05775	-3.12E+00	4.43E-02	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	1.02E-02
3	3	0.05775	-4.68E+00	9.31E-03	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	2.15E-03
4	4	0.05775	-6.24E+00	1.96E-03	1.40E+02	1	-1.40E+02	-1	2.65E+00	1	-2.65E+00	-0.9998	4.53E-04
5	5	0.05775	-7.79E+00	4.12E-04	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.999	-2.37E+00	-0.9992	9.52E-05
6	6	0.05775	-9.35E+00	8.67E-05	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.998	-2.17E+00	-0.9978	2.00E-05
7	7	0.05775	-1.09E+01	1.82E-05	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.995	-2.00E+00	-0.9954	4.20E-06
8	8	0.05775	-1.25E+01	3.84E-06	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	8.80E-07
9	9	0.05775	-1.40E+01	8.08E-07	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.988	-1.77E+00	-0.9876	1.84E-07
10	10	0.05775	-1.56E+01	1.70E-07	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.982	-1.68E+00	-0.9823	3.86E-08
11	11	0.05775	-1.71E+01	3.58E-08	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.976	-1.60E+00	-0.9763	8.06E-09
12	12	0.05775	-1.87E+01	7.52E-09	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.97	-1.53E+00	-0.9696	1.69E-09
13	13	0.05775	-2.03E+01	1.58E-09	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.962	-1.47E+00	-0.9625	3.52E-10
14	14	0.05775	-2.18E+01	3.33E-10	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	7.35E-11
15	15	0.05775	-2.34E+01	7.01E-11	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.947	-1.37E+00	-0.9472	1.53E-11
16	16	0.05775	-2.49E+01	1.47E-11	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.939	-1.33E+00	-0.9392	3.20E-12
17	17	0.05775	-2.65E+01	3.10E-12	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.931	-1.29E+00	-0.9311	6.67E-13
18	18	0.05775	-2.81E+01	6.53E-13	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.923	-1.25E+00	-0.9229	1.39E-13
19	19	0.05775	-2.96E+01	1.37E-13	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.915	-1.22E+00	-0.9147	2.90E-14
20	20	0.05775	-3.12E+01	2.89E-14	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.906	-1.19E+00	-0.9065	6.05E-15



Date:	24/02/2020
Version:	1

DOMENICO (TIME VARIANT)

Contaminant **Naphthalene**

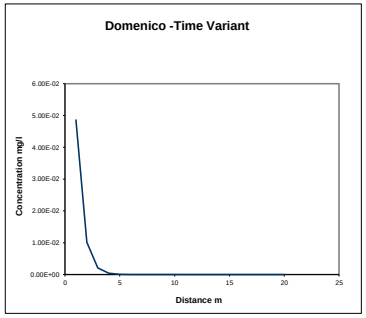
Input	Value	Units
C_T	0.002	mg/l
Co	2.31E-01	mg/l
λ	1.13E-05	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	3.60E+01	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	6.13E+02	
u	1.76E-06	m/d

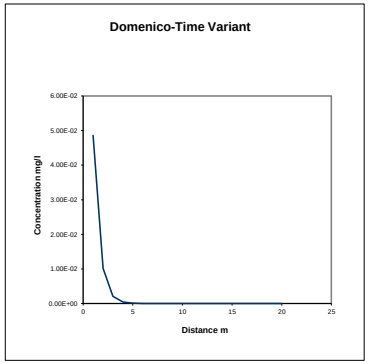
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.02888	-1.56E+00	2.10E-01	-3.40E+47	2	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	4.86E-02
2	2	0.02888	-3.12E+00	4.43E-02	-3.40E+47	2	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	1.01E-02
3	3	0.02888	-4.68E+00	9.31E-03	-3.40E+47	2	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.97	2.09E-03
4	4	0.02888	-6.24E+00	1.96E-03	-3.40E+47	2	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.939	4.25E-04
5	5	0.02888	-7.79E+00	4.12E-04	-3.40E+47	2	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.906	8.63E-05
6	6	0.02888	-9.35E+00	8.67E-05	-3.40E+47	2	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.874	1.75E-05
7	7	0.02888	-1.09E+01	1.82E-05	-3.40E+47	2	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.844	3.56E-06
8	8	0.02888	-1.25E+01	3.84E-06	-3.40E+47	2	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.815	7.23E-07
9	9	0.02888	-1.40E+01	8.08E-07	-3.40E+47	2	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.789	1.47E-07
10	10	0.02888	-1.56E+01	1.70E-07	-3.40E+47	2	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.764	3.00E-08
11	11	0.02888	-1.71E+01	3.58E-08	-3.40E+47	2	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.742	6.13E-09
12	12	0.02888	-1.87E+01	7.52E-09	-3.40E+47	2	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	1.25E-09
13	13	0.02888	-2.03E+01	1.58E-09	-3.40E+47	2	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.702	2.57E-10
14	14	0.02888	-2.18E+01	3.33E-10	-3.40E+47	2	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.684	5.26E-11
15	15	0.02888	-2.34E+01	7.01E-11	-3.40E+47	2	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.667	1.08E-11
16	16	0.02888	-2.49E+01	1.47E-11	-3.40E+47	2	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.651	2.22E-12
17	17	0.02888	-2.65E+01	3.10E-12	-3.40E+47	2	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.637	4.56E-13
18	18	0.02888	-2.81E+01	6.53E-13	-3.40E+47	2	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.623	9.40E-14
19	19	0.02888	-2.96E+01	1.37E-13	-3.40E+47	2	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.61	1.94E-14
20	20	0.02888	-3.12E+01	2.89E-14	-3.40E+47	2	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.598	3.99E-15



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.02888	-1.56E+00	2.10E-01	-3.40E+47	2	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	4.86E-02
2	2	0.02888	-3.12E+00	4.43E-02	-3.40E+47	2	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	1.02E-02
3	3	0.02888	-4.68E+00	9.31E-03	-3.40E+47	2	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	2.15E-03
4	4	0.02888	-6.24E+00	1.96E-03	-3.40E+47	2	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	4.53E-04
5	5	0.02888	-7.79E+00	4.12E-04	-3.40E+47	2	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.999	9.52E-05
6	6	0.02888	-9.35E+00	8.67E-05	-3.40E+47	2	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.998	2.00E-05
7	7	0.02888	-1.09E+01	1.82E-05	-3.40E+47	2	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.995	4.20E-06
8	8	0.02888	-1.25E+01	3.84E-06	-3.40E+47	2	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	8.80E-07
9	9	0.02888	-1.40E+01	8.08E-07	-3.40E+47	2	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.988	1.84E-07
10	10	0.02888	-1.56E+01	1.70E-07	-3.40E+47	2	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.982	3.86E-08
11	11	0.02888	-1.71E+01	3.58E-08	-3.40E+47	2	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.976	8.06E-09
12	12	0.02888	-1.87E+01	7.52E-09	-3.40E+47	2	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.97	1.69E-09
13	13	0.02888	-2.03E+01	1.58E-09	-3.40E+47	2	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.962	3.52E-10
14	14	0.02888	-2.18E+01	3.33E-10	-3.40E+47	2	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	7.35E-11
15	15	0.02888	-2.34E+01	7.01E-11	-3.40E+47	2	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.947	1.53E-11
16	16	0.02888	-2.49E+01	1.47E-11	-3.40E+47	2	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.939	3.20E-12
17	17	0.02888	-2.65E+01	3.10E-12	-3.40E+47	2	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.931	6.67E-13
18	18	0.02888	-2.81E+01	6.53E-13	-3.40E+47	2	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.923	1.39E-13
19	19	0.02888	-2.96E+01	1.37E-13	-3.40E+47	2	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.915	2.90E-14
20	20	0.02888	-3.12E+01	2.89E-14	-3.40E+47	2	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.906	6.05E-15



Date:	24/02/2020
Version:	1

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)	Variable	Value	Unit	Source
Contaminant		Vanadium		from Level 1
Target Concentration	C_T	2.00E-02	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	9.70E-01	mg/l	*Based on average soil conc of 206.93mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*Estimation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	2.13E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.57E+00	m	*see options*
Transverse dispersivity	az	1.57E-01	m	*see options*
Vertical dispersivity	ay	1.57E-02	m	*see options*

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 2.13E+02 — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction

Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — l/kg

Sorption coefficient for ionised species — $K_{oc,i}$ — l/kg

pH value — pH

acid dissociation constant — pKa

Fraction of organic carbon in aquifer — foc — fraction

Soil water partition coefficient — Kd — 2.13E+02 — l/kg

Define dispersivity (click brown cell and use pull down list)

Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

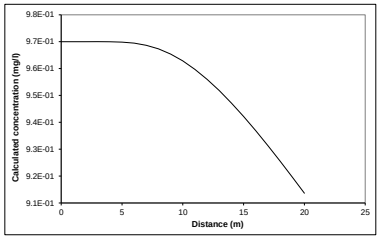
Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Calculated Parameters	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	3.62E+03	fraction
Decay rate used	λ	2.13E-104	d^{-1}
Rate of contaminant flow due to retardation	u	2.98E-07	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	9.14E-01	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.06E+00**	

Remedial Targets

Remedial Target		**2.12E-02**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**9.14E-01**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	9.7E-01
1.0	9.70E-01
2.0	9.70E-01
3.0	9.70E-01
4.0	9.70E-01
5.0	9.70E-01
6.0	9.69E-01
7.0	9.69E-01
8.0	9.67E-01
9.0	9.65E-01
10.0	9.63E-01
11.0	9.60E-01
12.0	9.56E-01
13.0	9.52E-01
14.0	9.47E-01
15.0	9.42E-01
16.0	9.37E-01
17.0	9.31E-01
18.0	9.26E-01
19.0	9.20E-01
20.0	9.14E-01

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions).

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	24-Feb-20		Version:	1
Contaminant	Benzo(a)pyrene			
Target Concentration (C_T)	0.00000017	mg/l	Origin of C_T:	Proposed Water Framework Directive EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Benzo(a)pyrene**		
Target concentration	C_T	**0.00000017**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_w	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.
The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**2.29E-05**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.00000017	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Benzo(a)pyrene**		from Level 1
Target concentration	**C_T**	**0.00000017**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters

	Variable	Value	Unit	Source
Contaminant		Benzo(a)pyrene		from Level 1
Target Concentration	C_T	0.00000017	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value, lab derived value)

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	av	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters

	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target	**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks	**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
	#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Distance to compliance point	**0**	**m**	
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**fraction** Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for ionic organic chemicals (acids)

Entry if specify partition coefficient (option)

Soil water partition coefficient	Kd		l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

Define dispersivity (click brown cell and use pull down list)

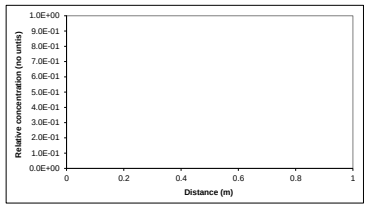
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

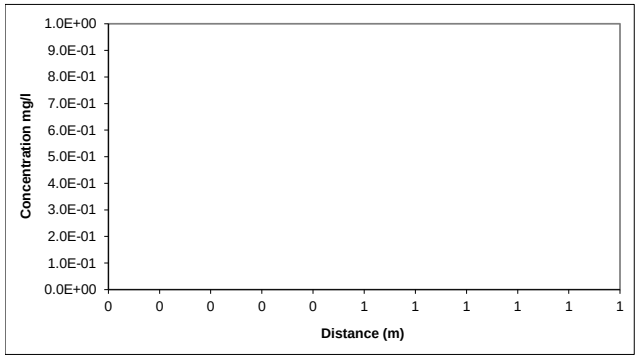
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_w	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu) | Variable | Value | Unit | Source

Contaminant		Benzo(a)pyrene		from Level 1
Target Concentration	C_T	1.70E-07	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	7.00E-02	mg/l	*Based on max soil conc of 714mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	3.65E+04	days	*10 year half life estimation*
Calculated decay rate	λ	1.90E-05	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	*Estimate*
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	1.02E+04	l/kg	*see options*
Longitudinal dispersivity	ax	2.00E+00	m	*see options*
Transverse dispersivity	az	2.00E-01	m	*see options*
Vertical dispersivity	ay	2.00E-02	m	*see options*

Calculated Parameters | Variable

Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	1.73E+05	fraction
Decay rate used	λ	1.10E-10	d^{-1}
Rate of contaminant flow due to retardation	u	6.24E-09	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	4.52E-02	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.55E+00**	

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient	Kd	1.02E+04	l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg
pH value	pH		
acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction
Soil water partition coefficient	Kd	1.02E+04	l/kg

Define dispersivity (click brown cell and use pull down list)

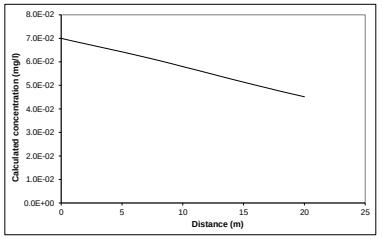
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	7.0E-02
1.0	6.88E-02
2.0	6.77E-02
3.0	6.65E-02
4.0	6.54E-02
5.0	6.42E-02
6.0	6.31E-02
7.0	6.19E-02
8.0	6.06E-02
9.0	5.93E-02
10.0	5.80E-02
11.0	5.67E-02
12.0	5.53E-02
13.0	5.40E-02
14.0	5.27E-02
15.0	5.14E-02
16.0	5.01E-02
17.0	4.88E-02
18.0	4.76E-02
19.0	4.63E-02
20.0	4.52E-02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Remedial Targets

Remedial Target		**2.64E-07**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	C_{ED}/C_0	**4.52E-02**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Benzo(a)pyrene**

Parameter (carried over from input sheet)	**Value**	**Units**
C_T	1.70E-07	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_W	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target	**2.29E-05**	**mg/kg**	**for**	**Benzo(a)pyrene**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24/02/2020
Version:	1

Level 2 Calculation Sheet

Contaminant **Benzo(a)pyrene**

Site assessed:	Glan Llyn
Date:	24/02/2020
Version:	1

Parameter	Value	Units
(carried over from input sheet)		
Mz	0.00E+00	m
L	0.00E+00	m
da	0.00E+00	m
Inf	0.00E+00	m/d
K	0.00E+00	m/d
i	0.00E+00	
		m3/d
A	0.00E+00	m2
		m3/d
Cc	0.00E+00	mg/l
C_T	1.70E-07	mg/l
Cu	0.00E+00	mg/l
w	0.00E+00	m

Calculated Dilution Factor

Calculation based on target concentration #DIV/0!

Calculation based on observed contaminant concentration #DIV/0!



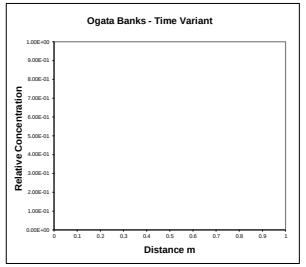
OGATA BANKS SOLUTION

Contaminant **Benzo(a)pyrene**

Input	Value	Units
C_T	1.700E-07	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

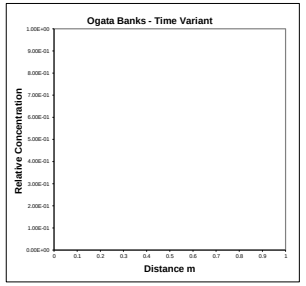
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

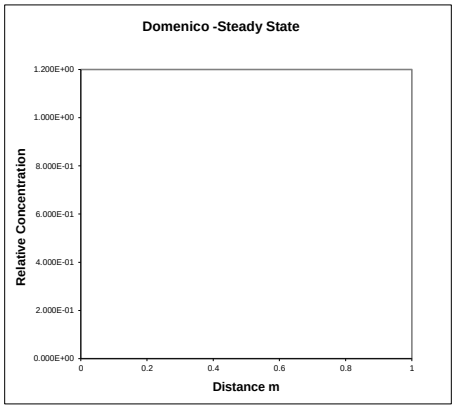
Contaminant **enzo(a)pyrene**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.700E-07	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



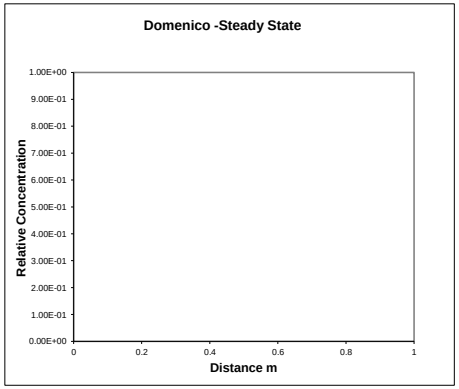
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

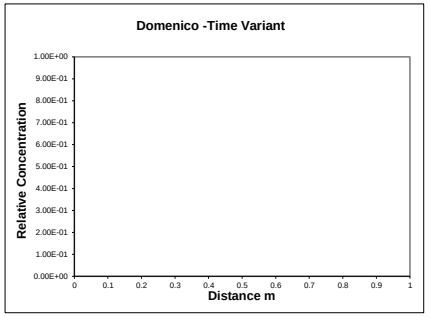
DOMENICO (TIME VARIANT)

Contaminant Benzo(a)pyrene

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.00000017	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

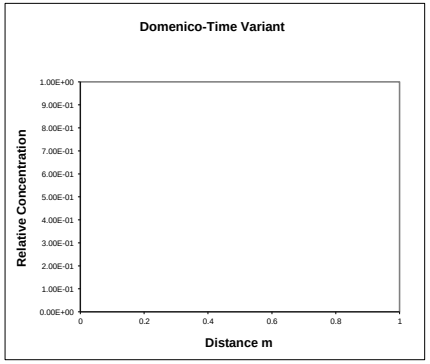


Calc

Value	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

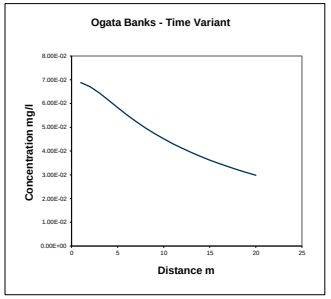
OGATA BANKS SOLUTION

Contaminant **Benzo(a)pyrene**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.00000017	mg/l
Co	7.00E-02	mg/l
λ	1.10E-10	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.02E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	0.00875	-1.7E-02	9.8E-01	-3.0E+45	2.000	5.2E-01	1.7E+00	3.0E+45	0.000	2.8E+02	1	-2.8E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	6.88E-02
2	0.00875	-3.4E-02	9.7E-01	-3.0E+45	2.000	1.0E+00	2.8E+00	3.0E+45	0.000	2.0E+02	1	-2.0E+02	-1	1.9E+00	0.992	-1.9E+00	-0.99199	6.71E-02
3	0.00875	-5.1E-02	9.5E-01	-3.0E+45	2.000	1.6E+00	4.7E+00	3.0E+45	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	6.45E-02
4	0.00875	-6.8E-02	9.3E-01	-3.0E+45	2.000	2.1E+00	7.9E+00	3.0E+45	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	6.14E-02
5	0.00875	-8.5E-02	9.2E-01	-3.0E+45	2.000	2.6E+00	1.3E+01	3.0E+45	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	5.83E-02
6	0.00875	-1.0E-01	9.0E-01	-3.0E+45	2.000	3.1E+00	2.2E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8742	-1.1E+00	-0.87421	5.53E-02
7	0.00875	-1.2E-01	8.9E-01	-3.0E+45	2.000	3.6E+00	3.7E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8436	-1.0E+00	-0.84362	5.24E-02
8	0.00875	-1.4E-01	8.7E-01	-3.0E+45	2.000	4.1E+00	6.3E+01	3.0E+45	0.000	9.9E+01	1	-9.9E+01	-1	9.4E-01	0.8151	-9.4E-01	-0.8151	4.98E-02
9	0.00875	-1.5E-01	8.6E-01	-3.0E+45	2.000	4.7E+00	1.0E+02	3.0E+45	0.000	9.3E+01	1	-9.3E+01	-1	8.8E-01	0.7887	-8.8E-01	-0.7887	4.74E-02
10	0.00875	-1.7E-01	8.4E-01	-3.0E+45	2.000	5.2E+00	1.8E+02	3.0E+45	0.000	8.8E+01	1	-8.8E+01	-1	8.4E-01	0.7643	-8.4E-01	-0.76432	4.51E-02
11	0.00875	-1.9E-01	8.3E-01	-3.0E+45	2.000	5.7E+00	3.0E+02	3.0E+45	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7418	-8.0E-01	-0.7418	4.31E-02
12	0.00875	-2.0E-01	8.2E-01	-3.0E+45	2.000	6.2E+00	4.9E+02	3.0E+45	0.000	8.1E+01	1	-8.1E+01	-1	7.7E-01	0.721	-7.7E-01	-0.72098	4.12E-02
13	0.00875	-2.2E-01	8.0E-01	-3.0E+45	2.000	6.7E+00	8.3E+02	3.0E+45	0.000	7.8E+01	1	-7.8E+01	-1	7.4E-01	0.7017	-7.4E-01	-0.70169	3.94E-02
14	0.00875	-2.4E-01	7.9E-01	-3.0E+45	2.000	7.2E+00	1.4E+03	3.0E+45	0.000	7.5E+01	1	-7.5E+01	-1	7.1E-01	0.6838	-7.1E-01	-0.68377	3.77E-02
15	0.00875	-2.6E-01	7.7E-01	-3.0E+45	2.000	7.8E+00	2.3E+03	3.0E+45	0.000	7.2E+01	1	-7.2E+01	-1	6.8E-01	0.6671	-6.8E-01	-0.66708	3.62E-02
16	0.00875	-2.7E-01	7.6E-01	-3.0E+45	2.000	8.3E+00	3.9E+03	3.0E+45	0.000	7.0E+01	1	-7.0E+01	-1	6.6E-01	0.6515	-6.6E-01	-0.6515	3.47E-02
17	0.00875	-2.9E-01	7.5E-01	-3.0E+45	2.000	8.8E+00	6.6E+03	3.0E+45	0.000	6.8E+01	1	-6.8E+01	-1	6.4E-01	0.6369	-6.4E-01	-0.63692	3.34E-02
18	0.00875	-3.1E-01	7.4E-01	-3.0E+45	2.000	9.3E+00	1.1E+04	3.0E+45	0.000	6.6E+01	1	-6.6E+01	-1	6.3E-01	0.6232	-6.3E-01	-0.62324	3.21E-02
19	0.00875	-3.2E-01	7.2E-01	-3.0E+45	2.000	9.8E+00	1.8E+04	3.0E+45	0.000	6.4E+01	1	-6.4E+01	-1	6.1E-01	0.6104	-6.1E-01	-0.61038	3.09E-02
20	0.00875	-3.4E-01	7.1E-01	-3.0E+45	2.000	1.0E+01	3.1E+04	3.0E+45	0.000	6.3E+01	1	-6.3E+01	-1	5.9E-01	0.5983	-5.9E-01	-0.59826	2.98E-02

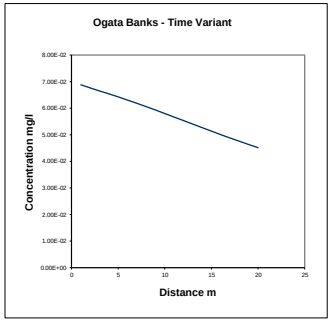


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.73E+05	
u	6.24E-09	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	0.00875	-1.7E-02	9.8E-01	-3.0E+45	2.000	5.2E-01	1.7E+00	3.0E+45	0.000	2.8E+02	1	-2.8E+02	-1	5.3E+00	1	-5.3E+00	-1	6.88E-02
2	0.00875	-3.4E-02	9.7E-01	-3.0E+45	2.000	1.0E+00	2.8E+00	3.0E+45	0.000	2.0E+02	1	-2.0E+02	-1	3.8E+00	1	-3.8E+00	-1	6.77E-02
3	0.00875	-5.1E-02	9.5E-01	-3.0E+45	2.000	1.6E+00	4.7E+00	3.0E+45	0.000	1.6E+02	1	-1.6E+02	-1	3.1E+00	1	-3.1E+00	-0.99999	6.65E-02
4	0.00875	-6.8E-02	9.3E-01	-3.0E+45	2.000	2.1E+00	7.9E+00	3.0E+45	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	6.54E-02
5	0.00875	-8.5E-02	9.2E-01	-3.0E+45	2.000	2.6E+00	1.3E+01	3.0E+45	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9992	-2.4E+00	-0.9992	6.42E-02
6	0.00875	-1.0E-01	9.0E-01	-3.0E+45	2.000	3.1E+00	2.2E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	2.2E+00	0.9978	-2.2E+00	-0.9978	6.31E-02
7	0.00875	-1.2E-01	8.9E-01	-3.0E+45	2.000	3.6E+00	3.7E+01	3.0E+45	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9954	-2.0E+00	-0.99541	6.19E-02
8	0.00875	-1.4E-01	8.7E-01	-3.0E+45	2.000	4.1E+00	6.3E+01	3.0E+45	0.000	9.9E+01	1	-9.9E+01	-1	1.9E+00	0.992	-1.9E+00	-0.99199	6.06E-02
9	0.00875	-1.5E-01	8.6E-01	-3.0E+45	2.000	4.7E+00	1.0E+02	3.0E+45	0.000	9.3E+01	1	-9.3E+01	-1	1.8E+00	0.9876	-1.8E+00	-0.98758	5.93E-02
10	0.00875	-1.7E-01	8.4E-01	-3.0E+45	2.000	5.2E+00	1.8E+02	3.0E+45	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9823	-1.7E+00	-0.98229	5.80E-02
11	0.00875	-1.9E-01	8.3E-01	-3.0E+45	2.000	5.7E+00	3.0E+02	3.0E+45	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9763	-1.6E+00	-0.97626	5.67E-02
12	0.00875	-2.0E-01	8.2E-01	-3.0E+45	2.000	6.2E+00	4.9E+02	3.0E+45	0.000	8.1E+01	1	-8.1E+01	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	5.53E-02
13	0.00875	-2.2E-01	8.0E-01	-3.0E+45	2.000	6.7E+00	8.3E+02	3.0E+45	0.000	7.8E+01	1	-7.8E+01	-1	1.5E+00	0.9625	-1.5E+00	-0.96249	5.40E-02
14	0.00875	-2.4E-01	7.9E-01	-3.0E+45	2.000	7.2E+00	1.4E+03	3.0E+45	0.000	7.5E+01	1	-7.5E+01	-1	1.4E+00	0.955	-1.4E+00	-0.95498	5.27E-02
15	0.00875	-2.6E-01	7.7E-01	-3.0E+45	2.000	7.8E+00	2.3E+03	3.0E+45	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9472	-1.4E+00	-0.94719	5.14E-02
16	0.00875	-2.7E-01	7.6E-01	-3.0E+45	2.000	8.3E+00	3.9E+03	3.0E+45	0.000	7.0E+01	1	-7.0E+01	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	5.01E-02
17	0.00875	-2.9E-01	7.5E-01	-3.0E+45	2.000	8.8E+00	6.6E+03	3.0E+45	0.000	6.8E+01	1	-6.8E+01	-1	1.3E+00	0.9311	-1.3E+00	-0.93109	4.88E-02
18	0.00875	-3.1E-01	7.4E-01	-3.0E+45	2.000	9.3E+00	1.1E+04	3.0E+45	0.000	6.6E+01	1	-6.6E+01	-1	1.3E+00	0.9229	-1.3E+00	-0.9229	4.76E-02
19	0.00875	-3.2E-01	7.2E-01	-3.0E+45	2.000	9.8E+00	1.8E+04	3.0E+45	0.000	6.4E+01	1	-6.4E+01	-1	1.2E+00	0.9147	-1.2E+00	-0.91468	4.63E-02
20	0.00875	-3.4E-01	7.1E-01	-3.0E+45	2.000	1.0E+01	3.1E+04	3.0E+45	0.000	6.3E+01	1	-6.3E+01	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	4.52E-02



Date:	24/02/2020
Version:	1

Contaminant enzo(a)pyrene

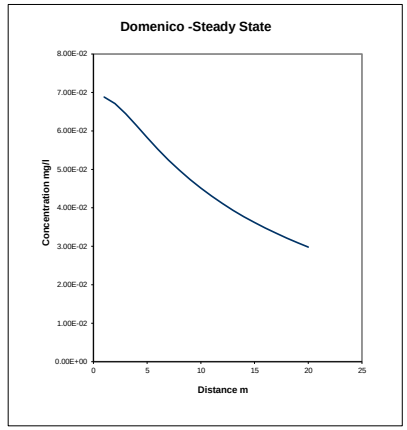
DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.00000017	mg/l
Co	7.00E-02	mg/l
λ	1.10E-10	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.02E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.0175	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	2.65E+00	1	-2.65E+00	-0.9998	6.88E-02
2	2	0.0175	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	6.71E-02
3	3	0.0175	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.97	-1.53E+00	-0.9696	6.45E-02
4	4	0.0175	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.939	-1.33E+00	-0.9392	6.14E-02
5	5	0.0175	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.906	-1.19E+00	-0.9065	5.83E-02
6	6	0.0175	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.874	-1.08E+00	-0.8742	5.53E-02
7	7	0.0175	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.844	-1.00E+00	-0.8436	5.24E-02
8	8	0.0175	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.815	-9.38E-01	-0.8151	4.98E-02
9	9	0.0175	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.789	-8.84E-01	-0.7887	4.74E-02
10	10	0.0175	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.764	-8.39E-01	-0.7643	4.51E-02
11	11	0.0175	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.742	-8.00E-01	-0.7418	4.31E-02
12	12	0.0175	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	4.12E-02
13	13	0.0175	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.702	-7.35E-01	-0.7017	3.94E-02
14	14	0.0175	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.684	-7.09E-01	-0.6838	3.77E-02
15	15	0.0175	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.667	-6.85E-01	-0.6671	3.62E-02
16	16	0.0175	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.651	-6.63E-01	-0.6515	3.47E-02
17	17	0.0175	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.637	-6.43E-01	-0.6369	3.34E-02
18	18	0.0175	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.623	-6.25E-01	-0.6232	3.21E-02
19	19	0.0175	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.61	-6.08E-01	-0.6104	3.09E-02
20	20	0.0175	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.598	-5.93E-01	-0.5983	2.98E-02



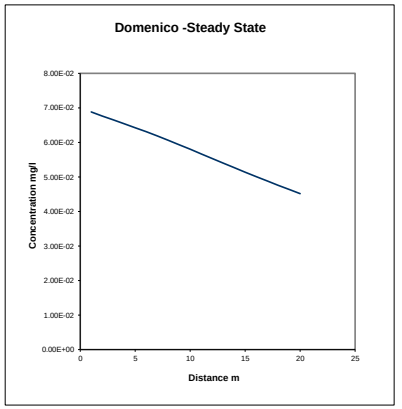
Calc **Value**

v	1.08E-03	m/d
Rc	1.73E+05	
u	6.24E-09	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	0.0175	-1.70E-02	9.83E-01	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	6.88E-02
2	2	0.0175	-3.40E-02	9.67E-01	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	6.77E-02
3	3	0.0175	-5.10E-02	9.50E-01	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	6.65E-02
4	4	0.0175	-6.80E-02	9.34E-01	1.40E+02	1	-1.40E+02	-1	2.65E+00	1	-2.65E+00	-0.9998	6.54E-02
5	5	0.0175	-8.50E-02	9.18E-01	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.999	-2.37E+00	-0.9992	6.42E-02
6	6	0.0175	-1.02E-01	9.03E-01	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.998	-2.17E+00	-0.9978	6.31E-02
7	7	0.0175	-1.19E-01	8.88E-01	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.995	-2.00E+00	-0.9954	6.19E-02
8	8	0.0175	-1.36E-01	8.73E-01	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	6.06E-02
9	9	0.0175	-1.53E-01	8.58E-01	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.988	-1.77E+00	-0.9876	5.93E-02
10	10	0.0175	-1.70E-01	8.44E-01	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.982	-1.68E+00	-0.9823	5.80E-02
11	11	0.0175	-1.87E-01	8.29E-01	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.976	-1.60E+00	-0.9763	5.67E-02
12	12	0.0175	-2.04E-01	8.15E-01	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.97	-1.53E+00	-0.9696	5.53E-02
13	13	0.0175	-2.21E-01	8.02E-01	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.962	-1.47E+00	-0.9625	5.40E-02
14	14	0.0175	-2.38E-01	7.88E-01	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	5.27E-02
15	15	0.0175	-2.55E-01	7.75E-01	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.947	-1.37E+00	-0.9472	5.14E-02
16	16	0.0175	-2.72E-01	7.62E-01	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.939	-1.33E+00	-0.9392	5.01E-02
17	17	0.0175	-2.89E-01	7.49E-01	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.931	-1.29E+00	-0.9311	4.88E-02
18	18	0.0175	-3.06E-01	7.36E-01	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.923	-1.25E+00	-0.9229	4.76E-02
19	19	0.0175	-3.23E-01	7.24E-01	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.915	-1.22E+00	-0.9147	4.63E-02
20	20	0.0175	-3.40E-01	7.12E-01	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.906	-1.19E+00	-0.9065	4.52E-02



Date:	24/02/2020
Version:	1

DOMENICO (TIME VARIANT)

Contaminant Benzo(a)pyrene

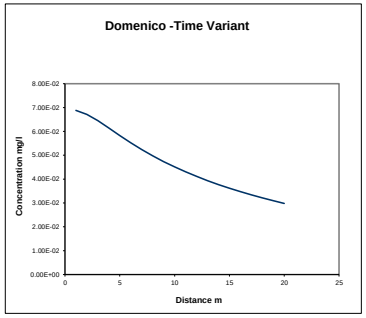
Input	Value	Units
C_T	0.00000017	mg/l
Co	7.00E-02	mg/l
λ	1.10E-10	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	1.02E+04	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option: Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.73E+05	
u	6.24E-09	m/d

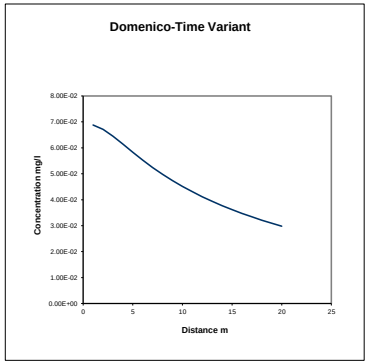
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.00875	-1.70E-02	9.83E-01	-2.98E+45	2	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	6.88E-02
2	2	0.00875	-3.40E-02	9.67E-01	-2.98E+45	2	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	6.71E-02
3	3	0.00875	-5.10E-02	9.50E-01	-2.98E+45	2	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.97	6.45E-02
4	4	0.00875	-6.80E-02	9.34E-01	-2.98E+45	2	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.939	6.14E-02
5	5	0.00875	-8.50E-02	9.18E-01	-2.98E+45	2	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.906	5.83E-02
6	6	0.00875	-1.02E-01	9.03E-01	-2.98E+45	2	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.874	5.53E-02
7	7	0.00875	-1.19E-01	8.88E-01	-2.98E+45	2	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.844	5.24E-02
8	8	0.00875	-1.36E-01	8.73E-01	-2.98E+45	2	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.815	4.98E-02
9	9	0.00875	-1.53E-01	8.58E-01	-2.98E+45	2	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.789	4.74E-02
10	10	0.00875	-1.70E-01	8.44E-01	-2.98E+45	2	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.764	4.51E-02
11	11	0.00875	-1.87E-01	8.29E-01	-2.98E+45	2	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.742	4.31E-02
12	12	0.00875	-2.04E-01	8.15E-01	-2.98E+45	2	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	4.12E-02
13	13	0.00875	-2.21E-01	8.02E-01	-2.98E+45	2	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.702	3.94E-02
14	14	0.00875	-2.38E-01	7.88E-01	-2.98E+45	2	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.684	3.77E-02
15	15	0.00875	-2.55E-01	7.75E-01	-2.98E+45	2	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.667	3.62E-02
16	16	0.00875	-2.72E-01	7.62E-01	-2.98E+45	2	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.651	3.47E-02
17	17	0.00875	-2.89E-01	7.49E-01	-2.98E+45	2	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.637	3.34E-02
18	18	0.00875	-3.06E-01	7.36E-01	-2.98E+45	2	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.623	3.21E-02
19	19	0.00875	-3.23E-01	7.24E-01	-2.98E+45	2	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.61	3.09E-02
20	20	0.00875	-3.40E-01	7.12E-01	-2.98E+45	2	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.598	2.98E-02



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	0.00875	-1.70E-02	9.83E-01	-2.98E+45	2	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	6.88E-02
2	2	0.00875	-3.40E-02	9.67E-01	-2.98E+45	2	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	6.77E-02
3	3	0.00875	-5.10E-02	9.50E-01	-2.98E+45	2	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	6.65E-02
4	4	0.00875	-6.80E-02	9.34E-01	-2.98E+45	2	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	6.54E-02
5	5	0.00875	-8.50E-02	9.18E-01	-2.98E+45	2	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.999	6.42E-02
6	6	0.00875	-1.02E-01	9.03E-01	-2.98E+45	2	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.998	6.31E-02
7	7	0.00875	-1.19E-01	8.88E-01	-2.98E+45	2	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.995	6.19E-02
8	8	0.00875	-1.36E-01	8.73E-01	-2.98E+45	2	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	6.06E-02
9	9	0.00875	-1.53E-01	8.58E-01	-2.98E+45	2	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.988	5.93E-02
10	10	0.00875	-1.70E-01	8.44E-01	-2.98E+45	2	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.982	5.80E-02
11	11	0.00875	-1.87E-01	8.29E-01	-2.98E+45	2	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.976	5.67E-02
12	12	0.00875	-2.04E-01	8.15E-01	-2.98E+45	2	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.97	5.53E-02
13	13	0.00875	-2.21E-01	8.02E-01	-2.98E+45	2	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.962	5.40E-02
14	14	0.00875	-2.38E-01	7.88E-01	-2.98E+45	2	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	5.27E-02
15	15	0.00875	-2.55E-01	7.75E-01	-2.98E+45	2	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.947	5.14E-02
16	16	0.00875	-2.72E-01	7.62E-01	-2.98E+45	2	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.939	5.01E-02
17	17	0.00875	-2.89E-01	7.49E-01	-2.98E+45	2	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.931	4.88E-02
18	18	0.00875	-3.06E-01	7.36E-01	-2.98E+45	2	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.923	4.76E-02
19	19	0.00875	-3.23E-01	7.24E-01	-2.98E+45	2	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.915	4.63E-02
20	20	0.00875	-3.40E-01	7.12E-01	-2.98E+45	2	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.906	4.52E-02



Date:	24/02/2020
Version:	1

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	**Glan Llyn**			
Site Address:	**Llanwern**			
Completed by:	**Ross Cameron**			
Date:	**24-Feb-20**		**Version:**	**1**
Contaminant	**Benzo(b)fluoranthene**			
Target Concentration (C_T)	**0.00000017**	**mg/l**	**Origin of C_T:**	**Proposed Water Framework Directive EQS**

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions).

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	20-Feb-20		Version:	1
Contaminant	Iron			
Target Concentration (C_T)	1	mg/l	Origin of C_T:	Water Framework Directive EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Iron**		
Target concentration	**C_T**	**1**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_w	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.

The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**1.35E+02**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	1	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	20-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Iron**		from Level 1
Target concentration	C_T	**1**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	20-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Input Parameters

	Variable	Value	Unit	Source
Contaminant		Iron		from Level 1
Target Concentration	C_T	1	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value, lab derived value)

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	av	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters

	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target	**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks	**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
	#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Distance to compliance point	**0**	**m**	
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**fraction** Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for ionic organic chemicals (acids)

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction
Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

Define dispersivity (click brown cell and use pull down list)

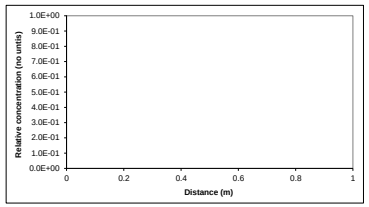
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

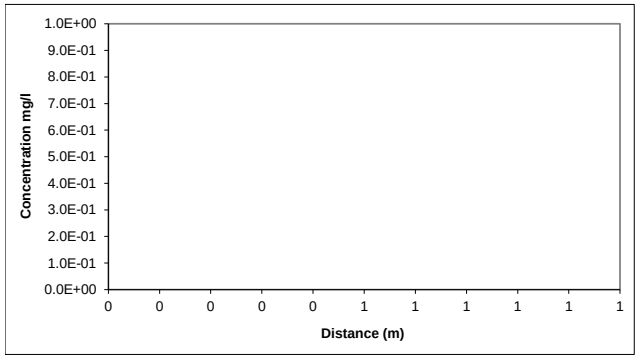
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_w	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Iron		from Level 1
Target Concentration	C_T	1.00E+00	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	2.95E+03	mg/l	*Based on maximum soil conc of 2390000mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*Estimation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	8.10E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.57E+00	m	*see options*
Transverse dispersivity	az	1.57E-01	m	*see options*
Vertical dispersivity	ay	1.57E-02	m	*see options*

Calculated Parameters

	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	1.38E+04	fraction
Decay rate used	λ	5.59E-105	d^{-1}
Rate of contaminant flow due to retardation	u	7.84E-08	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	2.78E+03	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.06E+00**	

Remedial Targets

Remedial Target		**1.06E+00**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**2.78E+03**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 8.10E+02 — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction

Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — l/kg

Sorption coefficient for ionised species — $K_{oc,i}$ — l/kg

pH value — pH

acid dissociation constant — pKa

Fraction of organic carbon in aquifer — foc — fraction

Soil water partition coefficient — Kd — 8.10E+02 — l/kg

Define dispersivity (click brown cell and use pull down list)

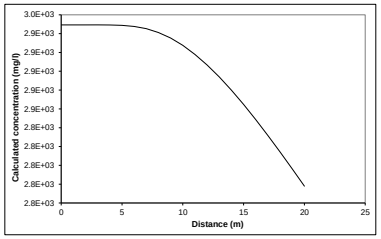
Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	2.9E+03
1.0	2.95E+03
2.0	2.95E+03
3.0	2.95E+03
4.0	2.95E+03
5.0	2.95E+03
6.0	2.95E+03
7.0	2.95E+03
8.0	2.94E+03
9.0	2.94E+03
10.0	2.93E+03
11.0	2.92E+03
12.0	2.91E+03
13.0	2.89E+03
14.0	2.88E+03
15.0	2.86E+03
16.0	2.85E+03
17.0	2.83E+03
18.0	2.81E+03
19.0	2.80E+03
20.0	2.78E+03

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Iron**

Parameter (carried over from input sheet)	Value	Units
C_T	1.00E+00	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_w	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **1.35E+02 mg/kg** **for Iron**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	20/02/2020
Version:	1

Level 2 Calculation Sheet

Contaminant **Iron**

Site assessed:	Glan Llyn
Date:	20/02/2020
Version:	1

Parameter	Value	Units
(carried over from input sheet)		
Mz	0.00E+00	m
L	0.00E+00	m
da	0.00E+00	m
Inf	0.00E+00	m/d
K	0.00E+00	m/d
i	0.00E+00	
		m3/d
A	0.00E+00	m2
		m3/d
Cc	0.00E+00	mg/l
C_T	1.00E+00	mg/l
Cu	0.00E+00	mg/l
w	0.00E+00	m

Calculated Dilution Factor

Calculation based on target concentration #DIV/0!

Calculation based on observed contaminant concentration #DIV/0!

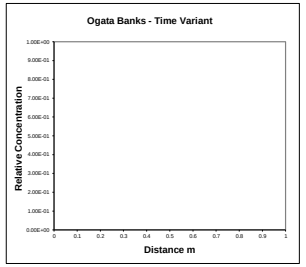


OGATA BANKS SOLUTION

Contaminant	Iron		
Input	**Value**	**Units**	
C_T	1.000E+00	mg/l	
DF	#DIV/0!		
λ	6.931E-101	$days^{-1}$	
Sz	0.000E+00	m	
Sy	0.000E+00	m	
Kd	0.000E+00	l/kg	
ρ	0.000E+00	g/cm3	
n	0.000E+00		
i	#DIV/0!		
K	0.000E+00	m/d	
x	0.000E+00	m	
z	0.000E+00	m	
y	0.000E+00	m	
t	1.000E+99	days	
ax	0.000E+00	m	
az	0.000E+00	m	
ay	0.000E+00	m	

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

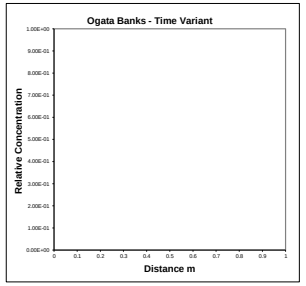
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	20/02/2020
Version:	1

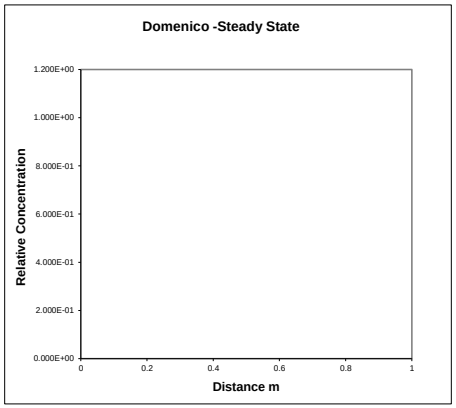
Contaminant **Iron**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1.000E+00	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



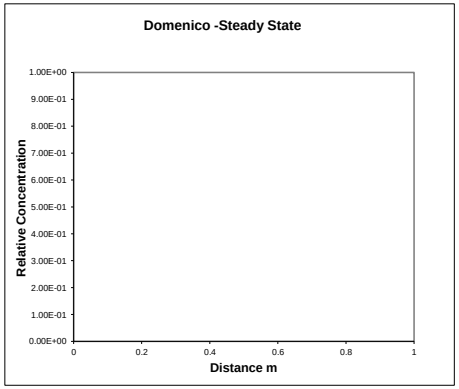
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



Date:	20/02/2020
Version:	1

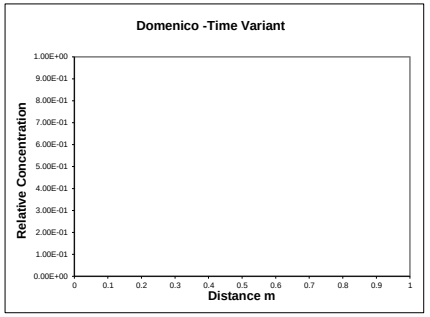
DOMENICO (TIME VARIANT)

Contaminant **Iron**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	1	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

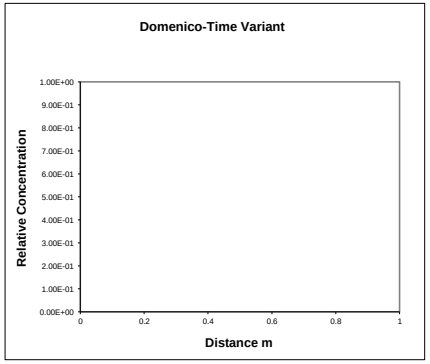


Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



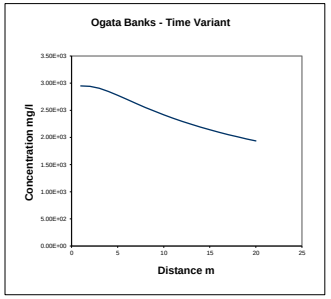
Date:	20/02/2020
Version:	1

OGATA BANKS SOLUTION

Contaminant	Iron	
Input	**Value**	**Units**
C_T	1	mg/l
Co	2.95E+03	mg/l
λ	5.59E-105	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	8.10E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E-01	1.9E+00	1.1E+46	0.000	3.2E+02	1	-3.2E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	2.95E+03
2	2	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+00	3.6E+00	1.1E+46	0.000	2.2E+02	1	-2.2E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	2.94E+03
3	3	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.9E+00	6.8E+00	1.1E+46	0.000	1.8E+02	1	-1.8E+02	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	2.91E+03
4	4	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	2.6E+00	1.3E+01	1.1E+46	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	2.85E+03
5	5	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	3.2E+00	2.4E+01	1.1E+46	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	2.78E+03
6	6	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	3.8E+00	4.6E+01	1.1E+46	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9163	-1.2E+00	-0.91633	2.70E+03
7	7	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	4.5E+00	8.7E+01	1.1E+46	0.000	1.2E+02	1	-1.2E+02	-1	1.1E+00	0.8907	-1.1E+00	-0.89072	2.63E+03
8	8	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	5.1E+00	1.7E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8659	-1.1E+00	-0.86587	2.55E+03
9	9	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	5.7E+00	3.1E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8422	-1.0E+00	-0.84215	2.48E+03
10	10	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E+00	5.9E+02	1.1E+46	0.000	1.0E+02	1	-1.0E+02	-1	9.5E-01	0.8197	-9.5E-01	-0.81971	2.42E+03
11	11	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	7.0E+00	1.1E+03	1.1E+46	0.000	9.5E+01	1	-9.5E+01	-1	9.0E-01	0.7986	-9.0E-01	-0.79858	2.36E+03
12	12	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	7.7E+00	2.1E+03	1.1E+46	0.000	9.1E+01	1	-9.1E+01	-1	8.6E-01	0.7787	-8.6E-01	-0.77872	2.30E+03
13	13	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	8.3E+00	4.0E+03	1.1E+46	0.000	8.8E+01	1	-8.8E+01	-1	8.3E-01	0.7601	-8.3E-01	-0.76006	2.24E+03
14	14	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	8.9E+00	7.6E+03	1.1E+46	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7425	-8.0E-01	-0.74253	2.19E+03
15	15	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	9.6E+00	1.4E+04	1.1E+46	0.000	8.2E+01	1	-8.2E+01	-1	7.7E-01	0.726	-7.7E-01	-0.72604	2.14E+03
16	16	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.0E+01	2.7E+04	1.1E+46	0.000	7.9E+01	1	-7.9E+01	-1	7.5E-01	0.7105	-7.5E-01	-0.71052	2.10E+03
17	17	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	5.2E+04	1.1E+46	0.000	7.7E+01	1	-7.7E+01	-1	7.3E-01	0.6959	-7.3E-01	-0.69588	2.05E+03
18	18	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	9.8E+04	1.1E+46	0.000	7.4E+01	1	-7.4E+01	-1	7.1E-01	0.6821	-7.1E-01	-0.68205	2.01E+03
19	19	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.2E+01	1.8E+05	1.1E+46	0.000	7.2E+01	1	-7.2E+01	-1	6.9E-01	0.669	-6.9E-01	-0.66897	1.97E+03
20	20	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+01	3.5E+05	1.1E+46	0.000	7.1E+01	1	-7.1E+01	-1	6.7E-01	0.6566	-6.7E-01	-0.65658	1.94E+03

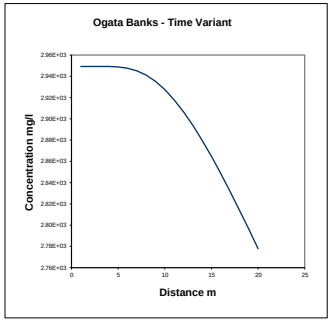


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	1.38E+04	
u	7.84E-08	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E-01	1.9E+00	1.1E+46	0.000	3.2E+02	1	-3.2E+02	-1	6.0E+00	1	-6.0E+00	-1	2.95E+03
2	2	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+00	3.6E+00	1.1E+46	0.000	2.2E+02	1	-2.2E+02	-1	4.2E+00	1	-4.2E+00	-1	2.95E+03
3	3	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.9E+00	6.8E+00	1.1E+46	0.000	1.8E+02	1	-1.8E+02	-1	3.5E+00	1	-3.5E+00	-1	2.95E+03
4	4	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	2.6E+00	1.3E+01	1.1E+46	0.000	1.6E+02	1	-1.6E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	2.95E+03
5	5	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	3.2E+00	2.4E+01	1.1E+46	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99985	2.95E+03
6	6	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	3.8E+00	4.6E+01	1.1E+46	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9995	-2.4E+00	-0.99946	2.95E+03
7	7	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	4.5E+00	8.7E+01	1.1E+46	0.000	1.2E+02	1	-1.2E+02	-1	2.3E+00	0.9986	-2.3E+00	-0.99864	2.95E+03
8	8	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	5.1E+00	1.7E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	2.94E+03
9	9	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	5.7E+00	3.1E+02	1.1E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9953	-2.0E+00	-0.99527	2.94E+03
10	10	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	6.4E+00	5.9E+02	1.1E+46	0.000	1.0E+02	1	-1.0E+02	-1	1.9E+00	0.9926	-1.9E+00	-0.99263	2.93E+03
11	11	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	7.0E+00	1.1E+03	1.1E+46	0.000	9.5E+01	1	-9.5E+01	-1	1.8E+00	0.9894	-1.8E+00	-0.98938	2.92E+03
12	12	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	7.7E+00	2.1E+03	1.1E+46	0.000	9.1E+01	1	-9.1E+01	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	2.91E+03
13	13	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	8.3E+00	4.0E+03	1.1E+46	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9812	-1.7E+00	-0.98124	2.89E+03
14	14	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	8.9E+00	7.6E+03	1.1E+46	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9765	-1.6E+00	-0.97647	2.88E+03
15	15	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	9.6E+00	1.4E+04	1.1E+46	0.000	8.2E+01	1	-8.2E+01	-1	1.5E+00	0.9713	-1.5E+00	-0.97133	2.86E+03
16	16	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.0E+01	2.7E+04	1.1E+46	0.000	7.9E+01	1	-7.9E+01	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	2.85E+03
17	17	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	5.2E+04	1.1E+46	0.000	7.7E+01	1	-7.7E+01	-1	1.5E+00	0.9601	-1.5E+00	-0.96015	2.83E+03
18	18	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.1E+01	9.8E+04	1.1E+46	0.000	7.4E+01	1	-7.4E+01	-1	1.4E+00	0.9542	-1.4E+00	-0.95421	2.81E+03
19	19	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.2E+01	1.8E+05	1.1E+46	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9481	-1.4E+00	-0.94812	2.80E+03
20	20	368.659	0.0E+00	1.0E+00	-1.1E+46	2.000	1.3E+01	3.5E+05	1.1E+46	0.000	7.1E+01	1	-7.1E+01	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	2.78E+03



Date:	20/02/2020
Version:	1

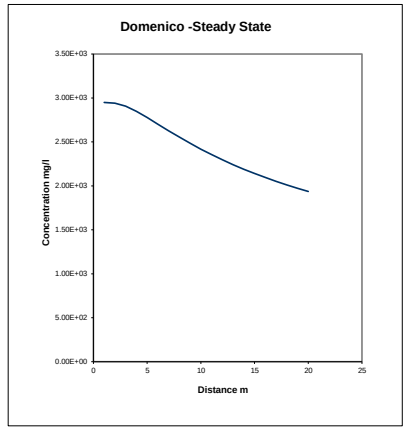
DOMENICO (STEADY STATE)

Contaminant	Iron	
Input	**Value**	**Units**
C_T	1	mg/l
Co	2.95E+03	mg/l
λ	5.59E-105	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	8.10E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	737.318	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	2.95E+03
2	2	737.318	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.997	-2.12E+00	-0.9973	2.94E+03
3	3	737.318	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.986	-1.73E+00	-0.9856	2.91E+03
4	4	737.318	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.966	-1.50E+00	-0.9659	2.85E+03
5	5	737.318	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.942	-1.34E+00	-0.9419	2.78E+03
6	6	737.318	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.916	-1.22E+00	-0.9163	2.70E+03
7	7	737.318	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.891	-1.13E+00	-0.8907	2.63E+03
8	8	737.318	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.866	-1.06E+00	-0.8659	2.55E+03
9	9	737.318	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.842	-9.99E-01	-0.8422	2.48E+03
10	10	737.318	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.82	-9.47E-01	-0.8197	2.42E+03
11	11	737.318	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.799	-9.03E-01	-0.7986	2.36E+03
12	12	737.318	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.779	-8.65E-01	-0.7787	2.30E+03
13	13	737.318	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.76	-8.31E-01	-0.7601	2.24E+03
14	14	737.318	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.743	-8.01E-01	-0.7425	2.19E+03
15	15	737.318	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	2.14E+03
16	16	737.318	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.711	-7.49E-01	-0.7105	2.10E+03
17	17	737.318	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.696	-7.27E-01	-0.6959	2.05E+03
18	18	737.318	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.682	-7.06E-01	-0.6821	2.01E+03
19	19	737.318	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	1.97E+03
20	20	737.318	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.657	-6.70E-01	-0.6566	1.94E+03

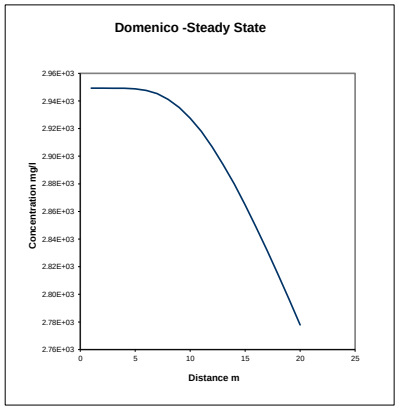


DOMENICO (STEADY STATE)

Calc	Value	
v	1.08E-03	m/d
Rc	1.38E+04	
u	7.84E-08	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	737.318	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	2.95E+03
2	2	737.318	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	2.95E+03
3	3	737.318	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	2.95E+03
4	4	737.318	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	2.95E+03
5	5	737.318	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	2.68E+00	1	-2.68E+00	-0.9998	2.95E+03
6	6	737.318	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.999	-2.45E+00	-0.9995	2.95E+03
7	7	737.318	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.999	-2.26E+00	-0.9986	2.95E+03
8	8	737.318	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.997	-2.12E+00	-0.9973	2.94E+03
9	9	737.318	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.995	-2.00E+00	-0.9953	2.94E+03
10	10	737.318	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.993	-1.89E+00	-0.9926	2.93E+03
11	11	737.318	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.989	-1.81E+00	-0.9894	2.92E+03
12	12	737.318	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.986	-1.73E+00	-0.9856	2.91E+03
13	13	737.318	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.981	-1.66E+00	-0.9812	2.89E+03
14	14	737.318	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.976	-1.60E+00	-0.9765	2.88E+03
15	15	737.318	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.971	-1.55E+00	-0.9713	2.86E+03
16	16	737.318	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.966	-1.50E+00	-0.9659	2.85E+03
17	17	737.318	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.96	-1.45E+00	-0.9601	2.83E+03
18	18	737.318	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.954	-1.41E+00	-0.9542	2.81E+03
19	19	737.318	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.948	-1.37E+00	-0.9481	2.80E+03
20	20	737.318	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.942	-1.34E+00	-0.9419	2.78E+03



Date:	20/02/2020
Version:	1

DOMENICO (TIME VARIANT)

Contaminant **Iron**

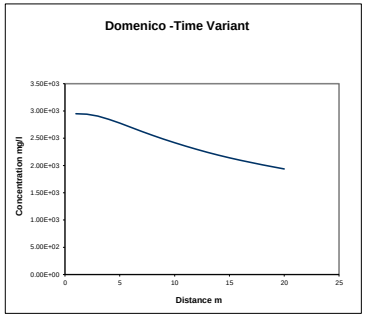
Input	**Value**	**Units**
C_T	1	mg/l
Co	2.95E+03	mg/l
λ	5.59E-105	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	8.10E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option: Simulate vertical dispersion in 1 direction

Calc	**Value**	**Units**
v	1.08E-03	m/d
Rc	1.38E+04	
u	7.84E-08	m/d

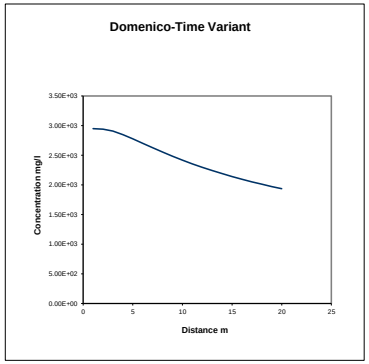
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	368.659	0.00E+00	1.00E+00	-1.12E+46	2	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	2.95E+03
2	2	368.659	0.00E+00	1.00E+00	-1.12E+46	2	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	2.94E+03
3	3	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.986	2.91E+03
4	4	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.966	2.85E+03
5	5	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.942	2.78E+03
6	6	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.916	2.70E+03
7	7	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.891	2.63E+03
8	8	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.866	2.55E+03
9	9	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.842	2.48E+03
10	10	368.659	0.00E+00	1.00E+00	-1.12E+46	2	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.82	2.42E+03
11	11	368.659	0.00E+00	1.00E+00	-1.12E+46	2	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.799	2.36E+03
12	12	368.659	0.00E+00	1.00E+00	-1.12E+46	2	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.779	2.30E+03
13	13	368.659	0.00E+00	1.00E+00	-1.12E+46	2	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.76	2.24E+03
14	14	368.659	0.00E+00	1.00E+00	-1.12E+46	2	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.743	2.19E+03
15	15	368.659	0.00E+00	1.00E+00	-1.12E+46	2	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	2.14E+03
16	16	368.659	0.00E+00	1.00E+00	-1.12E+46	2	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.711	2.10E+03
17	17	368.659	0.00E+00	1.00E+00	-1.12E+46	2	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.696	2.05E+03
18	18	368.659	0.00E+00	1.00E+00	-1.12E+46	2	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.682	2.01E+03
19	19	368.659	0.00E+00	1.00E+00	-1.12E+46	2	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	1.97E+03
20	20	368.659	0.00E+00	1.00E+00	-1.12E+46	2	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.657	1.94E+03



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	368.659	0.00E+00	1.00E+00	-1.12E+46	2	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	2.95E+03
2	2	368.659	0.00E+00	1.00E+00	-1.12E+46	2	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	2.95E+03
3	3	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	2.95E+03
4	4	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	2.95E+03
5	5	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-1	2.95E+03
6	6	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.999	2.95E+03
7	7	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.999	2.95E+03
8	8	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	2.94E+03
9	9	368.659	0.00E+00	1.00E+00	-1.12E+46	2	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.995	2.94E+03
10	10	368.659	0.00E+00	1.00E+00	-1.12E+46	2	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.993	2.93E+03
11	11	368.659	0.00E+00	1.00E+00	-1.12E+46	2	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.989	2.92E+03
12	12	368.659	0.00E+00	1.00E+00	-1.12E+46	2	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.986	2.91E+03
13	13	368.659	0.00E+00	1.00E+00	-1.12E+46	2	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.981	2.89E+03
14	14	368.659	0.00E+00	1.00E+00	-1.12E+46	2	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.976	2.88E+03
15	15	368.659	0.00E+00	1.00E+00	-1.12E+46	2	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.971	2.86E+03
16	16	368.659	0.00E+00	1.00E+00	-1.12E+46	2	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.966	2.85E+03
17	17	368.659	0.00E+00	1.00E+00	-1.12E+46	2	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.96	2.83E+03
18	18	368.659	0.00E+00	1.00E+00	-1.12E+46	2	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.954	2.81E+03
19	19	368.659	0.00E+00	1.00E+00	-1.12E+46	2	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.948	2.80E+03
20	20	368.659	0.00E+00	1.00E+00	-1.12E+46	2	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.942	2.78E+03



Date:	20/02/2020
Version:	1

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Manganese		from Level 1
Target Concentration	C_T	1.23E-01	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	8.99E-01	mg/l	*Based on maximum soil conc of 408000mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*Estimation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	7.20E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.57E+00	m	*see options*
Transverse dispersivity	az	1.57E-01	m	*see options*
Vertical dispersivity	ay	1.57E-02	m	*see options*

Calculated Parameters

	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	1.22E+04	fraction
Decay rate used	λ	6.29E-105	d^{-1}
Rate of contaminant flow due to retardation	u	8.82E-08	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	8.47E-01	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.06E+00**	

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 7.20E+02 — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction

Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — l/kg

Sorption coefficient for ionised species — $K_{oc,i}$ — l/kg

pH value — pH

acid dissociation constant — pKa

Fraction of organic carbon in aquifer — foc — fraction

Soil water partition coefficient — Kd — 7.20E+02 — l/kg

Define dispersivity (click brown cell and use pull down list)

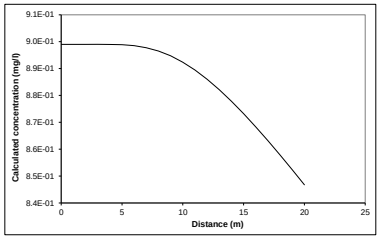
Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	9.0E-01
1.0	8.99E-01
2.0	8.99E-01
3.0	8.99E-01
4.0	8.99E-01
5.0	8.99E-01
6.0	8.99E-01
7.0	8.98E-01
8.0	8.97E-01
9.0	8.95E-01
10.0	8.92E-01
11.0	8.89E-01
12.0	8.86E-01
13.0	8.82E-01
14.0	8.78E-01
15.0	8.73E-01
16.0	8.68E-01
17.0	8.63E-01
18.0	8.58E-01
19.0	8.52E-01
20.0	8.47E-01

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Remedial Targets

Remedial Target		**1.31E-01**	**mg/l**
Domenico - Steady state			
Distance to compliance point		**20**	**m**
Concentration of contaminant at compliance point	C_{ED}/C_0	**8.47E-01**	**mg/l**

For comparison with measured groundwater concentration.

Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions)

Details to be completed for each assessment				
Site Name:	Glan Llyn			
Site Address:	Llanwern			
Completed by:	Ross Cameron			
Date:	24-Feb-20		Version:	3
Contaminant	Naphthalene			
Target Concentration (C_T)	0.002	mg/l	Origin of C_T:	Proposed Water Framework Directive EQS

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Naphthalene**		
Target concentration	**C_T**	**0.002**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_w	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.

The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**2.69E-01**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.002	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	3

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Naphthalene**		from Level 1
Target concentration	C_T	**0.002**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	3

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Environment Agency

Input Parameters

	Variable	Value	Unit	Source
Contaminant		Naphthalene		from Level 1
Target Concentration	C_T	0.002	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value, lab derived value)

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	av	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters

	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target	**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks	**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
	#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Distance to compliance point	**0**	**m**	
Ratio of Compliance Point to Source Concentration	**C_{ED}/C_0**	**#DIV/0!**	**fraction** Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for ionic organic chemicals (acids)

Entry if specify partition coefficient (option)

Soil water partition coefficient	Kd	l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer	foc	fraction
Organic carbon partition coefficient	Koc	l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

Define dispersivity (click brown cell and use pull down list)

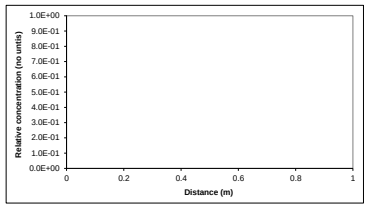
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	3

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

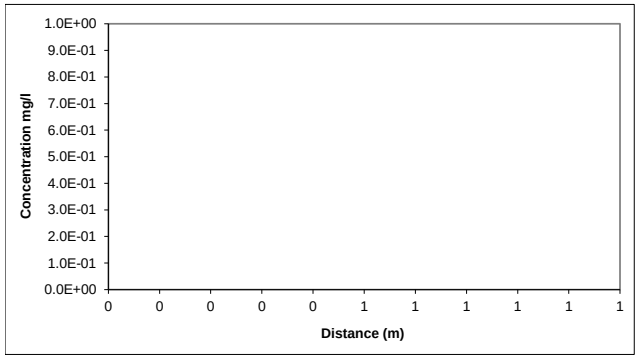
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_w	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu) | Variable | Value | Unit | Source

Contaminant		Naphthalene		from Level 1
Target Concentration	C_T	2.00E-03	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	1.29E+02	mg/l	*Based on maximum soil conc of 4680mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+02	days	*100 day half life estimation*
Calculated decay rate	λ	6.93E-03	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappir*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	3.60E+01	l/kg	*see options*
Longitudinal dispersivity	ax	2.00E+00	m	*see options*
Transverse dispersivity	az	2.00E-01	m	*see options*
Vertical dispersivity	ay	2.00E-02	m	*see options*

Calculated Parameters | Variable

Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	6.13E+02	fraction
Decay rate used	λ	1.13E-05	d^{-1}
Rate of contaminant flow due to retardation	u	1.76E-06	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	3.37E-12	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**3.82E+13**	

Remedial Targets

Remedial Target		**7.64E+10**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**3.37E-12**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.E+99.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)			
Soil water partition coefficient	Kd	3.60E+01	l/kg
Entry for non-polar organic chemicals (option)			
Fraction of organic carbon in aquifer	foc		fraction
Organic carbon partition coefficient	Koc		l/kg
Entry for ionic organic chemicals (option)			
Sorption coefficient for related species	$K_{oc,n}$		l/kg
Sorption coefficient for ionised species	$K_{ow\cdot i}$		l/kg
pH value	pH		
acid dissociation constant	pKa		
Fraction of organic carbon in aquifer	foc		fraction
Soil water partition coefficient	Kd	3.60E+01	l/kg

Define dispersivity (click brown cell and use pull down list)

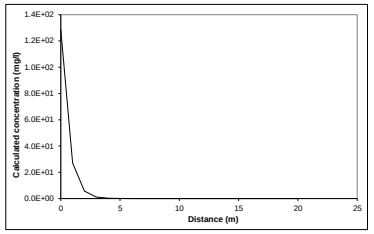
Dispersivities 10%, 1%, 0.1% of pathway length

		Enter value	Calc value Xu & Eckstein	m
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00 m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01 m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02 m

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	3

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	1.3E+02
1.0	2.71E+01
2.0	5.70E+00
3.0	1.20E+00
4.0	2.52E-01
5.0	5.30E-02
6.0	1.11E-02
7.0	2.34E-03
8.0	4.90E-04
9.0	1.03E-04
10.0	2.15E-05
11.0	4.49E-06
12.0	9.39E-07
13.0	1.96E-07
14.0	4.09E-08
15.0	8.54E-09
16.0	1.78E-09
17.0	3.72E-10
18.0	7.75E-11
19.0	1.62E-11
20.0	3.37E-12

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Naphthalene**

Parameter	Value	Units
(carried over from input sheet)		
C_T	2.00E-03	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_w	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target **2.69E-01 mg/kg** **for Naphthalene**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24/02/2020
Version:	3

Level 2 Calculation Sheet

Contaminant **Naphthalene**

Site assessed:	Glan Llyn
Date:	24/02/2020
Version:	3

Parameter	Value	Units
(carried over from input sheet)		
Mz	0.00E+00	m
L	0.00E+00	m
da	0.00E+00	m
Inf	0.00E+00	m/d
K	0.00E+00	m/d
i	0.00E+00	m3/d
A	0.00E+00	m2
Cc	0.00E+00	m3/d mg/l
C_T	2.00E-03	mg/l
Cu	0.00E+00	mg/l
w	0.00E+00	m

Calculated Dilution Factor

Calculation based on target concentration #DIV/0!

Calculation based on observed contaminant concentration #DIV/0!

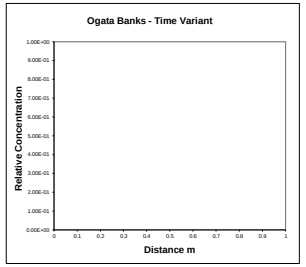


OGATA BANKS SOLUTION

Contaminant	Naphthalene	
Input	**Value**	**Units**
C_T	2.000E-03	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

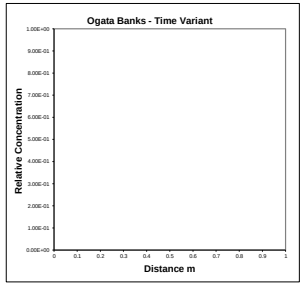
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value	
v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	3

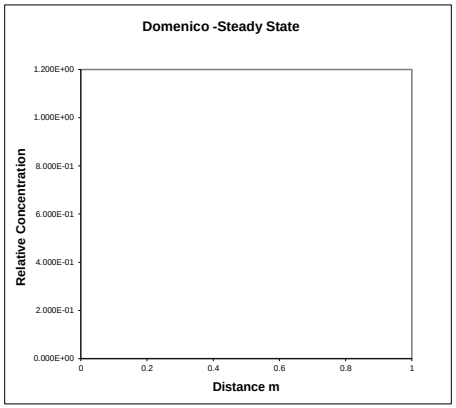
Contaminant **Naphthalene**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	2.000E-03	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



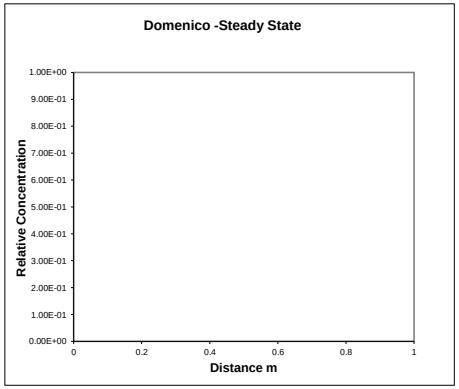
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	3

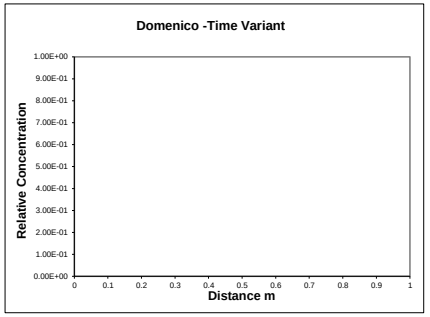
DOMENICO (TIME VARIANT)

Contaminant **Naphthalene**

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	0.002	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

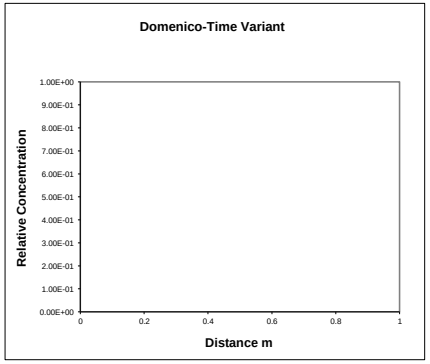


Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
	m														
1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



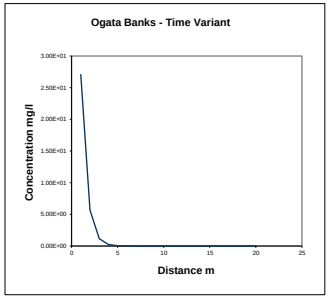
Date:	24/02/2020
Version:	3

OGATA BANKS SOLUTION

Contaminant	Naphthalene	
Input	**Value**	**Units**
C_T	0.002	mg/l
Co	1.29E+02	mg/l
λ	1.13E-05	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	3.60E+01	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	16.085	-1.6E+00	2.1E-01	-3.4E+47	2.000	2.1E+00	7.8E+00	3.4E+47	0.000	2.8E+02	1	-2.8E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	2.71E+01
2	2	16.085	-3.1E+00	4.4E-02	-3.4E+47	2.000	4.1E+00	6.1E+01	3.4E+47	0.000	2.0E+02	1	-2.0E+02	-1	1.9E+00	0.992	-1.9E+00	-0.99199	5.65E+00
3	3	16.085	-4.7E+00	9.3E-03	-3.4E+47	2.000	6.2E+00	4.8E+02	3.4E+47	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	1.16E+00
4	4	16.085	-6.2E+00	2.0E-03	-3.4E+47	2.000	8.2E+00	3.8E+03	3.4E+47	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	2.37E-01
5	5	16.085	-7.8E+00	4.1E-04	-3.4E+47	2.000	1.0E+01	3.0E+04	3.4E+47	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	4.81E-02
6	6	16.085	-9.4E+00	8.7E-05	-3.4E+47	2.000	1.2E+01	2.3E+05	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8742	-1.1E+00	-0.87421	9.76E-03
7	7	16.085	-1.1E+01	1.8E-05	-3.4E+47	2.000	1.4E+01	1.8E+06	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8436	-1.0E+00	-0.84362	1.98E-03
8	8	16.085	-1.2E+01	3.8E-06	-3.4E+47	2.000	1.6E+01	1.4E+07	3.4E+47	0.000	9.9E+01	1	-9.9E+01	-1	9.4E-01	0.8151	-9.4E-01	-0.8151	4.03E-04
9	9	16.085	-1.4E+01	8.1E-07	-3.4E+47	2.000	1.9E+01	1.1E+08	3.4E+47	0.000	9.3E+01	1	-9.3E+01	-1	8.8E-01	0.7887	-8.8E-01	-0.7887	8.20E-05
10	10	16.085	-1.6E+01	1.7E-07	-3.4E+47	2.000	2.1E+01	8.7E+08	3.4E+47	0.000	8.8E+01	1	-8.8E+01	-1	8.4E-01	0.7643	-8.4E-01	-0.76432	1.67E-05
11	11	16.085	-1.7E+01	3.6E-08	-3.4E+47	2.000	2.3E+01	6.8E+09	3.4E+47	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7418	-8.0E-01	-0.7418	3.41E-06
12	12	16.085	-1.9E+01	7.5E-09	-3.4E+47	2.000	2.5E+01	5.4E+10	3.4E+47	0.000	8.1E+01	1	-8.1E+01	-1	7.7E-01	0.721	-7.7E-01	-0.72098	6.98E-07
13	13	16.085	-2.0E+01	1.6E-09	-3.4E+47	2.000	2.7E+01	4.2E+11	3.4E+47	0.000	7.8E+01	1	-7.8E+01	-1	7.4E-01	0.7017	-7.4E-01	-0.70169	1.43E-07
14	14	16.085	-2.2E+01	3.3E-10	-3.4E+47	2.000	2.9E+01	3.3E+12	3.4E+47	0.000	7.5E+01	1	-7.5E+01	-1	7.1E-01	0.6838	-7.1E-01	-0.68377	2.93E-08
15	15	16.085	-2.3E+01	7.0E-11	-3.4E+47	2.000	3.1E+01	2.6E+13	3.4E+47	0.000	7.2E+01	1	-7.2E+01	-1	6.8E-01	0.6671	-6.8E-01	-0.66708	6.01E-09
16	16	16.085	-2.5E+01	1.5E-11	-3.4E+47	2.000	3.3E+01	2.0E+14	3.4E+47	0.000	7.0E+01	1	-7.0E+01	-1	6.6E-01	0.6515	-6.6E-01	-0.6515	1.24E-09
17	17	16.085	-2.6E+01	3.1E-12	-3.4E+47	2.000	3.5E+01	1.6E+15	3.4E+47	0.000	6.8E+01	1	-6.8E+01	-1	6.4E-01	0.6369	-6.4E-01	-0.63692	2.54E-10
18	18	16.085	-2.8E+01	6.5E-13	-3.4E+47	2.000	3.7E+01	1.2E+16	3.4E+47	0.000	6.6E+01	1	-6.6E+01	-1	6.3E-01	0.6232	-6.3E-01	-0.62324	5.23E-11
19	19	16.085	-3.0E+01	1.4E-13	-3.4E+47	2.000	3.9E+01	9.7E+16	3.4E+47	0.000	6.4E+01	1	-6.4E+01	-1	6.1E-01	0.6104	-6.1E-01	-0.61038	1.08E-11
20	20	16.085	-3.1E+01	2.9E-14	-3.4E+47	2.000	4.1E+01	7.6E+17	3.4E+47	0.000	6.3E+01	1	-6.3E+01	-1	5.9E-01	0.5983	-5.9E-01	-0.59826	2.22E-12

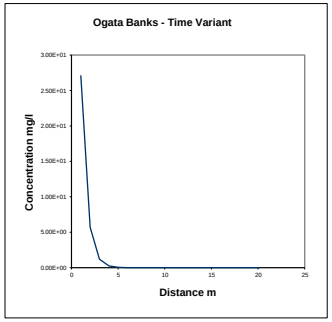


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	6.13E+02	
u	1.76E-06	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	16.085	-1.6E+00	2.1E-01	-3.4E+47	2.000	2.1E+00	7.8E+00	3.4E+47	0.000	2.8E+02	1	-2.8E+02	-1	5.3E+00	1	-5.3E+00	-1	2.71E+01
2	2	16.085	-3.1E+00	4.4E-02	-3.4E+47	2.000	4.1E+00	6.1E+01	3.4E+47	0.000	2.0E+02	1	-2.0E+02	-1	3.8E+00	1	-3.8E+00	-1	5.70E+00
3	3	16.085	-4.7E+00	9.3E-03	-3.4E+47	2.000	6.2E+00	4.8E+02	3.4E+47	0.000	1.6E+02	1	-1.6E+02	-1	3.1E+00	1	-3.1E+00	-0.99999	1.20E+00
4	4	16.085	-6.2E+00	2.0E-03	-3.4E+47	2.000	8.2E+00	3.8E+03	3.4E+47	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99982	2.52E-01
5	5	16.085	-7.8E+00	4.1E-04	-3.4E+47	2.000	1.0E+01	3.0E+04	3.4E+47	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9992	-2.4E+00	-0.9992	5.30E-02
6	6	16.085	-9.4E+00	8.7E-05	-3.4E+47	2.000	1.2E+01	2.3E+05	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	2.2E+00	0.9978	-2.2E+00	-0.9978	1.11E-02
7	7	16.085	-1.1E+01	1.8E-05	-3.4E+47	2.000	1.4E+01	1.8E+06	3.4E+47	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9954	-2.0E+00	-0.99541	2.34E-03
8	8	16.085	-1.2E+01	3.8E-06	-3.4E+47	2.000	1.6E+01	1.4E+07	3.4E+47	0.000	9.9E+01	1	-9.9E+01	-1	1.9E+00	0.992	-1.9E+00	-0.99199	4.90E-04
9	9	16.085	-1.4E+01	8.1E-07	-3.4E+47	2.000	1.9E+01	1.1E+08	3.4E+47	0.000	9.3E+01	1	-9.3E+01	-1	1.8E+00	0.9876	-1.8E+00	-0.98758	1.03E-04
10	10	16.085	-1.6E+01	1.7E-07	-3.4E+47	2.000	2.1E+01	8.7E+08	3.4E+47	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9823	-1.7E+00	-0.98229	2.15E-05
11	11	16.085	-1.7E+01	3.6E-08	-3.4E+47	2.000	2.3E+01	6.8E+09	3.4E+47	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9763	-1.6E+00	-0.97626	4.49E-06
12	12	16.085	-1.9E+01	7.5E-09	-3.4E+47	2.000	2.5E+01	5.4E+10	3.4E+47	0.000	8.1E+01	1	-8.1E+01	-1	1.5E+00	0.9696	-1.5E+00	-0.96962	9.39E-07
13	13	16.085	-2.0E+01	1.6E-09	-3.4E+47	2.000	2.7E+01	4.2E+11	3.4E+47	0.000	7.8E+01	1	-7.8E+01	-1	1.5E+00	0.9625	-1.5E+00	-0.96249	1.96E-07
14	14	16.085	-2.2E+01	3.3E-10	-3.4E+47	2.000	2.9E+01	3.3E+12	3.4E+47	0.000	7.5E+01	1	-7.5E+01	-1	1.4E+00	0.955	-1.4E+00	-0.95498	4.09E-08
15	15	16.085	-2.3E+01	7.0E-11	-3.4E+47	2.000	3.1E+01	2.6E+13	3.4E+47	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9472	-1.4E+00	-0.94719	8.54E-09
16	16	16.085	-2.5E+01	1.5E-11	-3.4E+47	2.000	3.3E+01	2.0E+14	3.4E+47	0.000	7.0E+01	1	-7.0E+01	-1	1.3E+00	0.9392	-1.3E+00	-0.93921	1.78E-09
17	17	16.085	-2.6E+01	3.1E-12	-3.4E+47	2.000	3.5E+01	1.6E+15	3.4E+47	0.000	6.8E+01	1	-6.8E+01	-1	1.3E+00	0.9311	-1.3E+00	-0.93109	3.72E-10
18	18	16.085	-2.8E+01	6.5E-13	-3.4E+47	2.000	3.7E+01	1.2E+16	3.4E+47	0.000	6.6E+01	1	-6.6E+01	-1	1.3E+00	0.9229	-1.3E+00	-0.9229	7.75E-11
19	19	16.085	-3.0E+01	1.4E-13	-3.4E+47	2.000	3.9E+01	9.7E+16	3.4E+47	0.000	6.4E+01	1	-6.4E+01	-1	1.2E+00	0.9147	-1.2E+00	-0.91468	1.62E-11
20	20	16.085	-3.1E+01	2.9E-14	-3.4E+47	2.000	4.1E+01	7.6E+17	3.4E+47	0.000	6.3E+01	1	-6.3E+01	-1	1.2E+00	0.9065	-1.2E+00	-0.90647	3.37E-12



Date:	24/02/2020
Version:	3

Contaminant **Naphthalene**

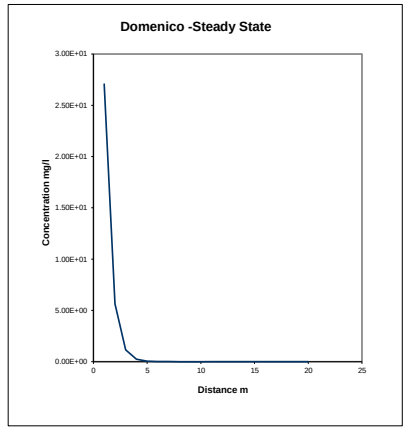
Input	Value	Units
C_T	0.002	mg/l
Co	1.29E+02	mg/l
λ	1.13E-05	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	3.60E+01	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion optio Simulate vertical dispersion in 1 direction

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	32.17	-1.56E+00	2.10E-01	2.80E+02	1	-2.80E+02	-1	2.65E+00	1	-2.65E+00	-0.9998	2.71E+01
2	2	32.17	-3.12E+00	4.43E-02	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	5.65E+00
3	3	32.17	-4.68E+00	9.31E-03	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.97	-1.53E+00	-0.9696	1.16E+00
4	4	32.17	-6.24E+00	1.96E-03	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.939	-1.33E+00	-0.9392	2.37E-01
5	5	32.17	-7.79E+00	4.12E-04	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.906	-1.19E+00	-0.9065	4.81E-02
6	6	32.17	-9.35E+00	8.67E-05	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.874	-1.08E+00	-0.8742	9.76E-03
7	7	32.17	-1.09E+01	1.82E-05	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.844	-1.00E+00	-0.8436	1.98E-03
8	8	32.17	-1.25E+01	3.84E-06	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.815	-9.38E-01	-0.8151	4.03E-04
9	9	32.17	-1.40E+01	8.08E-07	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.789	-8.84E-01	-0.7887	8.20E-05
10	10	32.17	-1.56E+01	1.70E-07	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.764	-8.39E-01	-0.7643	1.67E-05
11	11	32.17	-1.71E+01	3.58E-08	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.742	-8.00E-01	-0.7418	3.41E-06
12	12	32.17	-1.87E+01	7.52E-09	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	6.98E-07
13	13	32.17	-2.03E+01	1.58E-09	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.702	-7.35E-01	-0.7017	1.43E-07
14	14	32.17	-2.18E+01	3.33E-10	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.684	-7.09E-01	-0.6838	2.93E-08
15	15	32.17	-2.34E+01	7.01E-11	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.667	-6.85E-01	-0.6671	6.01E-09
16	16	32.17	-2.49E+01	1.47E-11	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.651	-6.63E-01	-0.6515	1.24E-09
17	17	32.17	-2.65E+01	3.10E-12	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.637	-6.43E-01	-0.6369	2.54E-10
18	18	32.17	-2.81E+01	6.53E-13	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.623	-6.25E-01	-0.6232	5.23E-11
19	19	32.17	-2.96E+01	1.37E-13	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.61	-6.08E-01	-0.6104	1.08E-11
20	20	32.17	-3.12E+01	2.89E-14	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.598	-5.93E-01	-0.5983	2.22E-12



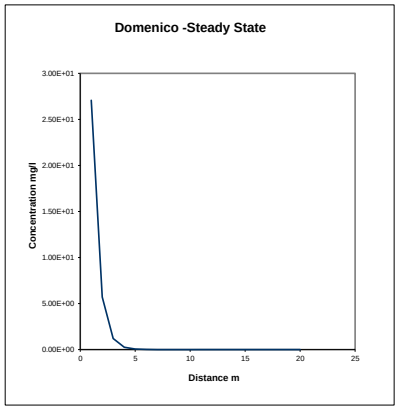
Calc **Value**

v	1.08E-03	m/d
Rc	6.13E+02	
u	1.76E-06	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
1	1	32.17	-1.56E+00	2.10E-01	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	2.71E+01
2	2	32.17	-3.12E+00	4.43E-02	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	5.70E+00
3	3	32.17	-4.68E+00	9.31E-03	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	1.20E+00
4	4	32.17	-6.24E+00	1.96E-03	1.40E+02	1	-1.40E+02	-1	2.65E+00	1	-2.65E+00	-0.9998	2.52E-01
5	5	32.17	-7.79E+00	4.12E-04	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.999	-2.37E+00	-0.9992	5.30E-02
6	6	32.17	-9.35E+00	8.67E-05	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.998	-2.17E+00	-0.9978	1.11E-02
7	7	32.17	-1.09E+01	1.82E-05	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.995	-2.00E+00	-0.9954	2.34E-03
8	8	32.17	-1.25E+01	3.84E-06	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	4.90E-04
9	9	32.17	-1.40E+01	8.08E-07	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.988	-1.77E+00	-0.9876	1.03E-04
10	10	32.17	-1.56E+01	1.70E-07	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.982	-1.68E+00	-0.9823	2.15E-05
11	11	32.17	-1.71E+01	3.58E-08	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.976	-1.60E+00	-0.9763	4.49E-06
12	12	32.17	-1.87E+01	7.52E-09	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.97	-1.53E+00	-0.9696	9.39E-07
13	13	32.17	-2.03E+01	1.58E-09	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.962	-1.47E+00	-0.9625	1.96E-07
14	14	32.17	-2.18E+01	3.33E-10	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	4.09E-08
15	15	32.17	-2.34E+01	7.01E-11	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.947	-1.37E+00	-0.9472	8.54E-09
16	16	32.17	-2.49E+01	1.47E-11	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.939	-1.33E+00	-0.9392	1.78E-09
17	17	32.17	-2.65E+01	3.10E-12	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.931	-1.29E+00	-0.9311	3.72E-10
18	18	32.17	-2.81E+01	6.53E-13	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.923	-1.25E+00	-0.9229	7.75E-11
19	19	32.17	-2.96E+01	1.37E-13	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.915	-1.22E+00	-0.9147	1.62E-11
20	20	32.17	-3.12E+01	2.89E-14	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.906	-1.19E+00	-0.9065	3.37E-12



Date:	24/02/2020
Version:	3

DOMENICO (TIME VARIANT)

Contaminant **Naphthalene**

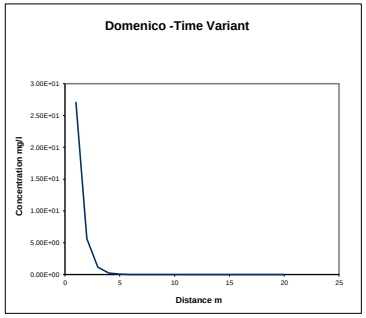
Input	**Value**	**Units**
C_T	0.002	mg/l
Co	1.29E+02	mg/l
λ	1.13E-05	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	3.60E+01	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	2.00E+00	m
az	2.00E-01	m
ay	2.00E-02	m

Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	**Value**	**Units**
v	1.08E-03	m/d
Rc	6.13E+02	
u	1.76E-06	m/d

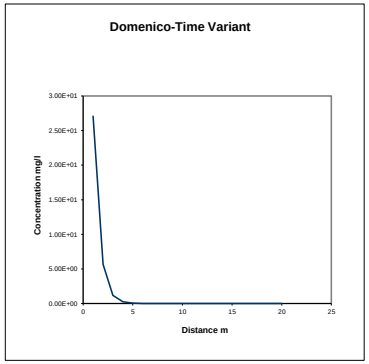
Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	16.085	-1.56E+00	2.10E-01	-3.40E+47	2	2.80E+02	1	-2.80E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	2.71E+01
2	2	16.085	-3.12E+00	4.43E-02	-3.40E+47	2	1.98E+02	1	-1.98E+02	-1	1.88E+00	0.992	-1.88E+00	-0.992	5.65E+00
3	3	16.085	-4.68E+00	9.31E-03	-3.40E+47	2	1.61E+02	1	-1.61E+02	-1	1.53E+00	0.9696	-1.53E+00	-0.97	1.16E+00
4	4	16.085	-6.24E+00	1.96E-03	-3.40E+47	2	1.40E+02	1	-1.40E+02	-1	1.33E+00	0.9392	-1.33E+00	-0.939	2.37E-01
5	5	16.085	-7.79E+00	4.12E-04	-3.40E+47	2	1.25E+02	1	-1.25E+02	-1	1.19E+00	0.9065	-1.19E+00	-0.906	4.81E-02
6	6	16.085	-9.35E+00	8.67E-05	-3.40E+47	2	1.14E+02	1	-1.14E+02	-1	1.08E+00	0.8742	-1.08E+00	-0.874	9.76E-03
7	7	16.085	-1.09E+01	1.82E-05	-3.40E+47	2	1.06E+02	1	-1.06E+02	-1	1.00E+00	0.8436	-1.00E+00	-0.844	1.98E-03
8	8	16.085	-1.25E+01	3.84E-06	-3.40E+47	2	9.88E+01	1	-9.88E+01	-1	9.38E-01	0.8151	-9.38E-01	-0.815	4.03E-04
9	9	16.085	-1.40E+01	8.08E-07	-3.40E+47	2	9.32E+01	1	-9.32E+01	-1	8.84E-01	0.7887	-8.84E-01	-0.789	8.20E-05
10	10	16.085	-1.56E+01	1.70E-07	-3.40E+47	2	8.84E+01	1	-8.84E+01	-1	8.39E-01	0.7643	-8.39E-01	-0.764	1.67E-05
11	11	16.085	-1.71E+01	3.58E-08	-3.40E+47	2	8.43E+01	1	-8.43E+01	-1	8.00E-01	0.7418	-8.00E-01	-0.742	3.41E-06
12	12	16.085	-1.87E+01	7.52E-09	-3.40E+47	2	8.07E+01	1	-8.07E+01	-1	7.65E-01	0.721	-7.65E-01	-0.721	6.98E-07
13	13	16.085	-2.03E+01	1.58E-09	-3.40E+47	2	7.75E+01	1	-7.75E+01	-1	7.35E-01	0.7017	-7.35E-01	-0.702	1.43E-07
14	14	16.085	-2.18E+01	3.33E-10	-3.40E+47	2	7.47E+01	1	-7.47E+01	-1	7.09E-01	0.6838	-7.09E-01	-0.684	2.93E-08
15	15	16.085	-2.34E+01	7.01E-11	-3.40E+47	2	7.22E+01	1	-7.22E+01	-1	6.85E-01	0.6671	-6.85E-01	-0.667	6.01E-09
16	16	16.085	-2.49E+01	1.47E-11	-3.40E+47	2	6.99E+01	1	-6.99E+01	-1	6.63E-01	0.6515	-6.63E-01	-0.651	1.24E-09
17	17	16.085	-2.65E+01	3.10E-12	-3.40E+47	2	6.78E+01	1	-6.78E+01	-1	6.43E-01	0.6369	-6.43E-01	-0.637	2.54E-10
18	18	16.085	-2.81E+01	6.53E-13	-3.40E+47	2	6.59E+01	1	-6.59E+01	-1	6.25E-01	0.6232	-6.25E-01	-0.623	5.23E-11
19	19	16.085	-2.96E+01	1.37E-13	-3.40E+47	2	6.41E+01	1	-6.41E+01	-1	6.08E-01	0.6104	-6.08E-01	-0.61	1.08E-11
20	20	16.085	-3.12E+01	2.89E-14	-3.40E+47	2	6.25E+01	1	-6.25E+01	-1	5.93E-01	0.5983	-5.93E-01	-0.598	2.22E-12



Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	16.085	-1.56E+00	2.10E-01	-3.40E+47	2	2.80E+02	1	-2.80E+02	-1	5.30E+00	1	-5.30E+00	-1	2.71E+01
2	2	16.085	-3.12E+00	4.43E-02	-3.40E+47	2	1.98E+02	1	-1.98E+02	-1	3.75E+00	1	-3.75E+00	-1	5.70E+00
3	3	16.085	-4.68E+00	9.31E-03	-3.40E+47	2	1.61E+02	1	-1.61E+02	-1	3.06E+00	1	-3.06E+00	-1	1.20E+00
4	4	16.085	-6.24E+00	1.96E-03	-3.40E+47	2	1.40E+02	1	-1.40E+02	-1	2.65E+00	0.9998	-2.65E+00	-1	2.52E-01
5	5	16.085	-7.79E+00	4.12E-04	-3.40E+47	2	1.25E+02	1	-1.25E+02	-1	2.37E+00	0.9992	-2.37E+00	-0.999	5.30E-02
6	6	16.085	-9.35E+00	8.67E-05	-3.40E+47	2	1.14E+02	1	-1.14E+02	-1	2.17E+00	0.9978	-2.17E+00	-0.998	1.11E-02
7	7	16.085	-1.09E+01	1.82E-05	-3.40E+47	2	1.06E+02	1	-1.06E+02	-1	2.00E+00	0.9954	-2.00E+00	-0.995	2.34E-03
8	8	16.085	-1.25E+01	3.84E-06	-3.40E+47	2	9.88E+01	1	-9.88E+01	-1	1.88E+00	0.992	-1.88E+00	-0.992	4.90E-04
9	9	16.085	-1.40E+01	8.08E-07	-3.40E+47	2	9.32E+01	1	-9.32E+01	-1	1.77E+00	0.9876	-1.77E+00	-0.988	1.03E-04
10	10	16.085	-1.56E+01	1.70E-07	-3.40E+47	2	8.84E+01	1	-8.84E+01	-1	1.68E+00	0.9823	-1.68E+00	-0.982	2.15E-05
11	11	16.085	-1.71E+01	3.58E-08	-3.40E+47	2	8.43E+01	1	-8.43E+01	-1	1.60E+00	0.9763	-1.60E+00	-0.976	4.49E-06
12	12	16.085	-1.87E+01	7.52E-09	-3.40E+47	2	8.07E+01	1	-8.07E+01	-1	1.53E+00	0.9696	-1.53E+00	-0.97	9.39E-07
13	13	16.085	-2.03E+01	1.58E-09	-3.40E+47	2	7.75E+01	1	-7.75E+01	-1	1.47E+00	0.9625	-1.47E+00	-0.962	1.96E-07
14	14	16.085	-2.18E+01	3.33E-10	-3.40E+47	2	7.47E+01	1	-7.47E+01	-1	1.42E+00	0.955	-1.42E+00	-0.955	4.09E-08
15	15	16.085	-2.34E+01	7.01E-11	-3.40E+47	2	7.22E+01	1	-7.22E+01	-1	1.37E+00	0.9472	-1.37E+00	-0.947	8.54E-09
16	16	16.085	-2.49E+01	1.47E-11	-3.40E+47	2	6.99E+01	1	-6.99E+01	-1	1.33E+00	0.9392	-1.33E+00	-0.939	1.78E-09
17	17	16.085	-2.65E+01	3.10E-12	-3.40E+47	2	6.78E+01	1	-6.78E+01	-1	1.29E+00	0.9311	-1.29E+00	-0.931	3.72E-10
18	18	16.085	-2.81E+01	6.53E-13	-3.40E+47	2	6.59E+01	1	-6.59E+01	-1	1.25E+00	0.9229	-1.25E+00	-0.923	7.75E-11
19	19	16.085	-2.96E+01	1.37E-13	-3.40E+47	2	6.41E+01	1	-6.41E+01	-1	1.22E+00	0.9147	-1.22E+00	-0.915	1.62E-11
20	20	16.085	-3.12E+01	2.89E-14	-3.40E+47	2	6.25E+01	1	-6.25E+01	-1	1.19E+00	0.9065	-1.19E+00	-0.906	3.37E-12



Date:	24/02/2020
Version:	3

Hydrogeological risk assessment for land contamination

Remedial Targets Worksheet , Release 3.2

First released: 2006. Version 3.2: January 2013

This worksheet has been produced in combination with the document 'Remedial Targets Methodology: Hydrogeological risk assessment for land contamination (Environment Agency 2006).

Users of this worksheet should always refer to the User Manual to the Remedial Targets Methodology and to relevant guidance on UK legislation and policy, in order to understand how this procedure should be applied in an appropriate context.

© Environment Agency, 2006. (Produced by the Environment Agency's Science Group)

The calculation of equations in this worksheet has been independently checked by Entec (UK) Ltd on behalf of the Environment Agency.

All rights reserved. You will not modify, reverse compile or otherwise dis-assemble the worksheet.

Liability: The Environment Agency does not promise that the worksheet will provide any particular facilities or functions. You must ensure that the worksheet meets your needs and you remain solely responsible for the competent use of the worksheet. You are entirely responsible for the consequences of any use of the worksheet and the Agency provides no warranty about the fitness for purpose or performance of any part of the worksheet. We do not promise that the media will always be free from defects, computer viruses, software locks or other similar code or that the operation of the worksheet will be uninterrupted or error free. You should carry out all necessary virus checks prior to installing on your computing system.

IMPORTANT: To enable MS Excel worksheet, click Tools, Add -Ins, Analysis Tool Pak and Analysis Tool Pak-VBA (to calculate error functions).

Details to be completed for each assessment

Site Name:	**Glan Llyn**			
Site Address:	**Llanwern**			
Completed by:	**Ross Cameron**			
Date:	**24-Feb-20**		**Version:**	**1**
Contaminant	**Vanadium**			
Target Concentration (C_T)	**0.02**	**mg/l**	**Origin of C_T:**	**UK Standard (Statutory): Protection of Aquatic Life (Co**

This worksheet can be used to determine remedial targets for soils (Worksheets Level 1 Soil, Level 2 and Level 3 Soil) or to determine remedial targets for groundwater (Level 3 Groundwater). For Level 3, parameter values must be entered separately dependent on whether the assessment is for soil or groundwater. For soil, remedial targets are calculated as either mg/kg (for comparision with soil measurements) or mg/l (for comparison with leaching tests or pore water concentrations).
Site details entered on this page are automatically copied to Level 1, 2 and 3 Worksheets.
Worksheet options are identified by brown background and employ a pull-down menus. Data entry are identified as blue background.
Data origin / justification should be noted in cells coloured yellow and fully documented in subsequent reports.
Data carried forward from an earlier worksheet are identified by a light green background
It is recommended that a copy of the original worksheet is saved (all data fields in the original copy are blank).

The spreadsheet also includes a porosity calculation worksheet, a soil impact calculation worksheet and a worksheet that performs some simple hydrogeological calculations.

Remedial Targets Worksheet , Release 3.2

Level 1 - Soil

Select the method of calculating the soil water Partition Co-efficient by using the pull down menu below

User specified value for partition coefficient

Contaminant		**Vanadium**		
Target concentration	**C_T**	**0.02**	**mg/l**	

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**
Standard entry				
Water filled soil porosity	θ_w	5.00E-01	fraction	0.5
Air filled soil porosity	θa	3.70E-01	fraction	0.0037
Bulk density of soil zone material	ρ	1.36E+00	g/cm^3	1.36
Henry's Law constant	H	1.00E+00	dimensionless	*1*
Entry if specify partition coefficient (option)				
Soil water partition coefficient	Kd	1.34E+02	l/kg	*1.34E+02*
Entry for non-polar organic chemicals (option)				
Fraction of organic carbon (in soil)	foc		fraction	
Organic carbon partition coefficient	Koc		l/kg	
Entry for ionic organic chemicals (option)				
Sorption coefficient for neutral species	$K_{oc,n}$		l/kg	
Sorption coefficient for ionised species	$K_{oc,i}$		l/kg	
pH value	pH		pH units	
Acid dissociation constant	pKa			
Fraction of organic carbon (in soil)	foc		fraction	

This sheet calculates the Level 1 remedial target for soils(mg/kg) based on a selected target concentration and theoretical calculation of soil water partitioning. Three options are included for determining the partition coefficient.

The measured soil concentration as mg/kg should be compared with the Level 1 remedial target to determine the need for further action.

Soil water partition coefficient used in Level Assessment	**Kd**	**1.34E+02**	**l/kg**	*Specified value*

Level 1 Remedial Target

Level 1 Remedial Target	**2.69E+00**	**mg/kg**	**(for comparison with soil analyses)**
	or		
	0.02	**mg/l**	**(for comparison with leachate test results)**

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 2 - Soil

Contaminant		**Vanadium**		from Level 1
Target concentration	C_T	**0.02**	**mg/l**	from Level 1

This sheet calculates the Level 2 remedial target for soils (mg/kg) or for pore water (mg/l).

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 2 remedial target to determine the need for further action. Equations presented in 'Hydrogeological risk assessment for land contamiantion' (Environment Agency 2006)

Input Parameters	**Variable**	**Value**	**Unit**	**Source of parameter value**	
Standard entry					
Infiltration	Inf	0.00E+00	m/d		
Area of contaminant source	A	0.00E+00	m^2		Not used in calculation
Entry for groundwater flow below site					
Length of contaminant source in direction of groundwater flow	L	0.00E+00	m		
Saturated aquifer thickness	da	0.00E+00	m		
Hydraulic Conductivity of aquifer in which dilution occurs	K	0.00E+00	m/d		
Hydraulic gradient of water table	i	0.00E+00	fraction		
Width of contaminant source perpendicular to groundwater flow	w	0.00E+00	m		Not used in calculation
Background concentration of contaminant in groundwater beneath site	Cu	0.00E+00	mg/l		
Define mixing zone depth by specifying or calculating depth (using pull down list)		**Specify**			
Enter mixing zone thickness	Mz	0.00E+00	m		
Calculated mixing zone thickness	Mz		m		

Calculated Parameters

Dilution Factor	**DF**	**#DIV/0!**		
Level 2 Remedial Target		**#DIV/0!**	**mg/l**	**For comparison with measured pore water concentration. This assumes Level 1 Remedial Target is based on Target Concentra**
		or		
		#DIV/0!	**mg/kg**	**For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water**

Additional option

Calculation of impact on receptor

Concentration of contaminant in contaminated discharge (entering receptor)	Cc	0.00E+00	mg/l	
Calculated concentration within receptor (dilution only)		#DIV/0!	mg/l	0

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24-Feb-20
Version:	1

Remedial Targets Worksheet , Release 3.2

Level 3 - Soil

See Note

Environment Agency

Input Parameters

	Variable	Value	Unit	Source
Contaminant		Vanadium		from Level 1
Target Concentration	C_T	0.02	mg/l	from Level 1
Dilution Factor	DF	#DIV/0!		from Level 2

Select analytical solution (click on brown cell below, then on pull-down menu)

Ogata Banks — Equations in HRA publication

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to pollutants in all phases (e.g. field derived value, lab derived value)

	Variable	Value	Unit	Source of parameter value
Enter source concentration		Soil concentration as mg/kg		
Enter soil concentration		0	mg/kg	
Half life for degradation of contaminant in water	$t_{1/2}$	1.00E+100	days	
Calculated decay rate	λ	6.93E-101	$days^{-1}$	calculated
Width of plume in aquifer at source	Sz	0.00E+00	m	from Level 2
Plume thickness in aquifer at source	Sy	0.00E+00	m	from Level 2
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Effective porosity of aquifer	n	0.00E+00	fraction	
Hydraulic gradient	i	#DIV/0!	fraction	from Level 2 (adjusted)
Hydraulic conductivity of saturated aquifer	K	0.00E+00	m/d	from Level 2
Distance to compliance point	x	0.00E+00	m	
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+99	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	0.00E+00	l/kg	*see options*
Longitudinal dispersivity	ax	0.000	m	*see options*
Transverse dispersivity	az	0.000	m	*see options*
Vertical dispersivity	av	0.000	m	*see options*

Parameter values should be checked against Level 1 and 2

Calculated Parameters

	Variable		
Groundwater flow velocity	v	#DIV/0!	m/d
Retardation factor	Rf	#DIV/0!	fraction
Decay rate used	λ	6.93E-101	d^{-1}
Hydraulic gradient used in aquifer flow down-gradient	i	#DIV/0!	fraction
Rate of contaminant flow due to retardation	u	#DIV/0!	m/d
Ratio of Compliance Point to Source Concentration	C_{ED}/C_0	#DIV/0!	fraction
Attenuation factor (C_0/C_{ED})	**AF**	**#DIV/0!**	**fraction**
Calculated soil leachate concentration	Co	0.00E+00	mg/l

Remedial Targets

Level 3 Remedial Target	**#DIV/0!**	**mg/l**	For comparison with measured pore water concentration.
Ogata Banks	**or**		This assumes Level 1 Remedial Target is based on Target Concentration.
	#DIV/0!	**mg/kg**	For comparison with measured soil concentration. This assumes Level 1 Remedial Target calculated from soil-water partitioning equation.
Distance to compliance point	**0**	**m**	
Ratio of Compliance Point to Source Concentration C_{ED}/C_0	**#DIV/0!**	**fraction**	Ogata Banks

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99

Enter method of defining partition co-efficient (using pull down list)

Calculate for ionic organic chemicals (acids)

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction
Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species	$K_{oc,n}$	0.00E+00	l/kg
Sorption coefficient for ionised species	$K_{oc,i}$	0.00E+00	l/kg
pH value	pH	0.00E+00	
Acid dissociation constant	pKa	0.00E+00	
Fraction of organic carbon in aquifer	foc	0.00E+00	fraction
Soil water partition coefficient	Kd	0.00E+00	l/kg

Define dispersivity (click brown cell and use pull down list)

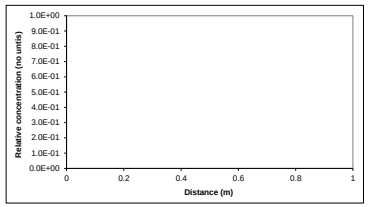
User defined values for dispersivity

		Enter value	Calc value	Xu & Eckstein	
Longitudinal dispersivity	**ax**	0.00E+00	0.00E+00	#NUM!	m
Transverse dispersivity	**az**	0.00E+00	0.00E+00	#NUM!	m
Vertical dispersivity	**ay**	0.00E+00	0.00E+00	#NUM!	m

Note values of dispersivity must be > 0

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed

Note
This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O_2, NO_3, SO_4 etc than an alternative solution should be used



Note: 'Relative concentration' is the ratio of calculated concentation at a given position compared to the source concentration. The calculations assume plume disperses from the top of the aquifer. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

This sheet calculates the Level 3 remedial target for soils(mg/kg) or for pore water (mg/l), based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.By setting a long travel time (e.g. 9E99) it will give the steady state solution, which should always be used when calculating remedial targets.

The measured soil concentration as mg/kg or pore water concentration should be compared with the Level 3 remedial target to determine the need for further action.

Note if contaminant is not subject to first order degradation, then set half life as 9.9E+99.

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	########
Version:	1

Calculated (relative) concentrations for distance-concentration graph

Ogata Banks
From calculation sheet

Distance	Relative concentration (No units)	Concentration mg/l
0	1.0E+00	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!
0.0	#DIV/0!	#DIV/0!

Remedial Targets Worksheet , Release 3.2

Calculation of contaminant concentration in groundwater from a soil source

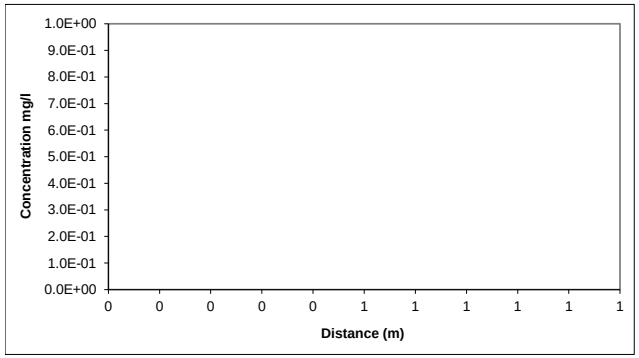
Only input required is Soil Contaminant Concentration

	Input Parameters			
	Soil contaminant concentration	C_0	0.00E+00	mg/kg
Level 1 Parameters				
	Water filled soil porosity	θ_w	5.00E-01	fraction
	Air filled soil porosity	θa	3.70E-01	fraction
	Bulk density	ρ	1.36E+00	g/cm^3
	Henry's Law constant	H	1.00E+00	dimensionless
	Soil water partition coefficient used in Level Assessment	Kd	1.34E+02	l/kg
	Factor (partitioning between soil and water)		1.35E+02	dimensionless
Level 2 Parameters	**Dilution Factor**	DF	#DIV/0!	
Level 3 Parameters	**Attenuation factor (C_O/C_{ED})**	AF	#DIV/0!	

Predicted concentrations at compliance point

Level 1	C	0.00E+00	mg/l	No dilution or attenuation
Level 2	C	#DIV/0!	mg/l	Dilution taken into account
Level 3	C	#DIV/0!	mg/l	Dilution and attenuation taken into account

Predicted concentrations between source and compliance point - Level 3



Distance m	Concentration mg/l
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!
0.00	#DIV/0!

R&D Publication 20 Remedial Targets Worksheet, Release 3.2

Level 3 - Groundwater

See Note

Input Parameters (using pull down menu)

	Variable	Value	Unit	Source
Contaminant		Vanadium		from Level 1
Target Concentration	C_T	2.00E-02	mg/l	from Level 1

Select analytical solution (click on brown cell below, then on pull-down menu)

Domenico - Steady state — Equations in HRA publication

Approach for simulating vertical dispersion: Simulate vertical dispersion in 1 direction

Select nature of decay rate (click on brown cell below, then on pull-down menu)

Approach for simulating degradation of pollutants: Apply degradation rate to dissolved pollutants only

				Source of parameter value
Initial contaminant concentration in groundwater at plume core	C_0	1.35E+01	mg/l	*Based on maximum soil conc of 2880mg/kg*
Half life for degradation of contaminant in water	$t_{1/2}$	9.00E+99	days	*Estimation*
Calculated decay rate	λ	7.70E-101	$days^{-1}$	
Width of plume in aquifer at source (perpendicular to flow)	Sz	5.00E+02	m	*Site data*
Plume thickness at source	Sy	1.50E+00	m	*Thickness of re-engineered MG*
Saturated aquifer thickness	da	2.00E+00	m	*Based upon proposed total MG and cappi*
Bulk density of aquifer materials	ρ	1.36E+00	g/cm^3	*Site data*
Effective porosity of aquifer	n	8.00E-02	fraction	*Estimate*
Hydraulic gradient	i	1.00E-02	fraction	
Hydraulic conductivity of aquifer	K	8.64E-03	m/d	*Proposed best achievable*
Distance to compliance point	x	2.00E+01	m	*Site data*
Distance (lateral) to compliance point perpendicular to flow direction	z		m	
Distance (depth) to compliance point perpendicular to flow direction	y		m	
Time since pollutant entered groundwater	t	1.00E+100	days	*time variant options only*
Parameters values determined from options				
Partition coefficient	Kd	2.13E+02	l/kg	*see options*
Longitudinal dispersivity	ax	1.57E+00	m	*see options*
Transverse dispersivity	az	1.57E-01	m	*see options*
Vertical dispersivity	ay	1.57E-02	m	*see options*

Calculated Parameters

	Variable		
Groundwater flow velocity	v	1.08E-03	m/d
Retardation factor	Rf	3.62E+03	fraction
Decay rate used	λ	2.13E-104	d^{-1}
Rate of contaminant flow due to retardation	u	2.98E-07	m/d
Contaminant concentration at distance x, assuming one-way vertical dispersion	C_{ED}	1.27E+01	mg/l
Attenuation factor (one way vertical dispersion, CO/CED)	**AF**	**1.06E+00**	

Remedial Targets

Remedial Target		**2.12E-02**	**mg/l**	For comparison with measured groundwater concentration.
Domenico - Steady state				
Distance to compliance point		**20**	**m**	
Concentration of contaminant at compliance point	**C_{ED}/C_0**	**1.27E+01**	**mg/l**	Domenico - Steady state

Care should be used when calculating remedial targets using the time variant options as this may result in an overestimate of the remedial target.
The recommended value for time when calculating the remedial target is 9.9E+99.

Select Method for deriving Partition Co-efficient (using pull down menu)

User specified value for partition coefficient

Entry if specify partition coefficient (option)

Soil water partition coefficient — Kd — 2.13E+02 — l/kg

Entry for non-polar organic chemicals (option)

Fraction of organic carbon in aquifer — foc — fraction

Organic carbon partition coefficient — Koc — l/kg

Entry for ionic organic chemicals (option)

Sorption coefficient for related species — $K_{oc,n}$ — l/kg

Sorption coefficient for ionised species — $K_{oc,i}$ — l/kg

pH value — pH

acid dissociation constant — pKa

Fraction of organic carbon in aquifer — foc — fraction

Soil water partition coefficient — Kd — 2.13E+02 — l/kg

Define dispersivity (click brown cell and use pull down list)

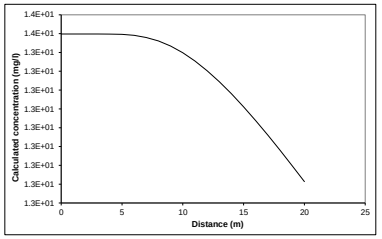
Dispersivity based on Xu & Eckstein (1995)

		Enter value	Calc value Xu & Eckstein		
Longitudinal dispersivity	**ax**	0.00E+00	2.00E+00	1.57E+00	m
Transverse dispersivity	**az**	0.00E+00	2.00E-01	1.57E-01	m
Vertical dispersivity	**ay**	0.00E+00	2.00E-02	1.57E-02	

Note values of dispersivity must be > 0

For calculated value, assumes ax = 0.1 *x, az = 0.01 * x, ay = 0.001 * x

Xu & Eckstein (1995) report ax = $0.83(\log_{10}x)^{2.414}$; az = ax/10, ay = ax/100 are assumed



Note graph assumes plume disperses vertically in one direction only. An alternative solution assuming the centre of the plume is located at the mid-depth of the aquifer is presented in the calculation sheets.

Note

This sheet calculates the Level 3 remedial target for groundwater, based on the distance to the receptor or compliance located down hydraulic gradient of the source Three solution methods are included, the preferred option is Ogata Banks.

By setting a long travel time it will give the steady state solution, which should be used to calculate remedial targets.

The measured groundwater concentration should be compared with the Level 3 remedial target to determine the need for further action.
Note if contaminant is not subject to first order degradation, then set half life as 9.0E+99.

This worksheet should be used if pollutant transport and degradation is best described by a first order reaction. If degradation is best desribed by an electron limited degradation such as oxidation by O2, NO3, SO4 etc than an alternative solution should be used

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	#######
Version:	1

Calculated concentrations for distance-concentration graph

Domenico - Steady state
From calculation sheet

Distance	Concentration
	mg/l
0	1.3E+01
1.0	1.35E+01
2.0	1.35E+01
3.0	1.35E+01
4.0	1.35E+01
5.0	1.35E+01
6.0	1.35E+01
7.0	1.35E+01
8.0	1.35E+01
9.0	1.34E+01
10.0	1.34E+01
11.0	1.34E+01
12.0	1.33E+01
13.0	1.32E+01
14.0	1.32E+01
15.0	1.31E+01
16.0	1.30E+01
17.0	1.30E+01
18.0	1.29E+01
19.0	1.28E+01
20.0	1.27E+01

Porosity Calculator

These results are not carried through to any of the other worksheets

DRY BULK DENSITY DATA

Variable	Value	Unit	justification
Natural Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Dry Bulk Density	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

WET BULK DENSITY DATA

Variable	Value	Unit	
Moisture Content	0.00	% wt	
Particle Density	2.78	tonnes/m^3	(Change this number only if you have specific information)
Actual (wet) Bulk Density (i.e. at natural MC)	0.00	tonnes/m^3	
Calculated Parameters			
Voids Ratio	#DIV/0!	fraction	
dry bulk density	0.00	tonnes/m^3	
Initial Saturation	#DIV/0!	%	
Total porosity	**1.000**	**fraction**	**#DIV/0!**
Air Filled Porosity	**#DIV/0!**	**fraction**	
Water Filled Porosity	**#DIV/0!**	**fraction**	

Analytical solutions provided by David Hall, Golder Associates (UK) Ltd

Simple hydrogeological calculations

(These are not specific to, or required in, the Remedial Targets Methodology)

Parameter	symbol		unit	justification
Hydraulic conductivity	K	0.00E+00	m/d	
Hydraulic gradient	i	0.00E+00	unitless	
Effective porosity of aquifer	n	0.00E+00	fraction	
Thickness of saturated aquifer	b	0.00E+00	m	
Width of aquifer perpendicular to flow	w	0.00E+00	m	
Distance to receptor	x	0.00E+00	m	
Bulk density of aquifer materials	ρ	0.00E+00	g/cm^3	
Soil-water partition co-efficient	Kd	0.00E+00	l/kg	
Retardation factor of pollutant	R	#DIV/0!		

Groundwater flow velocity	v(GW)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for groundwater to reach receptor	t(GW)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years
Rate of groundwater flow through aquifer	Q	0.00E+00	m^3/s	0.00E+00	m^3/day	0.00E+00	m^3/year

Contaminant flow velocity	v(contam)	#DIV/0!	m/s	#DIV/0!	m/day	#DIV/0!	m/year
Time for contaminant to reach receptor	t(contam)	#DIV/0!	seconds	#DIV/0!	days	#DIV/0!	years

Level 1 Calculation Sheet

Contaminant **Vanadium**

Parameter (carried over from input sheet)	**Value**	**Units**
C_T	2.00E-02	mg/l
Kd	1.34E+02	l/kg
foc		fraction
koc		l/kg
θ_w	5.00E-01	fraction
θa	3.70E-01	fraction
ρ	1.36E+00	g/cm3
H	1.00E+00	dimensionless
Koc,n		l/kg
Koc,i		l/kg
pH		pH units
pKa		
foc (ionic)		fraction

Calculations (Refer toTable 4.3, R&D Publication 20)

Selected option User specified value for partition coefficient

	calc	calc	Calc Kd	l/kg
Calculation of partition coefficient for ionic organic chemical				
Partition coefficient used in Level 1 Assessment			1.34E+02	l/kg

Calculated Remedial Target	**2.69E+00**	**mg/kg**	**for**	**Vanadium**

Factor (partitioning between soil and water) 1.35E+02

Site being assessed:	Glan Llyn
Completed by:	Ross Cameron
Date:	24/02/2020
Version:	1

Level 2 Calculation Sheet

Contaminant **Vanadium**

Site assessed:	Glan Llyn
Date:	24/02/2020
Version:	1

Parameter	Value	Units		
(carried over from input sheet)				
Mz	0.00E+00	m		
L	0.00E+00	m		
da	0.00E+00	m		Calculated
Inf	0.00E+00	m/d		Dilution Factor
K	0.00E+00	m/d		
i	0.00E+00		Calculation based on target concentration	#DIV/0!
		m3/d		
A	0.00E+00	m2	Calculation based on observed contaminant concentration	#DIV/0!
		m3/d		
Cc	0.00E+00	mg/l		
C_T	2.00E-02	mg/l		
Cu	0.00E+00	mg/l		
w	0.00E+00	m		



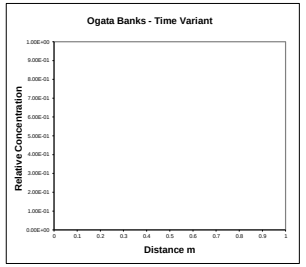
Contaminant **Vanadium**

OGATA BANKS SOLUTION

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units
C_T	2.000E-02	mg/l
DF	#DIV/0!	
λ	6.931E-101	$days^{-1}$
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
t	1.000E+99	days
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

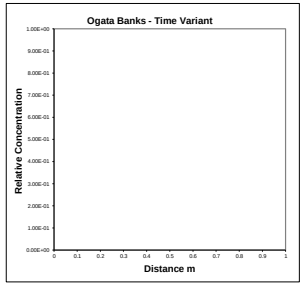


Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) -USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Relative Concentration
1	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.13	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Date:	24/02/2020
Version:	1

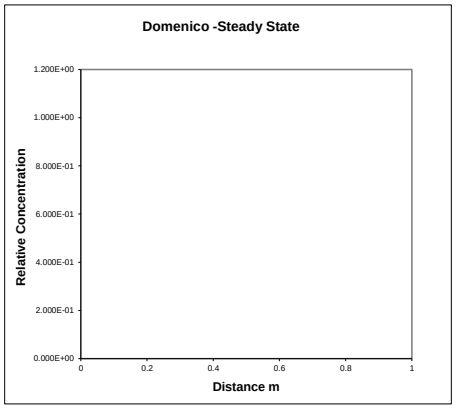
Contaminant **Vanadium**

Input	Value	Units
C_T	2.000E-02	mg/l
DF	#DIV/0!	
λ	6.931E-101	days^{-1}
Sz	0.000E+00	m
Sy	0.000E+00	m
Kd	0.000E+00	l/kg
ρ	0.000E+00	g/cm3
n	0.000E+00	
i	#DIV/0!	
K	0.000E+00	m/d
x	0.000E+00	m
z	0.000E+00	m
y	0.000E+00	m
ax	0.000E+00	m
az	0.000E+00	m
ay	0.000E+00	m

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



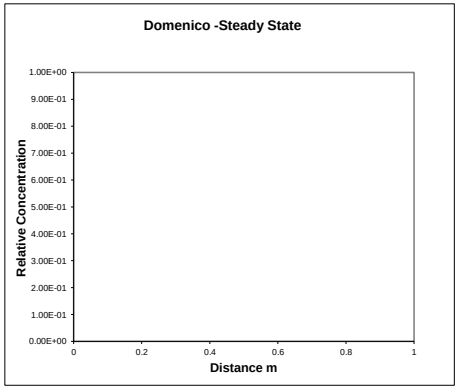
Calc **Value**

v	#DIV/0!	m/d
Rc	#DIV/0!	
u	#DIV/0!	m/d

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

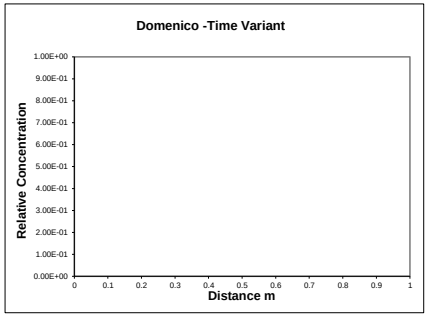
	X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Relative Concentration
1	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
2	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
3	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
4	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
5	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
6	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
7	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
8	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
9	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
10	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
11	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
12	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
13	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
14	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
15	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
16	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
17	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
18	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
19	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!
20	0	0.25	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	######	#DIV/0!	#DIV/0!	#DIV/0!



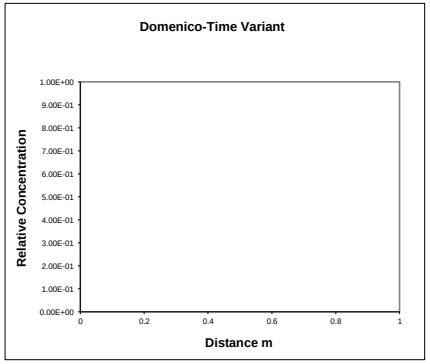
Date:	24/02/2020
Version:	1

DOMENICO (TIME VARIANT)

Contaminant	Vanadium																
			Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)														
Input	**Value**	**Units**		X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
				m														
C_T	0.02	mg/l	1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
DF	#DIV/0!		2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
λ	6.931E-101	$days^{-1}$	5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sz	0.000E+00	m	6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Sy	0.000E+00	m	7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Kd	0.000E+00	l/kg	8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ρ	0.000E+00	g/cm3	9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
n	0.000E+00		10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
i	#DIV/0!		11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
K	0.000E+00	m/d	12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
x	0.000E+00	m	13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
z	0.000E+00	m	14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
y	0.000E+00	m	15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
t	1.000E+99	days	16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ax	0.000E+00	m	17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
az	0.000E+00	m	18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ay	0.000E+00	m	19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



Calc	Value																
			Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT														
				X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Relative Concentration
v	#DIV/0!	m/d		m														
Rc	#DIV/0!		1	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
u	#DIV/0!	m/d	2	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			3	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			4	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			5	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			6	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			7	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			8	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			9	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			10	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			11	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			12	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			13	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			14	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			15	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			16	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			17	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			18	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			19	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
			20	0	0.125	#DIV/0!	#DIV/0!	#DIV/0!	#####	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



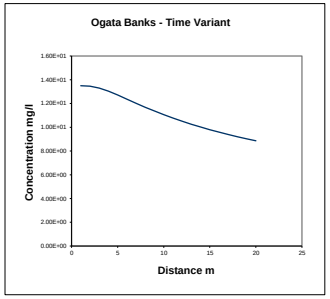
Date:	24/02/2020
Version:	1

OGATA BANKS SOLUTION

Contaminant	Vanadium	
Input	**Value**	**Units**
C_T	0.02	mg/l
Co	1.35E+01	mg/l
λ	2.13E-104	$days^{-1}$
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	2.13E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	6.4E-01	1.9E+00	2.2E+46	0.000	3.2E+02	1	-3.2E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	1.35E+01
2	2	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.3E+00	3.6E+00	2.2E+46	0.000	2.2E+02	1	-2.2E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	1.35E+01
3	3	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.9E+00	6.8E+00	2.2E+46	0.000	1.8E+02	1	-1.8E+02	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	1.33E+01
4	4	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	2.6E+00	1.3E+01	2.2E+46	0.000	1.6E+02	1	-1.6E+02	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	1.30E+01
5	5	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	3.2E+00	2.4E+01	2.2E+46	0.000	1.4E+02	1	-1.4E+02	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	1.27E+01
6	6	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	3.8E+00	4.6E+01	2.2E+46	0.000	1.3E+02	1	-1.3E+02	-1	1.2E+00	0.9163	-1.2E+00	-0.91633	1.24E+01
7	7	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	4.5E+00	8.7E+01	2.2E+46	0.000	1.2E+02	1	-1.2E+02	-1	1.1E+00	0.8907	-1.1E+00	-0.89072	1.20E+01
8	8	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	5.1E+00	1.7E+02	2.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.1E+00	0.8659	-1.1E+00	-0.86587	1.17E+01
9	9	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	5.7E+00	3.1E+02	2.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	1.0E+00	0.8422	-1.0E+00	-0.84215	1.14E+01
10	10	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	6.4E+00	5.9E+02	2.2E+46	0.000	1.0E+02	1	-1.0E+02	-1	9.5E-01	0.8197	-9.5E-01	-0.81971	1.11E+01
11	11	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	7.0E+00	1.1E+03	2.2E+46	0.000	9.5E+01	1	-9.5E+01	-1	9.0E-01	0.7986	-9.0E-01	-0.79858	1.08E+01
12	12	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	7.7E+00	2.1E+03	2.2E+46	0.000	9.1E+01	1	-9.1E+01	-1	8.6E-01	0.7787	-8.6E-01	-0.77872	1.05E+01
13	13	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	8.3E+00	4.0E+03	2.2E+46	0.000	8.8E+01	1	-8.8E+01	-1	8.3E-01	0.7601	-8.3E-01	-0.76006	1.03E+01
14	14	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	8.9E+00	7.6E+03	2.2E+46	0.000	8.4E+01	1	-8.4E+01	-1	8.0E-01	0.7425	-8.0E-01	-0.74253	1.00E+01
15	15	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	9.6E+00	1.4E+04	2.2E+46	0.000	8.2E+01	1	-8.2E+01	-1	7.7E-01	0.726	-7.7E-01	-0.72604	9.80E+00
16	16	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.0E+01	2.7E+04	2.2E+46	0.000	7.9E+01	1	-7.9E+01	-1	7.5E-01	0.7105	-7.5E-01	-0.71052	9.59E+00
17	17	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.1E+01	5.2E+04	2.2E+46	0.000	7.7E+01	1	-7.7E+01	-1	7.3E-01	0.6959	-7.3E-01	-0.69588	9.39E+00
18	18	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.1E+01	9.8E+04	2.2E+46	0.000	7.4E+01	1	-7.4E+01	-1	7.1E-01	0.6821	-7.1E-01	-0.68205	9.21E+00
19	19	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.2E+01	1.8E+05	2.2E+46	0.000	7.2E+01	1	-7.2E+01	-1	6.9E-01	0.669	-6.9E-01	-0.66897	9.03E+00
20	20	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.3E+01	3.5E+05	2.2E+46	0.000	7.1E+01	1	-7.1E+01	-1	6.7E-01	0.6566	-6.7E-01	-0.65658	8.86E+00

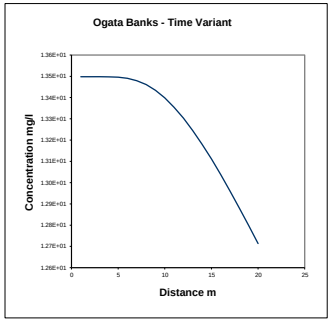


Vertical dispersion option Simulate vertical dispersion in 1 direction

Calc	Value	
v	1.08E-03	m/d
Rc	3.62E+03	
u	2.98E-07	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4	EXP	Term 5	ERFC	Term 6a	ERF	Term 6b	ERF	Term 7a	ERF	Term 7b	ERF	Concentration
1	1	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	6.4E-01	1.9E+00	2.2E+46	0.000	3.2E+02	1	-3.2E+02	-1	6.0E+00	1	-6.0E+00	-1	1.35E+01
2	2	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.3E+00	3.6E+00	2.2E+46	0.000	2.2E+02	1	-2.2E+02	-1	4.2E+00	1	-4.2E+00	-1	1.35E+01
3	3	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.9E+00	6.8E+00	2.2E+46	0.000	1.8E+02	1	-1.8E+02	-1	3.5E+00	1	-3.5E+00	-1	1.35E+01
4	4	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	2.6E+00	1.3E+01	2.2E+46	0.000	1.6E+02	1	-1.6E+02	-1	3.0E+00	1	-3.0E+00	-0.99998	1.35E+01
5	5	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	3.2E+00	2.4E+01	2.2E+46	0.000	1.4E+02	1	-1.4E+02	-1	2.7E+00	0.9998	-2.7E+00	-0.99985	1.35E+01
6	6	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	3.8E+00	4.6E+01	2.2E+46	0.000	1.3E+02	1	-1.3E+02	-1	2.4E+00	0.9995	-2.4E+00	-0.99946	1.35E+01
7	7	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	4.5E+00	8.7E+01	2.2E+46	0.000	1.2E+02	1	-1.2E+02	-1	2.3E+00	0.9986	-2.3E+00	-0.99864	1.35E+01
8	8	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	5.1E+00	1.7E+02	2.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.1E+00	0.9973	-2.1E+00	-0.99726	1.35E+01
9	9	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	5.7E+00	3.1E+02	2.2E+46	0.000	1.1E+02	1	-1.1E+02	-1	2.0E+00	0.9953	-2.0E+00	-0.99527	1.34E+01
10	10	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	6.4E+00	5.9E+02	2.2E+46	0.000	1.0E+02	1	-1.0E+02	-1	1.9E+00	0.9926	-1.9E+00	-0.99263	1.34E+01
11	11	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	7.0E+00	1.1E+03	2.2E+46	0.000	9.5E+01	1	-9.5E+01	-1	1.8E+00	0.9894	-1.8E+00	-0.98938	1.34E+01
12	12	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	7.7E+00	2.1E+03	2.2E+46	0.000	9.1E+01	1	-9.1E+01	-1	1.7E+00	0.9856	-1.7E+00	-0.98557	1.33E+01
13	13	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	8.3E+00	4.0E+03	2.2E+46	0.000	8.8E+01	1	-8.8E+01	-1	1.7E+00	0.9812	-1.7E+00	-0.98124	1.32E+01
14	14	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	8.9E+00	7.6E+03	2.2E+46	0.000	8.4E+01	1	-8.4E+01	-1	1.6E+00	0.9765	-1.6E+00	-0.97647	1.32E+01
15	15	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	9.6E+00	1.4E+04	2.2E+46	0.000	8.2E+01	1	-8.2E+01	-1	1.5E+00	0.9713	-1.5E+00	-0.97133	1.31E+01
16	16	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.0E+01	2.7E+04	2.2E+46	0.000	7.9E+01	1	-7.9E+01	-1	1.5E+00	0.9659	-1.5E+00	-0.96587	1.30E+01
17	17	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.1E+01	5.2E+04	2.2E+46	0.000	7.7E+01	1	-7.7E+01	-1	1.5E+00	0.9601	-1.5E+00	-0.96015	1.30E+01
18	18	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.1E+01	9.8E+04	2.2E+46	0.000	7.4E+01	1	-7.4E+01	-1	1.4E+00	0.9542	-1.4E+00	-0.95421	1.29E+01
19	19	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.2E+01	1.8E+05	2.2E+46	0.000	7.2E+01	1	-7.2E+01	-1	1.4E+00	0.9481	-1.4E+00	-0.94812	1.28E+01
20	20	1.68725	0.0E+00	1.0E+00	-2.2E+46	2.000	1.3E+01	3.5E+05	2.2E+46	0.000	7.1E+01	1	-7.1E+01	-1	1.3E+00	0.9419	-1.3E+00	-0.94189	1.27E+01



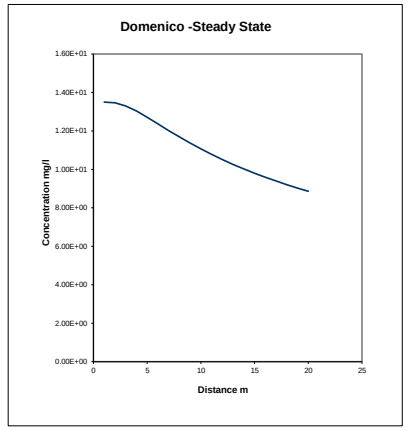
Date:	24/02/2020
Version:	1

Contaminant **Vanadium**

DOMENICO (STEADY STATE)

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

Input	Value	Units		X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
C_T	0.02	mg/l	1	1	3.3745	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	1.35E+01
			2	2	3.3745	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.997	-2.12E+00	-0.9973	1.35E+01
			3	3	3.3745	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.986	-1.73E+00	-0.9856	1.33E+01
Co	1.35E+01	mg/l	4	4	3.3745	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.966	-1.50E+00	-0.9659	1.30E+01
λ	2.13E-104	$days^{-1}$	5	5	3.3745	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.942	-1.34E+00	-0.9419	1.27E+01
Sz	5.00E+02	m	6	6	3.3745	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.916	-1.22E+00	-0.9163	1.24E+01
Sy	1.50E+00	m	7	7	3.3745	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.891	-1.13E+00	-0.8907	1.20E+01
Kd	2.13E+02	l/kg	8	8	3.3745	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.866	-1.06E+00	-0.8659	1.17E+01
ρ	1.36E+00	g/cm3	9	9	3.3745	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.842	-9.99E-01	-0.8422	1.14E+01
n	8.00E-02		10	10	3.3745	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.82	-9.47E-01	-0.8197	1.11E+01
i	1.00E-02		11	11	3.3745	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.799	-9.03E-01	-0.7986	1.08E+01
K	8.64E-03	m/d	12	12	3.3745	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.779	-8.65E-01	-0.7787	1.05E+01
x	2.00E+01	m	13	13	3.3745	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.76	-8.31E-01	-0.7601	1.03E+01
z	0.00E+00	m	14	14	3.3745	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.743	-8.01E-01	-0.7425	1.00E+01
y	0.00E+00	m	15	15	3.3745	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	9.80E+00
			16	16	3.3745	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.711	-7.49E-01	-0.7105	9.59E+00
ax	1.57E+00	m	17	17	3.3745	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.696	-7.27E-01	-0.6959	9.39E+00
az	1.57E-01	m	18	18	3.3745	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.682	-7.06E-01	-0.6821	9.21E+00
ay	1.57E-02	m	19	19	3.3745	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	9.03E+00
			20	20	3.3745	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.657	-6.70E-01	-0.6566	8.86E+00



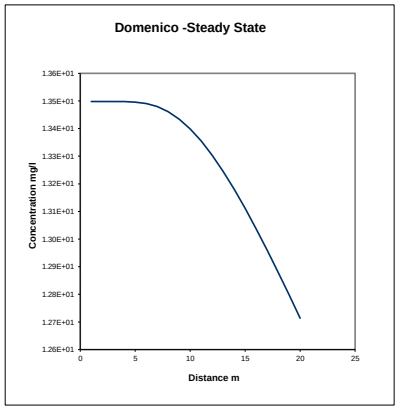
Vertical dispersion optio Simulate vertical dispersion in 1 direction

Calc **Value**

DOMENICO (STEADY STATE)

Calculations for source located at top of aquifer (ie vertical dispersion in one direction) - USED FOR LEVEL ASSESSMENT

				X	Term 1	Term 2	EXP	Term 3A	ERF	Term 3B	ERF	Term 4A	ERF	Term 4B	ERF	Concentration
v	1.08E-03	m/d														
Rc	3.62E+03															
u	2.98E-07	m/d	1	1	3.3745	0.00E+00	1.00E+00	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	1.35E+01
			2	2	3.3745	0.00E+00	1.00E+00	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	1.35E+01
			3	3	3.3745	0.00E+00	1.00E+00	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	1.35E+01
			4	4	3.3745	0.00E+00	1.00E+00	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	1.35E+01
			5	5	3.3745	0.00E+00	1.00E+00	1.41E+02	1	-1.41E+02	-1	2.68E+00	1	-2.68E+00	-0.9998	1.35E+01
			6	6	3.3745	0.00E+00	1.00E+00	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.999	-2.45E+00	-0.9995	1.35E+01
			7	7	3.3745	0.00E+00	1.00E+00	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.999	-2.26E+00	-0.9986	1.35E+01
			8	8	3.3745	0.00E+00	1.00E+00	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.997	-2.12E+00	-0.9973	1.35E+01
			9	9	3.3745	0.00E+00	1.00E+00	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.995	-2.00E+00	-0.9953	1.34E+01
			10	10	3.3745	0.00E+00	1.00E+00	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.993	-1.89E+00	-0.9926	1.34E+01
			11	11	3.3745	0.00E+00	1.00E+00	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.989	-1.81E+00	-0.9894	1.34E+01
			12	12	3.3745	0.00E+00	1.00E+00	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.986	-1.73E+00	-0.9856	1.33E+01
			13	13	3.3745	0.00E+00	1.00E+00	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.981	-1.66E+00	-0.9812	1.32E+01
			14	14	3.3745	0.00E+00	1.00E+00	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.976	-1.60E+00	-0.9765	1.32E+01
			15	15	3.3745	0.00E+00	1.00E+00	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.971	-1.55E+00	-0.9713	1.31E+01
			16	16	3.3745	0.00E+00	1.00E+00	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.966	-1.50E+00	-0.9659	1.30E+01
			17	17	3.3745	0.00E+00	1.00E+00	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.96	-1.45E+00	-0.9601	1.30E+01
			18	18	3.3745	0.00E+00	1.00E+00	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.954	-1.41E+00	-0.9542	1.29E+01
			19	19	3.3745	0.00E+00	1.00E+00	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.948	-1.37E+00	-0.9481	1.28E+01
			20	20	3.3745	0.00E+00	1.00E+00	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.942	-1.34E+00	-0.9419	1.27E+01



Date:	24/02/2020
Version:	1

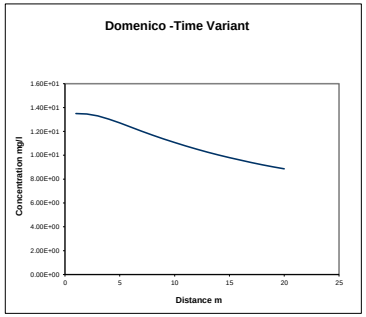
DOMENICO (TIME VARIANT)

Contaminant	Vanadium	
Input	**Value**	**Units**
C_T	0.02	mg/l
Co	1.35E+01	mg/l
λ	2.13E-104	days^{-1}
Sz	5.00E+02	m
Sy	1.50E+00	m
Kd	2.13E+02	l/kg
ρ	1.36E+00	g/cm3
n	8.00E-02	
i	1.00E-02	
K	8.64E-03	m/d
x	2.00E+01	m
z	0.00E+00	m
y	0.00E+00	m
t	1.00E+100	days
ax	1.57E+00	m
az	1.57E-01	m
ay	1.57E-02	m

Vertical dispersion option: Simulate vertical dispersion in 1 direction

Calculations for source located in centre of aquifer (ie vertical dispersion in two directions)

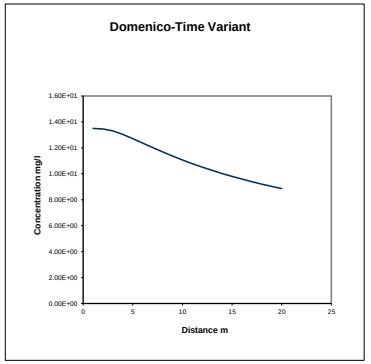
	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	3.16E+02	1	-3.16E+02	-1	3.00E+00	1	-3.00E+00	-1	1.35E+01
2	2	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	2.23E+02	1	-2.23E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	1.35E+01
3	3	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.82E+02	1	-1.82E+02	-1	1.73E+00	0.9856	-1.73E+00	-0.986	1.33E+01
4	4	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.58E+02	1	-1.58E+02	-1	1.50E+00	0.9659	-1.50E+00	-0.966	1.30E+01
5	5	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.41E+02	1	-1.41E+02	-1	1.34E+00	0.9419	-1.34E+00	-0.942	1.27E+01
6	6	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.29E+02	1	-1.29E+02	-1	1.22E+00	0.9163	-1.22E+00	-0.916	1.24E+01
7	7	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.19E+02	1	-1.19E+02	-1	1.13E+00	0.8907	-1.13E+00	-0.891	1.20E+01
8	8	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.12E+02	1	-1.12E+02	-1	1.06E+00	0.8659	-1.06E+00	-0.866	1.17E+01
9	9	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.05E+02	1	-1.05E+02	-1	9.99E-01	0.8422	-9.99E-01	-0.842	1.14E+01
10	10	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	9.99E+01	1	-9.99E+01	-1	9.47E-01	0.8197	-9.47E-01	-0.82	1.11E+01
11	11	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	9.52E+01	1	-9.52E+01	-1	9.03E-01	0.7986	-9.03E-01	-0.799	1.08E+01
12	12	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	9.12E+01	1	-9.12E+01	-1	8.65E-01	0.7787	-8.65E-01	-0.779	1.05E+01
13	13	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	8.76E+01	1	-8.76E+01	-1	8.31E-01	0.7601	-8.31E-01	-0.76	1.03E+01
14	14	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	8.44E+01	1	-8.44E+01	-1	8.01E-01	0.7425	-8.01E-01	-0.743	1.00E+01
15	15	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	8.15E+01	1	-8.15E+01	-1	7.74E-01	0.726	-7.74E-01	-0.726	9.80E+00
16	16	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	7.90E+01	1	-7.90E+01	-1	7.49E-01	0.7105	-7.49E-01	-0.711	9.59E+00
17	17	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	7.66E+01	1	-7.66E+01	-1	7.27E-01	0.6959	-7.27E-01	-0.696	9.39E+00
18	18	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	7.44E+01	1	-7.44E+01	-1	7.06E-01	0.6821	-7.06E-01	-0.682	9.21E+00
19	19	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	7.25E+01	1	-7.25E+01	-1	6.87E-01	0.669	-6.87E-01	-0.669	9.03E+00
20	20	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	7.06E+01	1	-7.06E+01	-1	6.70E-01	0.6566	-6.70E-01	-0.657	8.86E+00



Calc	Value	
v	1.08E-03	m/d
Rc	3.62E+03	
u	2.98E-07	m/d

Calculations for source located at top of aquifer (ie vertical dispersion in one direction only) - USED FOR LEVEL ASSESSMENT

	X	Term 1	Term 2	EXP	Term 3	ERFC	Term 4A	ERF	Term 4B	ERF	Term 5A	ERF	Term 5B	ERF	Concentration
	m														
1	1	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	3.16E+02	1	-3.16E+02	-1	5.99E+00	1	-5.99E+00	-1	1.35E+01
2	2	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	2.23E+02	1	-2.23E+02	-1	4.24E+00	1	-4.24E+00	-1	1.35E+01
3	3	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.82E+02	1	-1.82E+02	-1	3.46E+00	1	-3.46E+00	-1	1.35E+01
4	4	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.58E+02	1	-1.58E+02	-1	3.00E+00	1	-3.00E+00	-1	1.35E+01
5	5	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.41E+02	1	-1.41E+02	-1	2.68E+00	0.9998	-2.68E+00	-1	1.35E+01
6	6	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.29E+02	1	-1.29E+02	-1	2.45E+00	0.9995	-2.45E+00	-0.999	1.35E+01
7	7	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.19E+02	1	-1.19E+02	-1	2.26E+00	0.9986	-2.26E+00	-0.999	1.35E+01
8	8	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.12E+02	1	-1.12E+02	-1	2.12E+00	0.9973	-2.12E+00	-0.997	1.35E+01
9	9	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	1.05E+02	1	-1.05E+02	-1	2.00E+00	0.9953	-2.00E+00	-0.995	1.34E+01
10	10	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	9.99E+01	1	-9.99E+01	-1	1.89E+00	0.9926	-1.89E+00	-0.993	1.34E+01
11	11	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	9.52E+01	1	-9.52E+01	-1	1.81E+00	0.9894	-1.81E+00	-0.989	1.34E+01
12	12	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	9.12E+01	1	-9.12E+01	-1	1.73E+00	0.9856	-1.73E+00	-0.986	1.33E+01
13	13	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	8.76E+01	1	-8.76E+01	-1	1.66E+00	0.9812	-1.66E+00	-0.981	1.32E+01
14	14	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	8.44E+01	1	-8.44E+01	-1	1.60E+00	0.9765	-1.60E+00	-0.976	1.32E+01
15	15	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	8.15E+01	1	-8.15E+01	-1	1.55E+00	0.9713	-1.55E+00	-0.971	1.31E+01
16	16	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	7.90E+01	1	-7.90E+01	-1	1.50E+00	0.9659	-1.50E+00	-0.966	1.30E+01
17	17	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	7.66E+01	1	-7.66E+01	-1	1.45E+00	0.9601	-1.45E+00	-0.96	1.30E+01
18	18	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	7.44E+01	1	-7.44E+01	-1	1.41E+00	0.9542	-1.41E+00	-0.954	1.29E+01
19	19	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	7.25E+01	1	-7.25E+01	-1	1.37E+00	0.9481	-1.37E+00	-0.948	1.28E+01
20	20	1.68725	0.00E+00	1.00E+00	-2.18E+46	2	7.06E+01	1	-7.06E+01	-1	1.34E+00	0.9419	-1.34E+00	-0.942	1.27E+01



Date:	24/02/2020
Version:	1

Rodgers Leask Limited & Rodgers Leask Environmental Limited
01332 285000 • rlderby@rodgersleask.co.uk • **rodgersleask.co.uk**
St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ
Seven House, 18 High Street, Longbridge, Birmingham B31 2UQ

Appendix D – Phase 4E CWDQRA

Technical Note

Project:	P18-669 Llanwern – Phase 4E		
Subject:	Phase 4E Controlled Waters Detailed Quantitative Risk Assessment Addendum		
Prepared by:	Aimee Meredith-Smith – Geo-Environmental Consultant	**Date:**	May 2026
Authorised by:	Chris Wilson – Principal Geo-Environmental Consultant	**Status:**	S2 - Information
Document Ref:	18669-RLL-26-XX-RP-O-0865	**Revision:**	P01

1 Introduction

1.1 General

Rodgers Leask Ltd (RLL) has been commissioned by Brighton STM Developments Limited (BSTMDL) to develop a phase specific addendum Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) to assess the potential risk to Controlled Waters for Phase 4E of the Glan Llyn development at Llanwern, Newport (herein referred to as the Site).

In July 2024 the Client, St Modwen Developments was rebranded to be called Revantage Real Estate, then Brighton STM Developments Limited. Any reference to the previous company name in this report should be referred to accordingly.

1.2 Purpose

This report has been prepared to support the discharge of Planning Condition 27 of the Outline Planning Permission Reference 06/0471 for the proposed development of residential development Phase 4E as part of a wider mixed-use development at Llanwern, Newport.

Planning Condition 27 states the following.

"(27) Prior to the commencement of each phase of development as defined by Condition 03 (or at such other date or stage in development or for such specified activities or works as may be agreed in writing with the Local Planning Authority), the following components of a scheme to deal with the risks associated with contamination relating to that phase or activity shall each be submitted to and approved, in writing, by the Local Planning Authority:

(1) A preliminary risk assessment which has identified:

(a) all previous uses;
(b) potential contaminants associated with those uses;
(c) a conceptual model of the site indicating sources, pathways and receptors;
(d) potentially unacceptable risks arising from contamination at the site.

(2) A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off site.

(3) The site investigation results and the detailed risk assessment (2) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.

(4) A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in (3) are complete and identifying any requirements for longer term monitoring of pollutant linkages, maintenance and arrangements for contingency action. Any changes to these components require the express consent of the Local Planning Authority.

Reason: To ensure that the proposed development will not cause pollution of the environment or harm to human health."

1.3 Objectives and Scope

The objectives and scope of this report are to assess the soil chemical testing results obtained during previous ground investigations, within the Site, against the soil re-use criteria presented in H F Consulting's Soils Validation Strategy and to discuss the suitability of the soils for retention as part of the proposed remedial works.

1.4 Sources of Information

The following documents have been reviewed in preparation of this technical note, and should be read in conjunction with it:

- RLL, Updated Controlled Waters Detailed Quantitative Risk Assessment, Glan Llyn, ref. 18669-RLE-19-RP-O-0006, dated June 2022.
- H F Consulting, Glan Llyn: Soils validation strategy for protection of controlled waters (30937 R2), dated December 2024.RLL, Phase 4E Desk Study & Phase 2 Geo-Environmental Report, ref. 18669-RLL-26-XX-RP-O-0856-P01, dated May 2026.

2 Site Information

2.1 Site Setting

The Site is located within the Glan Llyn development at the former Llanwern Steelworks, approximately 5.5km to the east of Newport City Centre, at approximate National Grid Reference 336317E, 186693N. The wider Glan Llyn development covers approximately 250 hectares and is proposed to be redeveloped for residential, commercial and open space use.

The Site is irregular in shape, covers an area of approximately 1.5ha and is located near the centre of the wider Glan Llyn development. The Site historically housed, on its western side, part of a sinter plant and open space across much of the central, southern and eastern areas. In addition, roads are indicated to cross the Site in an approximate north to south orientation, and a conveyor and associated pipelines cross the northern section of the Site in an approximate east to west orientation. The Site was partially demolished by 2004 and fully demolished by 2021.

The Site boundary is shown on RLL Drawing 18669-RLL-24-XX-DR-O-0657-P01, and the site illustrative masterplan is presented on Drawing ref. 8111-08-A012, both presented in **Appendix A**.

2.2 Geology

Information pertaining to the underlying ground conditions at the Site has been obtained via the BGS Onshore Geoindex[1]. The published geological information shows the Site to be void of Made Ground. However, due to the Site's history, Made Ground is likely to be present associated with the previous development and subsequent demolition.

Superficial deposits are shown to comprise Tidal Flat Deposits.

Tidal Flat Deposits are described by the BGS as *'unconsolidated sediment, mainly mud and/ or sand. They may form the top surface of a deltaic deposit. Normally a consolidated soft silty clay, with layers of sand, gravel and peat.'*

The underlying bedrock is shown to be the Mercia Mudstone Group.

The Mercia Mudstone Group is described by the BGS as comprising '*predominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite bearing units in some basinal areas. Thin beds of gypsum/anhydrite are widespread; sandstones are also present*'.

[1] http://mapapps2.bgs.ac.uk/geoindex/home.html

There is an inferred fault approximately 700m northeast of the Site which trends roughly north to south and extends northwards away from Site.

2.3 Encountered Ground Conditions

Two previous ground investigations have been undertaken across the wider Glan Llyn development Site:

- IFA (2016) drilled 2 boreholes (one cable percussion one window sample)
- Atkins (2018) excavated 28 trial pits

Detailed information is available in the RLL Phase 4E Desk Study and Ground Investigation Report (**Appendix C**).

The following table provides a summary of the exploratory holes that were situated within the Site boundary.

Summary of Historical Exploratory Holes within the Site Boundary	
Report	**Exploratory Holes**
IFA (2016)	1 Dynamic Sample Borehole (CWWS31) and 1 Cable Percussion Borehole (CWCP31)
Atkins (2018)	28 Trial Pits (4GC1, 4GC2, 4GC3, 4GC4, 4GC5, 4GC6, 4GD1, 4GD2, 4GD3, 4GD4, 4GD5, 4GD6, 4GD7, 4GE1, 4GE2, 4GE3, 4GE4, 4GE5, 4GE6, 4GF1, 4GF2, 4GF3, 4GF4, 4GF5, 4GF6, 4GF7, 4GG5, 4GG6)

The ground investigation found the Site to be underlain by Made Ground to a maximum depth of 3.60m bgl overlying Tidal Flat Deposits.

Surfacing of tarmac was encountered in two locations from ground level to 0.15m.

The general Made Ground comprised the following types:

- occasionally ashy gravelly cobbly SAND;
- occasionally silty clayey gravelly SAND;
- occasionally clayey occasionally cobbly sandy GRAVEL; and
- occasionally gravelly occasionally sandy CLAY.

Gravel and cobble components typically comprised concrete, brick, iron ore, slag, mudstone, coke, tarmac, siltstone, steel slag and furnace slag.

Tidal Flat Deposits were generally described as fibrous PEAT; soft to firm silty CLAY; or occasionally clayey SILT with occasional rootlets.

The Mercia Mudstone Group was encountered in one location and described as silty CLAY (Mercia Mudstone Group Grade IVa).

2.4 Post-construction ground conditions

The following table provides an anticipated post-construction ground model.

Post-Development Ground Conditions		
Unit	**Approximate Depth (Depth mbgl)**	**Description**
Impermeable Construction Materials/ Housing Sub-base/Permeable Topsoil	0.6	Imported clean topsoil/ construction materials
Piling Mat*	0.5	Imported recycled 6F2 (*may be included within 600mm of construction materials)
Made Ground	1.5 – 2.0	re-engineered Made Ground
Tidal Flat Deposits	7.0 – 10.0	No change from current conditions
Bedrock (Mercia Mudstone Group)	>1,350	No change from current conditions

In accordance with the assumptions of the 2019 RLL CWDQRA, further mitigation to promote lateral flow is recommended, this will be in the form of a drainage blanket installation to cap the re-engineered Made Ground (including piling mat) which will increase the levels fall from the centre of a plot to periphery.

2.5 Historical Groundwater Monitoring and Wider Site Hydrogeology

A summary of pre-reclamation groundwater levels is presented in the Phase 4E Desk Study & Phase 2 Geo-Environmental Report. Groundwater levels recorded during the pre-reclamation ground investigations across the development suggest that the groundwater is present beneath the wider Glan Llyn development as follows:

- Shallow/ perched water within the Made Ground (shallow boreholes); and
- Groundwater within the Tidal Flat Deposits (confined to the basal sand layers) and Mercia Mudstone (deep boreholes).

The shallow perched water described above was recorded during pre-reclamation conditions. The earthworks for this phase include the re-engineering of the Made Ground, this shallow perched water shall no longer be present due to the engineering and compaction of Made Ground reducing the permeability.

Groundwater monitoring within the deep boreholes was in the solid geology, and hydraulic continuity between the upper perched shallow groundwater and 'regional'

groundwater was considered likely to be limited, due to low permeability strata (natural clay). Post-development, the excavation and re-compaction of the Made Ground was recognised as likely to reduce its permeability, lowering still further, the hydraulic continuity.

3 Controlled Waters Detailed Quantitative Risk Assessment

3.1 Introduction

In 2019 RLL was commissioned by St Modwen to prepare a Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) for the wider Glan Llyn development, report reference 18669-RLE-19-RP-O-0006, dated June 2022. This assessment was considered to be an update to and further development of Atkins Limited (Atkins), CWDQRA, Document Reference: 5111373-LLA-OUT-0257, Version: 3, dated February 2017.

The principal objective of the 2019 RLL CWDQRA, was to provide compliant future surface water flow contributions from private drainage system on the wider Glan Llyn development (following the redevelopment for mixed residential and commercial end use) upon entry into the Monks' Ditch. An important consideration in developing the CWDQRA was to improve sustainability and further limit the amount of material which requires off-site removal by improving soil chemical conditions to a degree that it would be suitable for reuse on site.

With the aim of generating a streamlined and consistent process for the Phase-by-Phase reporting process, in 2024 H Fraser Consulting Ltd. were commissioned to build on the findings of the CWDQRA and produce a Soils Validation Strategy for the Protection of Controlled Waters (30937 R2).

A summary of the reporting relating to controlled waters on the development are presented in the following sections.

The area of the development this assessment covers is known as Phase 4E, the Site area, is presented on RLL drawing reference 18669-RLE-19-XX-DR-O-0004 in **Appendix A**.

3.2 RLL CWDQRA Summary

In 2019 RLL prepared a Controlled Waters Detailed Quantitative Risk Assessment (CWDQRA) for the wider Glan Llyn development site. This assessment incorporated a comprehensive dataset of concentrations of contamination recorded in soils across the development, included data taken from the 2018 investigations within the Site. Screening analysis of soil, soil leachate, groundwater and surface water data revealed potential moderate to low levels of inorganic and organic contamination present across the wider site in line with contaminants associated with former steelworks sites.

The Made Ground generally comprises clayey sandy gravels with local slag, burnt shale, asphalt, concrete, brick and mudstone, and was identified to be a source of contamination. Calculation of representative re-use criteria for a residential with plant

uptake end use was undertaken using a dilution assessment methodology based on the site-wide water balance, incorporating site specific permeability and infiltration parameters. No allowance was made for dilution of discharged waters within Monks' Ditch itself as part of this calculation as, this being the receptor, it is proposed that the water quality in this Controlled Water be maintained (as far as possible) at EQS values.

Comparison of re-use criteria against available soil chemical testing established that a significant volume of the Made Ground was likely to be suitable for re-use onsite, however, localised source materials existed containing higher concentrations of contamination (particularly elevated concentrations of iron, manganese and vanadium), and ammoniacal and cyanide components, may require remediation, or offsite disposal.

Further modelling of these contaminants was undertaken using Remedial Target Methodology (RTM) to assess the potential extent of attenuation of these specific determinands within the ground where these soils may be placed, with the receiving surface waters being assumed to be existing Blueways (reens), which were considered as the Compliance Points. The compliance point for the Residential Development has been assigned to the point of discharge into the receptor Monks' Ditch and will require an enacted permit for discharge to occur.

Initial modelling was carried out by Atkins (Glan Llyn, Llanwern Controlled Waters Detailed Quantitative Risk Assessment dated February 2017), with this approach being adopted within later revisions of this Report in the Rodgers Leask, Controlled Waters Detailed Quantitative Risk Assessment, Glan Llyn (sitewide) Update (2019), using the Equation presented in the EA Table 5.2 – soil-water partitioning of the EA Remedial Targets Methodology Guidance (2006) where a pore-water concentration (Cp) was determined from soil concentration analyses to derive soil reuse criteria at the site as a whole. Subsequently, and purely to gauge the potential distance that re-engineered Made Ground could be placed from the respective Compliance Point(s), further modelling was carried out for specific determinands using the EA RT Excel Worksheets, based on maximum and average soils concentrations determined within samples of re-engineered Made Ground and available site derived data.

Further modelling was carried out for specific determinands (including specific PAHs) using the EA Remedial Target Excel Worksheets, based on maximum and average soils concentrations did indicate that there was little attenuation of the initial porewater PAH concentrations on migration within the re-engineered Made Ground toward the nearest reen Receptors. However, the presence of elevated porewater PAH concentrations was only theoretical and based on calculated values derived using the Equation presented in the EA Table 5.2 – soil-water partitioning of the EA Remedial Targets Methodology Guidance (2006). Actual PAH concentrations determined more recently in groundwater samples recovered (where sufficient groundwater was available for sampling purposes), were generally lower, and potentially significantly lower, than the calculated values which were derived using soils analyses data. Additionally, as previously mentioned, there was little evidence obtained of hydraulicly continuous groundwater horizon(s) within the re-

engineered Made Ground beneath areas proposed for residential and commercial development. Therefore, there has been no proven PAH (or other contaminant) migration pathways towards the reens.

As the data used within the CWDQRA has utilised ground investigation data taken from within the Site, it is therefore considered that the findings of this assessment are representative of the Site and therefore adoption of the calculated re-use criteria and recommendations presented within the CWQRA are appropriate.

3.3 HFCL Glan Llyn: Soils Validation Strategy for Protection of Controlled Waters

Following queries from Natural Resources Wales (NRW), H Fraser Consulting Limited (HFCL) were commissioned by RLL to assist with NRW liaison and reporting pursuant to the discharge of PC28. Following discussion with NRW, RLL and the developer, HFCL prepared a revised methodology for the validation of soils in relation to the protection of controlled waters.

The assessment does not rely on groundwater analysis, being dependent rather on soil re-use values. It included distance specific remedial targets that model the attenuation of contaminants in the saturated zone allowing for advection, dispersion, retardation and decay during transport. In addition to the inclusion of distance specific remedial targets, further statistical and spatial analysis was carried out on contaminants of concern.

More detail is provided in the HFC Glan Llyn: Soils Validation Strategy for the Protection of Controlled Waters (30937 R2).

4 Comparison of Phase 4E and CWDQRA Dataset

The dataset utilised in the RLL CWDQRA was taken from soil samples from the wider Glan Llyn development site which included the Site area. A comparison of the residential CWDQRA dataset with the soil samples taken from within the Site has been undertaken.

The purpose of this comparison is to establish if the residential dataset used in the CWDQRA is representative of concentrations of contamination present within Site and therefore whether the derived re-use criteria and recommendations of this assessment are applicable to the Site or whether further assessment is required.

4.1 Phase 4E Sampling

79 soil samples were collected from the Site during the 2018 Atkins ground investigation for contamination testing, taken from the Made Ground and Superficial Deposits. The works comprised trial pitting to collect soil samples for chemical analyses. Of the 79 soil samples collected, 52 were taken from the Made Ground and 27 of the natural ground (Tidal Flat Deposits).

The samples were analysed for heavy metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbon (TPH), gasoline range organics (GROs), BTEX, pH, soil organic matter (SOM), cyanide, phenols, ammoniacal nitrogen and select samples were also tested for asbestos.

4.2 Comparison of Results

The chemical soil results for both the Made Ground and natural superficial deposits analysed from Phase 4E have been compared to the sitewide dataset presented in the RLL CWDQRA, as shown in the following table. The table compares the maximum, average and 95th percentile concentrations for each determinand within Phase 4E against the sitewide dataset.

The Phase 4E data has been considered comparable with the sitewide dataset where the maximum, average and 95th percentile concentrations are less than or equal to the sitewide dataset. In limited cases where the Phase 4E dataset concentrations are greater than the sitewide dataset, these exceedances have been reviewed in the context of overall distribution to determine whether the dataset is broadly consistent with the sitewide dataset.

Determinand	Samples from Phase 4E – Residential Area			Samples from CWDQRA - Residential Area			Considered Representative of CWDQRA data (Yes/No)
	Maximum Soil Sample Value* (mg/kg)	Average Soil Sample Value* (mg/kg)	95th Percentile Soil Sample Value* (mg/kg)	Maximum Soil Sample Value (mg/kg)	Average Soil Sample Value* (mg/kg)	95th Percentile Soil Sample Value* (mg/kg)	
Inorganic Metals and Metalloids							
Arsenic	21.90	10.58	15.92	397.00	12.18	21.89	Y
Cadmium	16.90	0.48	1.41	31.30	0.65	2.37	Y
Chromium	695.00	63.68	276.30	3090.00	138.89	590.80	Y
Copper	356.00	23.31	43.42	1790.00	25.19	52.07	Y
Iron	452000.00	80465.95	231100.00	2390000	103039	277000	Y
Lead	276.00	41.80	107.70	4220.00	91.58	231.85	Y
Manganese	39500.00	4067.04	144000.00	408000	9574	33520	Y
Mercury	1.40	0.62	1.40	6.24	0.68	1.40	Y
Nickel	60.20	26.04	41.33	313.00	25.73	44.90	Y
Selenium	23.00	4.95	10.31	51.70	6.09	16.67	Y
Vanadium	2400.00	138.68	522.60	2880.00	206.93	693.10	Y
Zinc	1680.00	167.03	357.50	13300.00	291.45	784.75	Y
Other Inorganics							
Ammoniacal Nitrogen	1590.00	102.24	441.60	1590.00	60.97	263.00	Y
Cyanide	7.38	1.26	2.45	272.00	2.32	4.05	Y
Organics							
Benzene	1.80	0.12	0.18	0.12	0.04	0.04	N
Toluene	1.4	0.09	0.07	0.07	0.01	0.02	N
Ethylbenzene	0.80	0.05	0.04	0.02	0.01	0.01	N
Xylene	2.00	0.13	0.10	0.11	0.01	0.01	N
Phenol	0.01	0.01	0.01	1.21	0.02	0.03	Y
TPH Criteria Working Group							
Aliphatics >C5-C6	0.08	0.02	0.02	0.92	0.03	0.04	Y
Aliphatics >C6-C8	0.19	0.03	0.07	3.32	0.04	0.09	Y
Aliphatics >C8-C10	0.24	0.03	0.06	74.20	0.20	0.12	Y
Aliphatics >C10-C12	1.73	0.04	0.06	987.00	2.55	0.35	Y
Aliphatics >C12-C16	10.80	1.45	5.15	514.00	5.26	16.47	Y
Aliphatics >C16-C21	373.00	15.38	47.65	3530.00	26.92	83.07	Y
Aliphatics >C21-C35	399.00	43.17	145.60	2980.00	64.53	174.70	Y
Aliphatics >C35-C44	77.80	11.89	43.78	913.00	20.37	68.99	Y
Aromatics >EC5-EC7	0.02	0.02	0.02	5.26	0.03	0.04	Y
Aromatics >EC7-EC8	0.04	0.02	0.02	20.30	0.05	0.04	Y
Aromatics >EC8-EC10	0.16	0.02	0.04	49.50	0.14	0.10	Y
Aromatics >EC10-EC12	1.16	0.04	0.04	658.00	1.71	0.24	Y
Aromatics >EC12-EC16	21.40	2.39	11.05	5280.00	13.62	24.72	Y
Aromatics >EC16-EC21	134.00	13.72	72.71	9800.00	56.85	165.55	Y
Aromatics >EC21-EC35	482.00	64.23	218.30	9010.00	122.76	440.85	Y
Aromatics >EC35-EC44	156.00	24.49	75.82	1580.00	40.69	150.00	Y
Polyaromatic Hydrocarbons							
Acenaphthylene	1.20	0.10	0.28	2100.00	3.08	3.18	Y
Acenaphthene	1.14	0.04	0.08	193.00	0.47	0.41	Y
Anthracene	3.03	0.16	0.48	1860.00	3.61	5.48	Y
Benz(a)anthracene	5.81	0.53	1.74	1150.00	4.64	1.61	Y
Benzo(a)pyrene	5.58	0.54	1.86	714.00	3.73	10.58	Y
Benzo(b)fluoranthene	7.74	0.84	2.97	1110.00	5.28	15.87	Y

Determinand	Samples from Phase 4E – Residential Area			Samples from CWDQRA - Residential Area			Considered Representative of CWDQRA data (Yes/No)
	Maximum Soil Sample Value* (mg/kg)	Average Soil Sample Value* (mg/kg)	95th Percentile Soil Sample Value* (mg/kg)	Maximum Soil Sample Value (mg/kg)	Average Soil Sample Value* (mg/kg)	95th Percentile Soil Sample Value* (mg/kg)	
Benzo(k)fluoranthene	2.75	0.29	0.96	373.00	2.08	5.96	Y
Benzo(g,h,i)perylene	3.95	0.43	1.39	333.00	2.51	7.27	Y
Chrysene	5.37	0.52	1.56	1090.00	4.22	11.47	Y
Dibenzo(a,h)anthracene	1.26	0.12	0.36	177.00	0.74	1.86	Y
Indeno(1,2,3-cd)pyrene	3.73	0.41	1.33	374.00	2.61	7.46	Y
Fluoranthene	12.80	0.93	3.15	2940.00	11.59	29.56	Y
Fluorene	1.84	0.08	0.16	1890.00	2.81	2.72	Y
Naphthalene	5.10	0.27	0.93	4680.00	10.98	5.66	Y
Phenanthrene	9.17	0.55	1.79	3810.00	9.79	18.03	Y
Pyrene	9.83	0.76	2.48	1.95	0.01	0.03	Y

A review of the datasets has shown that the contaminants largely show similar or lower concentration ranges for the Site and for the wider Glan Llyn development site utilised within the CWDQRA. The results are therefore considered to be representative of the levels of contamination present within the Site and therefore adoption of the calculated re-use criteria and recommendations presented within the CWDQRA are appropriate for the Site.

Occasional contaminants have higher 95th percentile concentrations within the Site when compared to the DQRA dataset, however given the marginal difference this is not considered to affect the conclusions of the CWDQRA.

Contaminants benzene, toluene, ethylbenzene and xylene (sum) for the Site are shown to have higher maximum, average and 95th percentile concentrations when compared to the DQRA dataset. The detection limits for the tested determinands listed by the laboratory were higher than the respective values presented in the DQRA dataset, as summarised in the table below, and as a result caused a significant skew in the results.

Determinand	Laboratory Detection Limit (mg/kg)
Benzene	<0.09, <0.18, <1.80
Toulene	<0.07, <0.14, <1.40
Ethylbenzene	<0.04, <0.80
M & p-Xylene	<0.10, <2.00
o-Xylene	<0.10, <2.00

Where samples are reported at the detection limit, for screening purposes, it has been conservatively assumed that the value is that of the detection limit. The true concentration is likely to be significantly lower than this value.

In addition, given the values were lower than the relevant reuse criteria, their relatively low mobility and the distance of the Site from existing and future surface waters then it

is considered that this shouldn't have a detrimental impact on the conclusions of the CWDQRA.

4.3 Comparison to H Fraser Consulting re-use criteria

The samples collected from the Made Ground on the Site, as part of the Atkins ground investigation, have subsequently been assessed against the H F Consulting agreed soil re-use values for a residential end use as outlined in the Soils Validation Strategy for the Protection of Controlled Waters. A summary of exceedances is presented in the table below, and the chemical screening results are presented in full in **Appendix B**.

Summary of Exceedances of H Fraser Consulting Reuse Criteria for a Residential End Use				
Contaminant	**No. of Exceedances**	**Location of Exceedances (Depth in m)**	**Concentration Range (mg/kg)**	**Screening Value (mg/kg)**
Cyanide (Total)	5	4G-E1 (0.50), 4G-D5 (0.50), 4G-D6 (0.60), 4G-D7 (0.60)	1.00 – 7.38	2.02
Manganese	1	4G-F3 (0.60)	164.00 – 39500.00	33300.00
Vanadium	1	4G-C7 (0.50)	8.23 – 2400.00	1606.00
Fluoranthene	2	4G-C1 (1.00), 4G-E6 (0.30)	0.02 – 12.80	6.64
Benzo[b]fluoranthene	3	4G-C1 (1.00), 4G-F1 (0.50), 4G-E6 (0.30)	0.02 – 7.74	3.42

The results show that total cyanide, ammoniacal nitrogen, manganese, vanadium, fluoranthene and benzo[b]fluoranthene are in exceedances of the reuse criteria. The location of exceedances within the Made Ground are shown on RLL Drawing 18669-RLL-26-XX-DR-O-0861-P01, **Appendix A**.

Recorded exceedances of cyanide, manganese, vanadium, fluoranthene and benzo[b]fluoranthene shall be managed, via the earthworks operation, in accordance with the HFC Glan Llyn: Soils Validation Strategy for the Protection of Controlled Waters.

Soil chemical testing certificates are presented within the RLL Phase 4E Desk Study and Ground Investigation Report (18669-RLL-26-XX-RP-O-0856-P01).

5 Conclusion

In 2021 RLL submitted a CWDQRA for the wider Glan Llyn development site. This assessment incorporated a comprehensive dataset of concentrations of contamination recorded in soils across the development. Further assessment has been undertaken comparing soil concentrations recorded within the Site area with those of the wider residential Glan Llyn development site used in the CWDQRA.

This assessment has concluded that the dataset used in the CWDQRA is largely representative of the levels of contamination present within the Site and therefore adoption of the calculated re-use criteria and recommendations presented within the CWDQRA are appropriate for the Site.

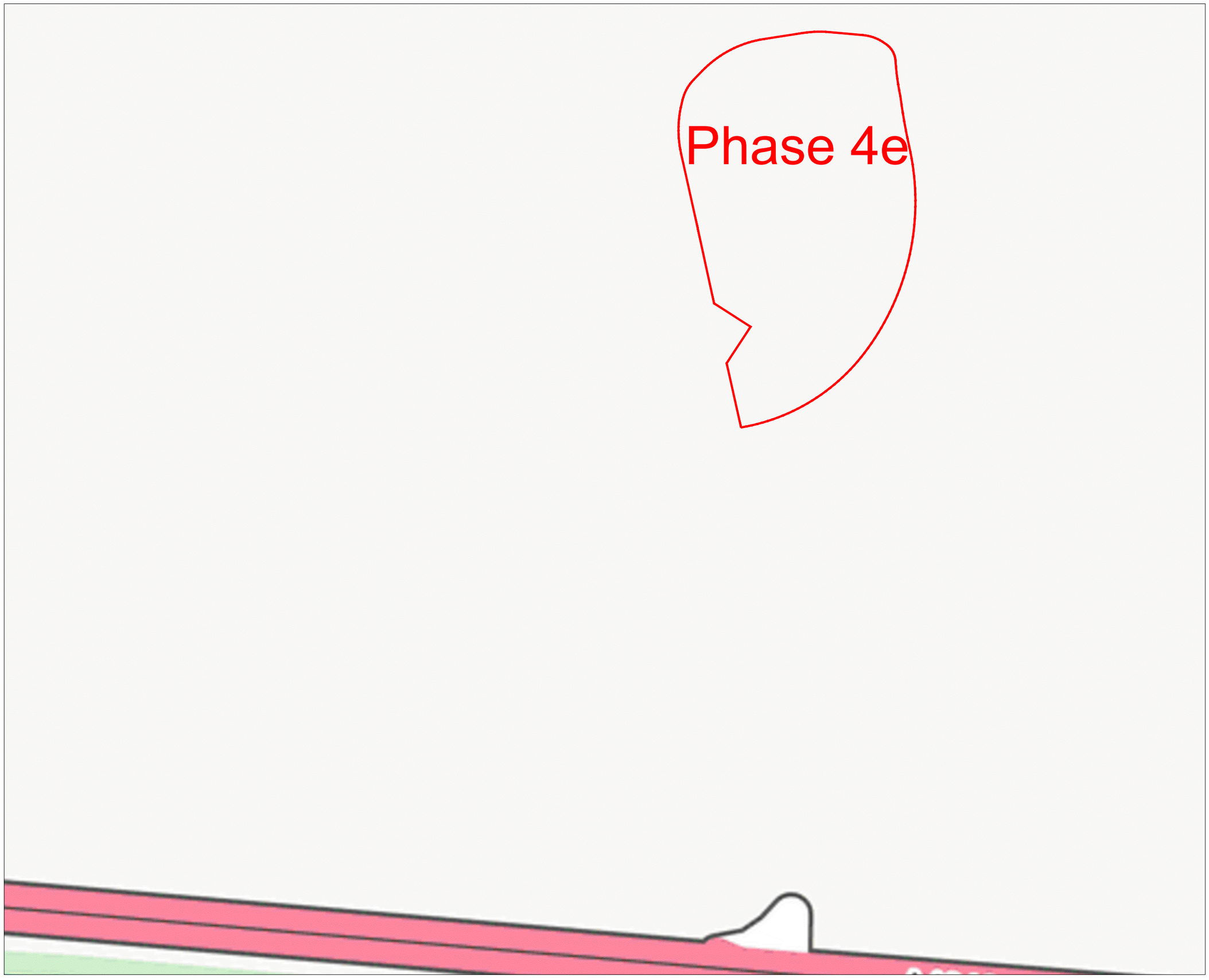
Following an assessment of soil chemical testing data from within the Site, exceedances of the reuse criteria for total cyanide, manganese, vanadium, fluoranthene and benzo[b]fluoranthene have been identified that may represent a risk to Controlled Waters.

The soil reuse criteria have been conservatively calculated considering only dilution of contamination by intercepted surface water from the finished development. In reality subsurface degradation and attenuation will occur as these contaminants migrate laterally though the ground, further reducing concentrations prior to dilution within the on-site private drainage system.

It is recommended that further delineation and assessment of the identified exceedances of total cyanide, ammoniacal nitrogen, manganese, vanadium, fluoranthene and benzo[b]fluoranthene (as shown on RLL Drawing 18669-RLL-26-XX-DR-O-0861-P01) are undertaken as part of the remediation works, with unsuitable material being removed as necessary, in order to ensure that they do not present a risk to controlled waters.

A Remediation Strategy has been prepared for Phase 4E (18669-RLL-26-XX-RP-O-0858-P01) outlining required remedial measures for the Site.

Appendix A: Drawings



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

Approximate Site Boundary

Rev	Date	Amendments	By	Chk

Client

St Modwen Developments

Project

P18-669 Llanwern Reclamation

Drawing Title

Phase 4e

Site Location Plan

INFORMATION

	Drawn	Checked	Date
1:1250 @ A1	AMS	CW	28.10.24

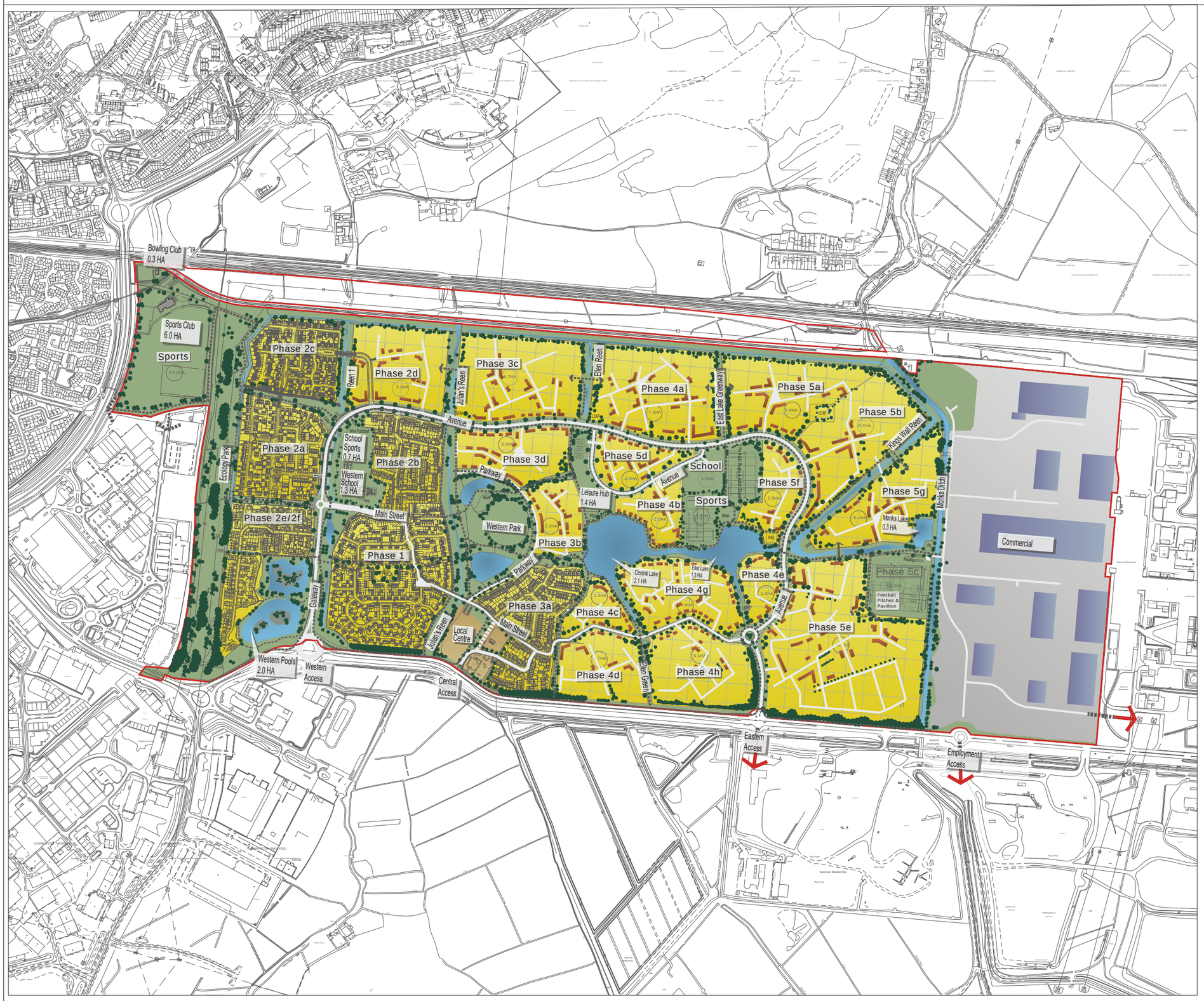
Drawing No. | Rev.

18669-RLL-24-XX-DR-O-0657 P01

Copyright © Rodgers Leask Limited

Seven House ● 18 High Street ● Longbridge ● B31 2UQ ● Tel: 0121 475 8462 ● Fax: 01332 291728 ● www.rodgersleask.co.uk

Glan Llyn -ESAMP Indicative Masterplan



Glan Llyn Residential Numbers (based on existing masterplan)					
Phase/Plot	Outlet	Area (HA)	Area (Acres)	Density (HA)	Total Units
1	Persimmon	**9.77**	**24.15**	31.4	307
2/a	Bellway	5.20	12.84	35	182
2/b	SMH	4.06	10.02	35	142
2/c	Bellway	4.30	10.62	35.3	152
2/d	Persimmon	4.98	12.30	35	174
2/e&f	SMH	5.10	12.61	29.8	152
1 and 2/Total		**33.40**	**82.54**		**1109**
3a		5.86	14.49	35	205
3b		2.32	5.74	35	81
3c		6.72	16.60	38.1	256
3d		3.45	8.53	35	121
3 Total		18.36	45.36		663
4a		7.19	17.78	34.8	250
4b		2.04	5.04	35	71
4c		1.53	3.78	35	54
4d		3.65	9.03	35	128
4e		1.49	3.68	35	52
4f		-	-	-	-
4g		4.64	11.46	35	162
4h		5.15	12.73	35	180
5a		5.65	13.95	35	198
5b		6.23	15.41	35	218
5c	Sports	2.67	6.60	35	93
5d		2.24	5.53	35	78
5e		13.72	33.90	35	480
5f		2.49	6.15	35	87
5g		5.06	12.50	35	177
4 and 5/Total		**63.75**	**157.53**		**2230**
1,2,3,4,5 Total		**115.51**	**285.44**		**4002**

NOTE: Areas and housing numbers assume that plot 5c sports is moved to CBP and converted to resi

SGP
Architects + Masterplanners

Waterfront House,
2a Smith Way, Grove Park,
Enderby, Leicester,
LE19 1SX
t: +44 (0)116 247 0557
www.stephengeorge.co.uk

SGP File Ref: 8111-08-A011
Project No: 8111-08
Drawn By: NV
Date: 10/04/2019

Drawing No: 8111-08-A011
Rev: Rev P09
Scale: 1:5000 @A1

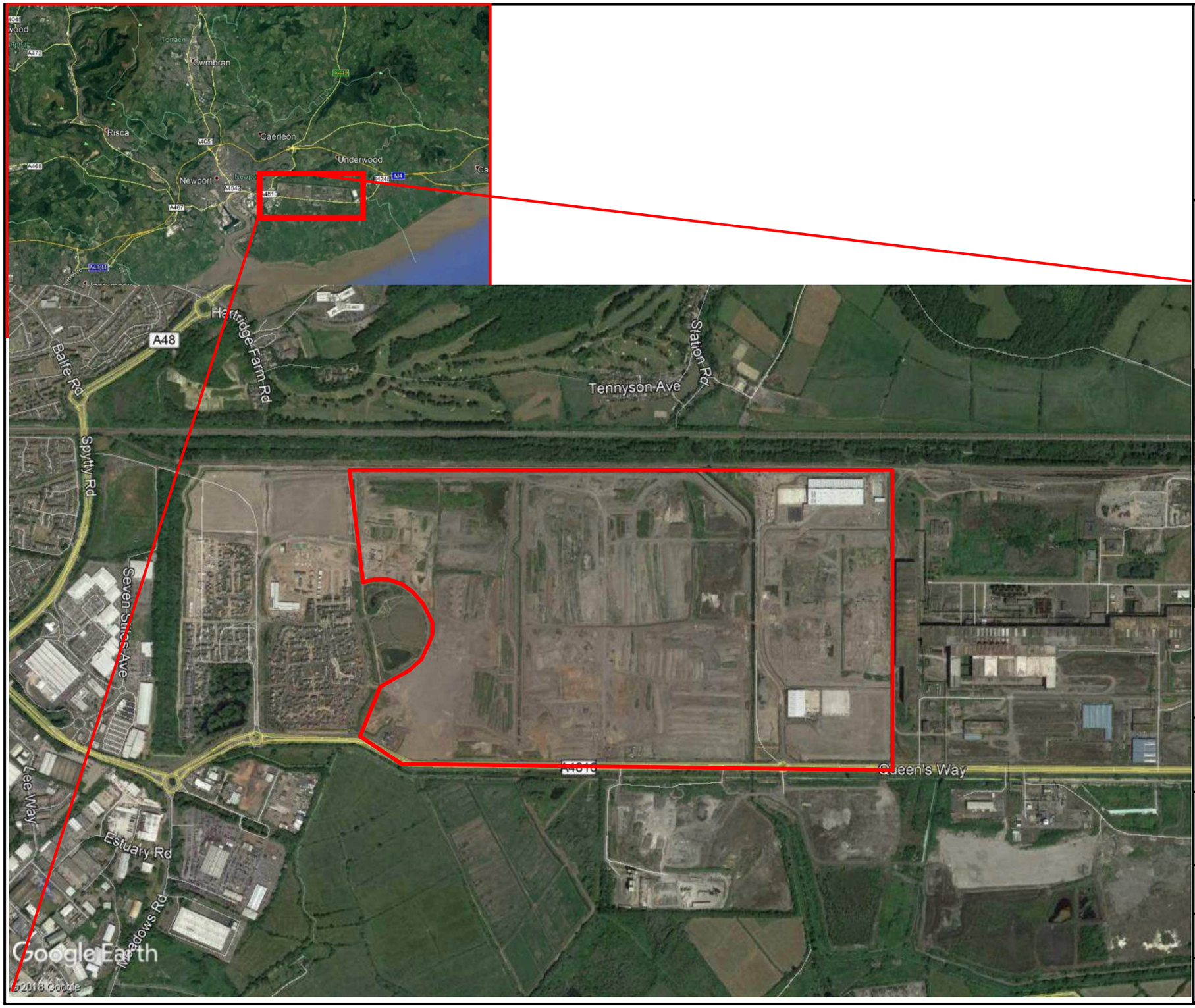
Notes:
Residential areas quoted are approximate gross site areas and include Leaps, Laps and on plot road infrastructure

Notes:
Residential areas quoted are approximate gross site areas and include Leaps, Laps and on plot road infrastruclayture

0 50 100 200 250 300 400 500
Metres at scale 1:5000

ST.MODWEN

This drawing, the works and concepts depicted are copyright of Stephen George + Partners LLP and may not be reproduced or made use of, either directly or indirectly without express written consent. Do not scale off this drawing. All heights, levels, sizes and dimentions to be checked on site before any work is put to hand.





GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT RCHITECTS AND ENGINEER'S DRAWINGS

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY

Key

Redline boundary

RLRE

CLIENT

ST. MODWEN DEVELOPMENTS

PROJECT

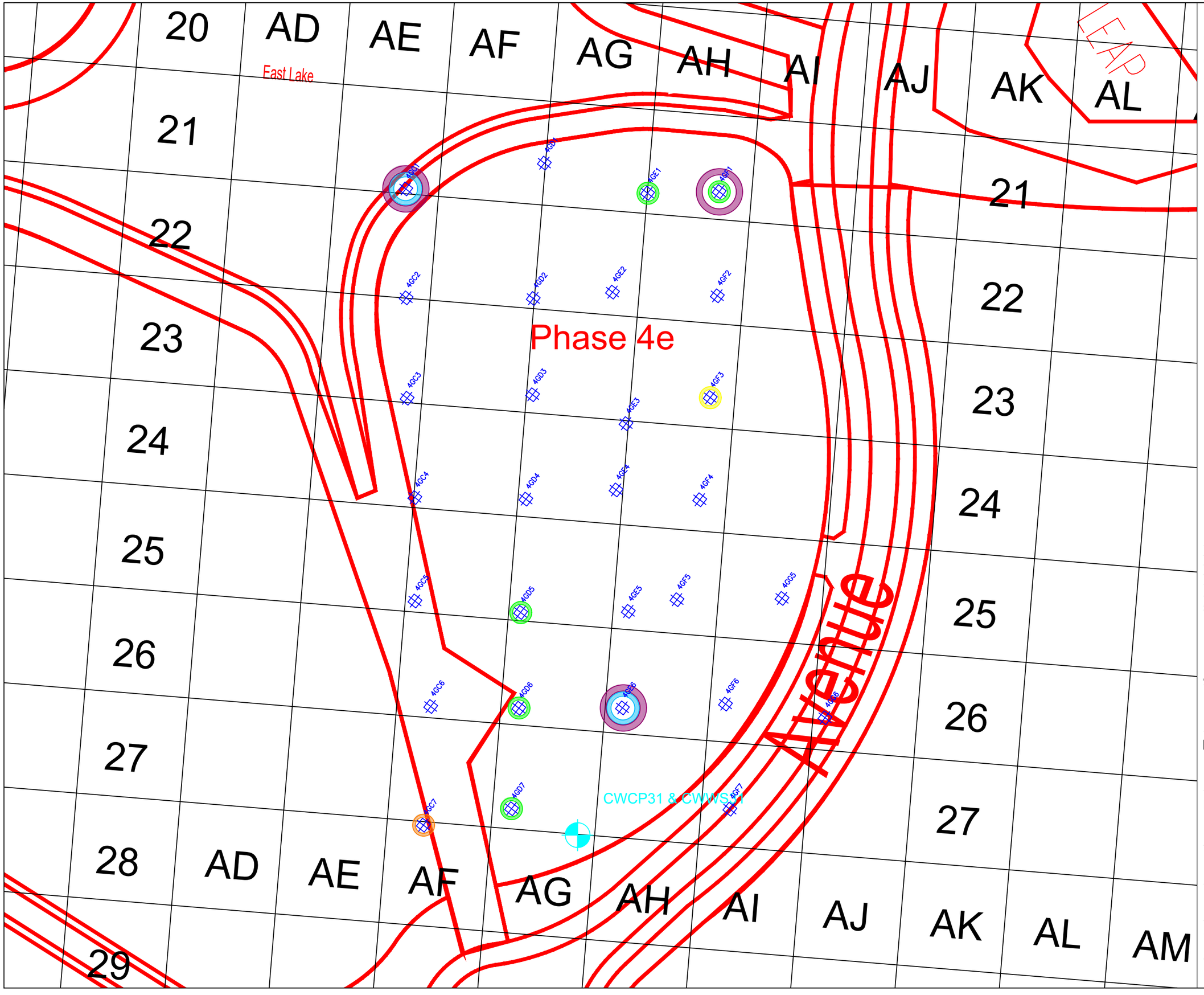
LLANWERN SITE LOCATION PLAN

STATUS

FOR INFORMATION

DRAWN	CHECKED	DATE
ET	CW	19/08/2019

PROJECT NUMBER	DRAWING NUMBER	REV.
P18-669	18669-RLE-19-XX-DR-O-0004	



GENERAL NOTES

NO DIMENSIONS TO BE SCALED OFF THIS DRAWING.

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S AND ENGINEER'S DRAWINGS.

ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.

ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.

KEY:

- PHASE BOUNDARY
- CWRA BOREHOLE
- ATKINS TRIAL PITS
- CYANIDE (TOTAL)
- MANGANESE
- VANADIUM
- FLUORANTHENE
- BENZO[B]FLUORANTHENE

Rev	Date	Amendments	By	Chk
P01	01/06/2026	Amended positions	AMS	CW
P01	04/03/2026	First Issue	AMS	CW

Client

Revantage Real Estate

Project

P18-669 Llanwern Reclamation

Drawing Title

Phase 4E Exploration Hole HFC SRVs

Exceedance Location Plan

INFORMATION

	Drawn	Checked	Date
NTS	AMS	CW	04/03/26

Drawing No. Rev.

18669-RLL-26-XX-DR-O-0861 P01

Copyright © Rodgers Leask Limited

1/100A Woodlands Court • Ash Ridge Road • Bristol • B32 4LB • Tel: 01332 285 000 • www.rodgersleask.co.uk

Appendix B: Chemical Screening

18-669 Llanwern Phase 4E Soil Chemical Screening

Project: P18-669																																
Client: Rodgers Leask Environmental					**Job No.:**																											
Quotation No.: Q21-24056					**Sample ID.:**																											
Order No.: .					Client Sample Ref.:																											
					Sample Type:	**HFC Soil Re-Use Criteria (Residential)**	**Number of Exceedances**	**Maximum Concentration Check**	**Minimum Exceedance Concentration**	**95th Percentile Concentration**	**95th Percentile Check**	**Maximum Concentration**	**Average Concentration**	**Minimum Concentration**	181103-16	181103-16	181103-16	181103-16	181103-16	181103-16	181106-25	181106-25	181106-25	181106-25	181106-25	181106-25	181106-25	181106-25	181108-13	181108-13	181108-13	181108-13
					Top Depth (m):										4G-C1	4G-C1	4G-C1-V	4G-C2	4G-C2	4G-C2-V	4G-C3	4G-C3	4G-C4	4G-C4	4G-C4-V	4G-C5	4G-C5	4G-C5-V	4G-D2	4G-D2	4G-D2-V	4G-E2
					Bottom Depth (m):										18660995	18661004	18661009	18661027	18660971	18660978	18673492	18673554	18673566	18673570	18673574	18673578	18673584	18673593	18689483	18689487	18689421	18689474
					Date Sampled:										SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
					Asbestos Lab:										0.40-0.40	1.00-1.00	2.20-2.20	0.50-0.50	1.00-1.00	2.30-2.30	0.50-0.50	1.00-1.00	0.30-0.30	0.80-0.80	2.10-2.10	0.70-0.70	1.20-1.20	1.90-1.90	0.40-0.40	0.80-0.80	1.80-1.80	0.80-0.80
															02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018	02/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	05/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																												
ACM Type	U	2192		N/A												Amosite (Brown) Asbestos											Amosite (Brown) Asbestos					
Asbestos Identification	U	2192		N/A												Detected			Not Detected		Not Detected			Not Detected			Detected		Not Detected			Not Detected
Asbestos by Gravimetry	U	2192	%	0.001												0.0074											<0.001					
Total Asbestos	U	2192	%	0.001												0.0077											<0.001					
Moisture	N	2030	%	0.020											7.3	10	24	11	8.1	24	7.7	9.5	16	11	24	13	11	23	12	15	22	11
Soil Colour	N	2040		N/A											Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Grey	Dark Brown	Dark Brown	Black	Dark Brown	Black	Black	Dark Brown	Dark Brown	Black	Dark Brown	Grey	Dark Brown
Other Material	N	2040		N/A											Glass & Stones	Stones	None	Stones	Stones	None	Stones	Stones	Stones	Stones	Stones	Stones	Stones	Vegetation	Stones	Stones	None	Vegetation
Soil Texture	N	2040		N/A											Sandy Loam	Sandy Loam	Clay	Sandy Loam	Sandy Loam	Clay	Loamy Sand	Loamy Sand	Loamy Sand	Sandy Loam	Sandy Clay	Sand	Loamy Sand	Sandy Loam	Sand	Sandy Loam	Clay	Sand
pH	M	2010		4.0											11.6	10.7	7.87	11.3	11.4	7.84	10.9	11.3	11.3	11.2	7	11.4	12	8.12	8.85	8.93	8.08	8.34
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	5	7.38	2.41	2.45	2.45	7.38	1.26	1.00	<1	<2	<1	<1	<1	<1	<1	<1	1.27	1.02	<1	1.64	<1	<1	<1	1.96	<1	<1	<1
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	12	1590.00	155.00	441.60	441.60	1590.00	102.24	12.00	<12	<12	274	<12	<12	136	<12	<12	<12	20.3	134	<12	<12	79.3	<12	<12	76	<12
Iron (Total)	N	2430	mg/kg	100			452000.00	7810.00	231100.00	231100.00	452000.00	80465.95	7810.00	101000	88200	40000	90200	260000	38700	91600	49500	49100	48100	29900	35600	17200	34400	190000	36800	37800	32900
Arsenic	M	2450	mg/kg	1	2533	0	21.90	0.00	15.92	no exc.	21.90	10.58	2.38	9.5	<6	11.3	11.7	7.34	14.5	11.6	9.95	9.69	9.25	10.8	10.9	6.62	13.4	14.5	8.79	12.8	16.5
Cadmium	M	2450	mg/kg	0.1	73	0	16.90	0.00	1.41	no exc.	16.90	0.48	0.02	1.11	<0.2	0.362	<0.02	<0.2	0.377	<0.2	0.775	0.702	<0.02	0.409	<0.02	0.0249	0.363	2.07	<0.02	<0.02	<0.02
Chromium	M	2450	mg/kg	1	9431	0	695.00	0.00	276.30	no exc.	695.00	63.68	0.90	139	30.3	34.4	116	114	31.7	256	99.4	104	12.6	40.1	14.4	25.6	33.2	81.7	56.7	29.5	11.2
Manganese	M	2450	mg/kg	5	3.33E+04	1	39500.00	39500.00	14000.00	no exc.	39500.00	4067.04	164.00	12100	3850	1310	10700	13700	1380	1230	9570	10300	2020	535	2070	2930	1270	7160	2960	1530	661
Copper	M	2450	mg/kg	0.5	451	0	356.00	0.00	43.42	no exc.	356.00	23.31	1.40	17.7	16.4	10.8	15.6	<14	11.7	21.6	22	32.8	14.1	24.8	20	8.24	11.4	34.4	23.6	9.12	42.6
Mercury	M	2450	mg/kg	0.1	132	0	no exc.	0.00	1.40	no exc.	1.40	0.62	0.14	<0.14	<1.4	<0.14	<0.14	<1.4	<0.14	<1.4	<0.14	0.268	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<1.4	<0.14	<0.14	<0.14
Nickel	M	2450	mg/kg	0.5	1.15E+04	0	60.20	0.00	41.33	no exc.	60.20	26.04	1.36	30.1	39.5	41.1	14.6	27.6	36.9	12.2	11.5	24.7	17.6	37.8	13.4	7.55	35.8	40.4	20.6	33.4	38.8
Lead	M	2450	mg/kg	0.5	1.57E+04	0	276.00	0.00	107.70	no exc.	276.00	41.80	3.57	44.7	49.8	27.7	42.5	<7	23.9	40.1	41.4	54.6	27.4	27	38.1	21.6	23.8	103	31.2	21	27.9
Selenium	M	2450	mg/kg	0.2	702	0	23.00	0.00	10.31	no exc.	23.00	4.95	1.00	3.67	<10	<1	4.15	<10	<1	<10	3.69	3.92	<1	<1	1.5	2.04	<1	<10	1.7	<1	<1
Vanadium	U	2450	mg/kg	5	1606	1	2400.00	2400.00	522.60	no exc.	2400.00	138.68	8.23	142	41.3	59.2	163	591	56	226	124	170	33.5	63.4	38.7	52.4	58.7	86.4	78.9	53.7	33.3
Zinc	M	2450	mg/kg	0.5	1.38E+05	0	1680.00	0.00	357.50	no exc.	1680.00	167.03	11.80	202	92.5	108	471	28.1	101	202	338	165	145	119	173	46.7	103	254	70.3	100	78.5
Organic Matter	M	2625	%	0.4			47.90	0.46	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	8.29	28.1	1.2	4.48	<0.35	0.957	1.81	3.83	10.1	1.31	4.5	34.1	12.6	1.3	38.1	6.6	0.741	17.6
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	0	no exc.	0.00	0.02	no exc.	0.08	0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0357	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359	0	no exc.	0.00	0.07	no exc.	0.19	0.03	0.01	0.0755	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.194	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	0	no exc.	0.00	0.06	no exc.	0.24	0.03	0.01	0.054	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.115	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	0	no exc.	0.00	0.06	no exc.	1.73	0.04	0.01	0.0583	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0656	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	0	10.80	0.00	5.15	no exc.	10.80	1.45	0.10	2.61	8.85	0.243	4.2	<0.1	<0.1	2.58	1.93	0.267	0.918	0.443	5.99	1.21	<0.1	<0.1	<0.1	<0.1	0.793
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	0	373.00	0.00	47.65	no exc.	373.00	15.38	0.10	29.4	33.2	0.376	42.4	5.33	<0.1	18.4	17.6	3.07	8.81	<0.1	27.1	7.45	<0.1	10.1	2.95	<0.1	0.835
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	0	399.00	0.00	145.60	no exc.	399.00	43.17	0.10	145	131	2.8	167	43.1	<0.1	198	399	18.7	14.9	1.22	151	21.3	<0.1	86.2	23.3	<0.1	4.1
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	0	77.80	0.00	43.78	no exc.	77.80	11.89	0.10	29.4	42.5	10.4	48.7	9.87	0.462	37.4	46.3	3.25	3.77	<0.1	43.5	2.38	<0.1	15.9	8.15	<0.1	<0.1
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5			531.00	0.46	235.30	235.30	531.00	71.78	0.10	207	215	13.8	262	58.3	0.462	256	465	25.2	28.4	1.67	227	32.3	<0.1	112	34.4	<0.1	5.73
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	0	no exc.	0.00	0.02	no exc.	0.02	0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	0	no exc.	0.00	0.02	no exc.	0.04	0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0449	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	0	0.16	0.00	0.04	no exc.	0.16	0.02	0.01	0.0356	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0759	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	0	1.16	0.00	0.04	no exc.	1.16	0.04	0.01	0.0388	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0437	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	0	21.40	0.00	11.05	no exc.	21.40	2.39	0.10	7.37	21.4	<0.1	7.44	2.01	0.363	4.04	1.7	1.11	0.302	<0.1	8.94	2.07	<0.1	3.46	1.45	0.608	0.782
Aromatic TPH >C16-C21	U	2680	mg/kg	1	1424	0	134.00	0.00	72.71	no exc.	134.00	13.72	0.10	28.9	103	<0.1	54.1	8.83	0.866	21.4	10.9	6.46	2.02	0.212	35.4	10.2	<0.1	19	4.41	1.39	1.36
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	0	482.00	0.00	218.30	no exc.	482.00	64.23	0.10	107	431	4.53	168	52.6	10.8	133	152	41.3	19.5	7.47	135	32.8	3.2	113	32.7	2.42	4.57
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	0	156.00	0.00	75.82	no exc.	156.00	24.49	0.10	48.8	128	0.892	70.3	26.9	7.35	63	40.7	14.2	14.3	1.11	40.7	9.99	<0.1	51.2	22	0.267	0.657
Total Aromatic Hydrocarbons	N	2680	mg/kg	5			736.00	1.49	324.20	324.20	736.00	104.78	0.10	192	683	5.43	300	90.3	19.4	222	205	63.1	36.1	8.8	220	55.1	3.2	187	60.5	4.69	7.37
Total Petroleum Hydrocarbons	N	2680	mg/kg	10			915.00	1.49	613.30	613.30	915.00	176.64	0.10	399	899	19.2	562	149	19.8	478	670	88.4	64.5	10.5	448	87.4	3.2	299	94.9	4.69	13.1
Benzene	M	2760	µg/kg	1	3800	0	314.00	0.00	180.00	no exc.	1800.00	119.37	90.00	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<180	<90	<90	<90
Toluene	M	2760	µg/kg	1	128000	0	140.00	0.00	73.80	no exc.	1400.00	89.09	70.00	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	108	<70	<70	140	<70	<70	<70
Ethylbenzene	M	2760	µg/kg	1	80000	0	80.00	0.00	40.00	no exc.	800.00	50.63	40.00	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	80	<40	<40	<40
m & p-Xylene	M	2760	µg/kg	1	74000.00	0	200.00	0.00	100.00	no exc.	2000.00	126.58	100.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	200	<100	<100	<100
o-Xylene	M	2760	µg/kg	1	74000.00	0	200.00	0.00	100.00	no exc.	2000.00	126.58	100.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	200	<100	<100	<100
Methyl Tert-Butyl Ether	M	2760	µg/kg	1			200.00	200.00	100.00	100.00	2000.00	126.58	100.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	200	<100	<100	<100
Naphthalene	M	2800	mg/kg	0.1	27.00	0	5.10	0.00	0.93	no exc.	5.10	0.27	0.01	0.469	0.855	<0.009	0.523	0.0501	0.0167	0.303	<0.09	0.131	0.0492	<0.009	0.909	0.224	<0.009	0.22	0.266	<0.009	0.051
Acenaphthylene	N	2800	mg/kg	0.1	16.70	0	no exc.	0.00	0.28	no exc.	1.20	0.10	0.01	0.195	0.488	<0.012	0.297	0.0155	<0.012	0.212	<0.12	0.0289	0.0145	<0.012	0.218	0.0659	<0.012	0.234	0.0679	<0.012	0.0146
Acenaphthene	M	2800	mg/kg	0.1	30.00	0	1.14	0.00	0.08	no exc.	1.14	0.04	0.01	0.0557	0.148	<0.008	<0.04	0.0202	<0.008	0.0515	<0.08	0.0221	<0.008	<0.008	0.0441	0.00959	<0.008	0.0527	<0.008	<0.008	<0.008
Fluorene	M	2800	mg/kg	0.1	27.00	0	1.84	0.00	0.16	no exc.	1.84	0.08	0.01	0.153	0.363	<0.01	0.15	0.0161	<0.01	0.16	<0.1	0.0358	<0.01	<0.01	0.157	0.0343	<0.01	0.0843	0.0188	<0.01	<0.01
Phenanthrene	M	2800	mg/kg	0.1	27.00	0	9.17	0.00	1.79	no exc.	9.17	0.55	0.02	1.34	4.99	<0.015	1.23	0.244	<0.015	1.41	0.276	0.388	0.13	<0.015	1.92	0.517	<0.015	1.78	0.167	<0.015	0.121
Anthracene	M	2800	mg/kg	0.1	34.00	0	3.03	0.00	0.48	no exc.	3.03	0.16	0.02	0.437	1.32	<0.016	0.345	0.064	<0.016	0.4	<0.16	0.104	0.0347	<0.016	0.472	0.215	<0.016	0.438	0.0409	<0.016	0.0187
Fluoranthene	M	2800	mg/kg	0.1	6.64	2	12.80	9.72	3.15	no exc.	12.80	0.93	0.02	2.5	9.72	<0.017	2.55	0.55	<0.017	3.04	0.391	0.785	0.288	<0.017	3.24	1.07	<0.017	3.14	0.31	<0.017	0.0971
Pyrene	M	2800	mg/kg	0.1	76.00	0	9.83	0.00	2.48	no exc.	9.83	0.76	0.02	2.02	7.88	<0.015	2.33	0.599	<0.015	2.61	0.449	0.707	0.271	<0.015	2.67	0.882	<0.015	2.28	0.266	<0.015	0.0774
Benzo[a]anthracene	M	2800	mg/kg	0.1	607.00	0	5.81	0.00	1.74	no exc.	5.81	0.53	0.01	1.3	5.81	<0.014	1.47	0.408	<0.014	1.71	0.218	0.646	0.245	<0.014	1.92	0.646	<0.014	1.53	0.214	<0.014	0.0609
Chrysene	M	2800	mg/kg	0.1	621.00	0	5.37	0.00	1.56	no exc.	5.37	0.52	0.01	1.22	4.83	<0.01	1.48	0.481	<0.01	1.54	0.261	0.647	0.261	<0.01	1.72	0.632	<0.01	1.38	0.231	<0.01	0.0818
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	3	7.74	4.89	2.97	no exc.	7.74	0.84	0.02	1.11	7.74	<0.015	2.29	0.718	<0.015	2.04	0.378	1.2	0.505	<0.015	2.94	0.762	<0.015	2.44	0.424	0.0244	0.062
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	0	2.75	0.00	0.96	no exc.	2.75	0.29	0.01	0.569	2.75	<0.014	0.644	0.292	<0.014	0.898	<0.14	0.465	0.167	<0.014	0.959	0.292	<0.014	0.885	0.137	<0.014	0.0251
Benzo[a]pyrene	M	2800	mg/kg	0.1	34.00	0	5.58	0.00	1.86	no exc.	5.58	0.54	0.02	1.1	5.58	<0.015	1.32	0.465	<0.015	1.85	0.261	0.906	0.364	<0.015	1.8	0.656	<0.015	1.52	0.275	<0.015	0.0531
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25.00	0	3.73	0.00	1.33	no exc.	3.73	0.41	0.02	0.697	3.73	<0.018	0.817	0.296	<0.018	1.15	<0.18	0.589	0.24	<0.018	1.3	0.447	<0.018	1.12	0.206	<0.018	0.0505
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838.00	0	1.26	0.00	0.36	no exc.	1.26	0.12	0.02	0.203	1.26	<0.023	0.244	0.077	<0.023	0.349	<0.23	0.164	0.0673	<0.023	0.361	0.126	<0.023	0.339	0.0578	<0.023	<0.023
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13.00	0	3.95	0.00	1.39	no exc.	3.95	0.43	0.02	0.812	3.95	<0.024	1.04	0.361	<0.024	1.34	<0.24	0.684	0.278	<0.024	1.37	0.503	<0.024	1.22	0.215	<0.024	0.0512
Total Of 16 PAH's	N	2800	mg/kg	2			73.10	0.20	20.47	20.47	73.10	6.49	0.12	14.2	61.4	<0.118	16.7	4.66	<0.118	19.1	2.23	7.5	2.92	<0.118	22	7.08	<0.118	18.7	2.89	<0.118	0.765
Resorcinol	M	2920	mg/kg	0.02			no exc.	0.00	#NUM!	#NUM!	0.00	#DIV/0!	0.00																			
Phenol	M	2920	mg/kg	0.02	3.05	0	0.01	0.00	0.01	no exc.	0.01	0.01	0.01	0.0108	<0.01	<0.01	<0.01	<0.01	<0.01	0.0108	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cresols	M	2920	mg/kg	0.02			0.01	0.01	0.01	0.01	0.01	0.01	0.01	<0.01	0.0111	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenols	M	2920	mg/kg	0.02			0.02	0.02	0.02	0.02	0.02	0.02	0.02	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.0217	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
1-Naphthol	N	2920	mg/kg	0.02			no exc.	0.00	#NUM!	#NUM!	0.00	#DIV/0!	0.00																			
Trimethylphenols	M	2920	mg/kg	0.02			no exc.	0.00	#NUM!	#NUM!	0.00	#DIV/0!	0.00																			
Total Phenols	M	2920	mg/kg	0.1			no exc.	0.00	0.04	0.04	0.04	0.04	0.04	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035

18-669 Llanwern Phase 4E Soil Chemical Screening

Project: P18-669																														
Client: Rodgers Leask Environmental			**Job No.:**		181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181108-13	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181107-11	181114-83	181114-83	181114-83	181114-83	181114-83
Quotation No.: Q21-24056			**Sample ID.:**		4G-E2-V	4G-E3	4G-E3-V	4G-F1	4G-F1	4G-F1-V	4G-F2	4G-F2-V	4G-F3	4G-F3	4G-F3-V	4G-C6	4G-C6	4G-C7	4G-C6-V	4G-C7-V	4G-D1	4G-D1	4G-D1-V	4G-E1	4G-E1	4G-E1-V	4G-D3	4G-D3	4G-D4	4G-D4	4G-D5
Order No.: .			Client Sample Ref.:		18689478	18689430	18689437	18689416	18689455	18689459	18689464	18689468	18689441	18689447	18689451	18681149	18681204	18681222	18681216	18681232	18681178	18681182	18681187	18681194	18681198	18681210	18733119	18733124	18733095	18733099	18733084
			Sample Type:		SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
			Top Depth (m):	**HFC Soil Re-Use Criteria (Residential)**	1.95-1.95	0.80-0.80	2.20-2.20	0.50-0.50	1.00-1.00	2.40-2.40	0.50-0.50	2.00-2.00	0.20-0.20	0.60-0.60	2.50-2.50	0.50-0.50	0.80-0.80	0.50-0.50	2.50-2.50	1.80-1.80	0.50-0.50	1.00-1.00	2.10-2.10	0.50-0.50	1.00-1.00	3.60-3.60	0.20-0.20	0.50-0.50	0.20-0.20	0.50-0.50	0.50-0.50
			Bottom Depth (m):																											
			Date Sampled:		07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	07/11/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	11/6/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018
			Asbestos Lab:																											
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																										
ACM Type	U	2192		N/A										Amosite (Brown) Asbestos																Amosite (Brown) Asbestos
Asbestos Identification	U	2192		N/A			Not Detected		Not Detected			Not Detected			Detected		Not Detected		Not Detected			Not Detected					Not Detected			Not Detected	Detected
Asbestos by Gravimetry	U	2192	%	0.001											<0.001																0.0034
Total Asbestos	U	2192	%	0.001											<0.001																0.0035
Moisture	N	2030	%	0.020		33	12	23	6.1	12	23	6.9	32	11	1	26	9.3	8.6	8.7	57	23	6.3	11	31	0	13	73	9	11	8.6	17	11
Soil Colour	N	2040		N/A		Dark Brown	Black	Grey	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Black	Grey	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown
Other Material	N	2040		N/A		Vegetation	Stones	None	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Stones	Stones	None	Stones	Stones	Stones	Vegetation	Vegetation	Stones	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Stones
Soil Texture	N	2040		N/A		Sandy Loam	Sand	Clay	Sandy Loam	Sandy Loam	Loamy Sand	Sandy Loam	Sandy Loam	Sand	Sand	Clay	Sand	Sand	Sand	Clay	Clay	Loamy Sand	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Peat	Sandy Loam	Loamy Sand	Sandy Loam	Sandy Loam	Loamy Sand
pH	M	2010		4.0		6.94	8.63	7.32	9.95	8.57	8.52	10	7.39	9.39	12.2	8.18	8.98	8.81	12.4	7.32	8.1	11.1	10.1	7.61	9.25	11.2	7.4	9.04	9.2	8.8	7.99	9
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	<1	1.56	<1	1.5	<1	5.64	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3.26	<1	<1	<1	<1	<1	<1	2.8
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	702	<12	133	<12	<12	573	<12	661	<12	<12	19.6	<12	<12	<12	155	45.6	<12	<12	427	<12	<12	1590	<12	<12	<12	71.6	<12
Iron (Total)	N	2430	mg/kg	100		29700	32300	35700	30300	54100	41100	49400	34200	107000	183000	35400	19300	24600	192000	29200	35500	77000	26400	38300	228000	125000	7810	124000	64700	72200	30400	95800
Arsenic	M	2450	mg/kg	1	2533	13.1	13.6	13.7	11.6	11.3	9.4	6.18	13.7	10.2	<6	11.6	5.67	6.37	7.49	16.1	11.4	<6	7.6	16.1	8.99	9.44	3.74	9.39	14.3	8.57	12.3	10.5
Cadmium	M	2450	mg/kg	0.1	73	<0.02	0.553	16.9	<0.2	0.821	<0.02	<0.2	<0.02	<0.02	1.62	<0.02	<0.02	<0.02	<0.2	0.0926	<0.02	<0.2	<0.02	<0.02	<0.2	<0.2	0.0218	<0.2	<0.2	<0.02	<0.02	<0.2
Chromium	M	2450	mg/kg	1	9431	36	18.7	56.7	<9	1.56	28.9	36.2	34.8	<0.9	547	28.4	14.4	24.2	695	23.5	28.6	12.8	14.2	32.7	<9	267	12.6	21	360	2.8	24.7	18.1
Manganese	M	2450	mg/kg	5	3.33E+04	228	1520	342	4750	1400	1820	2990	590	3260	39500	723	4470	2650	4710	352	1070	3710	2730	441	4770	207	226	5490	19100	7400	778	3770
Copper	M	2450	mg/kg	0.5	451	14.9	40.8	356	31.6	50.8	9.07	16.9	15.5	<14	18	11.3	11.1	18	35.8	23	9.1	<14	17.4	16.7	22.9	27.9	16.8	17.2	69.7	17.2	8.2	28
Mercury	M	2450	mg/kg	0.1	132	<0.14	<0.14	<0.14	<1.4	<0.14	<0.14	<1.4	<0.14	<0.14	<1.4	<0.14	<0.14	<0.14	<1.4	<0.14	<0.14	<1.4	<0.14	<0.14	<1.4	<1.4	<0.14	<1.4	<1.4	<0.14	<0.14	<1.4
Nickel	M	2450	mg/kg	0.5	1.15E+04	28.5	42.5	41.2	60.2	26.3	31.6	14.6	32.2	15	8.22	31.8	10.2	15	27.2	27.8	32.3	14.2	16.4	27.5	37.4	18	13.7	23.1	32.3	13.1	29.3	27.3
Lead	M	2450	mg/kg	0.5	1.57E+04	31.5	33.1	276	167	36.7	21.2	35.3	24.8	20	47.2	23.5	25.7	18.9	15.9	35	22.2	43.8	44.8	33.5	150	43.7	4.85	39.7	89	47.8	21.5	82.9
Selenium	M	2450	mg/kg	0.2	702	<1	1.11	<1	<10	1.26	<1	<10	<1	<1	18.4	<1	3.7	2.13	23	<1	<1	<10	1.83	<1	<10	10.3	2.25	<10	11.6	2.69	<1	<10
Vanadium	U	2450	mg/kg	5	1606	57	38.2	60.9	179	41.1	51.8	116	59.4	38.1	1270	51.1	35.4	33.7	2400	43.2	51.9	37.4	31.7	57.2	120	271	20.4	50.8	515	27.5	46.1	54.2
Zinc	M	2450	mg/kg	0.5	1.38E+05	115	137	1680	250	203	122	106	116	93.6	91	141	218	63	120	129	96.2	135	86.1	119	228	125	25.5	149	289	156	102	320
Organic Matter	M	2625	%	0.4		5.65	9.28	1.62	11.7	25	1.13	2.95	4.02	40.2	2.74	1.01	2.02	5.12	0.521	21.4	0.841	17.1	4.41	5.6	23.1	0.521	47.9	20.9	0.459	10.7	3.02	18.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	0.033	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0782	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359	0.122	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.177	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	0.137	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.244	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	0.057	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	1.73	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	0.216	<0.1	<0.1	<0.1	<0.1	<0.1	0.182	<0.1	<0.1	<0.1	<0.1	0.809	<0.1	2.27	5.06	<0.1	0.765	<0.1	0.419	1.66	<0.1	<0.1	2.03	<0.1	2.21	<0.1	2.3
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	<0.1	0.195	<0.1	7.64	1.21	<0.1	1.14	<0.1	8.35	1.03	<0.1	4.67	1.7	7.03	2.5	<0.1	5.69	4.2	<0.1	7.21	2.14	<0.1	7.91	2.72	7.77	<0.1	9.98
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	1.66	4.38	<0.1	26.2	6.45	3.44	16	0.782	34.9	17.2	<0.1	33.6	17.4	51.5	23.3	<0.1	45.2	18.6	4.58	25	28	22.9	49	12.1	64.4	<0.1	93.6
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	0.537	<0.1	<0.1	7.35	0.948	1.53	5.11	<0.1	13.5	2.79	<0.1	17	9.3	17.2	<0.1	<0.1	18.2	6.57	<0.1	5.55	8.66	0.655	12.4	4.06	15.5	<0.1	34.8
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5		2.42	4.57	<0.1	41.2	8.6	4.98	22.4	0.782	56.8	21	<0.1	56.1	28.4	78	30.9	<0.1	69.8	29.4	5	39.5	38.8	23.6	71.4	18.9	89.9	<0.1	141
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	0.09	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.161	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	0.0375	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	1.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	<0.1	1.15	<0.1	2.51	1.23	<0.1	0.711	<0.1	1.79	1.29	0.814	1.98	<0.1	1.27	16.6	<0.1	1.08	0.945	0.418	3.2	1.11	3	2.23	0.447	3.42	<0.1	2.55
Aromatic TPH >C16-C21	U	2680	mg/kg	1	1424	<0.1	6.67	<0.1	15.3	4.5	<0.1	5.21	0.219	13.9	18.9	1.47	12.9	1.7	11.7	23.8	<0.1	4.97	4.11	1.22	29.5	7.16	9.36	13.2	6.68	15.4	<0.1	12.5
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	22.7	14.8	3.14	93.7	12.5	5.22	40.9	10.1	64.1	147	3.65	84.9	20.6	68.7	230	<0.1	34	28.5	44.8	155	57.3	217	66.1	24.4	76.4	2.21	84.6
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	6.1	4.75	0.463	40.7	5.9	4.45	16.5	1.09	36.7	43.6	0.537	49.9	17.2	29.5	23.3	<0.1	24.1	21.8	3.13	60.7	26.6	29.3	29.1	9.37	36.7	0.566	56.4
Total Aromatic Hydrocarbons	N	2680	mg/kg	5		28.8	27.4	3.6	152	24.1	9.66	63.3	11.5	117	211	6.47	150	39.6	111	294	<0.1	64.2	55.4	49.6	249	92.1	258	111	40.9	132	2.78	156
Total Petroleum Hydrocarbons	N	2680	mg/kg	10		31.7	32	3.6	193	32.7	14.6	85.7	12.2	173	232	6.47	206	68	189	328	<0.1	134	84.8	54.6	288	131	282	182	59.8	222	2.78	297
Benzene	M	2760	µg/kg	1	3800	<90	<1800	<90	<90	<90	<90	<90	<90	<180	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90
Toluene	M	2760	µg/kg	1	128000	<70	<1400	<70	<70	<70	<70	<70	<70	140	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70
Ethylbenzene	M	2760	µg/kg	1	80000	<40	<800	<40	<40	<40	<40	<40	<40	80	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40
m & p-Xylene	M	2760	µg/kg	1	74000.00	<100	<2000	<100	<100	<100	<100	<100	<100	200	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
o-Xylene	M	2760	µg/kg	1	74000.00	<100	<2000	<100	<100	<100	<100	<100	<100	200	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Methyl Tert-Butyl Ether	M	2760	µg/kg	1		<100	<2000	<100	<100	<100	<100	<100	<100	200	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Naphthalene	M	2800	mg/kg	0.1	27.00	<0.009	0.118	<0.009	0.24	0.106	0.0948	0.0304	<0.009	0.103	<0.045	<0.009	0.402	0.0605	0.105	0.3	<0.009	0.36	0.0918	0.0226	<0.09	0.0678	<0.009	0.0873	0.0356	0.245	<0.009	0.131
Acenaphthylene	N	2800	mg/kg	0.1	16.70	<0.012	0.0864	<0.012	0.913	<0.012	<0.012	0.013	<0.012	0.108	<0.06	<0.012	0.113	<0.012	0.0405	0.0337	<0.012	0.216	0.0369	<0.012	<0.12	0.11	<0.012	0.194	0.049	0.259	<0.012	0.13
Acenaphthene	M	2800	mg/kg	0.1	30.00	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0168	<0.008	0.0134	<0.04	<0.008	0.018	<0.008	0.0947	1.14	<0.008	0.0315	0.0126	<0.008	<0.08	0.0396	<0.008	0.0102	0.0144	0.0192	<0.008	0.0219
Fluorene	M	2800	mg/kg	0.1	27.00	<0.01	0.013	<0.01	0.0434	<0.01	<0.01	0.0108	<0.01	0.0369	<0.05	<0.01	0.0508	0.0114	0.0742	1.38	<0.01	0.0476	0.0133	<0.01	<0.1	0.0188	<0.01	0.0293	0.0162	0.0823	<0.01	0.0463
Phenanthrene	M	2800	mg/kg	0.1	27.00	<0.015	0.287	<0.015	0.359	0.179	0.0341	0.229	<0.015	0.675	<0.075	<0.015	0.611	0.198	0.966	3.61	<0.015	0.776	0.182	0.0327	<0.15	0.256	<0.015	0.343	0.189	0.709	<0.015	0.457
Anthracene	M	2800	mg/kg	0.1	34.00	<0.016	0.0473	<0.016	0.227	<0.016	<0.016	0.0453	<0.016	0.161	<0.08	<0.016	0.179	0.0364	0.322	0.619	<0.016	0.191	0.0436	<0.016	<0.16	0.0813	<0.016	0.12	0.0883	0.178	<0.016	0.147
Fluoranthene	M	2800	mg/kg	0.1	6.64	<0.017	0.317	<0.017	2.01	0.101	0.0598	0.508	<0.017	1.47	<0.085	<0.017	1.25	0.3	2.3	1.45	<0.017	1.63	0.311	0.053	0.359	0.893	<0.017	0.973	1.15	1.6	<0.017	0.895
Pyrene	M	2800	mg/kg	0.1	76.00	<0.015	0.261	<0.015	1.95	0.0877	0.0443	0.443	<0.015	1.1	<0.075	<0.015	0.995	0.239	2.1	0.942	<0.015	1.21	0.251	0.0435	0.32	1.04	<0.015	0.78	0.826	1.18	<0.015	0.659
Benzo[a]anthracene	M	2800	mg/kg	0.1	607.00	<0.014	0.202	<0.014	1.78	0.0558	0.0329	0.274	<0.014	0.674	<0.07	<0.014	0.75	0.184	1.32	0.222	<0.014	0.849	0.197	<0.014	0.259	0.796	<0.014	0.668	1.38	1.1	<0.014	0.578
Chrysene	M	2800	mg/kg	0.1	621.00	<0.01	0.17	<0.01	1.23	0.0669	0.0335	0.327	<0.01	0.594	<0.05	<0.01	0.636	0.198	1.26	0.278	<0.01	0.737	0.207	0.0243	0.213	0.685	<0.01	0.863	1.45	1.14	<0.01	0.618
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	<0.015	0.467	<0.015	4.89	0.115	0.058	0.539	<0.015	1.14	<0.075	<0.015	1.33	0.182	2.31	0.282	<0.015	1.55	0.356	0.0274	0.505	1.65	<0.015	1.45	2.31	1.98	<0.015	0.895
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	<0.014	0.157	<0.014	1.35	0.0375	<0.014	0.17	<0.014	0.331	<0.07	<0.014	0.343	0.0897	0.701	0.0869	<0.014	0.526	0.117	<0.014	0.201	0.554	<0.014	0.472	0.773	0.564	<0.014	0.307
Benzo[a]pyrene	M	2800	mg/kg	0.1	34.00	<0.015	0.267	<0.015	3.08	0.053	0.0356	0.309	<0.015	0.61	<0.075	<0.015	0.802	0.181	1.51	0.13	<0.015	0.906	0.213	<0.015	0.47	1.14	<0.015	0.836	0.987	1.03	<0.015	0.458
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25.00	<0.018	0.234	<0.018	3.02	0.0441	0.0284	0.247	<0.018	0.449	<0.09	<0.018	0.618	0.116	1.04	0.106	<0.018	0.758	0.168	<0.018	0.391	0.834	<0.018	0.726	0.395	1.05	<0.018	0.504
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838.00	<0.023	0.0631	<0.023	0.72	<0.023	<0.023	0.0635	<0.023	0.143	<0.115	<0.023	0.161	0.0359	0.246	<0.023	<0.023	0.195	0.0473	<0.023	<0.23	0.196	<0.023	0.158	0.102	0.23	<0.023	0.0823
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13.00	<0.024	0.241	<0.024	3.46	0.0527	<0.024	0.297	<0.024	0.496	<0.12	<0.024	0.69	0.149	1.19	0.118	<0.024	0.801	0.194	<0.024	0.467	0.903	<0.024	0.685	0.318	0.982	<0.024	0.369
Total Of 16 PAH's	N	2800	mg/kg	2		<0.118	2.93	<0.118	25.3	0.899	0.421	3.52	<0.118	8.1	<0.59	<0.118	8.94	1.98	15.6	10.7	<0.118	10.8	2.44	0.203	3.19	9.27	<0.118	8.4	10.1	12.4	<0.118	6.3
Resorcinol	M	2920	mg/kg	0.02																												
Phenol	M	2920	mg/kg	0.02	3.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cresols	M	2920	mg/kg	0.02		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenols	M	2920	mg/kg	0.02		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
1-Naphthol	N	2920	mg/kg	0.02																												
Trimethylphenols	M	2920	mg/kg	0.02																												
Total Phenols	M	2920	mg/kg	0.1		<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035

18-669 Llanwern Phase 4E Soil Chemical Screening

Project: P18-669																														
Client: Rodgers Leask Environmental				**Job No.:**		181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181114-83	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23	181120-23
Quotation No.: Q21-24056				**Sample ID.:**		4G-D6	4G-D6	4G-D3-V	4G-D4-V	4G-D5-V	4G-D6-V	4G-E5	4G-E5	4G-E6	4G-E6	4G-E5-V	4G-E6-V	4G-F6	4G-F6	4G-F6	4G-F6-V	4G-G6	4G-G6	4G-E4	4G-E4-V	4G-F4	4G-F4	4G-F5	4G-F7	4G-F7	4G-F4-V	4G-F5-V
Order No.: .				Client Sample Ref.:		18733005	18733106	18733131	18733112	18733089	18733139	18733046	18733057	18733146	18733151	18733071	18733158	18733163	18733168	18733173	18733019	18733028	18733037	18775424	18775457	18775464	18775470	18775478	18775444	18775448	18775474	18775482
				Sample Type:		SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
				Top Depth (m):	**HFC Soil Re-Use Criteria (Residential)**	0.20-0.20	0.60-0.60	1.80-1.80	1.70-1.70	1.70-1.70	1.70-1.70	0.20-0.20	0.60-0.60	0.30-0.30	0.50-0.50	3.00-3.00	2.20-2.20	0.40-0.40	0.60-0.60	1.20-1.20	2.70-2.70	0.30-0.30	0.50-0.50	0.40-0.40	2.20-2.20	0.20-0.20	0.40-0.40	0.50-0.50	0.40-0.40	0.80-0.80	2.40-2.40	2.60-2.60
				Bottom Depth (m):																											
				Date Sampled:		13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	13/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018	19/11/2018
				Asbestos Lab:																											
Determinand	**Accred.**	**SOP**	**Units**	**LOD**																											
ACM Type	U	2192		N/A								Amosite (Brown) Asbestos																			
Asbestos Identification	U	2192		N/A			Not Detected					Detected		Not Detected				Not Detected		Not Detected		Not Detected		Not Detected			Not Detected	Not Detected	Not Detected		
Asbestos by Gravimetry	U	2192	%	0.001								<0.001																			
Total Asbestos	U	2192	%	0.001								<0.001																			
Moisture	N	2030	%	0.020		8.5	21	24	9.4	32	22	14	24	14	25	25	26	6.7	6.7	7.6	25	7.3	6.5	11	29	14	6.7	5.8	3.8	7.8	24	36
Soil Colour	N	2040		N/A		Dark Brown	Dark Brown	Dark Brown	Dark Brown	Light Brown	Light Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Grey	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Light Brown	Dark Brown	Light Brown	Light Brown	Dark Brown	Dark Brown	Dark Brown	Grey	Dark Brown
Other Material	N	2040		N/A		Stones	Vegetation	None	Stones	Stones	None	Vegetation	Vegetation	Vegetation	Vegetation	None	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Vegetation	Stones	Vegetation	Stones	Stones	Stones	Stones	Vegetation	None	None
Soil Texture	N	2040		N/A		Loamy Sand	Sandy Loam	Sandy Clay Loam	Loamy Sand	Clay	Clay	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Clay	Loamy Sand	Loamy Sand	Sandy Loam	Sandy Loam	Loamy Sand	Sandy Loam	Sandy Loam	Loamy Sand	Clay	Loamy Sand	Loamy Sand	Sand	Sand	Sandy Loam	Clay	Clay
pH	M	2010		4.0		11.5	10.4	8.38	8.69	6.79	8.5	9.99	9.21	11.1	8.61	8.2	7.14	11	12.2	10.7	7.88	10.4	9.82	11.7	7.35	10.7	10.4	9.44	9.55	10.6	8.01	7.14
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	<1	2.41	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	141	<12	29	20.9	271	48.5	<12	<12	<12	<12	105	331	<12	<12	<12	115	<12	<12	38.4	281	20.8	19	<12	30.5	<12	317	412
Iron (Total)	N	2430	mg/kg	100		48600	23800	25900	38500	25400	31100	101000	59400	113000	8800	31300	36700	173000	264000	155000	32900	13200	231000	232000	32700	74500	204000	179000	452000	134000	34200	19800
Arsenic	M	2450	mg/kg	1	2533	8.24	7.93	12.2	10.1	15.9	11.2	10.6	6.73	7.12	5.96	12.8	15.4	8.24	10.1	11.6	12.9	2.38	14.2	<6	14.1	21.9	11.8	11.5	12.8	7.91	13.2	13.4
Cadmium	M	2450	mg/kg	0.1	73	<0.02	0.15	0.277	0.505	<0.02	<0.02	<0.2	<0.2	<0.2	<0.02	<0.02	<0.02	<0.2	<0.2	<0.2	<0.02	<0.02	<0.2	<0.2	<0.02	<0.2	<0.2	0.634	<0.2	<0.2	<0.02	<0.02
Chromium	M	2450	mg/kg	1	9431	43.3	7.04	23.5	10	35	25.2	58.5	<9	446	3.08	24.9	30.6	<9	<9	19.1	31.9	17.8	<9	137	31.7	47.2	<9	<9	<9	<9	28.8	31.2
Manganese	M	2450	mg/kg	5	3.33E+04	4370	574	917	1850	268	1190	4010	1060	16700	164	1170	472	3380	3880	3530	626	4010	7140	8590	361	4760	2840	7110	4220	3550	1150	282
Copper	M	2450	mg/kg	0.5	451	9.53	28.6	10.1	33.2	16.4	8.94	19.6	<14	18.6	23.2	7.9	11.2	15.8	15.2	17.6	10.8	<1.4	<14	<14	11.4	36.9	<14	<14	<14	22.1	15.9	9.01	20
Mercury	M	2450	mg/kg	0.1	132	<0.14	0.575	<0.14	<0.14	<0.14	<0.14	<1.4	<1.4	<1.4	0.81	<0.14	<0.14	<1.4	<1.4	<1.4	<0.14	<0.14	<1.4	<1.4	<0.14	<1.4	<1.4	<1.4	<1.4	<1.4	<0.14	<0.14
Nickel	M	2450	mg/kg	0.5	1.15E+04	9.47	11.8	29.3	21.9	29.7	31.9	24	11.7	18.1	8.3	30.3	34.7	31	32.8	24.2	37.3	1.36	23.7	44.1	34.3	36.6	12	52.3	37.1	17.9	34.1	24.2
Lead	M	2450	mg/kg	0.5	1.57E+04	32.6	45.2	20.6	31.6	40.2	22.2	84.1	8.2	58.6	12.2	23	29.3	29.3	32.1	40.9	26.7	3.57	25.1	9.62	30	76.9	24	37.4	21.4	48.9	24.7	45.8
Selenium	M	2450	mg/kg	0.2	702	1.7	<1	<1	2.57	<1	<1	<10	<10	10.4	<1	<1	<1	<10	<10	<10	<1	3.57	<10	<10	<1	<10	<10	<10	<10	<10	<1	<1
Vanadium	U	2450	mg/kg	5	1606	73.5	17.5	41.7	34.8	53.1	43.7	85.4	18	327	8.23	44.3	55	87.7	112	96.1	54.6	40	76.2	106	54.2	70.2	29.4	28.2	93.6	46.1	51	46.7
Zinc	M	2450	mg/kg	0.5	1.38E+05	398	225	94.3	78.1	139	90.7	353	25.1	206	23.7	95.1	107	160	195	167	103	11.8	134	133	107	270	125	95.8	149	89.7	104	146
Organic Matter	M	2625	%	0.4		7.88	>100	0.56	9.1	4.93	0.765	13.7	>100	24.8	-	0.94	1.9	18.6	4.93	12.5	1.3	0.712	1.72	5.81	3.88	4.17	8	13.7	4.88	15.3	0.909	8.41
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0244	0.0694	0.0725	<0.02	<0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	0.0239	0.0412	<0.02	0.022
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0267	0.0524	0.069	<0.02	<0.02	0.0459	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	0.0229	0.039	<0.02	<0.02
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0301	0.0761	<0.02	<0.02	0.023	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	0.0466	<0.02	<0.02
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	2.24	4.56	<0.1	0.525	<0.1	<0.1	2.48	4.02	4.32	4.96	<0.1	<0.1	2.6	2.28	2.54	<0.1	<0.1	6.29	1.13	<0.1	1.26	<0.1	<0.1	0.888	4.51	<0.1	0.878
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	12.4	103	<0.1	2.48	<0.1	<0.1	15.7	94.9	29.3	140	<0.1	<0.1	13.7	16.4	10.9	<0.1	3.03	23.4	8.1	<0.1	11.3	<0.1	4.37	5.14	16.3	<0.1	1.97
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	67.6	63.3	<0.1	14.2	3.17	<0.1	105	46.2	110	44.3	<0.1	1.65	70.7	118	71	<0.1	15.8	125	70.6	4.06	60.9	<0.1	20.7	27.7	36.6	2.16	4.16
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	31.5	8.84	<0.1	3.23	0.875	<0.1	38.3	5.19	46.7	3.7	<0.1	<0.1	30.8	23.7	21.4	<0.1	12.1	77.8	15.4	<0.1	19.7	<0.1	5.23	4.18	11.5	<0.1	<0.1
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5		114	179	<0.1	20.4	4.04	<0.1	161	150	191	193	<0.1	1.65	118	160	106	<0.1	30.9	233	95.2	4.06	93.1	<0.1	30.3	37.9	69	2.16	7.01
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0341	0.0456	<0.02	<0.02	0.0297	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	0.026	<0.02	<0.02
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0503	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	0.0314	<0.02	<0.02
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	1.04	16.6	<0.1	1.37	0.858	<0.1	5.86	4.19	10.9	12.4	<0.1	<0.1	1.94	0.966	0.973	<0.1	1.13	2.66	0.556	<0.1	1.58	<0.1	1.31	0.216	0.644	<0.1	<0.1
Aromatic TPH >C16-C21	U	2680	mg/kg	1	1424	8.13	134	<0.1	2.86	<0.1	<0.1	35.6	19.4	74.6	108	<0.1	<0.1	8.2	5.67	4.94	<0.1	1.41	11	8.71	<0.1	8.71	2.14	6.31	1.55	3.9	<0.1	2.07
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	41.9	482	<0.1	9.26	31.8	1.49	114	55	206	256	<0.1	5.68	45.7	37.3	33.1	<0.1	10.4	133	37.9	13	48.3	5.55	29	10.8	18.4	1.75	29.2
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	38.2	104	<0.1	3.42	4.3	<0.1	54.6	9.53	97.6	37.7	<0.1	<0.1	30.9	14.5	18.4	<0.1	19.5	156	11.3	1.26	24.1	0.824	11.7	1.21	7.79	<0.1	2.02
Total Aromatic Hydrocarbons	N	2680	mg/kg	5		89.3	736	<0.1	16.9	37	1.49	210	88.1	389	414	<0.1	5.68	86.7	58.4	57.4	<0.1	32.4	303	58.5	14.3	82.7	8.51	48.3	13.7	30.7	1.75	33.3
Total Petroleum Hydrocarbons	N	2680	mg/kg	10		203	915	<0.1	37.3	41	1.49	372	239	580	607	<0.1	7.48	205	219	163	<0.1	63.3	536	154	18.3	176	8.51	78.6	51.7	99.9	3.91	40.3
Benzene	M	2760	µg/kg	1	3800	<90	<90	<90	<90	<90	<90	<90	<90	<90	314	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90	<90
Toluene	M	2760	µg/kg	1	128000	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70	<70
Ethylbenzene	M	2760	µg/kg	1	80000	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40
m & p-Xylene	M	2760	µg/kg	1	74000.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
o-Xylene	M	2760	µg/kg	1	74000.00	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Methyl Tert-Butyl Ether	M	2760	µg/kg	1		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Naphthalene	M	2800	mg/kg	0.1	27.00	0.116	1.11	<0.009	0.0433	<0.009	<0.009	0.373	0.407	4.73	5.1	0.0205	<0.009	0.143	0.0479	0.123	<0.009	0.0164	0.0633	0.0963	<0.009	0.167	0.015	0.0778	0.0161	0.0307	<0.009	<0.009
Acenaphthylene	N	2800	mg/kg	0.1	16.70	0.0642	0.277	<0.012	0.0423	<0.012	<0.012	0.201	0.051	1.2	0.252	<0.012	<0.012	0.0919	<0.012	0.0483	<0.012	<0.012	<0.06	0.0284	<0.012	0.0987	<0.012	0.0571	<0.012	0.0133	<0.012	<0.012
Acenaphthene	M	2800	mg/kg	0.1	30.00	0.0144	0.0665	<0.008	<0.008	<0.008	<0.008	0.0433	0.0207	0.448	0.0245	<0.008	<0.008	0.0182	0.0138	0.0138	<0.008	<0.008	0.0474	0.0146	<0.008	0.0191	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Fluorene	M	2800	mg/kg	0.1	27.00	0.0319	0.141	<0.01	<0.01	<0.01	<0.01	0.162	0.0385	1.84	0.103	<0.01	<0.01	0.0737	0.0204	0.0271	<0.01	<0.01	<0.05	0.0236	<0.01	0.039	<0.01	0.0231	<0.01	<0.01	<0.01	<0.01
Phenanthrene	M	2800	mg/kg	0.1	27.00	0.322	1.08	<0.015	0.167	<0.015	<0.015	1.75	0.281	9.17	1.03	<0.015	<0.015	0.612	0.168	0.319	<0.015	0.0416	0.207	0.481	<0.015	0.488	0.0726	0.195	0.0454	0.0863	<0.015	0.0414
Anthracene	M	2800	mg/kg	0.1	34.00	0.0973	0.366	<0.016	0.0263	<0.016	<0.016	0.506	0.0402	3.03	0.247	<0.016	<0.016	0.137	0.0385	0.113	<0.016	<0.016	<0.08	0.132	<0.016	0.15	<0.016	0.0683	<0.016	0.0231	<0.016	<0.016
Fluoranthene	M	2800	mg/kg	0.1	6.64	0.861	2.02	<0.017	0.145	<0.017	<0.017	3.28	0.211	12.8	0.379	<0.017	0.0232	0.778	0.219	0.622	<0.017	0.0501	0.24	1.02	<0.017	1	0.0906	0.402	0.0394	0.167	<0.017	0.0776
Pyrene	M	2800	mg/kg	0.1	76.00	0.83	1.69	<0.015	0.105	<0.015	<0.015	2.47	0.187	9.83	0.368	<0.015	<0.015	0.607	0.175	0.487	<0.015	0.0374	0.22	0.843	<0.015	0.943	0.0789	0.322	0.0319	0.148	<0.015	0.0633
Benzo[a]anthracene	M	2800	mg/kg	0.1	607.00	0.601	1.74	<0.014	0.0703	<0.014	<0.014	1.63	0.173	5.33	0.192	<0.014	<0.014	0.391	0.0959	0.349	<0.014	0.0282	0.0954	0.513	<0.014	0.602	0.0628	0.277	0.0271	0.098	<0.014	0.0387
Chrysene	M	2800	mg/kg	0.1	621.00	0.546	2.08	<0.01	0.084	<0.01	<0.01	1.45	0.27	5.37	0.29	<0.01	0.0197	0.433	0.134	0.391	<0.01	0.0293	0.139	0.546	<0.01	0.614	0.0715	0.303	0.0322	0.131	<0.01	0.0428
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	1.17	3.23	<0.015	0.132	<0.015	<0.015	2.44	0.379	6.47	0.402	<0.015	0.0235	0.583	0.16	0.511	<0.015	0.039	0.141	0.777	<0.015	1.05	0.1	0.474	0.0505	0.163	<0.015	0.067
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	0.284	0.981	<0.014	0.0445	<0.014	<0.014	0.772	0.105	2.31	0.122	<0.014	<0.014	0.233	0.0435	0.197	<0.014	<0.014	<0.07	0.191	<0.014	0.343	0.0367	0.163	<0.014	0.0814	<0.014	0.0222
Benzo[a]pyrene	M	2800	mg/kg	0.1	34.00	0.955	1.91	<0.015	0.0721	<0.015	<0.015	1.41	0.179	4.2	0.185	<0.015	<0.015	0.321	0.0759	0.286	<0.015	0.0232	0.0819	0.506	<0.015	0.637	0.0718	0.284	0.0243	0.0802	<0.015	0.0355
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25.00	0.908	1.63	<0.018	0.109	<0.018	<0.018	0.847	0.161	3.15	0.234	<0.018	<0.018	0.292	0.0738	0.257	<0.018	0.0195	<0.09	0.397	<0.018	0.589	0.0534	0.253	0.0297	0.0769	<0.018	0.0347
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838.00	0.204	0.368	<0.023	<0.023	<0.023	<0.023	0.242	0.0399	0.706	0.0716	<0.023	<0.023	0.0563	<0.023	0.0467	<0.023	<0.023	<0.115	0.0824	<0.023	0.129	<0.023	0.0593	<0.023	<0.023	<0.023	<0.023
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13.00	0.882	1.58	<0.024	0.086	<0.024	<0.024	0.971	0.167	2.55	0.202	<0.024	<0.024	0.243	0.0756	0.206	<0.024	<0.024	<0.12	0.372	<0.024	0.486	0.0495	0.238	0.026	0.075	<0.024	<0.024
Total Of 16 PAH's	N	2800	mg/kg	2		7.89	20.3	<0.118	1.13	<0.118	<0.118	18.5	2.71	73.1	9.21	<0.118	<0.118	5.01	1.34	4	<0.118	0.285	1.23	6.03	<0.118	7.35	0.703	3.2	0.322	1.17	<0.118	0.423
Resorcinol	M	2920	mg/kg	0.02																												
Phenol	M	2920	mg/kg	0.02	3.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0117	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cresols	M	2920	mg/kg	0.02		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0117	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0141	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenols	M	2920	mg/kg	0.02		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
1-Naphthol	N	2920	mg/kg	0.02																												
Trimethylphenols	M	2920	mg/kg	0.02																												
Total Phenols	M	2920	mg/kg	0.1		<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035

18-669 Llanwern Phase 4E Soil Chemical Screening

Project: P18-669

Client: Rodgers Leask Environmental				**Job No.:**		181120-23	181120-23	181120-23	181120-23	181121-47	181121-47	181121-47
Quotation No.: Q21-24056				**Sample ID.:**		4G-F7-V	4G-G5	4G-G5	4G-G5-V	4G-D7	4G-D7	4G-D7-V
Order No.: .				Client Sample Ref.:		18775453	18775486	18775490	18775431	18786553	18786557	18786495
				Sample Type:	**HFC Soil Re-Use Criteria (Residential)**	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
				Top Depth (m):		2.60-2.60	0.40-0.40	0.70-0.70	3.20-3.20	0.30-0.30	0.60-0.60	1.70-1.70
				Bottom Depth (m):								
				Date Sampled:		19/11/2018	19/11/2018	19/11/2018	19/11/2018	20/11/2018	20/11/2018	20/11/2018
				Asbestos Lab:								
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A								
Asbestos Identification	U	2192		N/A			Not Detected			Not Detected		
Asbestos by Gravimetry	U	2192	%	0.001								
Total Asbestos	U	2192	%	0.001								
Moisture	N	2030	%	0.020		23	7.4	8.4	25	5.8	21	18
Soil Colour	N	2040		N/A		Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown
Other Material	N	2040		N/A		Vegetation	Vegetation	Vegetation	Vegetation	Stones	Stones	Vegetation
Soil Texture	N	2040		N/A		Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sand	Silty Clay
pH	M	2010		4.0		7.76	9.82	9.91	8.59	11.4	8.55	7.99
Cyanide (Total)	M	2300	mg/kg	0.5	2.02	<1	<1	<1	<1	1.38	7.38	<1
Ammoniacal Nitrogen	M	2425	mg/kg	0.5	154	123	<12	<12	89	<12	<12	47.1
Iron (Total)	N	2430	mg/kg	100		32500	164000	51600	28800	161000	18100	32600
Arsenic	M	2450	mg/kg	1	2533	11.4	11.4	5.48	11.6	6.99	8.13	15.1
Cadmium	M	2450	mg/kg	0.1	73	<0.02	1.6	0.524	0.326	1.39	0.678	<0.02
Chromium	M	2450	mg/kg	1	9431	29.1	<9	5.37	27.1	210	10.3	27.7
Manganese	M	2450	mg/kg	5	3.33E+04	960	3660	2780	985	17900	1610	954
Copper	M	2450	mg/kg	0.5	451	9.57	<14	6.68	11	52.3	22.6	9.05
Mercury	M	2450	mg/kg	0.1	132	<0.14	<1.4	<0.14	<0.14	<1.4	0.59	<0.14
Nickel	M	2450	mg/kg	0.5	1.15E+04	34.3	15.8	6.93	35.2	36.5	10.9	32.6
Lead	M	2450	mg/kg	0.5	1.57E+04	22.4	27.6	17.7	25.5	151	63	22.4
Selenium	M	2450	mg/kg	0.2	702	<1	<10	<1	<1	<10	2.02	<1
Vanadium	U	2450	mg/kg	5	1606	49.7	38.3	36.7	49.4	1080	31.2	46.8
Zinc	M	2450	mg/kg	0.5	1.38E+05	102	72.8	57.3	105	440	285	95.2
Organic Matter	M	2625	%	0.4		0.962	7.1	7.03	0.91	7.57	>100	0.8
Aliphatic TPH >C5-C6	N	2680	mg/kg	1	73	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C6-C8	N	2680	mg/kg	1	359	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C8-C10	M	2680	mg/kg	1	2841	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C10-C12	M	2680	mg/kg	1	2.25E+04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aliphatic TPH >C12-C16	M	2680	mg/kg	1	4.50E+05	<0.1	<0.1	3.09	<0.1	3.42	10.8	<0.1
Aliphatic TPH >C16-C21	M	2680	mg/kg	1	5.66E+07	<0.1	3.35	7.46	<0.1	26.3	373	<0.1
Aliphatic TPH >C21-C35	M	2680	mg/kg	1	5.66E+07	3.39	34.2	53.2	2.25	99.7	127	<0.1
Aliphatic TPH >C35-C44	N	2680	mg/kg	1	5.66E+07	<0.1	6.07	41	<0.1	26.6	19.3	<0.1
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5		3.39	43.6	105	2.25	156	531	<0.1
Aromatic TPH >C5-C7	N	2680	mg/kg	1	8.51	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C7-C8	N	2680	mg/kg	1	177	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C8-C10	M	2680	mg/kg	1	144	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C10-C12	M	2680	mg/kg	1	227	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Aromatic TPH >C12-C16	M	2680	mg/kg	1	451	<0.1	0.719	1.23	<0.1	3.13	5.52	<0.1
Aromatic TPH >C16-C21	U	2680	mg/kg	1	1424	<0.1	3.83	5.31	<0.1	24.3	72.5	<0.1
Aromatic TPH >C21-C35	M	2680	mg/kg	1	1.13E+04	2.03	23.6	49.2	<0.1	86.5	190	2.55
Aromatic TPH >C35-C44	N	2680	mg/kg	1	1.13E+04	0.615	13.3	73.4	<0.1	30.5	48.3	<0.1
Total Aromatic Hydrocarbons	N	2680	mg/kg	5		2.65	41.4	129	<0.1	144	317	2.55
Total Petroleum Hydrocarbons	N	2680	mg/kg	10		6.04	85.1	234	2.25	300	848	2.55
Benzene	M	2760	µg/kg	1	3800	<90	<90	<90	<90	<90	296	<90
Toluene	M	2760	µg/kg	1	128000	<70	<70	<70	<70	<70	<70	<70
Ethylbenzene	M	2760	µg/kg	1	80000	<40	<40	<40	<40	<40	<40	<40
m & p-Xylene	M	2760	µg/kg	1	74000.00	<100	<100	<100	<100	<100	<100	<100
o-Xylene	M	2760	µg/kg	1	74000.00	<100	<100	<100	<100	<100	<100	<100
Methyl Tert-Butyl Ether	M	2760	µg/kg	1		<100	<100	<100	<100	<100	<100	<100
Naphthalene	M	2800	mg/kg	0.1	27.00	<0.009	0.0265	0.0403	<0.009	0.341	1.08	<0.009
Acenaphthylene	N	2800	mg/kg	0.1	16.70	<0.012	<0.012	<0.012	<0.012	0.219	0.186	<0.012
Acenaphthene	M	2800	mg/kg	0.1	30.00	<0.008	0.0126	0.0643	<0.008	0.0306	0.0102	<0.008
Fluorene	M	2800	mg/kg	0.1	27.00	<0.01	0.0109	0.0348	<0.01	0.131	0.0175	<0.01
Phenanthrene	M	2800	mg/kg	0.1	27.00	<0.015	0.118	0.209	<0.015	1.5	0.215	<0.015
Anthracene	M	2800	mg/kg	0.1	34.00	<0.016	0.0195	<0.016	<0.016	0.409	0.108	<0.016
Fluoranthene	M	2800	mg/kg	0.1	6.64	<0.017	0.0942	0.269	<0.017	2.68	0.315	<0.017
Pyrene	M	2800	mg/kg	0.1	76.00	<0.015	0.0905	0.228	<0.015	2.35	0.249	<0.015
Benzo[a]anthracene	M	2800	mg/kg	0.1	607.00	<0.014	0.0493	0.13	<0.014	1.41	0.238	<0.014
Chrysene	M	2800	mg/kg	0.1	621.00	<0.01	0.0697	0.158	<0.01	1.51	0.313	<0.01
Benzo[b]fluoranthene	M	2800	mg/kg	0.1	3.42	<0.015	0.0798	0.175	<0.015	2.33	0.614	<0.015
Benzo[k]fluoranthene	M	2800	mg/kg	0.1	5.05	<0.014	0.0255	0.064	<0.014	0.833	0.189	<0.014
Benzo[a]pyrene	M	2800	mg/kg	0.1	34.00	<0.015	0.0407	0.121	<0.015	1.36	0.337	<0.015
Indeno(1,2,3-c,d)Pyrene	M	2800	mg/kg	0.1	25.00	<0.018	0.0348	0.0994	<0.018	0.735	0.309	<0.018
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.1	838.00	<0.023	<0.023	<0.023	<0.023	0.213	0.0852	<0.023
Benzo[g,h,i]perylene	M	2800	mg/kg	0.1	13.00	<0.024	0.0406	0.108	<0.024	0.94	0.413	<0.024
Total Of 16 PAH's	N	2800	mg/kg	2		<0.118	0.713	1.7	<0.118	17	4.68	<0.118
Resorcinol	M	2920	mg/kg	0.02								
Phenol	M	2920	mg/kg	0.02	3.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cresols	M	2920	mg/kg	0.02		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Xylenols	M	2920	mg/kg	0.02		<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
1-Naphthol	N	2920	mg/kg	0.02								
Trimethylphenols	M	2920	mg/kg	0.02								
Total Phenols	M	2920	mg/kg	0.1		<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035

Appendix C: Phase 4E DS GIR

Glan Llyn
Phase 4E

Desk Study & Phase 2 Geo-Environmental Interpretative Report

Glan Llyn, Newport

Phase 4E

Desk Study & Phase 2 Geo-Environmental Report

For

Brighton STM Developments Limited (BSTMDL)

DATE: May 2026

REV: P01

18669-RLL-26-XX-RP-O-0856-P01

Document Reference & Control

Project Name:	**Glan Llyn, Phase 4E**
Project Reference:	**P18-669**
Report Title:	**Desk Study & Phase 2 Geo-Environmental Report**
Client:	**Brighton STM Developments Limited (BSTMDL)**
Document Reference:	**18669-RLL-26-XX-RP-O-0856**
Report Status:	**FINAL**

Approval Status	Name & Position
Prepared by:	**Ruth Hardy** BSc (Hons) Graduate Geo-Environmental Consultant
Reviewed by:	**Aimee Meredith-Smith** BSc (Hons) MScR FGS Geo-Environmental Consultant **Jason Bradley** BSc (Hons) MSc CGeol CEnv FGS MIEnvSc Principal Engineer
Approved by:	**Chris Wilson** BSc (Hons) MCIWEM Principal Geo-Environmental Consultant

Revision Status	Date	Summary of Revision
P01	May 2026	First Issue

Executive Summary

This presents the salient points of the report and should not be referred to in isolation.

Summary	Rodgers Leask Ltd (RLL) were commissioned by Brighton STM Developments Limited (BSTMDL) to prepare a combined Desk Study and Phase 2 Geo-Environmental Interpretative Report for Phase 4E of the Glan Llyn development on the former Llanwern steelworks (hereafter referred to as the 'Site'). The Site is proposed to be developed for residential end-use.
Site Location and Description	The Site covers approximately 1.5 hectares and is located within the Glan Llyn development at the former Llanwern Steelworks, approximately 5.5km to the east of Newport at National Grid Reference 336317E, 186693N. The Site is irregular in shape and presently comprises an area used for storage of excavated Made Ground originating from the wider Llanwern Site.
History	Historically, the Site is shown to comprise part of four open fields, segregated by reens and trees, until 1967 where the Site formed part of Llanwern Steelworks. Following construction of the steelworks, the Site was shown to comprise of railway sidings and access tracks running approximately north to south through the centre of Site and the western side formed part of an ore stockyard. To the west of the Site were ore stockpiles, conveyors, travelling booms, roadways, a wetland area with drains, marshland and a small pond. As the steelworks expanded a sinter plant was constructed, encroaching on the western side of the Site alongside associated structures, conveyors, and tracks. The Site currently comprises an area used for the stockpiling of materials from the wider Glan Llyn Site The Site was partially demolished by 2006 and above ground structures were completely demolished to slab level by 2009.
Geology / Ground Conditions	The 2016 (IFA) and 2018 (Atkins) ground investigations generally found the Site to be underlain by Made Ground from ground level or underlying asphalt surfacing in all 30 locations, to depths of between 0.60mbgl to 3.60mbgl. Beneath the Made Ground, Superficial Tidal Flat Deposits were encountered in 28 locations, to depths of between 1.65mbgl and 3.60mbgl. The base of these deposits was only encountered in the IFA investigation at 10.00mbgl, while the 2018 Atkins investigation recorded the deposits to depths of up to 3.70mbgl. The Mercia Mudstone Group was not encountered during the 2018 Atkins investigation of Phase 4E but was encountered in one IFA borehole location (CWCP31) between 10.00m and 10.50mbgl. Hydrocarbon odours/ oil sheens in groundwater were encountered in ten locations within the Made Ground, at depths ranging from 0.00mbgl to 1.40mbgl. Buried obstructions such as concrete slabs, electric cables and brick walls, steel cables, hard layers of slag or iron ore aggregate, and compacted layers of gravelly ashy sand or sandy gravel were encountered in 7 locations at depths between 0.00mbgl to at 1.50mbgl.

	Perched water was encountered within the Made Ground or surface of the in 27 locations between 0.6mbgl and 1.50mbgl. Regional groundwater was only encountered in one exploratory hole (CWCP31) within Phase 4E during the IFA ground investigation, at a depth of 9.50mbgl within the basal sand layer of the Tidal Flat Deposits. As reported in the CWDQRA for the wider Site, groundwater is present beneath the Site as perched water within the Made Ground, or regional groundwater within the Tidal Flat Deposits (confined to the basal sand layers) and Mercia Mudstone.
Hydrology and Hydrogeology	The Mercia Mudstone Group is classified as a Secondary B Aquifer. The Tidal Flat Deposits are classified as Secondary (Undifferentiated) Aquifer. The nearest surface water feature is the Central Lake and East Lake located north of the Site. These form part of the private reen network. The Site lies within an area shown as having a Low Flood Risk from Sea according to Natural Resources Wales Flood Risk mapping.
Controlled Waters	With regard to controlled waters, the following pathways are considered applicable to the Site, following completion of the development and once relevant approvals have been granted to allow discharge into Monks Ditch: ▪ Leaching of soil-borne contamination in Made Ground and subsequent lateral migration through permeable pathways in Made Ground to Monks' Ditch via onsite reens; and ▪ Newly created preferential pathways associated with the redevelopment of the Site e.g. foundations and infrastructure. As such, it is recommended that this report is read in conjunction with the Phase Specific Controlled Waters Risk Assessment.
Contamination	79 soil samples were collected during the 2018 Atkins ground investigation for contamination testing, all of which were taken from the Made Ground. The samples collected were conservatively assessed against LQM/ CIEH 2015 S4ULs (Suitable for Use Levels) for a residential end use with plant uptake (1% SOM). Chemical testing has identified some exceedances of lead, vanadium, benzene, benzo[b]fluoranthene, benzo[a]pyrene and dibenz(a,h)anthracene. Asbestos was identified within 5 of the 30 soil samples tested in the form of debris or loose fibres at concentrations of <0.001% to 0.0077%. The presence of asbestos and elevated contaminants identified on site are a risk to human health and will be managed through the remedial works and succeeding housebuilder requirements.
Ground Gas and Radon	No gas monitoring has been undertaken within Phase 4E. A programme of shallow gas monitoring is recommended following turnover and earthworks reengineering. The Site is located within a radon affected area, with 1-3% of properties being above the action level and as such no radon protection measures will be required in the construction of the new development.
Recommendations	Following the completion of the ground investigations, completed by others, the following recommendations have been made:

	▪ Turnover of the Made Ground to natural geology with removal of obstructions. ▪ Compaction and reengineering of materials in accordance with the approved Remediation Strategy to an appropriate specification to achieve the required formation level. ▪ Chemical validation of the placement of material following turnover. ▪ A programme of shallow gas monitoring and assessment is recommended following the turnover and reengineering of the earthworks. ▪ Concrete classification testing should be undertaken in accordance with BRE Special Digest 1. ▪ Phase-specific geotechnical assessments and validation relating to the proposed development. ▪ Removal of identified hotspot contamination on a grid square basis, and subsequent validation testing and reporting. ▪ Construction of buildings and hardstanding with suitable construction materials to break the pathway with underlying Made Ground, to intercept rainwater and to reduce infiltration. ▪ A 600mm clean cover system, suitable for a residential with plant uptake end use, will be required in areas of residential gardens and landscaping. ▪ Consultation with the water supply company in relation to the potential use of barrier pipe. ▪ Preparation of a Piling Risk Assessment. ▪ Preparation of a Detailed Quantitative Controlled Waters Risk Assessment to assess the risk posed to controlled waters within the future development and inform the Remediation Strategy. ▪ Preparation of an MMP to facilitate the reuse of excavated materials and import of soil for use in the cover system.

Contents

1.0 Introduction 1
1.1. Terms of Reference 1
1.2. Proposed Development 1
1.3. Purpose 1
1.4. Objectives 2
1.5. Scope 2
1.6. Sources of Information 3
1.7. Limitations and Confidentiality 3
2.0 Site Location and Description 5
2.1. Site Location 5
2.2. Site Boundaries and Surrounding Area 5
2.3. Site Walkover 5
2.4. Site History - Ordnance Survey Maps 6
2.5. Site History – Aerial Photographs 9
2.6. Site History - Available Information 9
3.0 Ground Conditions and Mining Review 11
3.1. Published Geology 11
3.2. BGS Borehole Records 11
3.3. Mining History 11
3.4. Railway and Tunnel Features 12
3.5. Radon 12
3.6. Potential for Ground Stability Hazards 12
3.7. Hydrogeology 12
3.8. Hydrology 13
3.9. Unexploded Ordnance (UXO) 13
4.0 Regulatory Review 14
4.1. Authorisations and Consents 14
4.2. Environmental permits, incidents and registers 14
4.3. Waste Management and Hazardous Substances 14
4.4. Landfills and Other Waste Sites 15
4.5. Current Land Use: Industrial Data 15
4.6. Designated Environmentally Sensitive Areas 15
4.7. Archaeology 15
5.0 Previous Ground Investigations 16
5.1. Existing Reports 16
5.2. Encountered Ground Conditions 16
5.2.1. Made Ground - Surfacing 16

5.2.2. Made Ground 16
5.2.3. Superficial Deposits 17
5.2.4. Bedrock 17
5.2.5. Perched Water 18
5.2.6. Encountered Buried Obstructions or Services 18
5.2.7. Visual/ Olfactory Evidence of Contamination 18
5.2.8. Instability 19
5.3. Gas Screening 19
6.0 Chemical Testing 20
6.1. Risks to Human Health 20
6.1.1. Methodology 20
6.1.2. Results 20
6.1.3. Asbestos 21
6.1.4. Groundwater 22
7.0 Conceptual Site Model (CSM) 23
7.1. Potential Pollutant Linkages 23
7.1.1. Sources 23
7.2. Potential Receptors 24
7.2.1. Potential Pathways 24
7.2.2. Preliminary Remediation Assessment 25
7.2.3. Proposed Mitigation 26
8.0 Geotechnical Testing 28
8.1. Sampling and Testing 28
8.2. Classification Testing 28
8.2.1. Natural Moisture Content 28
8.2.2. Material Grading and Classification 28
8.3. BRE Total Expansion Tests 29
9.0 Conclusions and Recommendations 30
9.1. Conclusion 30
9.2. Recommendations 31

Appendices

Appendix A: Drawings and Plans
Appendix B: Site Walkover Photographs
Appendix C: Historical Maps
Appendix D: Envirocheck Report
Appendix E: Flood Risk Map
Appendix F: UXO Map
Appendix G: EH Logs
Appendix H: Chemical Screening
Appendix I: Chemical Test Certificates
Appendix J: Geotechnical Testing
Appendix K: Geotechnical Test Certificates

1.0 Introduction

1.1. Terms of Reference

Rodgers Leask Ltd (RLL) was commissioned by Brighton STM Developments Limited (BSTMDL) to prepare a combined Desk Study and Phase 2 Geo-Environmental Interpretative Report for Phase 4E of the Glan Llyn development in Newport (hereafter referred to as the 'Site').

The Site is situated within the ongoing redevelopment of the former Llanwern Steelworks. The Site location plan is shown on Drawing 18669-RLL-24-XX-DR-O-0657-P01, included in **Appendix A**.

In July 2024 the Client, St Modwen Developments were rebranded to be called Revantage Real Estate, then in 2025 to Brighton STM Developments Limited (BSTMDL). Any reference to the previous company names in this report should be referred to accordingly.

1.2. Proposed Development

It is understood that the Site is proposed to be redeveloped for a residential end use with gardens and public open space areas. An illustrative masterplan (ref. 8111-08-A011, Rev P09, dated April 2019) is available in **Appendix A**.

The development will form part of the wider Glan Llyn development.

1.3. Purpose

This report has been prepared to support the discharge of Planning Condition 27 of the Outline Planning Permission Reference 06/0471 for the proposed development of residential development Phase 4E as part of a wider mixed-use development at Llanwern, Newport.

Planning Condition 27 states the following.

"(27) Prior to the commencement of each phase of development as defined by Condition 03 (or at such other date or stage in development or for such specified activities or works as may be agreed in writing with the Local Planning Authority), the following components of a scheme to deal with the risks associated with contamination relating to that phase or activity shall each be submitted to and approved, in writing, by the Local Planning Authority:

(1) A preliminary risk assessment which has identified:
- *(a) all previous uses;*
- *(b) potential contaminants associated with those uses;*
- *(c) a conceptual model of the site indicating sources, pathways and receptors;*
- *(d) potentially unacceptable risks arising from contamination at the site.*

(2) A site investigation scheme, based on (1) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off site.

(3) The site investigation results and the detailed risk assessment (2) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.

(4) A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in (3) are complete and identifying any requirements for longer term monitoring of pollutant linkages, maintenance and arrangements for contingency action. Any changes to these components require the express consent of the Local Planning Authority.

Reason: To ensure that the proposed development will not cause pollution of the environment or harm to human health."

The scope of this report is detailed in Section 1.4 below. It is considered that this report addresses the requirements of Condition 27 part 1 and 2. Part 3 and part 4 will be addressed in future reporting including a Remediation Strategy and Validation Report.

1.4. Objectives

The objectives of this report were to:

- Obtain desktop information to assist in the assessment of potential environmental and ground related issues that may have implications for the proposed development.
- Review the available information to determine the anticipated ground conditions and identify the potential for contamination to be present within the Site boundary, including formulation of an initial Conceptual Site Model.
- Present the findings of the ground investigations, completed by others, and produce an updated Ground Model.
- Present contamination data and undertake risk assessment to establish the nature and extent of any contamination within the Site.
- Prepare a refined Conceptual Site Model for the site using the findings of the desktop study and ground investigation works, including identification of Source Pathway Receptor Linkages that require mitigation.
- Make outline recommendations for remedial actions, where required, to mitigate unacceptable risks.

1.5. Scope

In order to achieve the outlined objectives, the scope of the study includes:

- A review of existing geo-environmental data for the Site including a review of historical maps and existing ground investigation data.
- A site visit/ walkover survey.
- Undertake an intrusive ground investigation, including chemical and geotechnical laboratory testing.

- An assessment of the levels of contamination present within the soils on Site against generic screening criteria based on the results of laboratory testing of samples collected during the investigation.

1.6. Sources of Information

The following documents and data sources have been reviewed in preparation of this Desk Study & Phase 2 Geo-Environmental Interpretative Report and should be read in conjunction with it:

Landmark Envirocheck Report

- Landmark Envirocheck Report, Historical Map Pack (**Appendix C**).
- Landmark Envirocheck Report, Datasheet. 30488531_1_1, dated December 2022 (**Appendix D**).

It should be noted that the Landmark Envirocheck Report includes the Site area as well as the adjacent Phase 4G and Phase 4C (Drawing 8111-08-A011).

The following reports have been prepared to be read in conjunction with this report:

- IOM, Assessment of asbestos contamination at former Llanwern Steelworks Site, Newport, Wales, ref. 610-34464 Rev 1, dated March 2024; and
- RLL, Phase 4E Controlled Waters Detailed Quantitative Risk Assessment Addendum, ref. 18669-RLL-26-XX-RP-O-0865-P01, dated May 2026.

1.7. Limitations and Confidentiality

All conclusions and recommendations made within this report are based upon and limited to the factual information obtained as part of this investigation. No responsibility can be taken by RLL for information obtained by third parties and it has been assumed that all third-party information provided is true and correct.

No liability can be accepted for conditions not revealed within the exploratory holes or pits undertaken by this investigation. The exploratory points cover only a small proportion of the total site area. RLL has where necessary undertaken extrapolation between locations and no responsibility can be taken for different conditions which may occur between locations.

RLL has undertaken the work in accordance with our understanding of current best practice at the time of undertaking the report. Further assessment and revision of the report may be required should new information come to light or legislation/ changes to best practice be introduced after the date of issue of the report.

RLL has prepared the report for the sole use and reliance of the Client. The report may not be used or relied upon by any unauthorised third party without the explicit written agreement of RLL.

The interpretive work undertaken within this report remains the intellectual property of RLL and must not be divulged to any commercial third party without prior written agreement of RLL.

At the time of writing, detailed information on the proposed structures, such as detailed layout, loadings and serviceability limits, was not available. Accordingly, where geotechnical design advice is provided it is for information only and should be reassessed by a competent specialist once the development layout and structural loadings are known.

2.0 Site Location and Description

2.1. Site Location

The Site is located within the Glan Llyn development at the former Llanwern Steelworks, approximately 5.5km to the east of Newport City Centre, at approximate National Grid Reference 336317E, 186693N. The wider Glan Llyn development covers approximately 250 hectares and is proposed to be redeveloped for residential, commercial and open space use. The Site location plan is included on RLL Drawing 18669-RLL-24-XX-DR-O-0657-P01 in **Appendix A.**

The Site is irregular in shape, covers an area of approximately 1.5ha and is located near the centre of the wider Glan Llyn development. On its western side the Site historically housed part of a sinter plant and open space across much of the central, southern and eastern areas. In addition, roads are indicated to cross the Site in an approximate north to south orientation, and a conveyor and associated pipelines cross the northern section of the Site in an approximate east to west orientation. The Site currently comprises an area used for the stockpiling of excavated Made Ground from the wider Glan Llyn Site.

The Site boundary is shown on RLL Drawing 18669-RLL-24-XX-DR-O-0657-P01, **Appendix A**.

2.2. Site Boundaries and Surrounding Area

The Site is bounded on all sides by the wider undeveloped Glan Llyn development site. To the north of the Site is the proposed East Lake, Sports Pitches and Phase 5F. The east of the Site is bounded by Baldwin Drive Road, beyond which is Phase 5E1. To the south are Phases 4H & 5E1 & Phase 5e2, and to the west is Phase 4G and the proposed Central Lake.

There are no physical boundaries between the Site and the wider undeveloped Glan Llyn development.

2.3. Site Walkover

A site walkover was conducted in 2021 and again in 2023 by an RLL Engineer as part of the wider development. The purpose of the site walkover was to provide a general description of the Site. Copies of relevant photographs are included in **Appendix B**.

At the time of the 2021 site walkover, the Site had been demolished to slab level and housed one large stockpile of Made Ground material originating from the wider Llanwern site, located centrally within the Site. Numerous tracks and temporary haul routes were present across the Site, connecting the stockpile and the phase to the wider site.

With the exception of minimal vegetation on the stockpile and vegetation on the banks of Central Lake, very little vegetation was present on the phase.

At the time of the 2023 site walkover, there were seven large stockpiles (W214, W167, 3CPA, 3C, W153, SP57, W202-3) covered the west of the phase (some overgrown). Construction haul roads ran approximately north to west in the north-west corner and in the in the east to south-east. A site compound was located in the east of the phase. At the time of the walkover. the Site appeared waterlogged with significant surface water pooling observed across the north, southwest and centre of the Site.

2.4. Site History - Ordnance Survey Maps

Historical Ordnance Survey maps have been assessed to identify former land uses at the Site and the surrounding area. Records have been obtained from a Landmark Envirocheck Report commissioned for Site in 2022 (**Appendix C**).

Map Date	Site Feature	Adjacent Features
1886 – 1887 OS	The Site comprised part of four open fields, segregated by drains, hedgerows and trees.	Surrounding land is characterised by open agricultural fields segregated by reens and trees. Two parallel reens are shown to the west of the Site, with one reen located to the east. The central main watercourse (Ellen Reen), with connected field drains to the east and west (including Middle Reen), is shown to flow in a southerly direction. Collectively this system is labelled Kings Wall. Monks Ditch; which forms part of Black Wall is shown approximately 400m east. Decoypool Farm and the associated Decoy Pool (marshy pond) are located from approximately 300m northwest of the Site. A footpath with various foot bridges runs from Decoypool Farm in a north easterly direction towards Llanwern Station which is approximately 800m northeast. The mainline railway (Great Western Railway), orientated east to west, runs approximately 700m north of Site at its closest point. Various farms and residential properties are shown within approximately 1km (Monkspill Cottage 750m northeast, Pwll-pan 1km northwest, Tatton Farm 1km southwest, New House 1km southeast).
1902 OS	Little significant change is observed within the Site, with the exception of the removal of trees ion the field boundaries.	Decoy Pool is renamed Old Decoy Pool. Little significant change is observed within 1km.

Map Date	Site Feature	Adjacent Features
1921 OS	Little significant change.	Llanwern lime Works and Goods Shed located from approximately 850m north. Little significant change is observed within 1km. Ellens Reen and Middle Reen are indicated to have southeasterly flow direction.
1938 – 1954 OS	No significant change.	Llanwern Golf Club is shown to the north of the Great Western Railway line.
1954 OS	No significant change.	Roman Burials (found AD 1925) indicated to the west of Llanwern Golf Club. Little significant change is observed within 1km.
1965 OS	No significant change.	Little significant change is observed within 1km.
1967-1968 OS	The Site is shown to form part of the Llanwern Steelworks. Much of the site shown as a part of the railway sidings orientated approximately north to south, parallel to the railway sidings are tracks. A pipeline crosses the western site boundary in an approximate north to south orientation over indicated marshy ground, with an unnamed structure positioned to the west of the pipeline.	Mapping shows the surrounding area to comprise the Spencer Steelworks (later known as the Llanwern Steelworks). Within the steelworks, land to the north comprised travelling booms, chimneys, hoppers, tanks, and other infrastructure associated with the coking works. Land to the northeast comprised infrastructure associated with a sinter plant, including a gas holder located 56m northeast. A Benzole plant/ Benzene plant are located to the north. To the west was the ore stocks alongside associated conveyors, travelling booms, roadways, a wetland area with drains, marshland and a small pond. To the south of the site was tanks and infrastructure associated with the Benzole refinery.
1973-1974 OS	A conveyor is shown to cross the northern side of the Site in an approximate east to west orientation. In addition, the marshy ground is now indicated as open space. Railway sidings that were present on the eastern side of the site are no longer indicated with open space in their place.	Previously indicated marshland and ponds directly to the west of the Site now comprises open space. The eastern half of the railway siding tracks have been removed with open space now occupying their place. To the northeast of the site an unnamed factory building is located east of the western railway siding tracks.

Map Date	Site Feature	Adjacent Features
1981 – 1989 OS	The Site evolved in line with the expansion of the steelworks, with former railway sidings and tracks replaced by open space. A second conveyor is located south of the original, associated with the sinter plant. In addition, a hopper, conveyors and unnamed factory buildings are located on the western side of the Site.	Some additional structures are indicated to the south of the Site associated with expansion of the Benzole refinery approximately 100m south. Expansion is shown to the Benzole plant approximately 150m to the north of the site with additional tanks and structures shown. Various infrastructure associated with the steelworks is located to the west of the Site comprising conveyors, hoppers, chimneys and several unnamed buildings.
1992 OS	Little significant change.	Little significant change.
1995 OS	An embankment is indicated on the western Site boundary, extending from the south in an approximate north-south orientation.	Several embankments, pits and tracks are located to the north south and southwest of the Site.
1999 OS	The western embankment is no longer present.	Little significant change.
2006 OS	Little significant change.	Infrastructure associated with the Llanwern Steelworks to the west and south of the Site has been demolished, leaving open space in its place. Little change is shown to the Llanwern Steelworks infrastructure to the north and east.
2022 OS	Infrastructure associated with the Llanwern Steelworks has been demolished within the Site, leaving open space in its place.	A residential area associated with the Glan Llyn development is shown from approximately 500m west. Notable features include Glan Llyn West Primary School, numerous residential houses with private gardens, numerous roads, recreational park areas and an updated surface water drainage network. Four new commercial units, a surface water drainage network and access roads are shown from approximately 400m east of the Site associated with the Celtic Business Park. The land surrounding the north, east and south of the Site is characterised by open space where infrastructure associated with the former steelworks has been demolished.

2.5. Site History – Aerial Photographs

Historical aerial photography included in the Landmark Envirocheck Report and photography from other sources[1] provides additional information relating to the Site (**Appendix C**).

1947: Low resolution black and white photography shows the Site comprising fields use for agricultural purposes. Ellens Reen is visible to the west, Kings Wall Reen system to the south-west, and Black Wall to the east. Decoy Pool and Decoypool Farm are identifiable to the north of the Site.

2001: Low resolution colour photography shows two large conveyors extending across the northern area of the Site. A sinter plant is shown along the eastern boundary with associated structures. The mapping also indicates that the Site formed part of an ore stockyard. These features appear to be separated by a track and a fence running parallel to one another in a north-south orientation along the eastern boundary of the stockyard.

2004: High resolution, colour aerial imagery shows much of the Site and the surrounding area to have been demolished to slab level. Infrastructure associated with the sinter plant remains along the western boundary. The track and fencing also remains, along with stockpiles of demolition materials.

2006: High resolution, colour aerial imagery shows the majority of the Site to be demolished to ground level, with outlines of the former building slabs and tracks still visible.

2015: High resolution, colour aerial imagery shows approximately two large stockpiles comprising material from the wider earthwork operation across the wider Site. The track along the western side of the Site remains.

2018: Moderate resolution, colour aerial imagery shows approximately one small stockpile across the centre of the Site. A haul route is shown on the western side of the Site, orientated north to south. Ongoing development is evident associated with Glan Llyn to the west and Celtic Business Park to the east.

2020: High resolution, colour aerial imagery shows numerous stockpiles across the Site. Some vegetation is visible on a few of the stockpiles.

2.6. Site History - Available Information

According to the Royal Commission on the Ancient and Historical Monuments of Wales[2], the Llanwern Steelworks were built between 1958 and 1962 for Richard & Thomas Baldwin, and was subsequently owned by British Steel, and is currently owned by Tata Steel Europe (formerly known as Corus Group). Reportedly due to the lack of a deep-water iron ore unloading terminal, the Steelworks struggled and steel making ceased in 2001 with demolition commencing in 2004.

[1] Google Earth Pro, Accessed 27/02/2026, BNG 336317E, 186693N, URL: https://earth.google.com/
[2] https://coflein.gov.uk/en/site/86821/

Blueprints and a Historical Site Layout Plan of the wider Llanwern Steelworks site indicates that the Site comprised part of the 'C Sinter Plant', the ore stockyards, and various conveyors. Within the sinter plant various infrastructure is shown including sinter bins, coke cutting plant, a rod mill, a precipitator, return fines plant and control room. Surrounding the sinter plant were various accessways and haul routes.

The historical overlays of the Site are shown on RLL Drawings 18669-RLL-22-XX-DR-O-0390 and 18669-RLL-26-XX-DR-O-0859-P01, and the original Operational Site Layout Drawing (ref. 839181, dated December 1999), included in **Appendix A**.

3.0 Ground Conditions and Mining Review

3.1. Published Geology

Information pertaining to the underlying ground conditions at the Site has been obtained via the BGS Onshore Geoindex[3].

The published geological information shows the Site to be void of Made Ground. However, due to the Site's history, Made Ground is known to be present associated with the previous development and subsequent demolition.

Superficial deposits are shown to comprise Tidal Flat Deposits.

Tidal Flat Deposits are described by the BGS as *'unconsolidated sediment, mainly mud and/ or sand. They may form the top surface of a deltaic deposit. Normally a consolidated soft silty clay, with layers of sand, gravel and peat.'*

The underlying bedrock is shown to be the Mercia Mudstone Group.

The Mercia Mudstone Group is described by the BGS as comprising '*predominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite bearing units in some basinal areas. Thin beds of gypsum/anhydrite are widespread; sandstones are also present'*.

There is an inferred fault approximately 700m northeast of the Site which trends roughly north to south and extends northwards away from Site.

3.2. BGS Borehole Records

The nearest non-confidential BGS borehole record is located approximately 185m south-west of the Site. Record ST38NE/8 was drilled to 30.50m and encountered topsoil to 0.10m, overlying Tidal Flat Deposits which comprised layers of soft blue clay to 1.67m, brown fibrous peat to 9.45m. Underlying the Tidal Flat Deposits from 9.45m to 30.50m was the Mercia Mudstone Group, comprising firm reddish brown clay marl becoming firmer with depth.

3.3. Mining History

The Site does not lie in a coal mining reporting area, as defined by the Coal Authority.

There are no records relating to historical mining or extraction activities within 500m of the Site (**Appendix D**).

[3] http://mapapps2.bgs.ac.uk/geoindex/home.html

3.4. Railway and Tunnel Features

Information presented in the Landmark Envirocheck report (**Appendix D**) indicates that there are no railways, underground railways or tunnels present within 250m of the Site boundary.

However, it is known that railway sidings and tunnels were present throughout the wider Llanwern Steelworks during its history. The historical review identified railway sidings within 50m to the east.

3.5. Radon

Information available from the 'UK Maps of Radon'[4] interactive map, shows the Site to lie within a radon affected area, where the maximum radon potential is 1-3%. As such, the site is in a radon effected area but no radon protection measures are likely to be required in the construction of the new development.

3.6. Potential for Ground Stability Hazards

The Site has been given the following BGS classifications with regards to ground stability hazards (**Appendix D**):

- Potential for Collapsible Ground Stability Hazards: **No Hazard**
- Potential for Compressible Ground Stability Hazards: **Moderate**
- Potential for Ground Dissolution Stability Hazards: **No Hazard**
- Potential for Landslide Ground Stability Hazards: **Very Low**
- Potential for Running Sand Ground Stability Hazards: **Moderate**
- Potential for Shrinking or Swelling Clay Ground Stability Hazards: **Low**

3.7. Hydrogeology

Information presented in the Landmark Envirocheck Report (**Appendix D**) indicates that the underlying Mercia Mudstone Group strata is defined as a Secondary B Aquifer and the superficial Tidal Flat Deposits are defined as Unproductive Strata.

Secondary B Aquifers are classified as comprising '*predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifer*'.

Unproductive Strata classification has been given to cases where '*rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow'.*

There are no records relating to groundwater abstraction licences for the Site.

[4] UKradon - UK maps of radon

The Site is not located within a groundwater Source Protection Zone and there are no reported Source Protection Zones within 500m of the Site boundary.

3.8. Hydrology

Information presented in the Landmark Envirocheck Report (**Appendix D**) indicates that the nearest surface water feature is located 192m north of the Site and refers to a drain that is orientated approximately east to west.

There are no active surface water discharge consents within 500m of the Site.

The Site lies within an area shown as having a Low Flood Risk from Sea according to Natural Wales Flood Risk mapping[5] from Natural Resources Wales. The Flood risk map is presented in **Appendix E**.

3.9. Unexploded Ordnance (UXO)

Regional Unexploded Bomb Risk maps obtained from Zetica indicates that the Site is in a low-risk area for UXO. The UXO report is presented in **Appendix F**.

[5] https://check-your-flood-risk.naturalresources.wales/?culture=en-GB

4.0 Regulatory Review

4.1. Authorisations and Consents

Data regarding Natural resources Wales and Local Authority authorisations and consents has been obtained for the Site via a Landmark Envirocheck Report (**Appendix D**) commissioned for Site in December 2022.

The Landmark Envirocheck Report contains factual information which is produced from a database of records obtained from various sources including; Local Authorities, Environment Agency (Wales Region), Natural Resources Wales and UK Health Security Agency (formerly Public Health England).

4.2. Environmental permits, incidents and registers

There are six records of Integrated Pollution Controls within 500m of the Site. The closest of which is located 172m southwest, relating to carbonisation and associated processes within the Fuel & Power Industry for Bitmac Ltd, in 1999.

There are no records of prosecutions relating to authorised processes in the vicinity of the Site.

There are seven Local Authority Pollution Prevention and Controls within 500m of the Site, the closest refers to the mineral industries under Cambrian Stone Ltd, located 143m southwest of the Site.

There is one record of Notification of Installations Handling Hazardous Substances (NIHHS) sites, located 379m east of the Site and related to B.S.C.

There are no active discharge consents within 500m of the Site.

4.3. Waste Management and Hazardous Substances

There are three records of Licensed Waste Management Facilities within 500m of the Site. The closest is 194m southwest of the Site and relates to the Englobe Wastewater Treatment Plant within the wider Glan Llyn development, operated by Englobe Regeneration UK Ltd.

There is one record for Registered Waste Treatment or Disposal Site within 500m, located 60m southwest of the Site, associated with incineration of waste produced at the Llanwern Works, operated by Bitmac Ltd.

There is one record of Control of Major Accident Hazard Sites (COMAH) located within 187m northeast of the Site, related to British Oxygen Co Ltd. A Planning Hazardous Substance Consent record is located 116m northeast of the Site, relating to British Steel for liquefied extremely flammable gas and natural gas within the wider former Llanwern Steelworks. Neither of these records are currently active.

There are two records of contemporary trade directory entries located within 500m of the Site, the nearest of which is located 364m northeast and refers to Tarmac Western Ltd, stone product manufacturers.

4.4. Landfills and Other Waste Sites

The Landmark Envirocheck Report (2021) indicates that there are no active or historical landfills recorded on the Site or within 500m of the Site boundary.

There are eight records of Potentially Infilled Land (Water) located within 500m of the Site, all relating to unknown infilled land (pond, marsh, river, stream, dock, etc.) which are thought to be associated with the reen/ drainage network which was infilled when Llanwern Steelworks was built.

4.5. Current Land Use: Industrial Data

Information presented in the Landmark Envirocheck Report (2021) indicates there are fifty-four records of Points of Interests – Manufacturing and Production points within 500m of the Site boundary, all relating to tanks, industrial features, unspecified quarries or mines and stone quarrying and preparation activities; relating to the Llanwern Steelworks or Tarmac Western Ltd.

4.6. Designated Environmentally Sensitive Areas

Reference to the Data Map Wales Website[6] (accessed February 2026) and the Landmark Envirocheck Report (2021) indicates there is a SSSI located 220m south relating to the Gwent Levels - Nash and Goldcliff.

No further designated environmentally sensitive sites are recorded within 500m of the Site.

4.7. Archaeology

A preliminary search of the Historic Wales[7] archaeological database (accessed February 2026) indicates no records within the Site boundary.

[6] New map | DataMapWales
[7] https://historic-wales-rcahmw.hub.arcgis.com/ (accessed June 2025)

5.0 Previous Ground Investigations

5.1. Existing Reports

Two ground investigation were undertaken within the wider Glan Llyn development that included the Site area: one by IFA in June 2016 and one by Atkins in November 2018. As part of these investigations, Atkins excavated 28 trial pits and IFA drilled 2 boreholes within the Site area.

The following table provides a summary of the exploratory holes that were situated within the Site boundary.

Summary of Historical Exploratory Holes within the Site Boundary	
Report	**Exploratory Holes**
IFA (2016)	1 Window Sample Borehole (CWWS31) and 1 Cable Percussion Borehole (CWCP31)
Atkins (2018)	28 Trial Pits (4GC1, 4GC2, 4GC3, 4GC4, 4GC5, 4GC6, 4GD1, 4GD2, 4GD3, 4GD4, 4GD5, 4GD6, 4GD7, 4GE1, 4GE2, 4GE3, 4GE4, 4GE5, 4GE6, 4GF1, 4GF2, 4GF3, 4GF4, 4GF5, 4GF6, 4GF7, 4GG5, 4GG6)

RLL Drawing 18669-RLL-22-XX-DR-O-0376 presented in **Appendix A** shows the location of the exploratory holes.

The historical logs within the Site boundary are presented in **Appendix G**.

5.2. Encountered Ground Conditions

The Site was generally found to be underlain by Made Ground overlying superficial deposits, reported as Tidal Flat Deposits. Bedrock of the Mercia Mudstone Group was encountered in one location (CWCP31).

5.2.1. Made Ground - Surfacing

Surfacing of tarmac was encountered in three locations (4GC6, 4GF7 & 4GG5) from ground level to depths between 0.10mbgl to 0.15mbgl.

5.2.2. Made Ground

Made Ground was encountered within all 30 exploratory holes. The Made Ground was encountered from ground level or underlying the surfacing at thicknesses of between 0.60m to 3.60m, and was generally described as:

- Black/ dark brown/brown/light brown/light grey/reddish brown gravelly SAND with cobbles and occasional slag;
- Black/ dark brown gravelly ashy SAND with cobbles;
- Dark brown/ brown/ light brown/ orange clayey gravelly SAND;

- Light grey slightly clayey silty SAND;
- Black/ dark brown/ red/ blue/ purple sandy GRAVEL with cobbles;
- Dark brown/ brown/ light brown clayey sandy GRAVEL with occasional cobbles;
- Light brown CLAY;
- Dark brown/ brown/ light brown/ red gravelly CLAY; and
- Dark brown/ brown/ light brown/ dark grey/ grey sandy gravelly CLAY.

Gravel and cobble components typically comprised concrete, brick, iron ore, slag, mudstone, coke, asphalt, siltstone, steel slag and furnace slag.

Two locations (4GC3 and 4GC6) refused at depths of 0.60mbgl and 1.50mbgl. Refusal occurred within slag layers/ fused slag horizons or was due to obstructions from iron ore aggregate and/ or concrete.

5.2.3. Superficial Deposits

Tidal Flat Deposits were encountered beneath the Made Ground in 28 locations (CWWS31, CWCP31, 4GC1, 4GC2, 4GC4, 4GC5, 4GD1, 4GD2, 4GD3, 4GD4, 4GD5, 4GD6, 4GD7, 4GE1, 4GE2, 4GE3, 4GE4, 4GE5, 4GE6, 4GF1, 4GF2, 4GF3, 4GF4, 4GF5, 4GF6, 4GF7, 4GG5, 4GG6). The top of the strata was encountered from depths of between 1.65mbgl and 3.60mbgl. The base of the formation was not encountered during the 2018 Atkins ground investigation, although the formation was recorded to depths of up to 3.70m. In contrast, the base of the formation was recorded at 10.00mbgl during the 2016 IFA ground investigation.

The Tidal Flat Deposits were generally described as:

- Soft to firm blue peaty silty CLAY;
- Firm blue/brownish grey/ greenish grey mottled brown silty CLAY with rootlets or rare roots;
- Very soft to soft dark brown/ brown/ dark grey/ blue fibrous PEAT;
- Very soft grey SILT; and
- Loose grey slightly gravelly fine to medium SAND.

5.2.4. Bedrock

Bedrock of the Mercia Mudstone Group was not encountered in the 2018 Atkins ground investigation. However, the Mercia Mudstone was encountered in one of the IFA boreholes (CWCP31). The top of the strata was encountered at 10.00mbgl. The base of the formation was not encountered but the strata was recorded to a maximum depth of 10.95mbgl.

The Mercia Mudstone Group was described as:

- Very stiff reddish brown mottled grey, silty CLAY (Mercia Mudstone Group Grade IVa).

5.2.5. Perched Water

During the Atkins intrusive investigation, perched water was encountered in 27 locations, typically perched within the Made Ground, or towards the base of the Made Ground perched on top of the natural clay. The depth below ground level was recorded from 0.6m to 1.50m.

In the IFA intrusive investigation, perched water was encountered in 1 location (CWCP31) within the Tidal Flat Deposits. The depth below ground level was recorded at 9.50m.

5.2.6. Encountered Buried Obstructions or Services

Buried obstructions or services were encountered in 7 exploratory locations as detailed in the following table.

Encountered Buried Obstructions			
Borehole	**Depth (m)**	**Strata**	**Remarks**
4GC1	0.50	MG	Steel cables
4GC3	1.50	MG	Concrete Slab
4GD2	0.50	MG	Cables
4GD3	0.00	MG	Electric cables and brick wall
4GD4	0.15	MG	Electric cables and brick wall
4GD5	0.00	MG	Electric cables and brick wall
4GG6	0.60	MG	Slag/iron ore aggregate

Notes: MG= Made Ground

5.2.7. Visual/ Olfactory Evidence of Contamination

During the intrusive investigation, visual or olfactory evidence of contamination was encountered in 10 locations as detailed in the following table.

Visual/ Olfactory Evidence of Contamination			
Exploratory Hole	**Depth (m)**	**Strata**	**Remarks**
4GC4	1.20	MG	Oil sheen coming from north of trial pit, no hydrocarbon odour.
4GC6	1.10	MG	Oil sheen on groundwater.
4GD6	0.70	MG	Oil sheen on groundwater, slight hydrocarbon odour.
4GE3	0.00	MG	Oil sheen in groundwater.
4GE4	0.60	MG	Light hydrocarbon odour.
4GE5	0.70	MG	Oil sheen in groundwater, slight hydrocarbon odour.
4GF1	1.40	MG	Light hydrocarbon odour.
4GF2	0.85	MG	Oil sheen in groundwater, hydrocarbon odour.
4GF4	0.60	MG	Light hydrocarbon odour.
4GF5	0.75	MG	Oil sheen in groundwater, slight hydrocarbon odour.

Notes: MG= Made Ground

5.2.8. Instability

Evidence of instability within the exploratory holes was not noted during the 2016 IFA or 2018 Atkins intrusive investigations.

5.3. Gas Screening

No gas monitoring was undertaken during the 2016 IFA and 2018 Atkins ground investigations. A programme of shallow gas monitoring is recommended following turnover and earthworks reengineering.

The classification of the Site will depend on the gas generation potential of the Made Ground and permeability of the upper clay of the Tidal Flat Deposits following earthworks. A site-specific ground gas assessment is recommended following the completion of the earthworks.

6.0 Chemical Testing

6.1. Risks to Human Health

6.1.1. Methodology

To assess the risk posed to the health of site end users, the concentrations of contaminants recorded in soils have been compared to appropriate Site Assessment Criteria (SAC). These have been derived using the Contaminated Land Exposure Assessment Model (CLEA). SACs used in this generic quantitative risk assessment, include:

- Defra Category 4 Screening Levels (C4SLs) (Defra, 2014); and
- Land Quality Management & Chartered Institute of Environmental Health (LQM & CIEH, 2015) Suitable for use levels (S4ULs).

Where C4SL or S4UL are not available for a contaminant or are not considered appropriate for the risk assessment reference has been made to the Environment Agency Soil Guideline Values (SGV), the LQM/CIEH Generic Assessment Criteria (GAC) and the Environmental Industries Commission GAC (EIC GAC).

The C4SL and EA SGV have been derived based on the CLEA default value for Soil Organic Matter (SOM) content of 6% and a sandy loam soil type. The LQM/CIEH S4UL and GAC and the EIC GAC are based on 1%, 2.5% and 6% SOM content and a sandy loam soil type.

The Site has been assessed based on a residential end use with plant uptake as defined in the Environment Agency (EA) CLEA model v1.071 'Updated technical background to the CLEA model Science Report – SC050021/SR3'.

6.1.2. Results

79 soil samples were collected during the 2018 Atkins ground investigation for contamination testing taken from the Made Ground and Superficial Deposits (Samples suffix "-V"). No samples were taken during the 2016 IFA ground investigation.

Samples were tested for heavy metals, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbon (TPH), gasoline range organics (GROs), BTEX, pH, soil organic matter (SOM), cyanide, phenols, ammoniacal nitrogen and select samples were also tested for asbestos.

The samples collected were conservatively assessed against LQM/ CIEH 2015 S4ULs (Suitable for Use Levels) for a residential end use with plant uptake (1% SOM). A summary of exceedances is presented in the following table, and the chemical analysis results are presented in full in **Appendix H**.

Summary of Exceedances of S4ULs Residential with Plant Uptake Criteria.				
Contaminant	**No. of Exceedances**	**Location of Exceedances**	**Exceedance Concentration Range (mg/kg)**	**Screening Value (mg/kg)**
Lead	1 of 79 (1.27%)	4G-E3-V	276.00	200.00
Vanadium	5 of 79 (6.33%)	4G-C2, 4G-F3, 4G-C7, 4G-D3, 4G-D7	515.00 – 2400.00	410.00
Benzene	79 of 79 (100.00%)	All Samples	0.18 – 1.80	0.087
Benzo[b]fluoranthene	5 of 79 (6.33%)	4G-C1, 4G-C5, 4G-F1, 4G-D6, 4G-E6	2.94 – 7.74	2.60
Benzo[a]pyrene	3 of 79 (3.80%)	4G-C1, 4G-F1, 4G-E6	5.58 – 3.08	2.20
Dibenz(a,h)Anthracene	10 of 79 (12.66%)	4G-C1, 4G-C2, 4G-C3, 4G-C5, 4G-D2, 4G-F1, 4G-C7, 4G-D6, 4G-E5, 4G-E6	0.24 – 1.26	0.24

79 of 79 samples were shown to exceed the screening criteria for benzene. It should be noted that only two samples had concentrations above the limit of detection for benzene. The detection limit for benzene tested listed by the laboratory was between 90µg/kg (74 samples), 180µg/kg (2 samples) or 1800µg/kg (1 sample) these are greater than the screening value of 87µg/kg (0.087mg/kg) and causes a significant skew in the results. Where samples are reported at the detection limit, for screening purposes, it has been conservatively assumed that the value is 90µg/kg, 180µg/kg or 1800µg/kg. The true concentration is likely to be significantly lower than this value.

Of the 79 samples tested, 27 were collected from the natural ground (Tidal Flat Deposits). One exceedance was recorded for lead (4G-E3-V at 2.20m bgl) within the natural ground. This isolated exceedance is considered likely to result from contamination associated with the overlying Made Ground, rather than being representative of elevated concentrations within the natural deposits.

6.1.3. Asbestos

Asbestos was identified in 5 samples from the 30 analysed; a summary of the asbestos identified is given in the below table.

Summary of Asbestos Identified within the Site		
Location (Depth in m bgl)	**Asbestos Type**	**Quantification (%)**
4G-D5 (0.50)	Amosite Asbestos	0.0035
4G-E5 (0.2)	Amosite Asbestos	<0.001
4G-F3 (0.6)	Amosite Asbestos	<0.001
4G-C1 (1.0)	Amosite Asbestos	0.0077
4G-C5 (1.2)	Amosite Asbestos	<0.001

Asbestos was identified in five samples; all positive samples were quantified to ascertain the weight for weigh concentration of asbestos in soil and returned results ranging between <0.001% to 0.0077%. The Institute of Occupational Medicine (IOM) risk assessment report for the reuse of soils containing asbestos at Llanwern

(Ref. 401134-IOM-14-XX-RP-Z-0001) and has been agreed with Natural Resources Wales, states the following:

- Within the clean cover system a minimum of 0.6m of clean soil (asbestos content <0.001%) will be placed across the Llanwern site.
- Beneath the cover system, soil will be screened and, if asbestos contamination is less than 0.02% (200PPM) in the soil, that soil may be used in residential areas.

6.1.4. Groundwater

No samples of perched groundwater were taken during the 2016 IFA or 2018 Atkins intrusive investigation.

Historical investigations undertaken by Atkins across the wider development have identified elevated concentration of contaminants associated with the Site's former usage that may present a risk to Controlled Waters.

Further assessment of the risk posed by the Site as part of the wider development has been completed via preparation of a Controlled Waters Detailed Quantitative Risk Assessment (Ref. 18669-RLE-19-RP-O-0006) for the wider development and a phase specific addendum to this (Ref. 18669-RLL-26-XX-RP-O-0865-P01).

Due to the history of the Site, it is anticipated that further remedial works including turnover of the Made Ground will be undertaken with post remedial monitoring of water and gas following the completion of the earthworks.

7.0 Conceptual Site Model (CSM)

This section provides a qualitative assessment of the risk posed from potential on and off-site contamination sources identified from the information presented in the previous sections. The CSM considers the findings of all ground investigations that have been undertaken at the Site.

The assessment carried out assumes that the Site will be redeveloped for a residential with plant uptake end-use, as the most sensitive of the proposed uses. Should the end use be altered, potential pathways and receptors should be re-assessed.

The conceptual site model below has been developed based on the commonly adopted source-pathway-receptor model as recommended within the Environment Agency Land Contamination Risk Management guidance and the Welsh Government's Contaminated Land Statutory Guidance for Wales 2012, and the Welsh Government, Natural Resources Wales & Welsh Government's Development of Land Affected by Contamination: A Guide for Developers (2017).

7.1. Potential Pollutant Linkages

7.1.1. Sources

The Site makes up part of the former Llanwern Steelworks; the Site historically comprised part of an ore stockyard, conveyors and part of a sinter plant. Within the sinter plant various infrastructure was present including sinter bins, coke cutting plant, a rod mill, a precipitator, return fines plant and control room. Surrounding the sinter plant there were various accessways and haul routes.

Chemical analysis of soil samples has identified concentrations higher than the selected screening criteria for lead, vanadium, benzene, benzo[b]fluoranthene, benzo[a]pyrene and dibenz(a,h)anthracene. Asbestos was identified in five of the thirty soil samples tested in the form of debris and loose fibres at concentrations of <0.001% to 0.0077%.

Potential contaminant sources are summarised in the following table.

Summary of Potential On Site Sources of Contamination		
Source	**Site Area**	**Key Contaminants**
Deep Made Ground, including slag material	Whole Site	Heavy metals, PAHs, Benzene and ground gas.
Historical Steelworks infrastructure	Whole Site	Heavy metals, PAHs, TPHs.
Made Ground	Isolated locations across the Site	Low concentrations of asbestos.
Natural Strata	Whole Site	Potential for ground gas from organic materials in the Tidal Flat Deposits. Potential for sulphates and pyrites in the underlying Tidal Flat Deposits and Mercia Mudstone Group.

7.2. Potential Receptors

The following receptors (current and proposed) have been identified at the Site. Given the absence of significant ecological designations in the vicinity of the Site, ecological receptors are not considered below.

Humans:

- Construction workers and maintenance workers; and
- Residents on and off-site (current and future).

Controlled Waters:

- Mercia Mudstone Group (Secondary B Aquifer) and Tidal Flat Deposits (Secondary [Undifferentiated] Aquifer); and
- East Lake, Kings Wall Reen and associated development drainage network within 500m.

Property:

- Existing and proposed buildings and services on and immediately surrounding the Site; and
- Proposed infrastructure on the Site.

7.2.1. Potential Pathways

Human Health

There is the potential for exposure of site end users to contaminants in soils via the following pathways, based on a residential with plant uptake end use (Environment Agency CLEA land use scenario):

- Direct soil and dust ingestion;
- Dermal contact with soil directly and indoor dust;
- Plant uptake followed by consumption of homegrown produce;
- Inhalation of vapours;
- Inhalation of dust; and
- Inhalation of gases.

Due to the levels of contamination encountered it is recommended that appropriate risk assessments and method statements are prepared and safety measures (use of PPE/ hygiene rules) implemented in order to provide adequate protection for construction workers.

If materials are required to be imported to Site they will have to be assessed and validated in line with the agreed import criteria detailed in the remediation strategy and site-specific Materials Management Plan (MMP).

Basic radon protection measures are not required.

Controlled Waters

It is considered that due to the low permeability nature of the underlying Tidal Flat Deposits, there is no feasible pathway for vertical migration of contaminants into the underlying Mercia Mudstone Aquifer.

Currently Monks Ditch crosses the wider development within a concrete channel and no connection with the private drainage system presently exists. It is proposed that the future surface water network of reens and lakes will discharge via a pumping system into Monk's Ditch. This on-site surface water system will discharge, via a permit, into Monks Ditch once the specified quality criteria are met and the application to connect the system is approved.

Monks Ditch is not currently a receptor (it is understood to be hydraulically isolated as it flows between the Glan Llyn development and the business park the east, within a concrete channel), although it could potentially be a future receptor if surface water discharge is permitted into the Monks Ditch.

With regard to Controlled Waters, the following pathways are considered applicable to the Site, following completion of the development and once relevant approvals have been granted to allow discharge into Monks Ditch:

- Leaching of soil-borne contamination in Made Ground and subsequent lateral migration through permeable pathways in Made Ground to Monks' Ditch via onsite reens.

As such, a Site Specific Detailed Controlled Waters Risk Assessment (Ref. 18669-RLL-26-XX-RP-O-0865) has been prepared for the Site and should be read in conjunction with this report.

Structures

Concrete classification testing has not been undertaken. A Design Sulphate (DS) class and Aggressive Chemical Environment for Concrete (ACEC) class should be derived for the Site in accordance with the recommendations given within BRE SD1 and based on pH and sulphate testing.

A site-specific ground gas assessment is recommended following the earthworks. The classification of the Site will depend on the gas generation potential of the Made Ground and permeability of the upper clay of the Tidal Flat Deposits.

7.2.2. Preliminary Remediation Assessment

The Site has previously undergone various phases of ground investigation and remedial earthworks.

A preliminary assessment of remedial works has been undertaken based on information from the ground investigations on the Site. The preliminary assessment indicates that the provision of clean cover is likely to make the Site suitable for human health but some material is anticipated to be removed to render the site suitable in terms of the risks to controlled waters (private reen network). The Made Ground will be tested, re-assessed and where the soil does not meet the reuse criteria it will be

excavated, removed, and replaced with suitable fill that meets the criteria. Prior to filling, excavations of unsuitable material shall be validated to demonstrate compliance with the Remediation Strategy.

The installation and validation of gas mitigation measures may be required following completion of the post-earthworks ground gas risk assessment.

7.2.3. Proposed Mitigation

The proposed remedial approach is to remove unsuitable material based on the grid of testing and turnover the Made Ground to natural geology, approximately 0.60m to 3.60mdgl to remove obstructions and reduce the permeability of the Made Ground. Based on the results of chemical testing, the Made Ground is not suitable for reuse at shallow depths within the residential plot but is likely to be suitable for use as part of the reengineered formation beneath 600mm of clean cover.

Construction of buildings and hardstanding with suitable construction materials to break the pathway with underlying Made Ground, to intercept rainwater and to reduce infiltration through to Controlled Waters (private reen network) is recommended.

To break the identified contamination linkages, the following mitigation measures are required:

- Excavation of Made Ground to natural clay and removal of unsuitable material and buried obstructions to facilitate reengineering and reuse of the Made Ground;
- Identify, remove and validate the removal of gross contamination and potential obstructions on a grid square basis, and subsequent validation testing and reporting;
- Treatment or off-site disposal of impacted soils (where required);
- Reengineering of materials in accordance with the approved Remediation Strategy and Earthworks Specification to an appropriate specification to achieve the required formation level;
- Chemical and geotechnical validation of the placement of material following turnover;
- Site-specific geotechnical assessment relating to the proposed development;
- Installation of a 600mm clean cover system, suitable for a residential with plant uptake end use, will be required in areas of residential gardens and landscaping;
- Consultation with the water supply company in relation to the potential use of barrier pipe;
- Preparation of a Piling Risk Assessment;
- With respect to asbestos, a minimum of 600mm of clean soil (in accordance with Llanwern Asbestos Risk Assessment prepared by IOM) will be placed across the Llanwern site. Made Ground material will be screened and, if asbestos contamination is less than 0.02% (200PPM) then it may be used in residential areas below the clean cover. The materials used in the preparation of the site