

Princess Royal Theatre

784-B046183

Ground Investigation Report

FINAL

Morgan Sindall

Aug 2024

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TABLE OF CONTENTS

1.0	INTRODUCTION	6
1.1	Instruction	6
1.2	Brief.....	6
1.3	report scope	7
1.4	Limitations.....	7
2.0	SUMMARY OF SITE INFORMATION	8
2.1	Location.....	8
2.2	SITE DESCRIPTION	8
2.3	Ground Conditions.....	8
2.4	Previous Site Investigation	10
3.0	SITE INVESTIGATION	11
3.1	Scope	11
4.0	GROUND CONDITIONS ENCOUNTERED	13
4.1	Strata Encountered	13
4.2	GROUNDWATER.....	15
4.3	Insitu testing.....	15
4.4	Visual or Olfactory Evidence of Contamination	16
4.5	Obstructions.....	16
5.0	LABORATORY TESTING	17
5.1	Geotechnical Testing	17
5.2	Environmental Testing.....	17
6.0	GROUNDWATER AND GAS MONITORING	19
6.1	Groundwater Monitoring	19
6.2	Ground Gas Monitoring.....	19
7.0	SOIL INFILTRATION TESTING.....	20
7.1	Background	20
7.2	Soil Infiltration Tests	20
7.3	Ground Conditions.....	21
7.4	Constraints and Limitations	21
8.0	GEOTECHNICAL ASSESSMENT	22

8.1	Ground Conditions	22
8.2	Soil Properties	22
8.3	Summary of Characteristic Material Parameters.....	23
9.0	PRELIMINARY GEOTECHNICAL DESIGN CONSIDERATIONS	24
9.1	Proposed Development	24
9.2	Earthworks	24
9.3	Foundations	24
9.4	Chemical Attack on Buried Concrete.....	24
9.5	Temporary Works.....	25
9.6	Pavements.....	25
9.7	Drainage	25
10.0	GEOTECHNICAL RISK REGISTER.....	26
10.1	Introduction	26
10.2	Risk Matrix	27
11.0	GROUND CONTAMINATION ASSESSMENT – HUMAN HEALTH.....	30
11.1	Introduction	30
11.2	Assessment Criteria.....	30
11.3	Tier 1 – Soil Screening.....	31
11.4	Asbestos.....	32
12.0	GROUND CONTAMINATION ASSESSMENT – WIDER ENVIRONMENT	33
12.1	Introduction	33
12.2	Assessment Criteria.....	33
12.3	Tier 1 Screening Assessment – Leachate.....	33
13.0	PRELIMINARY GROUND GAS ASSESSMENT	35
13.1	INTRODUCTION	35
13.2	PRELIMINARY GROUND GAS RISK ASSESSMENT	36
13.3	SUMMARY AND DISCUSSION	38
14.0	CONCEPTUAL SITE MODEL & PRELIMINARY GROUND CONTAMINATION RISK ASSESSMENT	40
14.1	Overview	40
14.2	Current Site Usage and Proposed Development	40
14.3	Conceptual Site Model.....	40
14.4	Ground Conditions Risk Assessment.....	41

15.0	CONCLUSIONS AND RECOMMENDATIONS	44
15.1	Conclusions	44
16.0	NOTES.....	46
17.0	GLOSSARY.....	47

FIGURES

Figure 1: Site Location Plan

Figure 2: Ground Investigation Exploratory Location Plans

APPENDICES

Figures

Appendix A: Report Conditions

Appendix B: Exploratory Hole Logs

Appendix C: Soil Infiltration Test

Appendix D: CBR Test Data

Appendix E: Laboratory Test Results

Appendix F: Groundwater and Ground Gas Monitoring Results

Appendix G: CIRIA C552 Risk Methodology

1.0 INTRODUCTION

1.1 INSTRUCTION

Tetra Tech Ltd (Tetra Tech) was commissioned by Morgan Sindall (the client) to a ground investigation to assess the underlying ground conditions for the re-development of the Princess Royal Theatre for a site known as Princess Royal Theatre (known hereafter as “the site”).

1.2 BRIEF

The brief was to undertake a preliminary intrusive ground investigation to provide information on ground and groundwater regimes to assist in assessing the suitability of the site for remediation. The ground investigation was devised by Hydrock (PRT-HYD-XX-ZZ-S-SC-0001).

The investigation was designed to comprise the following elements:

- 9 no. dynamically sampling boreholes, including in situ testing of SPT's, to refusal with dynamic probe follow on to refusal. Sampling and testing in accordance with Ground Investigation specification (Appendix C):
- Up to 4 No. machine excavated Trial Pits excavated with soakaway tests undertaken to BRE 365 Digest to inform drainage design.
- 4 No. in-situ California Bearing Ratio (CBR) tests using the TRL-DCP method adjacent to each borehole location and soakaway.
- 2 No. hand dug inspection pits to assess foundations of existing theatre building.
- Installation of 3 No. ground gas and groundwater monitoring wells;
- On-site inspection and logging of samples;
- Representative soil samples taken and submitted for geotechnical classification testing;
- Representative soil samples taken, submitted and tested for a suite of potential contaminants;
- Three return visits to monitor ground gas and groundwater levels;
- Preparation of a Ground Investigation report.

Phase 2

- 3 No. vacuum excavated inspection trenches services and to assess foundations of existing theatre building.

The specification of works were completed in accordance with ICE specification for ground investigation and the works themselves be completed in general accordance with the principles set out in BS EN 1997-2:2007 and with the general practice described in BS5930:2015. The geo-environmental aspects of the ground investigation complied with the general requirements of BS 10175+A1:2017.

1.3 REPORT SCOPE

This report summarises the work undertaken and includes the following elements:

- Full factual records of the site works carried out;
- Ground conditions encountered;
- Environmental laboratory testing results;
- Geotechnical laboratory testing results.

1.4 LIMITATIONS

This report has been prepared in accordance with the requirements of Morgan Sindall. This report is subject to the report conditions presented in Appendix A.

The information contained in this report is intended for the use of the Morgan Sindall and Tetra Tech can take no responsibility for the use of this information by any third party or for uses other than that described in this report or detailed within the terms of our engagement.

2.0 SUMMARY OF SITE INFORMATION

2.1 LOCATION

The site is located within the grounds surrounding the Princess Royal Theatre in the centre of Port Talbot. The site is centred on National Grid Reference (NGR) 276525, 190235.

A site location plan is presented in Figure 1.

The site is situated within the centre of Port Talbot just off junction 41 of the M4 and has approximately 105 hardstanding car parking spaces with sporadic areas of soft landscaping.

2.2 SITE DESCRIPTION

The site lies within two sections (A and B) within the centre of Port Talbot and is bounded by:

- To the west: further residential housing with Neat Port Talbot Hospital located beyond.
- To the north: the M4 traverses along the northern boundary of the site.
- To the east: the town centre is located to the east of the site with a series of residential streets.
- To the south: A4241 is located to the south of the site with Port Talbot Parkway railway line.

The site lies immediately adjacent to the River Afan, and the general topography in the area is relatively flat at an elevation of around 13m AOD (based on on-line aerial photography). Vehicular access to the site is gained via an access road gate from B4286 on the northern site boundary.

2.3 GROUND CONDITIONS

All information collated on ground conditions is based on extrapolation from data available on adjacent sites, and from literature sources. In summary, the following data sources have been consulted:

2.3.1 British Geological Survey Information

The geology of the site area is covered by:

- British Geological Survey (BGS) Sheet No. 247 (Swansea) Solid and Drift Edition, 1:50 000;
- BGS website (British Geological Survey, 2024);
- Environmental database (Groundsure Report)- to be presented within finalised Desk Top Study Report.

According to the BGS map of the area (plate 1 and 2) the following ground conditions appear to be underlying the site:

Made Ground

The BGS mapping shows the presence of Made Ground to be present across the entirety of the site and within the surrounding area. The Made Ground across the area is anticipated to be associated with the steel works and is likely to comprise highly variable materials, including remnants of former sub-structures.

Superficial Geology

BGS mapping indicates much of the site is underlain by Till, Diamicton superficial deposits. These are expected to be fine-grained with occasional gravel along with the possibility of both cobbles and boulders.

Tidal Flat Deposits are shown to be present within the western part of the site. Typically, these deposits are described as *'mud flat and sand flat deposits, form extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide. They consist of unconsolidated sediment, mainly mud and/or sand. They may form the top surface of a deltaic deposit.'*

Alluvial Fan Deposits are also shown to be present on site and located within the central and eastern part of the site. The BGS lexicon describes these superficial deposits as *'low, outspread, relatively flat to gently sloping masses of loose rock material, shaped like a fan or segment of a cone. They are deposited by streams at the mouths of tributary valleys onto a plain or broad valley.'*

These superficial deposits will typically be overlying bedrock.

Solid Geology

BGS mapping indicates that the solid geology underlying the site is comprised of the South Wales Upper Coal Measures Formation (UCM) which are comprised of mudstone, siltstone and sandstone. The Coal Measures bedrock comprises of coal-bearing interbedded sandstone, mudstone and siltstone, associated seat earths with minor grey, quartz-rich sandstones, coals and ironstones.

To the north of the site, underlying the Devensian Till is the Llynfi Member which is comprised of Sandstone. This member is typically a *'green-grey and blue-grey, feldspathic, micaceous lithic arenites ('Pennant sandstones') with thin mudstone/siltstone and seatearth interbeds and mainly thin coals'*.

South Wales Middle Coal Measures underlies the southernmost part of the site (within section B) which are comprised of mudstone, siltstone and sandstone.

The geological map indicates the presence of a fault at rockhead to potentially intersect the site and traverse in a north-west to south-east direction. Full details are outlined with Tetra Tech's Desktop Study (784-B046183 Princess_Royal_Theatre_DTS).

Plate 1 – BGS Solid Geology

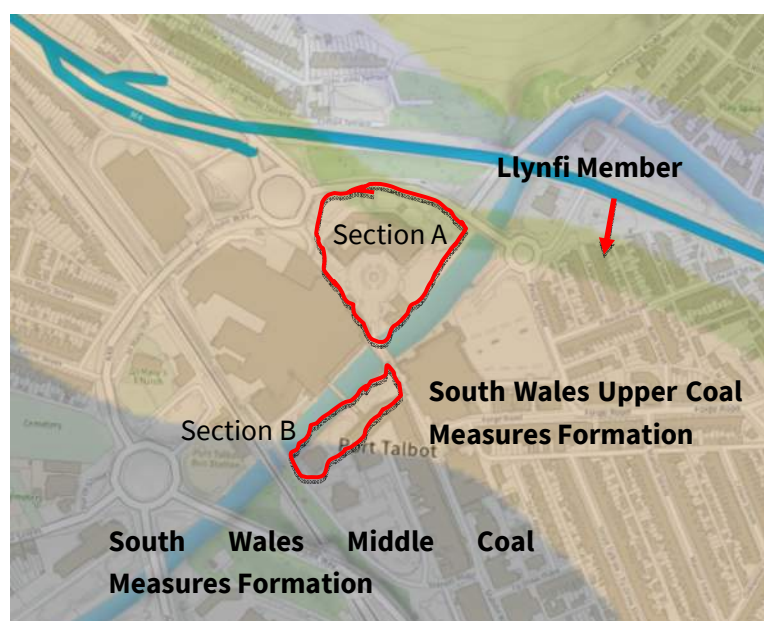


Plate 2 – BGS Superficial Geology



2.4 PREVIOUS SITE INVESTIGATION

At the time of writing the report Tetra Tech are not aware of any previous site investigations that have been undertaken at the site, or within the immediate surrounding area.

3.0 SITE INVESTIGATION

A site investigation was undertaken by Tetra Tech between the 2nd of April and 5th April 2024, with a return visit yet to be confirmed following complications that arose during the initial phase of investigation. The exploratory borehole logs are presented in Appendix B. the second phase of GO was undertaken between the 6th and 8th of August 2024.

At the time of writing the report, there are still outstanding works to be completed, with an expected completion date within in April 2024. Testing outstanding includes permeability testing within selected boreholes which is to be specified and undertaken by Tetra Tech Hydrogeologist. The testing is scheduled for 18th March.

3.1 SCOPE

The scope of the site investigation was designed by Hydrock (PRT-HYD-XX-ZZ-S-SC-0001) and outlined within the Ground Investigation Specification Document, with specification requirements outlined in Appendix C and included the following:

- 9 no. dynamically sampling boreholes, including in situ testing of SPT's, to refusal with dynamic probe follow on to refusal. Sampling and testing in accordance with Ground Investigation specification (Appendix C):
- Up to 4 No. machine excavated Trial Pits excavated with soakaway tests undertaken to BRE 365 Digest to inform drainage design.
- 4 No. in-situ California Bearing Ratio (CBR) tests using the TRL-DCP method adjacent to each borehole location and soakaway.
- 2 No. hand dug inspection pits to assess foundations of existing theatre building.
- Installation of 3 No. ground gas and groundwater monitoring wells;
- On-site inspection and logging of samples;
- Representative soil samples taken and submitted for geotechnical classification testing;
- Representative soil samples taken, submitted and tested for a suite of potential contaminants;
- Three return visits to monitor ground gas and groundwater levels;
- Preparation of a Ground Investigation report.

Phase 2

- 3 No. vacuum excavated inspection trenches services and to assess foundations of existing theatre building.

The ground investigation is required to further refine existing ground models for the development of the detailed design of the remedial measures. The objectives of the GI are:

- To collect appropriate data so to provide a ground model of the site;
- To provide a geotechnical assessment of the site to allow design; and
- To refine the Preliminary Conceptual Site Model and to quantify risks to identified receptors

The specification was completed in accordance with ICE specification for ground investigation and the works themselves be completed in general accordance with the principles set out in BS EN 1997-2:2007 and with the general practice described in BS5930:2015. The geo-environmental aspects of the ground investigation complied with the general requirements of BS 10175+A1:2017.

Figure 2 shows the layout of the exploratory holes advanced during the site investigation, following positions marked on a plan by Hydrock, outlined in the pre-construction information. Exploratory hole logs are presented in Appendix B with photographic plates presented in the figure section of the report.

After completion of two of the dynamic windowless boreholes, Tetra Tech instructed the installation in line with the requirements outlined in the ground investigation specification to reflect ground conditions encountered.

3.1.1 Deviations to Scope

No major deviations or changes to the scope were implemented on site and works were undertaken in accordance with Appendix C of the Hydrock Ground Investigation Specification.

Minor deviations occurred on site, where positions were relocated on a micro-scale, due to obstructions on site. These locations included SA03 due to the location of utility services on site, and SA01 due to the location of trees.

4.0 GROUND CONDITIONS ENCOUNTERED

4.1 STRATA ENCOUNTERED

The sequence of strata encountered beneath the site was;

- Made Ground / Topsoil
- Superficial Deposits

A summary of each stratum depth is provided in Table 1 below, with descriptions of each stratum detailed in the subsequent sections, as well breakdown of installations within Table 2.

Table 1 - Summary of strata depths (m bgl) for boreholes

Location	Depth of strata (m bgl)			
	Topsoil	Made Ground	Superficial Deposits	Bedrock
SA01	GL – 0.25	0.25 – 1.00*	NE	NE
SA02	GL – 0.35	0.35 – 1.15*	NE	NE
SA03	GL – 0.30	0.30 – 0.80	0.80 – 1.25*	NE
SA04	GL – 0.15	0.15 – 0.90	0.90 – 1.20*	NE
TP01	GL - 0.35	0.35 – 0.50*	NE	NE
TP02	GL - 0.25	0.25 – 0.60*	NE	NE
WS01	NE	GL – 1.20	1.20 – 2.50*	NE
WS02	NE	GL – 0.55	0.55 – 1.60*	NE
WS03	GL – 0.35	0.35 – 0.85	0.85 – 1.50*	NE
WS04	GL – 0.30	0.30 – 0.40*	NE	NE
WS05	NE	GL – 0.15	NE	NE
WS05A	NE	GL – 0.20	NE	NE
WS05B	NE	GL – 0.20	NE	NE
WS06	Borehole was not required			
WS07	GL – 0.20	0.20 – 0.90	0.90 – 2.00*	NE
WS08	GL – 0.35	0.35 – 2.00*	NE	NE

Location	Depth of strata (m bgl)			
	Topsoil	Made Ground	Superficial Deposits	Bedrock
WS09	GL – 1.20	1.20 – 2.30	2.30 – 2.50*	NE
WS10	NE	GL – 0.45	0.45 – 0.75*	NE
WS11	NE	GL – 0.35	0.35 – 0.60*	NE

*Base of stratum not proven

NE denotes not encountered

Table 2 – Summary of Installations

Location	Installation Summary				
	Borehole Type (m bgl)	Standpipe Type	Installation Depth (m bgl)	Diameter (mm)	Installation
WS01	DS (Windowless)	Standpipe with GW monitor	2.50	54	Installed to base of borehole GL – 1.00m (Plain) 1.00 – 2.50m (Slotted)
WS07	DS (Windowless)	Standpipe with GW monitor	2.00	54	Installed to base of borehole GL – 1.00m (Plain) 1.00 – 2.00m (Slotted)

4.1.1 Made Ground

Made ground was encountered in each of the exploratory locations, with four of these being located on the hardstanding to the north and south of the Royal Princess Theatre. Made Ground was encountered to a maximum depth of 2.30m bgl which was encountered within WS09.

Made ground was predominantly a black to blackish brown silty Gravel, sand SILT, sandy gravelly SILT, or a clayey GRAVEL. Gravel was comprised of sandstone, slag, orange brick, concrete, clinker, rare coal, mudstone, and ceramic tile. Glass and occasional plastic were recorded in WS07.

A thin veneer of asphalt was also recorded in positions (WS05, WS05A, and WS05B)

4.1.2 Topsoil

Topsoil was identified in eleven of the exploratory locations to maximum depth of 1.20m bgl which was identified in WS09, in the section B of the site. A thinner veneer of topsoil was encountered within Section A to a maximum depth of 0.35m bgl which was identified in WS03.

Predominantly recorded as a silty sandy GRAVEL, or a sandy SILT of various brown shades. The gravel identified was recorded as a mixture of either mudstone or sandstone with angular to subangular in shape, with occasional rootlets throughout the strata.

Present in exploratory locations as indicated in Table 1 above.

4.1.3 Superficial Deposits

Present in seven of the exploratory borehole locations, outlined in Table 1 above, shows the superficial deposits was encountered to a maximum depth of 2.50m bgl in WS01 and WS09, however base of the stratum was not proven. Superficial deposits on site were identified as either Tidal Flat Deposits (TFD) or Alluvium Deposits.

Tidal Flat Deposits

Predominantly recorded as a sandy SILT or clayey SILT, with the strata being typically a greyish brown or grey in colour.

Alluvial Fan Deposits

Predominantly recorded as sandy GRAVEL, gravelly SILT, or clayey GRAVEL with subrounded to subangular gravel comprised of sandstone and mudstone. The colour of the strata was typically shades of brown and orange.

For a full comprehensive description of each strata encountered with depths, refer to the exploratory location logs presented in Appendix B.

4.2 GROUNDWATER

No obvious groundwater strikes were noted in the exploratory locations across the site during both drilling and excavations. It may be possible further water strikes would be encountered below 2.50m bgl, however due to the nature of the drilling techniques it was not possible to positively identify these to an accurate depth.

For full details of the water strikes at each location, please see the full exploratory logs in Appendix B.

4.2.1 Ground Monitoring

Three rounds of groundwater monitoring are scheduled to be undertaken between April and May 2024 with the potential on a further three visits further groundwater monitoring rounds required, following the second phase of investigation.

Results of all monitoring data will be presented within the final Ground Investigation Report.

4.3 INSITU TESTING

4.3.1 Standard Penetration Testing

Standard Penetration Tests were undertaken at 1.50m intervals during dynamic sampling in the rotary percussive boreholes, in accordance with BS EN ISO 22476-3 (2005) and BS5930 (2015) to assess the relative density of the superficial deposits encountered within the borehole.

As stipulated by BS5930:2015, the SPT N-values represented on the borehole log are the uncorrected results which were obtained in the field, and these are presented on the borehole logs in Appendix B.

4.3.2 Dynamic Cone Penetration Test (DCP)

DCP probing, via TRL method, to provide California Bearing Ratio values for pavement design was undertaken in four exploratory positions (DP01-DP04), up to 1.0m bgl across the site or until refusal. Results are presented in Appendix D.

4.4 VISUAL OR OLFACTORY EVIDENCE OF CONTAMINATION

No visual or olfactory evidence of gross contamination was encountered during the investigation. However, a slight industrial odour was observed from inspection pits and trial pits from the Made Ground, with a isolated strong hydrocarbon odor being identified in WS10 between depths of 0.45 – 0.75m bgl.

Exploratory hole locations throughout the site encountered Made Ground with most of the locations having remnants of anthropogenic debris.

Environmental samples were taken from a range of depths across the site. The test results are included in Appendix D.

4.5 OBSTRUCTIONS

A drainage and full utility survey (PAS128) was undertaken by Gwalia prior to Tetra Techs arrival on site with utilities identified on drawing 3348-U Princess Theatre, and as such a further survey has not been conducted on the site and was not part of the ground investigation. All exploratory positions were cleared of services and obstructions prior to the start of the works by Tetra Techs engineer using a CAT and Genny.

The positions were further re-scanned by a Tetra Tech engineer every 300mm during excavation. No further obstructions were encountered.

4.5.1 Unmapped Utilities

The utility drawing issued by Gwalia (3348-U Princess Theatre) did not record numerous utilities present on site when compared to individual utility providers, and as such certain locations were either locally moved or could not be undertaken. Locations that were affected are outlined below:

A thin black cable was identified, during the inspection pit, in WS08 at a depth of 0.75m bgl, thought to be a pilot cable due to the intermittent signal on the CAT 4+. The inspection pit was widened in order to carry finish the location.

Two strips of yellow service tape were identified in WS04 at 0.40m bgl, traversing in a west to east direction, which was not mapped on the 3348-U utility drawing. After TT consulted the National Grid service plan, it showed the presence of a 4-way electric cables of high voltage and low voltage. As a result, this location was terminated.

Prior to excavating SA03 and SA04, manhole drainage covers were observed within the vicinity of the proposed locations, and after TT engineer lifted them combined drainage pipes were observed and as a result locations were moved to offset these. Again, these were not detailed on the provided drawing by Gwalia or detailed on the Welsh Water (Dŵr Cymru Welsh Water) utility plan.

5.0 LABORATORY TESTING

5.1 GEOTECHNICAL TESTING

Geotechnical testing was scheduled by Coffey Geotechnics Ltd and undertaken by GSTL Ltd, an approved supplier in accordance with the requirements of Tetra Tech quality system and are UKAS accredited for a range of geotechnical tests.

The test procedures used in each case are given in Table 4. The Geotechnical Testing Results are presented in Appendix E.

Table 4 - Summary of Geotechnical Tests

Test	Standard (BS1377:1990) and Accreditation	No.
BRE Suite SD1	BRE SD1	12

5.2 ENVIRONMENTAL TESTING

Environmental chemistry was investigated by specialist chemical analysis of selected soil samples carried out by I2 Environmental Laboratories, an approved supplier in accordance with the requirements of TT quality system and UKAS and MCERTS accredited for a range of chemical analyses. The testing was scheduled by TT and is summarised in Table 5 for soil samples. The test results are included in Appendix E.

Table 5 - Summary of environmental testing

Test suite	No.
<u>Soil Samples:</u> SUITE E • Heavy metals including Chromium (Hexavalent), Boron (water soluble), Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Vanadium and Zinc; • Inorganics – including pH, Water soluble Sulphate as SO₄ (2:1 Extract), Cyanide (Easily liberatable- low level); • Speciated Petroleum Hydrocarbons (TPH CWG); • Speciated Polyaromatic Hydrocarbons (USEPA 16); • BTEX and MTBE; • Asbestos Screen; and, • Phenol.	9

Test suite	No.
SUITE F • Heavy metals including Arsenic, Boron, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc; • Inorganics – including pH, Water soluble Sulphate as SO₄ (2:1 Extract), Cyanide (Easily liberatable- low level); • Speciated Petroleum Hydrocarbons (TPH CWG); • Speciated Polyaromatic Hydrocarbons (USEPA 16); • Phenols	7

6.0 GROUNDWATER AND GAS MONITORING

6.1 GROUNDWATER MONITORING

Groundwater levels were monitored on three occasions following the completion of the ground investigation, between 14th February and 1st March 2024. The monitoring data is presented in Appendix F.

Table 6-1- Summary of groundwater levels

Location	Base of borehole (m bgl)	Depth to water (m bgl)	
		24/04/2024	30/04/2024
WS01	2.40	Dry	Dry
WS07	1.90	Dry	Dry

6.2 GROUND GAS MONITORING

Ground gas levels were monitored on two occasions following the completion of the ground investigation, between 24th and 30th April 2024. The monitoring data is presented in Appendix F and discussed in more detail in Section 13. The monitoring data is summarised in Appendix F.

Table 6-1 below.

Table 6-2- Summary of groundwater levels

Location	Max. Methane (peak) (% vol)	Max. Carbon Dioxide (peak) (% vol)	Min. Oxygen (steady) (% vol)	Max. Carbon Monoxide (steady) (ppm)	Max. Hydrogen Sulphide (steady) (ppm)	Max. Borehole flow (peak) (l/h)
WS01	0.00	0.10	21.00	<0.10	<1.00	0.60
WS07	0.00	2.40	17.50	<0.10	<1.00	0.50

The monitoring rounds were undertaken during atmospheric pressure conditions ranging from 1005mb to 1020mb. A review of atmospheric pressure graphs on weatheronline.co.uk indicates that monitoring was undertaken during periods of falling, steady and rising atmospheric pressure.

In addition, the ground gas monitoring results indicate hydrogen sulphide concentrations of <1 ppm across all monitoring rounds. Maximum concentrations of carbon monoxide of <0.10 ppm was recorded.

7.0 SOIL INFILTRATION TESTING

7.1 BACKGROUND

On 7th January 2019, the Welsh Government introduced Schedule 3 of the Flood and Water Management Act 2010 which requires new developments to consider the feasibility of Sustainable Drainage Systems (SuDS) at the design stage. New developments over 100m² or including more than one property must obtain approval of the drainage system from the SuDS Approval Body (SAB) prior to the commencement of construction.

To support the assessment study, preliminary soil infiltration testing has been undertaken as part of the site investigation to provide information on the potential infiltration rates within the sub-strata on the site.

Soil infiltration tests have been undertaken in line with BRE 365 (2016) methodology and any deviations from this approach are documented within the following section. Where possible, locations and depths of test pits were determined based on the proposed drainage design.

7.2 SOIL INFILTRATION TESTS

Five soil infiltration tests were undertaken within a machine excavated trial pit as summarised in the following table.

Table 7-1 Summary of Soil Infiltration Test Locations

Test Location	Depth to Base (m bgl)	Target strata
SA01	1.00	Made Ground
SA01A	1.00	Made Ground
SA02	1.20	Made Ground
SA03	1.25	Natural Deposits
SA04	1.20	Natural Deposits

Three repeat fills were undertaken within the test location over a period of 3 days. Test locations were securely fenced and covered until the testing period was completed and excavations backfilled on completion.

The results of the soil infiltration tests are presented in the following table. Full test results are included in Appendix C of this report.

Table 7-2 Summary of Soil Infiltration Test Results

Test Location	Soil Infiltration Rate (m/s)		
	Test 1	Test 2	Test 3
SA01	Unable to undertake testing due to obstruction		
SA01A	$>10^{-3}$	$>10^{-3}$	$>10^{-3}$
SA02	3.90×10^{-6}	5.41×10^{-6}	5.18×10^{-4}
SA03	6.34×10^{-6}	3.79×10^{-6}	3.49×10^{-6}
SA04	4.12×10^{-5}	3.05×10^{-5}	2.34×10^{-5}

7.3 GROUND CONDITIONS

7.3.1 Depth to Groundwater

Due to the nature of where the soil infiltration testing was being undertaken, a trial pit was not excavated adjacent to the test location in order to identify the groundwater level.

Based on the findings of the fieldworks and post completion monitoring, it is anticipated that groundwater is at 2.0m bgl or deeper. It should be noted that groundwater levels can vary seasonally and year on year.

7.3.2 Strata Type

Testing was undertaken within Made Ground strata. Full draft logs of the exploratory pits are included in Appendix B.

7.3.3 Ground Contamination

Significant ground contamination was not identified as part of the ground investigation, a contamination assessment is presented in Sections 4.1.1 and 12.0.

7.4 CONSTRAINTS AND LIMITATIONS

The information presented above is intended to assess the feasibility of soakaway drainage in order to support the development of the drainage strategy. Further testing, groundwater monitoring and ground investigation may be required to support a full SAB application or to inform the development of the final design process.

Ground conditions can vary throughout the year, including the location of the groundwater table. Consideration should be given to the potential effects of seasonal variation when reviewing the data above and the presence of any contamination within the Made Ground. It should be noted that due to the nature of the site being hard standing the entirety of the site was dry at the time of investigation.

8.0 GEOTECHNICAL ASSESSMENT

8.1 GROUND CONDITIONS

The site is typically underlain by a 0.35m to 1.60m thick mantle of Made Ground, overlying Alluvial and Tidal Flat deposits.

8.2 SOIL PROPERTIES

The ranges of the various soil properties measured are discussed below, to aid in the selection of design values. However, the appropriate choice of characteristic and design values will depend on the particular analysis and design philosophy used and should be selected by the designer.

Where characteristic values are given, these are reasonably conservative estimates of a measured or assessed property that may be used to represent the overall behaviour of the material. Design values are similar but also take into account the ground-structure interaction for a given structure so need to be selected by the designer. It is recommended, however, that design values used do not exceed the characteristic values given in this report.

8.2.1 B1 – Alluvial/Tidal Flat Deposits

Generally coarse-grained Alluvial and Tidal Flat deposits were identified immediately below the Made Ground. A summary is presented in the table below.

Table 8-1 - Summary of test results within the coarse-grained Alluvial deposits

	No. of results	Range (min-max)	Average	Lower quartile	Upper quartile	Characteristic value ⁺
SPT N Values	28	4 – 58	38	29	50	29
Angle of Shearing Resistance ϕ (°)*	28	28 – 43	38	36	41	36

Notes:

+ suggested characteristic values are appropriate for most normal applications but designers should satisfy themselves that they are suitable for the specific application and design method they are using;

* Estimated from a correlation from Peck, Hansen and Thornburn, Foundation Engineering, Wiley, 2nd ed., (1974)⁽⁶⁾

Based on the above, it is recommended that the following values are taken as design/characteristic values for this material:

- Angle of shearing resistance, ϕ 36°

8.3 SUMMARY OF CHARACTERISTIC MATERIAL PARAMETERS

Table 8-2 - Characteristic Material Parameters

Alluvial/TF Deposits –	Unit	Parameter (Unit)	Characteristic Value	Rationale
	B1	Unit Weight (kN/m ³)	19	Conservative value
		Angle of Friction ϕ' (°)	36	Conservative value based on SPT, correlations and lab testing

9.0 PRELIMINARY GEOTECHNICAL DESIGN CONSIDERATIONS

9.1 PROPOSED DEVELOPMENT

Final footing dimensions, founding depths, and bearing capacities remain the responsibility of the Client's Designer. The results detailed herein should not be utilised in detailed design as loads on the foundations have not been considered as these were not available at the time of writing the report.

It should be noted that the design of foundations should consider the risk of the migration of any possible ground gas or contaminants in soils or groundwaters or surface waters.

It is understood that the proposed development will involve the construction of a lightweight steel framed extension to the front and back of the existing building.

9.2 EARTHWORKS

Given the current levels of the site, significant earthworks (cut and fill) is not anticipated at this stage.

9.3 FOUNDATIONS

Based on the ground conditions it is considered that a traditional pad or strip foundations, placed within shallow natural deposits using conventional methods suggested by Hansen⁽¹⁾, may be Designed, in accordance with Eurocode 7 BS EN1997-1 (ULS DA1-2, partial factor of 1.25 for ϕ'), to an allowable net bearing pressure, R_d , of 200kPa (Note: No loadings for the structure have been supplied so the degree of utilisation, Λ_{GEO} , has not been assessed).

Based on the information above, and the material parameters presented in Section 8, traditional pad or strips founded at approximately 0.75 to 1.0m bgl should result in settlement less than 25mm. Settlements of foundations within coarse-grained material were estimated using the Burland and Burbidge method⁽²⁾. Where deeper Made Ground exists, foundations should be taken deeper until natural ground is encountered, or alternatively replaced with compacted engineered granular fill.

Foundation excavations should be inspected by a suitably experienced engineer or inspector to ensure the founding material is suitable natural deposits. Any soft, loose or otherwise unsuitable material should be excavated and replaced by compacted granular backfill or lean concrete.

Construction elsewhere on the site would require further ground investigation.

9.4 CHEMICAL ATTACK ON BURIED CONCRETE

Chemical tests undertaken on representative samples from the site show levels of water-soluble sulphates and generally slightly alkaline conditions. Based on these conditions, it is recommended that for foundations the Design Sulphate Class for the site, as defined in BRE Special Digest 1, be taken as DS-1, and the Aggressive Chemical Environment for Concrete (ACEC) site classification be taken as AC-1.

¹ Hansen, A General Formula for Bearing Capacity, Danish Geotechnical Institute Bulletin No. 11, 1961. Also, Danish Geotechnical Institute Bulletin No. 28, 1968; and Code of Practice for Foundation Engineering, Danish Geotechnical Institute Bulletin No. 32, 1978.

² Settlements of Foundations on Sand and Gravel, J.B Burland and M.C Burbidge, Proceedings of the Institute of Civil Engineers, Vol 78, 1985.

9.5 TEMPORARY WORKS

Battering or side protection will be needed where man-entry into excavations is required, especially for excavations deeper than 1.2m.

Shallow ground water strikes were not recorded during the intrusive investigation across the soils on the site.

It is possible that perched groundwater may be encountered within the Made Ground.

Therefore, deeper excavations (>1m) may require groundwater control which would need to be implemented in accordance with C750³.

9.6 PAVEMENTS

Given the test results obtained and the very variable nature of the near surface Made Ground, it is recommended that a preliminary conservative value of 4% is adopted for pavement design within this stratum.

Proof rolling of the formation level will be required and any loose or soft spots should be removed and replaced with an engineer fill, in accordance with a suitable specification. The formation level will also need to be protected during inclement weather from deterioration.

Prior to placement of the founding material and the construction of the road pavement, the sub-formation and formation will need to be inspected and checked in accordance with a suitable specification to ensure the ground conditions are as expected. All testing should be carried out in accordance with DMRB CS 229 to confirm that the ground conditions at the time of construction are consistent with the previous design parameters.

9.7 DRAINAGE

Soakaway testing within the shallow coarse-grained Made Ground deposits at SA01 to SA04 has yielded soil infiltration values of the magnitude $>10^{-3}$ to 10^{-6} m/s with three tests undertaken at each location.

Testing indicates that soakaway drainage would be suitable for the development.

³ Groundwater control: design and practice (second edition) (CIRIA750)

10.0 GEOTECHNICAL RISK REGISTER

10.1 INTRODUCTION

The following Geotechnical Risk Register (Risk Matrix

Table 15-2) has been considered with regard to the details of other construction related risks known at this time. The risks have been evaluated using the risk evaluation matrix suggested in CD622 'Managing Geotechnical Risk, which is reproduced as Table 10-1.

For the purposes of this report, risk has been assessed with reference to 'probability', 'impact' and 'risk rating'. Risk rating $I = \text{Probability (P)} \times \text{Impact (I)}$ as detailed in Table 10-1.

Table 10-1 - Risk Evaluation Matrix

Probability (P)		Impact (I)				Risk Rating (R = P x I)	Response to Risk
Very Likely	5	Very High	5	Potential to halt project	OR	17 to 25	Unacceptable: act now to prevent
Likely	4	High	4	Significant delay on overall project		13 to 16	Unacceptable: act now to prevent
Probable	3	Medium	3	Major delay on this task, significant impact on overall project unlikely		9 to 12	Early attention required
Unlikely	2	Low	2	Minor delay on this task, significant impact on overall project unlikely		5 to 8	Regular attention required
Negligible	1	Very Low	1	No significant impact on task or project		1 to 4	Monitor

10.2 RISK MATRIX

Table 10-2 - Geotechnical Risk Register

Identified Geotechnical Hazard	Consequence	Risk before control			Risk Level	Control Measures	Residual Risk			Risk Level
		P	I	R			P	I	R	
Striking unrecorded services (including drainage)	Delay to programme of works and associated cost implication.	4	4	16	High	Buried services are present across the site and surrounding areas the Contractor should obtain from the Employer the latest statutory service plans and positively identify all services prior to commencing any excavations. Any works undertaken in the vicinity of existing buried services shall be undertaken in accordance with the statutory undertakers' requirements and the recommendations of HSG 47 'avoiding danger from underground services'.	3	4	12	Medium
Lack of groundwater information	Conservative and inefficient design Uncertainty as to requirement for dewatering or excavation stability	4	4	16	High	Design to assume ground water level is equal to ~2.50m below ground level. Design to assume excavations will require support. Design to consider need for ground water control	1	4	4	Negligible
Differential settlement due to the variable Made Ground deposits at site	Loss of serviceability to structures Repairs required, entailing costs and legal preceding	4	4	16	High	Foundation subgrade material to be of a uniform soil with uniform mechanical properties Excavations and foundation sub-grade to be inspected and approved by qualified foundation engineer. Contractor to make allowance for over excavation	1	4	4	Negligible

Identified Geotechnical Hazard	Consequence	Risk before control			Risk Level	Control Measures	Residual Risk			Risk Level
		P	I	R			P	I	R	
						of foundation and replacement of overburden with imported structural fill.				
Poor ground conditions (e.g: soft ground, running sands, excessive groundwater ingress, etc.)	Poor ground Conditions may result in further time and cost of installing a gravity wall due to the requirement for shoring temporary works or the creation of lifting or piling platforms.	4	4	16	High	Excavations and earthworks to be overseen by a qualified person who can identify poor ground conditions and advise on remedial measures or appropriate actions. Designer and client to consider to the use of ground improvement to enable safe site work. Include contractors and sub-contractors at early stage of project and brief them on any possible poor ground conditions encountered.	1	4	4	Negligible
Site workers exposed to contamination or reduced quality Made Ground	Illness or death of site operatives. Delays to site works. Requirement for further contamination assessment.	3	3	9	Medium	Food and drink to be consumed in designated areas. Uphold a strict hygiene routine on site prior to smoking, eating or drinking. Site operatives issued with appropriate PPE under CDM regulations.	2	3	6	Low
Soft sub-soil conditions	Toppling of equipment, damage to plant, injury or death of workers. Excessive differential settlement of foundations	4	5	20	Very high	Ground conditions on site to be inspected by a qualified engineer and soft ground to be subsequently identified so that they may be avoided, excavated and replaced, or treated. Contractor to adopt safe method of working. Location of heavy plant and crane bases away from edges of excavations. Accurate	1	5	5	Low

Identified Geotechnical Hazard	Consequence	Risk before control			Risk Level	Control Measures	Residual Risk			Risk Level
		P	I	R			P	I	R	
						understanding of soft soil from GI to plan working platforms. Appropriate design to be undertaken to minimise/eliminate risk from excessive/differential settlement. Designer to specify the removal of any soft ground encountered at formation/foundation levels. Designer to specify lift platforms, as required.				
Hard or dense strata	Programme and cost implications due to shallow refusal of sheet piles	4	5	20	Very High	Specialist piling contractor to be consulted regarding ground conditions, pile type and length.	3	3	9	Medium
Aggressive chemical ground conditions	Chemical attack on buried concrete, weakening of structure, structural failure of foundations	4	4	16	High	Design to consider soil aggressivity classification DS-1 and AC-1.	1	4	4	Negligible

11.0 GROUND CONTAMINATION ASSESSMENT – HUMAN HEALTH

11.1 INTRODUCTION

The UK Contaminated Land Regime (CLR) allows for a tiered approach to the assessment of ground contamination which is designed to allow increasingly site-specific assessment. In order to assess the potential risk posed by contaminants contained within the soils at the study area a generic quantitative risk assessment (gQRA) has been undertaken by comparing recorded concentrations of chemical constituents in soil with Generic Assessment Criteria (GAC) to identify whether, at the concentrations recorded, the presence of the constituent has the potential to adversely affect the health of site users (a Tier 1 assessment). GAC are set at levels where potential exposure is deemed to be within acceptable limits.

If the recorded concentrations of a particular constituent are below the GAC then the risk is generally considered to be acceptable and further assessment / or mitigation measures are not required. Where a substance is recorded at concentrations higher than GAC this does not necessarily indicate that a particular risk is present, however, it does typically signify the requirement to undertake further assessment in line with the UK tiered risk assessment framework.

11.2 ASSESSMENT CRITERIA

11.2.1 Generic Assessment Criteria

The following GAC for soils have been utilised for the screening process, in order of preference:

- CL:AIRE published C4SL (DEFRA, 2014);
- CIEH/LQM published S4UL (LQM/CIEH, 2015);
- Tetra Tech internal Tier 1 Screening Criteria (issue 15) derived using the derivation tool CLEA version 1.06, in line with the current UK Contaminated Land Regime.

C4SL are currently available for arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead⁴. The C4SL were originally developed to support the categorisation of sites in accordance with Part 2A are also, based on DEFRA guidance, considered suitable for use during the assessment of sites as part of the planning process.

Where C4SLs are not available, 'Suitable for Use Levels' (S4UL) developed by CIEH/LQM have been used. The S4UL provide GAC based on minimal or tolerable risk intended to be protective of human health for individual or mixtures of substances. It is considered conservative and appropriate to use these values for contaminants for which C4SL are unavailable. GAC for volatile and semi-volatile organic compounds (VOC and SVOC) not presented in the S4UL document are sourced from CL:AIRE (CL:AIRE, January 2010).

Where no published screening values are available Tetra Tech have derived their own values (easily liberatable cyanide).

The CLEA model states that "For most exposure pathways, the contamination is assumed to be at or within one metre of the surface" (Environment Agency, 2009). It is considered that at depths greater than

⁴ Arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI, lead assuming 6% SOM (1% SOM C4SL also published for benzene).

1.0m, the probability of human exposure via the direct contact pathways are significantly reduced, leaving inhalation of volatile compounds as the dominant pathway with regard to human health risks. Typically, volatile compounds only significantly affect the indoor inhalation pathway. The same screening concentrations have been used for all depths at this stage, though it is noted that these are highly conservative for depths below 1.00m bgl.

11.2.2 Proposed End Use

Screening criteria have been developed for the following land use scenarios:

- Residential with plant uptake;
- Residential without plant uptake;
- Allotments;
- Public open space (park and residential);
- Commercial / Industrial.

The proposed development is to construct an extension to the existing on-site structure in addition to the construction of a seating area on the eastern bank of the river. As the site will be publicly accessible a Public Open Space (park) end use scenario has been adopted to reflect the most conservative end use for the site.

11.2.3 Soil Organic Matter

For organic contaminants, the generic soil screening values have been derived for a range of concentrations of soil organic matter (1%, 2.5%, 6%). In order to provide a conservative assessment, the GAC derived for a 1% SOM have been adopted.

11.3 TIER 1 – SOIL SCREENING

A total of 9 soil samples collected from across the site were submitted for chemical laboratory analysis. Full copies of laboratory certificates for all soil analysis are included in Appendix G.

Comparison of the chemical analysis results with the generic assessment criteria for a public open space, a limited number of exceedances have been recorded as summarised below.

Table 11-1 - Summary of Constituents of Concern

Constituent of Concern	No. of Samples	Min	Max	SSV	Exceedances	
					No. of exceedances	Location
pH	8	7.9	9.2	9	1	SA01, 0.6m
Dibenzo(a,h)anthracene	8	<0.05	1.7	1.1	1	WS03, 0.65m

The adopted screening values are considered to be relatively conservative in nature and the actual exposure scenario with respect to shallow soils will be more limited than that modelled. It is also noted that the exceedance of dibenzo(a,h)anthracene is only marginally above the screening value.

Elevated pH values are generally indicative of concrete within the Made Ground and the recorded value is not considered to be significant.

11.4 ASBESTOS

The samples sent for laboratory testing were also scheduled for asbestos screens. Asbestos containing materials were not identified in any of the samples.

12.0 GROUND CONTAMINATION ASSESSMENT – WIDER ENVIRONMENT

12.1 INTRODUCTION

The potential for contaminated groundwater on site to adversely affect controlled water receptors (groundwater and surface water bodies) has been assessed at this stage by direct comparison of analytical data from the Tetra Tech ground investigation with relevant Water Quality Standards (WQS).

Similarly, the potential for soil contamination to impact controlled waters has been assessed by comparing analytical data from soil derived leachate tests directly against WQS.

12.2 ASSESSMENT CRITERIA

In light of the environmental setting of the site under consideration. The following water quality standards have been adopted, in order of preference.

- Water Framework Directive (WFD),
- Environmental Quality Standards (EQS);⁵
- WHO 2008 - Petroleum Products in Drinking Water (WHO 2008)
- UK Drinking Water Standards⁶.

12.3 TIER 1 SCREENING ASSESSMENT – LEACHATE

Six soil derived leachate samples were obtained from the site and the samples analysed for the suite of determinants outlined above. The results were screened against a suite of determinants outlined in Section 12.2.

The following table summarises the determinants which have been identified at concentrations in excess of the relevant WQS screening criteria.

Table 12-1 – Summary of Exceedances within Leachate Samples

Determinant	Units	Maximum	Minimum	Screening Value	Exceedances	
					No.	Location
Anthracene	µg/l	0.17	<0.01	0.1 [*]	1	SA03, 0.50m
Fluoranthene	µg/l	1.6	<0.01	0.01 [#]	1	SA03, 0.50m
Copper	µg/l	42	6.7	1 ^{\$}	6	SA01, 0.60m SA03, 0.50m WS01, 0.80m WS03, 0.65m WS07, 0.50m WS09, 0.80m

⁵ Where WFD 2015 are not presented revoked WFD 2010 standards are used

⁶ WHO 2005; WHO 2008; UK Water Supply Regulations 2010 and 1989 Regulations. Priority given to UK drinking water standards

Determinant	Units	Maximum	Minimum	Screening Value	Exceedances	
					No.	Location
						WS10 0.6m
Lead	µg/l	33	<1	1.2*	3	SA03, 0.50m WS07, 0.50m WS09, 0.80m
Nickel	µg/l	5.8	<0.3	4*	1	WS07, 0.50m
Zinc	µg/l	70	3.2	10.9\$	3	SA03, 0.50m WS07, 0.50m WS09, 0.80m
* Inland surface water EQS 2015 # LOD in lieu of EQS \$ Freshwater EQS						

As seen in the table above, a number of PAH compounds and heavy metals are recorded in excess of the adopted screening criteria. These samples are obtained from Made Ground strata associated with the former development on the site.

The recorded concentrations are considered further within the risk assessment presented in Section 13.0.

13.0 PRELIMINARY GROUND GAS ASSESSMENT

13.1 INTRODUCTION

One return ground gas monitoring visits were undertaken on the 30th April 2024. Full factual site records of the gas monitoring results are in Section 6.2.

13.1.1 Ground Gas Monitoring

Ground gases are monitored within boreholes on the site recording the following parameters.

- Concentrations of ground gases;
 - Methane (%v/v);
 - Carbon dioxide (%v/v);
 - Oxygen (%v/v);
 - Carbon monoxide (ppm);
 - Hydrogen sulphide (ppm);
- Borehole flow rate (l/hr);
- Depth to groundwater;
- Atmospheric pressure trends;

Where groundwater levels are noted to be above the screened sections of the boreholes the data is not considered to be representative of the ground gas regime and are therefore not used within the risk assessment process.

Atmospheric pressure trends are recorded on site during the monitoring process, but are also noted in the preceding three days, and one day after each monitoring visit. Falls in atmospheric pressure are generally considered to indicate a higher potential for ground gas migration from the sub surface and as such monitoring during periods of falling pressure are considered to represent worst case scenarios as outlined in the CL:AIRE Technical Bulletin TB17 (CL:AIRE, August 2018).

13.1.2 Ground Gas Risk Assessment Methodology

The key reference document which has been used to undertake the semi-quantitative land gas assessment presented in this report is CIRIA C665 (CIRIA, 2007). This provides a framework for assessment of land gas risk to buildings/structures with foundations (i.e. houses and/or commercial properties).

The risk assessment process is based on a Source-Pathway-Receptor Conceptual Site Model Methodology, with consideration given to the potential sources likely to be present on the site and the ground gas monitoring regime designed to reflect the scale of the source potential.

The collected data has been used for the purposes of undertaking a semi-quantitative assessment in accordance with the CIRIA 665 methodology. The calculation used to calculate the gas screening value (GSV) for the site, together with the relevant definition of units, is as follows:

$$\text{GSV (litres of gas/hr)} = \text{borehole flow rate (l/hr)} \times \text{gas concentration (volume/100)}$$

The calculated GSV values are used to determine the Characteristic Situation (CS) for the site in terms of methane and carbon dioxide, based on the conditions outlined in Table 12-2 below.

CS classification is applicable to all buildings, with the exception of low-rise housing with a ventilated underfloor void, in these situations, the NHBC Traffic Light System is adopted. As such the CS classification system has been adopted for the proposed development.

Table 12-2 –GSV Classification (Modified Wilson and Card Methodology)

Characteristic Situation	Risk Classification	Gas Screening Value Threshold (l/hr)	Additional Considerations
1	Very Low Risk	<0.07	Methane concentration <1% Carbon dioxide <5%
2	Low Risk	<0.7	Borehole flow rate <70 l/hr
3	Moderate Risk	<3.5	-
4	Moderate to High Risk	<15	Quantitative risk assessment required to evaluate scope of protective measures
5	High Risk	<70	-
6	Very High Risk	>70	-

13.2 PRELIMINARY GROUND GAS RISK ASSESSMENT

13.2.1 Conceptual Site Model

The following sections outline the anticipated Source-Pathway- Receptor model associated with the proposed development on site.

Sources

The following potential sources have been identified on and off site.

- Made Ground deposits
- Organic risk deposits potentially associated with the adjacent river.

Pathways

The following potential pathways have been identified which may act as preferential pathways for ground gas migration:

- The underlying strata have been classified as sands and gravels with varying components of clays and silts. Therefore, there is potential for some horizontal and vertical migration of ground gas;
- Buried service runs and existing foundations, including sub-floor voids.

Receptors

Within the context of ground gases, the following enclosed structures are considered to represent potential receptors.

- The existing structure on the site
- Structures and enclosed areas within proposed development.

13.2.2 Risk Assessment – Methane and Carbon Dioxide

In order to assess the significance of ground gases at the site, measured concentrations and flow rates have been used to derive Gas Screening Values (GSVs). GSVs are the product of gas concentration and gas flow measured in a borehole and provide an indication of the flow of the particular gas in question out of the ground.

Due to the limited data obtained from the site the worst-case values have been used within the risk assessment.

Based on a maximum flow recorded of 0.6l/hr and the maximum recorded concentration of carbon dioxide (CO₂) and methane (CH₄) during the three monitoring visits, the GSVs have been calculated as presented in Table 12-3.

Table 12-3 – Initial GSV Calculations

	Maximum Concentration (%)	Maximum Flow Rate (l/hr)	GSV (l/hr)	Characteristic Situation (Wilson and Card)
Carbon Dioxide	2.4	0.6	0.0144	CS1 (very low risk)
Methane	<0.1	0.6	6x10 ⁻⁴	CS1 (very low risk)

These values have been compared with the Revised Wilson and Card Classification presented in Table 12-2.

The risk assessment process indicates the site is representative of Characteristic Situation 1 (Very Low Risk) based on the recorded concentrations of carbon dioxide and methane and maximum flow rates within the sub surface.

13.2.3 Carbon Monoxide and Hydrogen Sulphide

Maximum concentrations of carbon monoxide and hydrogen sulphide were recorded at <1ppm throughout the monitoring period. The recorded concentrations are considered to be suitably low to negate the requirement for additional risk assessment.

13.2.4 Atmospheric Pressure Trends

The monitoring was undertaken during a period of relatively high, stable atmospheric pressure and as such may not represent worst case conditions for the site.

13.3 SUMMARY AND DISCUSSION

The site has been classified as Characteristic Situation 1 (Very Low Risk) based on the worst-case recorded concentrations of carbon dioxide and methane and maximum flow rates. Site classification of a Characteristic Situation 1 indicates gas protection measures are not required within new developments.

Further monitoring may be required to fully classify ground gas conditions on the site.

14.0 WASTE CLASSIFICATION ASSESSMENT

Waste classification is a two stage process, with the first step comprising a hazard assessment of the soil quality data in line with the guidance set out in the Environment Agency waste classification technical guidance WM3⁷ document. Once the hazardous properties of the materials are known, the second step is to assess the potential performance of the materials in a landfill, undertaken by considering the results of waste acceptance criteria (WAC) testing.

14.1.1 Waste Classification

The chemical analysis data obtained from the ground investigation has been used to make a preliminary assessment of whether soils from the study area would be classified as hazardous waste. The assessment provides an initial indication of the classification of the soils in the event that they are disposed to landfill. Note the decision as to whether soils are deemed to be hazardous waste ultimately rests with the receiving landfill.

The waste classification report is presented as Appendix E. The assessment was undertaken using HazWasteOnline, web-based software for waste classification. The software follows Environment Agency guidance and European regulations. Assessment sheets are presented in Appendix E.

In making the assessment the following assumptions have been made:

- TPH are not derived from petrol or diesel. There was no visual or olfactory evidence of hydrocarbons observed during the ground investigation.

The nine samples analysed as part of the ground investigation were of made ground hence all data has been included in the assessment.

The initial assessment identified numerous samples that were classified as hazardous as a result of the presence of flammable liquids. After a review of the exploratory hole logs this hazardous property has been removed from all the samples where it was identified by the software as there was no visual or olfactory evidence of flammable liquids such as hydrocarbons observed during the ground investigation. The assessment sheets in Appendix E detail which samples this edit has been applied to.

The assessment process has confirmed that all samples are classified as non-hazardous.

14.1.2 Materials Management

Any material excavated on site may be classified as waste and it is the responsibility of the holder of a material to form their own view on whether or not it is waste. This includes determining when waste that has been treated in some way can cease to be classed as waste for a particular purpose.

If site-won material is to be reused on site, or soils other than primary aggregate or aggregates produced under the WRAP Protocol, imported to site, a Materials Management Plan will be required, signed off by a Qualified Person as defined in the 'Development Industry Code of Practice' (CL:AIRE, 2011).

⁷ Environment Agency 2018. Technical Guidance WM3: Guidance on the classification and assessment of waste (Version 1.1).

15.0 CONCEPTUAL SITE MODEL & PRELIMINARY GROUND CONTAMINATION RISK ASSESSMENT

15.1 OVERVIEW

The information presented in the previous sections of this report have been collated and evaluated to establish an initial qualitative risk assessment for the site. A conceptual model of the site has been generated based on information derived from this Phase 1 Geo-environmental Assessment, supplemented by information attained during the Tetra Tech site walkover.

The site has been considered with regard to current UK legislation and guidance, namely Part 2A of the Environmental Protection Act 1990 and the Contaminated Land (England) Regulations 2006, as amended, and in accordance with current UK good practice guidelines (for example BS10175:2011).

In general, ground contamination can occur through several causes, particularly from historical operations and activities. Contamination can result from either on-site sources or from on-site migration from off-site sources, leading to long term liabilities under recent legislation for any site owner.

For a risk of pollution or environmental harm to occur as a result of ground contamination, all of the following elements must be present:

- Source, i.e. a substance that is capable of causing pollution or harm;
- Pathway, i.e. a route by which the contaminant can reach a target; and
- Receptor (target), i.e. something which could be adversely affected by the contaminant.

If one of these elements is absent there can be no significant risk. If all are present then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

15.2 CURRENT SITE USAGE AND PROPOSED DEVELOPMENT

The proposed development is for an extension to the current on site building as well as the construction of a number benches within the seating area to the east of the river.

15.3 CONCEPTUAL SITE MODEL

The key source, pathways and receptor model is outlined below within the context of potential development of the site.

15.3.1 Potential Sources of Contamination

The main potential sources of contamination on the site are associated with existing features as well as historical land uses on the site as summarised below.

On site Sources

- Made Ground associated with historical development on the site.
- Asbestos containing materials,

Off Site Sources

- Mobile contamination from Made Ground associated with historical development of wider site area.

15.3.2 Potential Contaminant Pathways

The following contaminant pathways are considered to potentially be active based on the current site use and proposed development:

Human Exposure Pathways

- Direct dermal contact or ingestion of soils, or inhalation of dust and/or vapours (i.e. human interaction with surface and sub-surface materials).

Environmental Pathways

- Leaching and horizontal or vertical migration through the unsaturated ground, either through permeable sub-surface materials and/or preferential pathways;
- Lateral and vertical migration of groundwater through permeable sub-surface materials and/or preferential pathways;
- Leaching to surface water run-off/drainage;
- The migration and accumulation of gases or vapours through permeable sub-surface materials and/or preferential pathways.

15.3.3 Potential Receptors at Risk

The following potential receptors have been identified:

Human Health

- Current site users (commercial etc);
- Future site users (commercial etc);
- Site workers during the redevelopment of the site;

Wider Environment

- Secondary A Aquifer within superficial deposits;
- Surface waters (coastal environment);

15.4 GROUND CONDITIONS RISK ASSESSMENT

The source, pathway, receptor linkages identified in the previous section are outlined and a qualitative risk assessment shown in the following tables.

The risk assessment considers the site within an area context and assesses potential risks to identified receptors in relation to the existing site setting and the proposed development. CIRIA C552 has been used to define the risk rating presented in the Qualitative Risk Assessment matrix, the methodology for which is presented in Appendix G.

Table 15-1 – CIRIA C552 Qualitative Risk Assessment

This matrix is based on CIRIA C552 risk evaluation methodology, definitions for risk ratings is presented in Appendix G.						
Source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Risk Classification	Potential risk management requirements
Ground contamination associated with Made Ground	Inhalation, ingestion and direct dermal contact	Current site users	Medium	Low risk	Moderate / Low Risk	Whilst Benzo(ghi)perylene have been recorded on the site, the limited interaction with the subsurface indicates the risks to human health are unlikely to be significant. However, due to the nature of the historical development of the site, it is recommended that a reactive approach is adopted during the development phase to identify any previously unidentified contamination which may be encountered during the site works. Additional risks to site workers are covered by the Health and Safety at Work Regulations and should be managed through tool box talks, good on site hygiene practices and appropriate PPE.
		Future site users		Low risk	Moderate / Low Risk	
		Construction workers		Low risk	Moderate / Low Risk	

This matrix is based on CIRIA C552 risk evaluation methodology, definitions for risk ratings is presented in Appendix G.

Source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Risk Classification	Potential risk management requirements
	Leaching and lateral migration of contaminants	Groundwater	Medium	Low risk	Moderate / Low Risk	Elevated concentrations of heavy metals and PAH have been recorded in soil derived leachate samples from the site, which are considered to be associated with the presence Made Ground related to the historical development of the site.
		Surface water		Low risk	Moderate / Low Risk	
Asbestos	Inhalation	Current site users	Medium	Unlikely	Low risk	Asbestos containing materials have not been identified within samples obtained from the site ground investigation.
		Future site users		Unlikely	Low risk	
		Construction workers		Unlikely	Low risk	
Ground gas	Migration and accumulation in enclosed spaces Inhalation	Future site users	Severe	Unlikely	Moderate / Low Risk	Only one round of ground gas monitoring has been undertaken to date, with generally low concentrations and flow rates. Further ground gas monitoring may be required to fully classify the ground gas regime.

16.0 CONCLUSIONS AND RECOMMENDATIONS

16.1 CONCLUSIONS

16.1.1 Ground Contamination

With respect to the risks to human health, whilst concentrations of Benzo(ghi)perylene were recorded in excess of the adopted screening value for a Public Open space (park) the actual anticipated exposure to sub surface soils is likely to be significantly reduced by the presence of hard standing and anticipated short duration of exposure. As such no significant risk to human health have been identified.

However, due to the nature of the historical development of the site, it is recommended that a reactive approach is adopted during the development phase to identify any previously unidentified contamination which may be encountered during the site works.

Soil derived leachate testing identified elevated concentrations of heavy metals and PAH, however shallow groundwater was not identified on the site and as such the mobility of these contaminants are likely to be limited. When the aggressive nature of the testing procedure is also considered, no further risk management procedures are considered necessary.

Asbestos containing materials were not identified in site or during the subsequent laboratory testing.

16.1.2 Waste Classification

The chemical analysis data obtained from the ground investigation has been used to make a preliminary assessment of whether soils from the study area would be classified as hazardous waste. The assessment provides an initial indication of the classification of the soils in the event that they are disposed to landfill.

Nine samples were analysed as part of the ground investigation. The assessment process has confirmed that all samples are classified as non-hazardous.

16.1.3 Geotechnical

Based on the ground conditions it is considered that traditional pad or strip foundations, placed within the natural deposits using conventional methods suggested by Hansen, may be designed, in accordance with Eurocode 7 BS EN1997-1 (ULS DA1-2, partial factor of 1.25 for ϕ'), to an allowable net bearing pressure, R_d , of 200kPa.

Based on the information above, and the material parameters presented in the GIR, pad foundations founded within the natural deposits should result in settlements of less than 25mm.

For buried concrete the Design Sulphate Class for the site can be taken as DS-1 and the Aggressive Chemical Environment for Concrete (ACEC) site classification can be taken as AC-1.

It is recommended that a preliminary conservative value of 4% is adopted for pavement design.

Soakaway drainage is considered feasible for the development.

17.0 NOTES

1. Standards

All boring operations, sampling of soils, *in situ* testing and geotechnical laboratory testing have been carried out in accordance with the recommendations of the British Standards BS 5930(2015)⁽¹⁾, BS 1377 (1990)⁽²⁾ and BS10175 (2001)⁽³⁾.

Soil and rock descriptions follow the recommendations of BS 593. Where descriptions or classifications are based on other documents (e.g. BS 8004 (1986) or CIRIA Project Report 11 (1993)), this is stated in the report text.

2. Site methods

Unless specifically stated otherwise, the following methods are used for exploratory holes.

- Holes described as cable percussive are bored using a light cable percussive rig. Standard penetration tests are carried out where appropriate, as shown in the logs. Disturbed and undisturbed samples are taken from the exploratory holes at the depths on the records.
- Window sampling generally uses the windowless sampling method, using a tracked Geotool.
- Dynamic probes are usually heavy dynamic probes, using the same tracked Geotool used for window sampling.

3. Definitions and abbreviations

The following terms are used in the exploratory hole logs

Samples

U	Undisturbed 102mm dia. sample
TW	Thin Walled undisturbed 102mm dia. sample
B	Bulk sample
D	Small disturbed sample
W	Water sample
CBR	California Bearing Ratio test or CBR value obtained from Mexiprobe test

In situ tests

S	Standard penetration test (SPT)
N	SPT N value (blows/300mm)
HP	Hand penetrometer – shear strength
SV	Hand shear vane – shear strength
VOC	Volatile organic compounds (ppm)
PID	Photo-ionisation detector – used to detect the presence of VOCs.

Core recovery and rock quality

TCR	Total core recovery (%)
SCR	Solid core recovery (%)
RQD	Rock quality designation (%)
FI	Fracture index
NR	No recovery
NI	Not intact

Rotary drilling sizes

Index letter	Nominal diameter (mm)	
	Borehole	Core
N	75	54
H	99	76
P	120	92
S	146	113

Water strikes

▽	Level of water strike
▼	Water level rose to this level (see Remarks at foot of log for details)

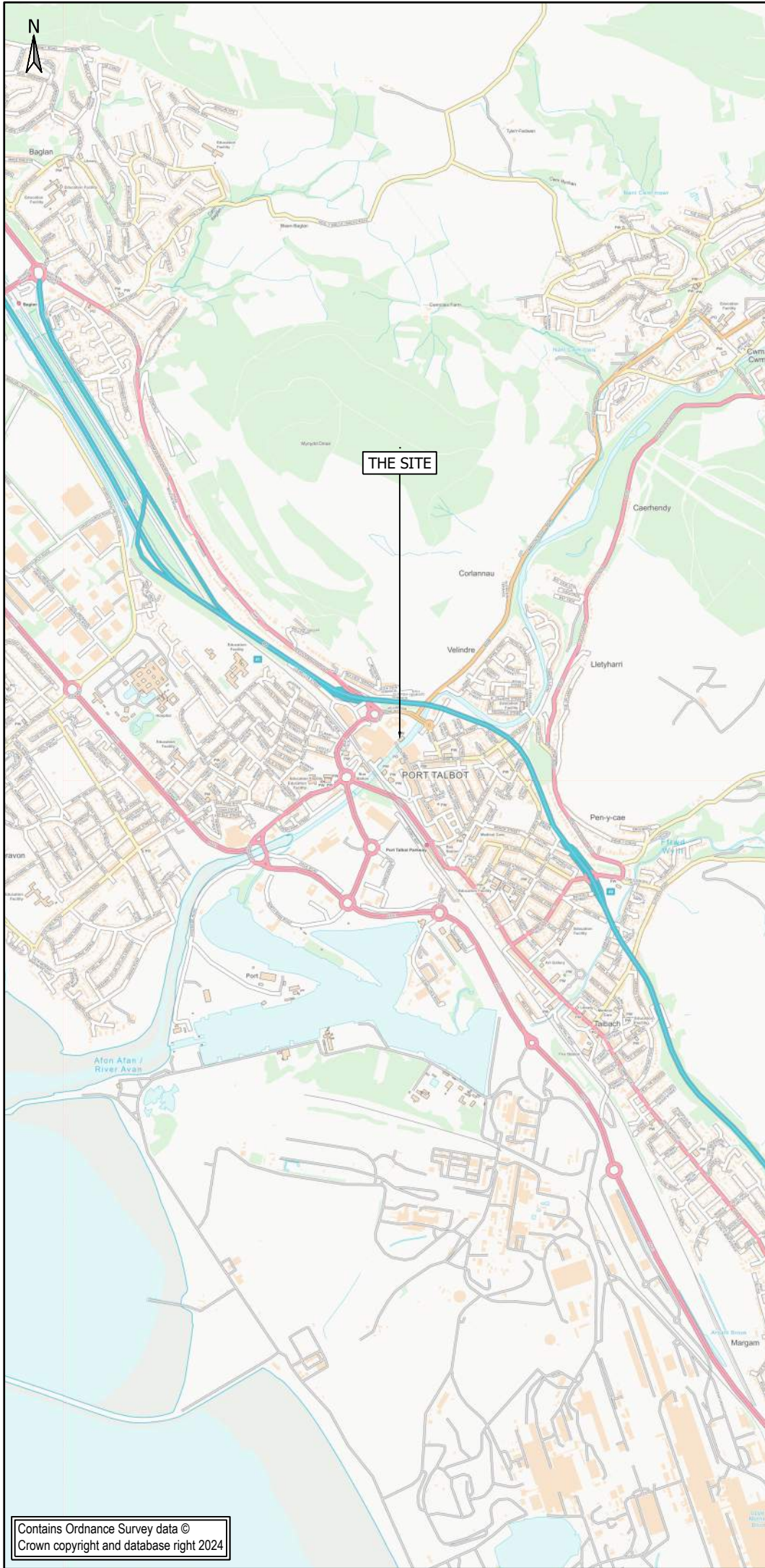
Depth means depth below existing ground level unless otherwise specified. Values specified in soil descriptions given in the exploratory hole logs are depths unless otherwise specified.

18.0 GLOSSARY

AOD	above Ordnance Datum
bgl	below ground level
BGS	British Geological Survey
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
C4SL	Category 4 Screening Levels
CIEH	Chartered Institute of Environmental Health
CLEA	Contaminated Land Exposure Assessment
CoC	Constituent of Concern
CSM	Conceptual Site Model
DEFRA	Department of Environment, food and Rural Affairs
DQRA	Detailed Quantitative Risk Assessment
DTS	Desktop Study
DRO	Diesel Range Organics
DWS	Drinking Water Standard
EA	Environment Agency (England)
EPH	Extractable Petroleum Hydrocarbons
EQS	Environmental Quality Standards
FOC	Fraction Organic Carbon
GPR	Ground Penetrating Radar
LOD	Limit of detection
LQM	Land Quality Management
NRW	Natural Resources Wales
OS	Ordnance Survey
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PPE	Personal Protection Equipment
ppm	parts per million
PRO	Petroleum Range Organics
SGV	Soil Guideline Values
SOM	Soil Organic Matter
SVOC	Semi-volatile organic compounds
TPH	Total Petroleum Hydrocarbon
TSV	Tier 1 Screening Values
VOC	Volatile Organic Carbon
VPH	Volatile Petroleum Hydrocarbons

FIGURES

Figure 1 – Site Location Plan



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MORGAN SINDALL

Project Name

PRINCESS ROYAL THEATRE

Sheet Title

SITE LOCATION PLAN

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Client Project Number	Originator	Volume/System	Level/Location	Type/Code	Role	Number	Revision	
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Figure 2 – Site Investigation Layout Plan



- LEGEND:
- VACUUM EXCAVATED TEST PIT
 - VACUUM EXCAVATED FOUNDATION INSPECTION PIT
 - TRIAL PIT
 - SOAKAWAY TEST PIT
 - WINDOW SAMPLE

FINAL ISSUE

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SITE INVESTIGATION LAYOUT PLAN

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APPENDIX A: REPORT CONDITIONS

APPENDIX A – REPORT CONDITIONS

SITE INVESTIGATION

This report is produced solely for the benefit of Morgan Sindall and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report is based on a visual site inspection, reference to accessible referenced historical records, information supplied by those parties referenced in the text and preliminary discussions with local and Statutory Authorities. Some of the opinions are based on unconfirmed data and information and are presented as the best that can be obtained without further extensive research. Where ground contamination is suspected but no physical site test results are available to confirm this, the report must be regarded as initial advice only, and further assessment should be undertaken prior to activities related to the site. Where test results undertaken by others have been made available these can only be regarded as a limited sample. The possibility of the presence of contaminants, perhaps in higher concentrations, elsewhere on the site cannot be discounted.

Whilst confident in the findings detailed within this report because there are no exact UK definitions of these matters, being subject to risk analysis, we are unable to give categoric assurances that they will be accepted by Authorities or Funds etc. without question as such bodies often have unpublished, more stringent objectives. This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to Tetra Tech. In time improved practices or amended legislation may necessitate a re-assessment.

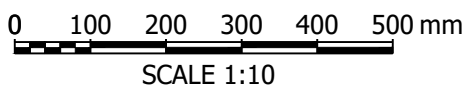
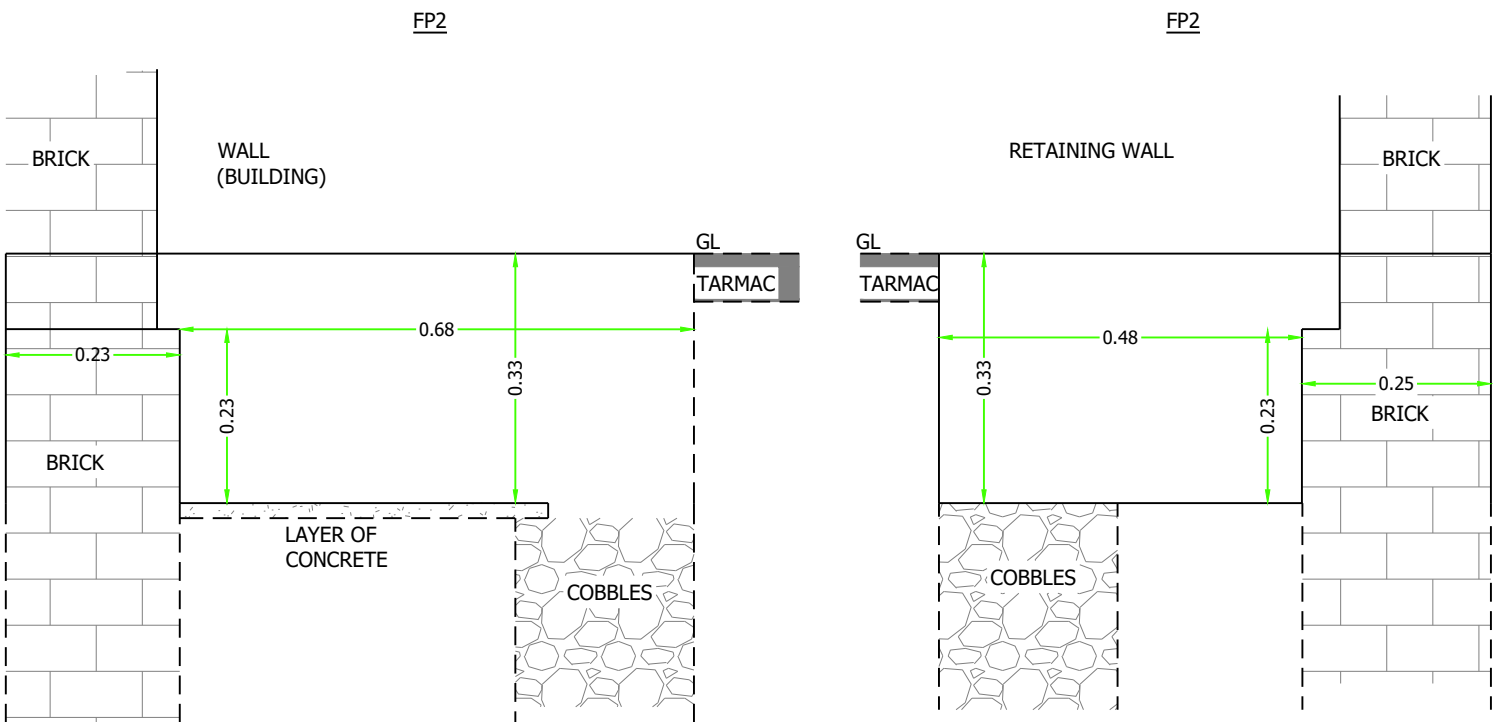
The assessment of ground conditions within this report is based upon the findings of the study undertaken. We have interpreted the ground conditions in between locations on the assumption that conditions do not vary significantly. However, no investigation can inspect each and every part of the site and therefore changes or variances in the physical and chemical site conditions as described in this report cannot be discounted.

The report is limited to those aspects of land contamination specifically reported on and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report and provides an opinion on surrounding sites. If migrating pollution or contamination (past or present) exists further extensive research will be required before the effects can be better determined.

APPENDIX B: EXPLORATORY HOLE LOGS

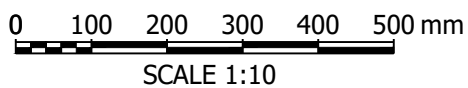
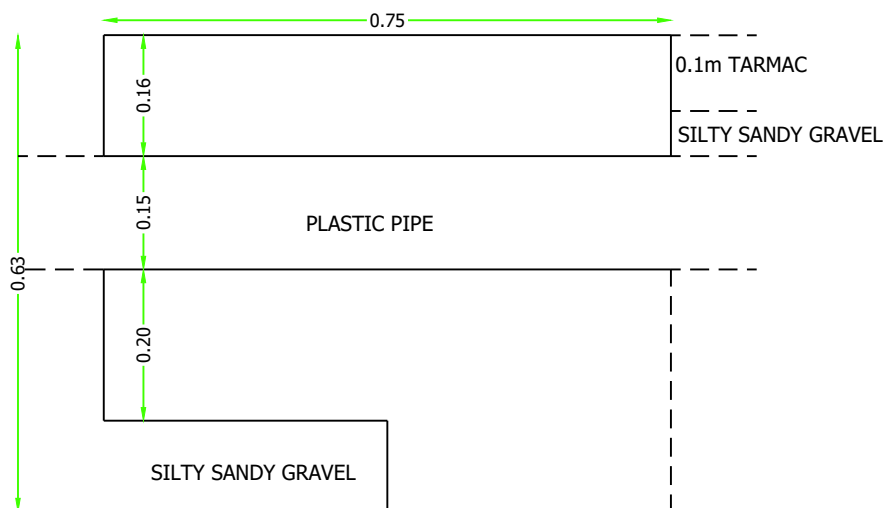
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	Location: Port Talbot		Easting:		Northing:		FINAL		FP1	
Client: Morgan Sindall		Level:		Depth: 0.95m						
		Logger: CS		Type: IP				Sheet 1 of 1		
Hole Information Pit Dimensions 0.50m 1.30m	Hole Information		Groundwater				Scale: 1:10			
	Orientation: 0° Shoring: None Stability: Stable Plant: Vacuum extractor	Strike (m)	Rose To (m)	After (mins)	Remarks	Checked By: PV				
						Approved By: SR				
						Start Date: 06/08/2024				
						Finish Date: 06/08/2024				
Strata Description			Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing		
MADE GROUND: Turf over dark brown silty sandy CLAY with abundant rootlets. (TOPSOIL) MGR(TS)				0.20						Tests / Results
MADE GROUND: Dark greyish brown silty sandy clayey GRAVEL with high cobble content. Sand is fine to coarse. Gravel is fine to coarse angular sandstone and rare concrete. Cobbles are subangular to subrounded sandstone and rare brick. MGR										
0.40mbgl Metal bar across width of pit.										
Dark brownish grey silty gravelly sandy COBBLES. Sand is fine to coarse. Gravel is fine to coarse angular sandstone. Cobbles are subangular to subrounded sandstone. ALV				0.70						
EOH at 0.95m - Refusal				0.95						

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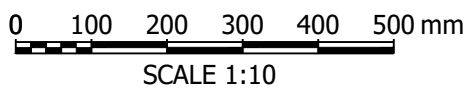
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	Location: Port Talbot		Easting:		Northing:		FINAL		TP1 A		
	Client: Morgan Sindall		Level:		Depth: 0.63m						
			Logger: CS		Type: VE				Sheet 1 of 1		
Hole Information Pit Dimensions 0.29m 0.75m Orientation: 0° Shoring: None Stability: Stable Plant: Vacuum extractor			Groundwater				Scale: 1:25				
			Strike (m)		Rose To (m)		After (mins)		Remarks		Checked By: PV
									Approved By: SR		
									Start Date: 07/08/2024		
									Finish Date: 07/08/2024		
Strata Description			Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing			
								Depth (m)		Ref	Tests / Results
MADE GROUND: Asphalt.				0.10							
MGR											
MADE GROUND: Dark greyish brown silty sandy clayey GRAVEL with high cobble content. Sand is fine to coarse. Gravel is fine to coarse angular sandstone and concrete and asphalt. Cobbles are subangular to subrounded sandstone and rare brick.											
MGR											
0.16mbgl Corrugated plastic pipe encountered				0.63							
EOH at 0.63m - Target reached											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											
											



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TP02

BRICK

GL

1.20

0.30

0.20

BLACK CORRUGATED
PIPE @ 0.2m

0.10



0 100 200 300 400 500 mm

SCALE 1:10

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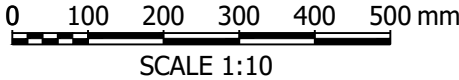
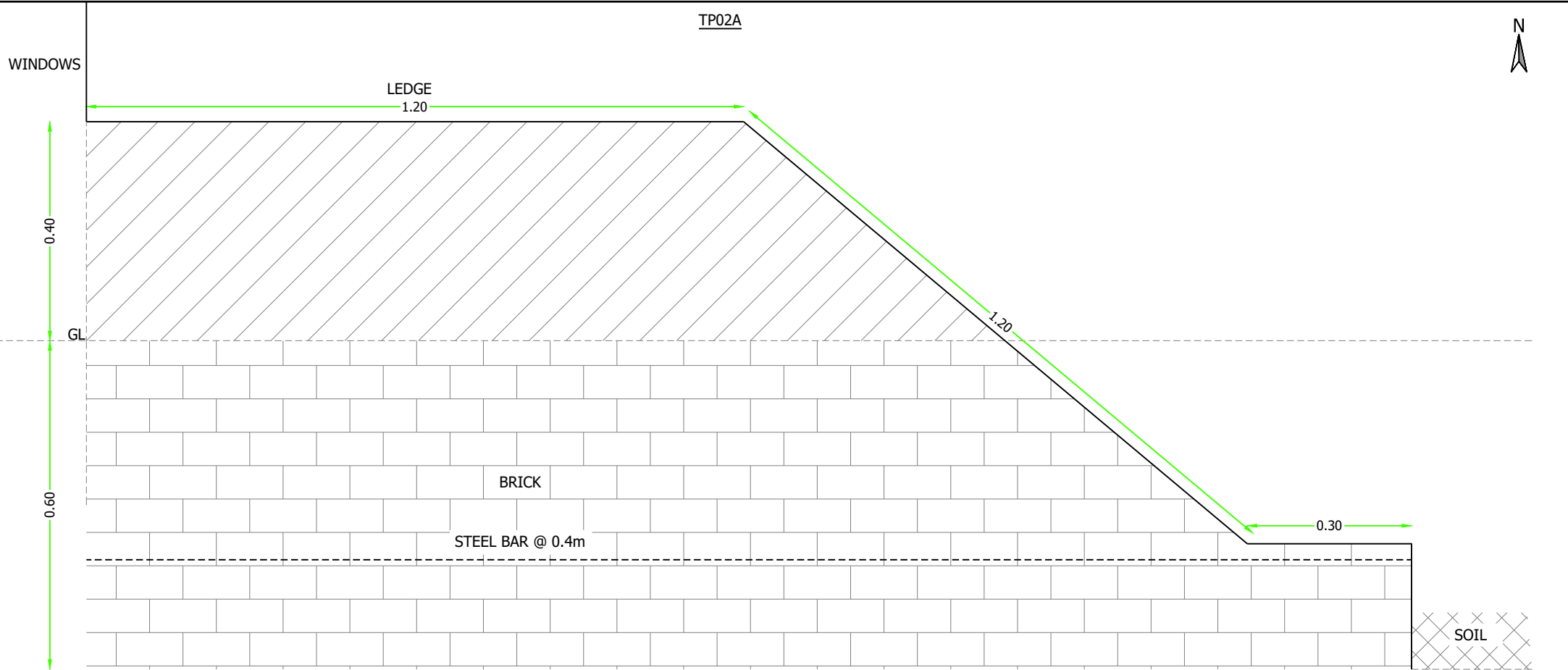


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Sheet Title
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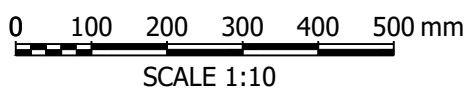
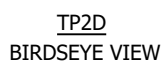
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PIT SKETCH - TP02A				
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Role				Number
U				TP02A
Revision				P01
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	Project: Princess Royal Theatre		Location Details					Status		Pit Number		
	Location: Port Talbot		Easting:		Northing:			FINAL		TP2 F		
	Client: Morgan Sindall		Level:		Depth: 0.13m							
			Logger: CS		Type: VE					Sheet 1 of 1		
Hole Information Pit Dimensions 0.30m 0.58m Orientation: 0° Shoring: None Stability: Stable Plant: Vacuum extractor			Groundwater						Scale: 1:25			
			Strike (m)		Rose To (m)		After (mins)		Remarks		Checked By: PV	
											Approved By: SR	
									Start Date: 08/08/2024			
									Finish Date: 08/08/2024			
Strata Description			Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing				
								Depth (m)	Ref	Tests / Results		
MADE GROUND: Asphalt. MGR				0.13								
EOH at 0.13m - Refusal												
											1	
											2	
											3	
											4	
											5	
Observations / Remarks										Atlantic House, Greenwood Close, Gate Business Park, Pontprennau, Cardiff, CF23 8RD		
1. Location inspected with CAT and Genny by TT Engineer. 2. Trial pit vacuum excavated to 0.13m bgl. 3. Groundwater not encountered. 4. Upon completion TP backfilled. 5. Location refusal on concrete.										029 2082 9200		
										Project Number 784-B046183		

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Tt TETRA TECH	Project: Princess Royal Theatre		Location Details				Status		Pit Number				
	Location: Port Talbot		Easting:		Northing:		FINAL		SA04				
	Client: Morgan Sindall		Level:		Depth: 1.20m								
			Logger:		Type: TP								
		Hole Information		Groundwater						Scale: 1:25			
Pit Dimensions		Orientation: °		Strike (m)		Rose To (m)		After (mins)		Remarks		Checked By: PV	
m		Shoring:										Approved By: SR	
		Stability:										Start Date:	
		Plant:										Finish Date:	
Strata Description			Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Backfill	Samples and Testing					
Brown slightly sandy SILT.				0.15				Depth (m)	Ref	Tests / Results			
Black sandy GRAVEL, sand and gravel is fine to coarse, gravels vary from angular to well rounded, low boulder content of rounded sandstone, concrete and brick.													
Greyish brown slightly sandy SILT. Sands are fine.				0.90									
EOH at 1.20m -				1.20									
			</										

Project: Princess Royal Theatre Location: Port Talbot Client: Morgan Sindall				Easting: Northing: Level: Depth: 2.50m Logger: Type: WS+DP Inclination: °				Status FINAL		Hole Number WS01		Sheet 1 of 1			
Hole Information From (m) To (m) Type Termination				Groundwater Strike (m) Rises to (m) Time (min) Remarks						Scale: 1:50 Checked By: PV Approved By: SR Start Date: Finish Date:					
Blows / 100mm 5 10 15 20 25 30 35 40 45				Strata Description		Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing Depth (m) Ref Test Results			
MADE GROUND: Block paving. MGR MADE GROUND: Brown fine to coarse bedding SAND. MGR MADE GROUND: Orange brown silty sandy angular fine to coarse limestone GRAVEL. MGR						0.10 0.16									
Brown very sandy rounded to angular fine to coarse sandstone GRAVEL with a high rounded cobble content. (ALLUVIAL) ALV(G)						1.20					1.20	SPT(C)	N=42 (4,8/7,10,12,13)		1
											2.00	SPT(C)	N=20 (8,7/7,5,4,4)		2
EOH at 2.50m - WS Refusal.						2.50					2.50	SPT(C)	N=50 (10,14/50 for 160mm)		3
10 14 12 12 12 13 25														3	
															4
															5
															6
															7
															8
															9
															10
Observations / Remarks 1. Location inspected with CAT and Genny by TT Engineer. 2. Groundwater not encountered.				Sampling Runs From (m) To (m) Diam (mm) Recovery (%) Remarks						Hammer Information Hammer Serial No. Energy Ratio %					
										DART540 68					
										Project Number 784-B046183					

Tt TETRA TECH Project: Princess Royal Theatre Location: Port Talbot Client: Morgan Sindall				Location Details Easting: Northing: Level: Depth: 1.65m Logger: Type: WS+DP Inclination: °				Status FINAL		Hole Number WS02 Sheet 1 of 1			
		Hole Information From (m) To (m) Type Termination WS Refusal.				Groundwater Strike (m) Rises to (m) Time (min) Remarks				Scale: 1:50 Checked By: PV Approved By: SR Start Date: Finish Date:			
Blows / 100mm 5 10 15 20 25 30 35 40 45		Strata Description		Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing Depth (m) Ref Test Results			
		MADE GROUND: Block paving. MGR			0.08								
		MADE GROUND: Orange brown clayey angular to sub-angular fine to coarse limestone GRAVEL. MGR			0.55								
		MADE GROUND: Black silty fine to medium GRAVEL. MGR			0.65								
1		MADE GROUND: Black very sandy SILT with rare coal fragments. MGR			1.20						1.20	SPT(C) N=39 (2,3/5,9,13,12)	1
		MADE GROUND: Black very sandy gravelly SILT: MGR			1.60								
2		Brown very sandy rounded to angular fine to coarse sandstone GRAVEL with a high rounded cobble content. (ALLUVIAL)			1.65						1.65	SPT(C) N=50 (12,12/50 for 265mm)	2
4		EOH at 1.65m - WS Refusal.											
3													3
4													4
5													5
6													6
7													7
8													8
9													9
10													10
Observations / Remarks 1. Location inspected with CAT and Genny by TT Engineer. 2. Groundwater not encountered.				Sampling Runs From (m) To (m) Diam (mm) Recovery (%) Remarks				Hammer Information Hammer Serial No. Energy Ratio % Project Number 784-B046183					

[illegible]

 Project: Princess Royal Theatre Location: Port Talbot Client: Morgan Sindall						Location Details Easting: Northing: Level: Depth: 1.00m Logger: Type: WS Inclination: °						Status FINAL		Borehole Number WS04		
												Sheet 1 of 1				
Method, Plant and Crew					Diameter		Casing		Groundwater						Scale: 1:50	
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Strike (m)	Casing (m)	Sealed (m)	Rose To (m)	Time (mins)	Remarks	Checked By: PV	
															Approved By: SR	
															Start Date:	
															Finish Date:	
Strata Description							Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing				
												Depth (m)	Ref	Tests / Results		
MADE GROUND: Brown sandy SILT MGR								0.30								
MADE GROUND: Orange brown sandy CLAY MGR								0.40								
MADE GROUND: Black silty sandy GRAVEL with low brick cobble content. MGR								0.80								
Brown locally clayey sub-rounded to rounded sandstone GRAVEL. EOH at 1.00m - WS Refusal.								1.00						SPT(C) 1.00m, 50 (12,12/50 for 145mm)	1	
															2	
															3	
															4	
															5	
															6	
															7	
															8	
															9	
															10	
Observations / Remarks 1. Location inspected with CAT and Genny by TT Engineer. 2. Groundwater not encountered.										Sampling Runs				Hammer Information		
										From (m)	To (m)	Diam (mm)	Recovery %	Remarks	Serial No.	Energy Ratio %
										Project Number 784-B046183						

 Project: Princess Royal Theatre Location: Port Talbot Client: Morgan Sindall						Location Details						Status		Borehole Number			
						Easting:		Northing:				FINAL		WS06			
						Level:		Depth: 0.00m									
						Logger:		Type: WS		Sheet 1 of 1							
						Inclination: °											
Method, Plant and Crew					Diameter		Casing		Groundwater					Scale: 1:50			
From (m)	To (m)	Type	Plant Used	Crew	Depth (m)	Diam (mm)	Depth(m)	Diam (mm)	Strike (m)	Casing (m)	Sealed (m)	Rose To (m)	Time (mins)	Remarks	Checked By: PV		
															Approved By: SR		
Strata Description							Legend	Depth (m)	Reduced Level (mAOD)	Water Level (m)	Inst / Backfill	Samples and Testing				Finish Date:	
												Depth (m)	Ref	Tests / Results			
															1		
															2		
															3		
															4		
															5		
															6		
															7		
															8		
															9		
															10		
Observations / Remarks											Sampling Runs			Hammer Information			
1. Location inspected with CAT and Genny by TT Engineer. 2. Groundwater not encountered.											From (m)	To (m)	Diam (mm)	Recovery %	Remarks	Serial No.	Energy Ratio %
																Project Number	
											784-B046183						

Tt TETRA TECH Project: Princess Royal Theatre Location: Port Talbot Client: Morgan Sindall				Location Details Easting: Northing: Level: Depth: 2.40m Logger: Type: WS+DP Inclination: °				Status FINAL		Hole Number WS07 Sheet 1 of 1		
		Hole Information From (m) To (m) Type Termination WS Refusal.				Groundwater Strike (m) Rises to (m) Time (min) Remarks				Scale: 1:50 Checked By: PV Approved By: SR Start Date: Finish Date:		
Blows / 100mm 5 10 15 20 25 30 35 40 45		Strata Description		Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing Depth (m) Ref Test Results		
		MADE GROUND: Brown sandy gravelly SILT. TOP			0.20							
		MADE GROUND: Black silty sandy GRAVEL. MGR										
1		Grey very sandy becoming very gravelly SILT ALV(C)			0.90					1.20	SPT(C)	N=7 (0,1/0,1,2,4)
2											2.00	SPT(C)
20 18 20 25		EOH at 2.40m - WS Refusal.			2.40							
3												
4												
5												
6												
7												
8												
9												
10												
Observations / Remarks 1. Location inspected with CAT and Genny by TT Engineer. 2. Groundwater not encountered.				Sampling Runs From (m) To (m) Diam (mm) Recovery (%) Remarks				Hammer Information Hammer Serial No. Energy Ratio % Project Number 784-B046183				

Tt TETRA TECH Project: Princess Royal Theatre Location: Port Talbot Client: Morgan Sindall				Easting: Level: Logger: Northing: Depth: 2.20m Type: WS+DP Inclination: °				Status FINAL		Hole Number WS08 Sheet 1 of 1											
Hole Information From (m) To (m) Type Termination				Groundwater Strike (m) Rises to (m) Time (min) Remarks				Scale: 1:50 Checked By: PV Approved By: SR Start Date: Finish Date:													
Blows / 100mm 5 10 15 20 25 30 35 40 45				Strata Description MADE GROUND: Brown sandy SILT. TOP MADE GROUND: Light brown silty sandy GRAVEL. MGR MADE GROUND: Brown bedding SAND with a black cable. MGR Grey brown very sandy angular to round fine to coarse sandstone GRAVEL. ALV(G) EOH at 2.20m - WS Refusal.		Legend		Depth (m) 0.35 0.70 0.90 2.20		Reduced Level (mAOD)		Casing Ø (mm) Depth (m)		Water Level (m)		Installation / Backfill		Samples & Testing Depth (m) Ref Test Results			
1 8 7 14 13 12 13 25				2		3		4		5		6		7		8		9		10	
Observations / Remarks 1. Location inspected with CAT and Genny by TT Engineer. 2. Groundwater not encountered.				Sampling Runs From (m) To (m) Diam (mm) Recovery (%) Remarks				Hammer Information Hammer Serial No. Energy Ratio %				Project Number 784-B046183									

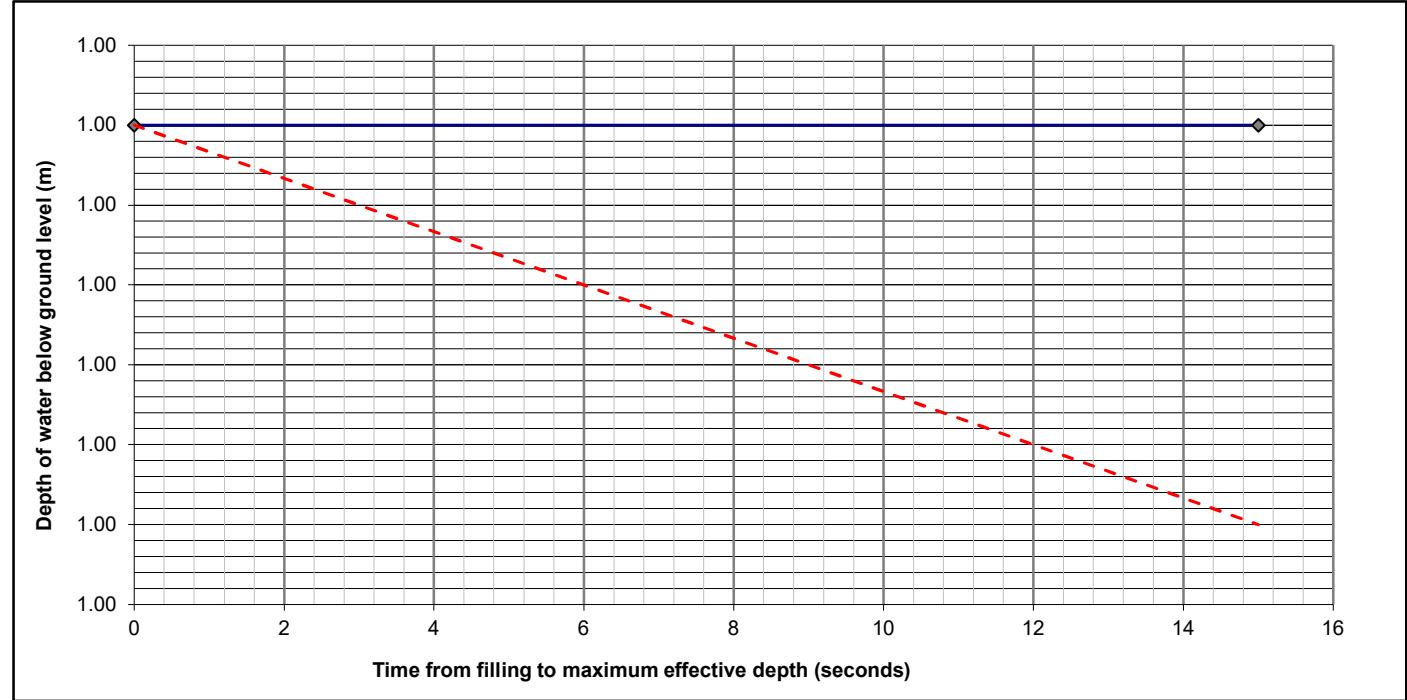
Tt TETRA TECH Project: Princess Royal Theatre Location: Port Talbot Client: Morgan Sindall				Location Details Easting: Northing: Level: Depth: 2.50m Logger: Type: WS+DP Inclination: °				Status FINAL		Hole Number WS09 Sheet 1 of 1			
		Hole Information From (m) To (m) Type Termination WS Refusal.				Groundwater Strike (m) Rises to (m) Time (min) Remarks				Scale: 1:50 Checked By: PV Approved By: SR Start Date: Finish Date:			
Blows / 100mm 5 10 15 20 25 30 35 40 45		Strata Description		Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing Depth (m) Ref Test Results			
1 MADE GROUND: Grass/turf over black slightly clayey sandy gravelly SILT. MGR				1.20						1.20	SPT(C)	N=4 (2,1/1,1,1,1)	1
2 Grey brown silty very sandy sub-angular to rounded fine to coarse sandstone GRAVEL. ALV(G)				2.00						2.00	SPT(C)	N=27 (3,5/7,5,8,7)	2
3 EOH at 2.50m - WS Refusal.				2.50						2.50	SPT(C)	N=50 (10,8/50 for 200mm)	3
4													4
5													5
6													6
7													7
8													8
9													9
10													10
Observations / Remarks 1. Location inspected with CAT and Genny by TT Engineer. 2. Groundwater not encountered.				Sampling Runs From (m) To (m) Diam (mm) Recovery (%) Remarks				Hammer Information Hammer Serial No. Energy Ratio % Project Number 784-B046183					

Tt TETRA TECH Project: Princess Royal Theatre Location: Port Talbot Client: Morgan Sindall				Easting: Level: Logger: JM Northing: Depth: 0.75m Type: WS+DP Inclination: 90°				Status FINAL		Hole Number WS10 Sheet 1 of 1		
Hole Information From (m) To (m) Type Termination 0.00 0.75 Inspection Pit WS Refusal.				Groundwater Strike (m) Rises to (m) Time (min) Remarks				Scale: 1:50 Checked By: PV Approved By: SR Start Date: 24/04/2024 Finish Date: 24/04/2024				
Blows / 100mm 5 10 15 20 25 30 35 40 45		Strata Description		Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing		
1 2 3 4 5 6 7 8 9 10		Asphalt. Concrete with 1cm rebar. Light grey fine to coarse SAND. (Subbase). MGR Brown very sandy GRAVELS with high cobble content. Sand is fine to coarse. Gravel is fine to coarse subangular to rounded of sandstone. 0.45m - 0.75m: Strong hydrocarbon odour. EOH at 0.75m - WS Refusal.			0.05 0.35 0.45 0.75					0.45 - 0.75 0.60 0.75	1 B 1 ES SPT(C)	50 (10,14/50 for 85mm)
Observations / Remarks 1. Location inspected with CAT and Genny by TT Engineer. 2. Groundwater not encountered.				Sampling Runs From (m) To (m) Diam (mm) Recovery (%) Remarks				Hammer Information Hammer Serial No. Energy Ratio % DART540 68 Project Number 784-B046183				

Tt TETRA TECH Project: Princess Royal Theatre Location: Port Talbot Client: Morgan Sindall				Location Details Easting: Northing: Level: Depth: 0.60m Logger: JM Type: WS+DP Inclination: 90°				Status FINAL		Hole Number WS11 Sheet 1 of 1		
Hole Information From (m) To (m) Type Termination 0.00 0.60 Inspection Pit WS Refusal				Groundwater Strike (m) Rises to (m) Time (min) Remarks				Scale: 1:50 Checked By: PV Approved By: SR Start Date: 24/04/2024 Finish Date: 24/04/2024				
Blows / 100mm 5 10 15 20 25 30 35 40 45		Strata Description		Legend	Depth (m)	Reduced Level (mAOD)	Casing Ø (mm) Depth (m)	Water Level (m)	Installation / Backfill	Samples & Testing Depth (m) Ref Test Results		
15 16 19 25		Ashpalt. Concrete with 1cm rebar. Brown very sandy GRAVELS with high cobble content. Sand is fine to coarse. Gravel is fine to coarse subangular to rounded of sandstone. EOH at 0.60m - WS Refusal			0.05 0.35 0.60					0.35 - 0.60 0.60 0.60	1 B 1 ES SPT(C)	50 (10,13/50 for 105mm)
1												1
2												2
3												3
4												4
5												5
6												6
7												7
8												8
9												9
10												10
Observations / Remarks 1. Location inspected with CAT and Genny by TT Engineer. 2. Groundwater not encountered.				Sampling Runs From (m) To (m) Diam (mm) Recovery (%) Remarks				Hammer Information Hammer Serial No. Energy Ratio % DART54068 Project Number 784-B046183				

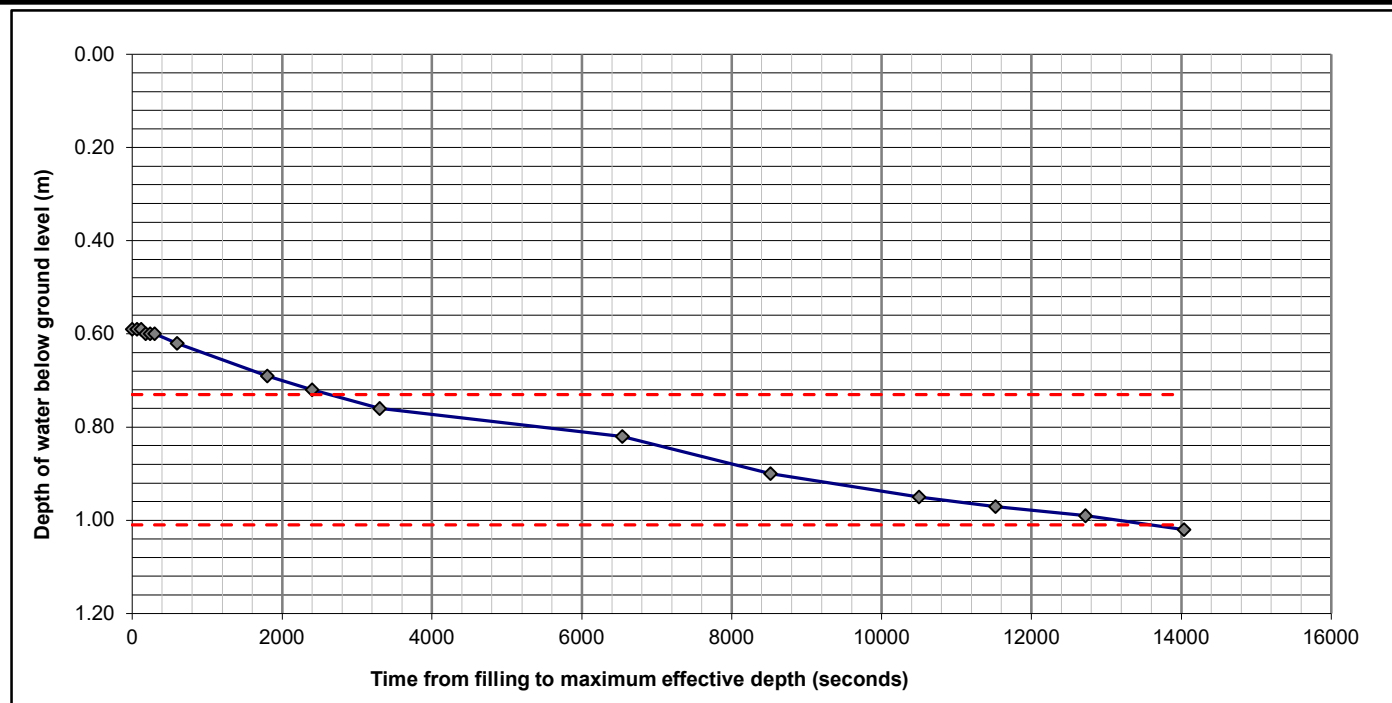
APPENDIX C: SOIL INFILTRATION TEST

SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION



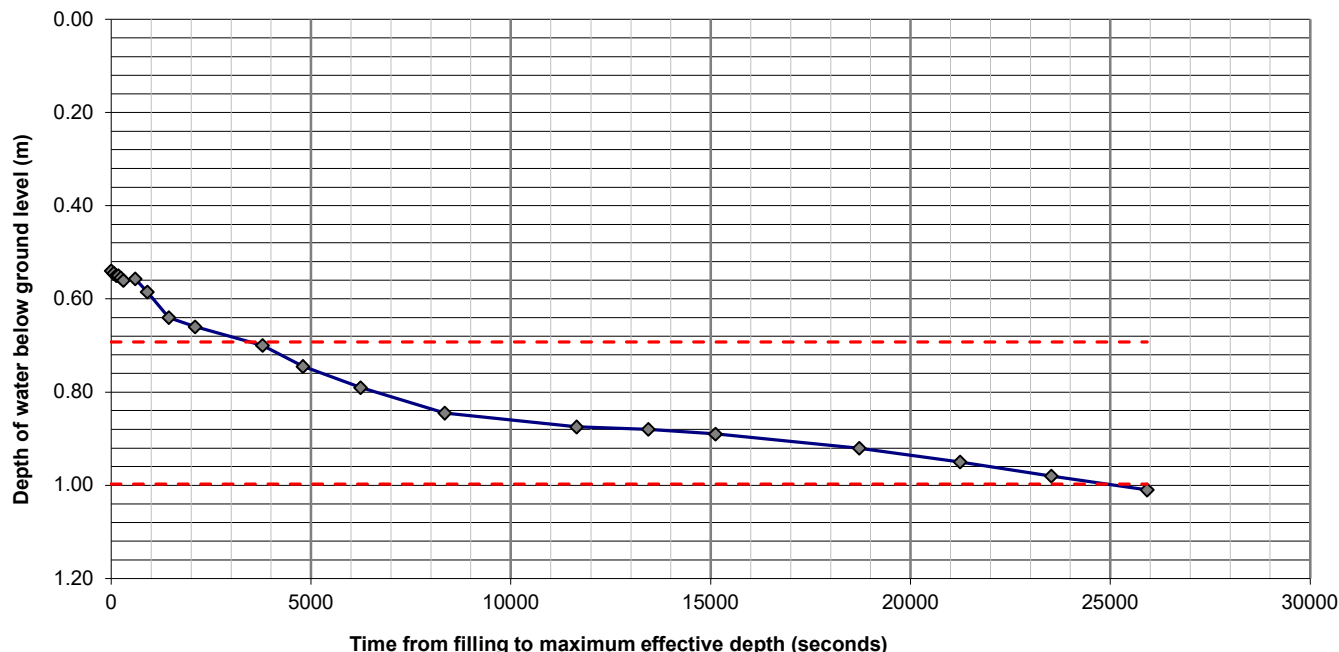
Time Elapsed (s)	Time Elapsed (mins)	Distance to water surface from ground level (m)	PIT LENGTH (m): 1.40	Pit construction	
			PIT WIDTH (m): 0.50	Open - No gravel	
			PIT DEPTH (m): 1.00		
15	0.25	1.000	INPUT PARAMETERS:		
			Total volume of pit	(m ³)	0.00
			Pit volume between 75% and 25% depths = L x W x 1/2D	(m ³)	0.00
			Effective depth of Pit	(m)	0.00
			Proportion of pit volume occupied by gravel solids	(0-1)	0.00
			Maximum potential volume of Water	(m ³)	0.00
			Level of water in pit at 75% effective depth (p ₇₅)	(m)	0.00
			Level of water in pit at 25% effective depth (p ₂₅)	(m)	0.00
			Effective volume between 75% & 25% depth V _{p75-25} = V x P _g	(m ³)	0.00
			Surface area of pit up to 50% effective depth (A _{p50})	(m ²)	0.70
			Time at 75% effective depth (p ₇₅)	(s)	0
			Time at 25% effective depth (p ₂₅)	(s)	#N/A
			Time for outflow for 75% and 25% effective depth (Tp75-25)	(s)	#N/A
			OUTPUT:		
			SOIL INFILTRATION RATE (f)	$\frac{V_{p75-25}}{A_{p50} \times T_{p75-25}}$	(m/s) #N/A
			WATER INPUT: 500 l 5 mins		
			GEOLOGY OF TEST SECTION:		
			Made Ground		
			Compiled by: JC		
			Checked by: PV		

SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION

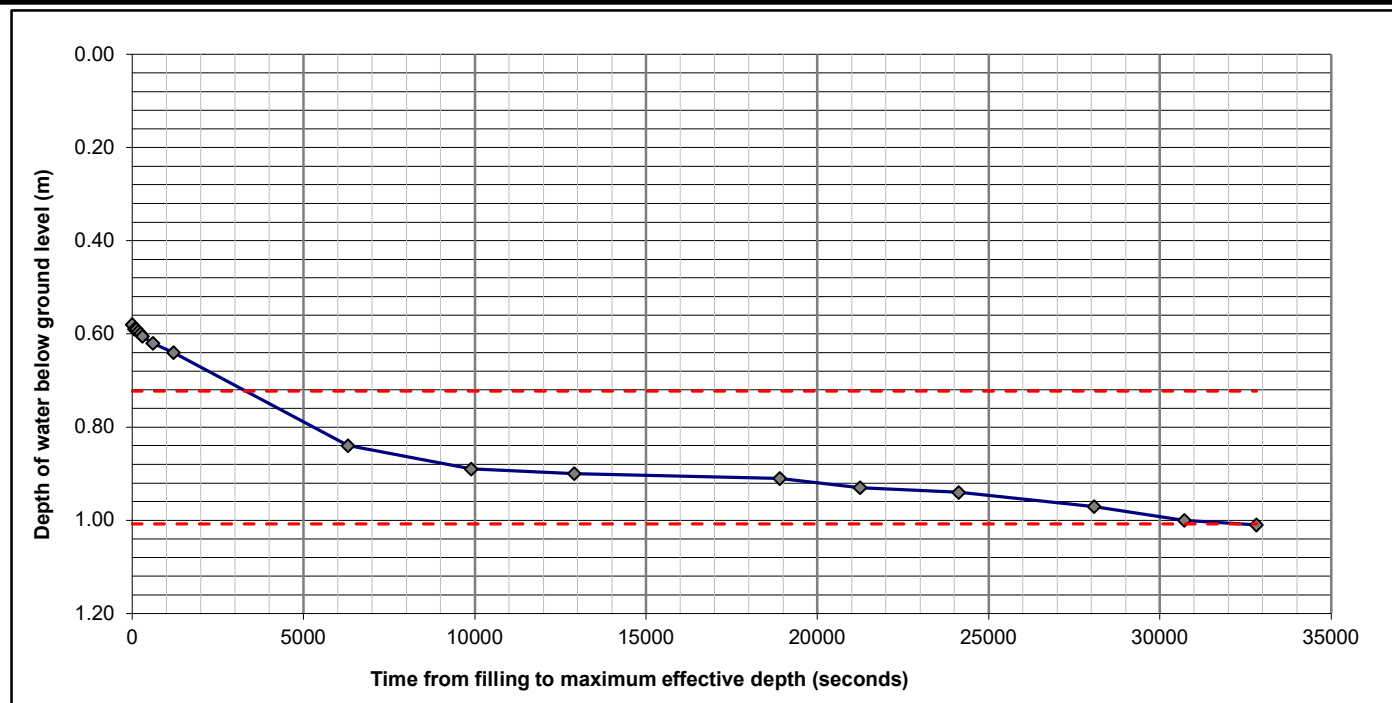


Time Elapsed (s)	Time Elapsed (mins)	Distance to water surface from ground level (m)				
	0.00	0.590				
60	1.00	0.590				
120	2.00	0.590				
180	3.00	0.600				
240	4.00	0.600				
300	5.00	0.600				
600	10.00	0.620				
1800	30.00	0.690				
2400	40.00	0.720				
3300	55.00	0.760				
6540	109.00	0.820				
8520	142.00	0.900				
10500	175.00	0.950				
11520	192.00	0.970				
12720	212.00	0.990				
14040	234.00	1.020				

SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION

[illegible]

SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION

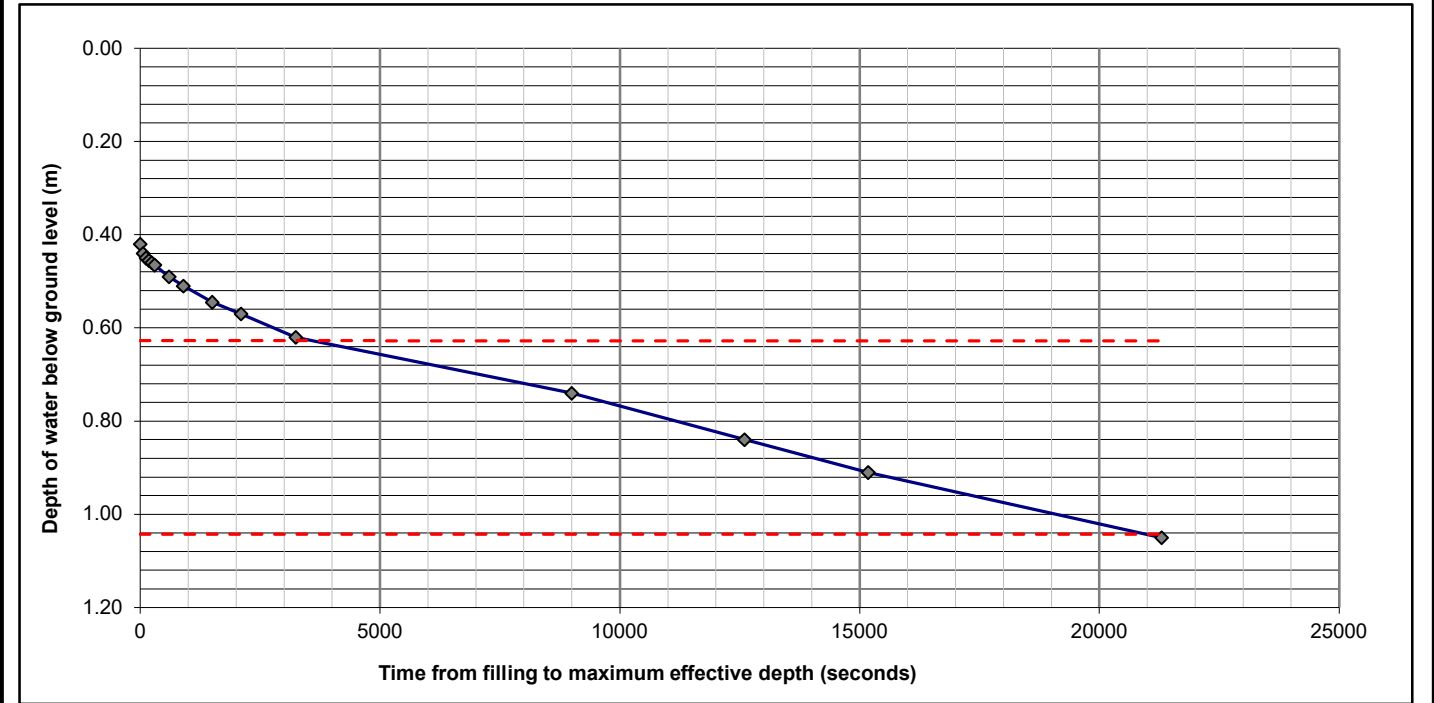


Time Elapsed (s)	Time Elapsed (mins)	Distance to water surface from ground level (m)	PIT LENGTH (m):		1.50	Pit construction	
			PIT WIDTH (m):		0.50	Open - No gravel	
			PIT DEPTH (m):		1.15		
	0.00	0.580	INPUT PARAMETERS:				
60	1.00	0.590	Total volume of pit		(m ³)	0.43	
120	2.00	0.590	Pit volume between 75% and 25% depths = L x W x ½D		(m ³)	0.21	
180	3.00	0.595	Effective depth of Pit		(m)	0.57	
240	4.00	0.600	Proportion of pit volume occupied by gravel solids		(0-1)	0.00	
300	5.00	0.605	Maximum potential volume of Water		(m ³)	0.43	
600	10.00	0.620	Level of water in pit at 75% effective depth (p ₇₅)		(m)	0.14	
1200	20.00	0.640	Level of water in pit at 25% effective depth (p ₂₅)		(m)	0.43	
6300	105.00	0.840					
9900	165.00	0.890	Effective volume between 75% & 25% depth V _{p75-25} = V x P _g		(m ³)	0.21	
12900	215.00	0.900	Surface area of pit up to 50% effective depth (A _{p50})		(m ²)	1.89	
18900	315.00	0.910					
21240	354.00	0.930	Time at 75% effective depth (p ₇₅)		(s)	3305	
24120	402.00	0.940	Time at 25% effective depth (p ₂₅)		(s)	32311	
28080	468.00	0.970	Time for outflow for 75% and 25% effective depth (Tp75-25)		(s)	29006	
30720	512.00	1.000	OUTPUT:				
32820	547.00	1.010	SOIL INFILTRATION RATE (f)		V _{p75 - 25}	(m/s)	3.90E-06
					A _{p50} x T _{p75 - 25}		
			WATER INPUT:		500	l	5 mins
			GEOLOGY OF TEST SECTION:				
			Made Ground				



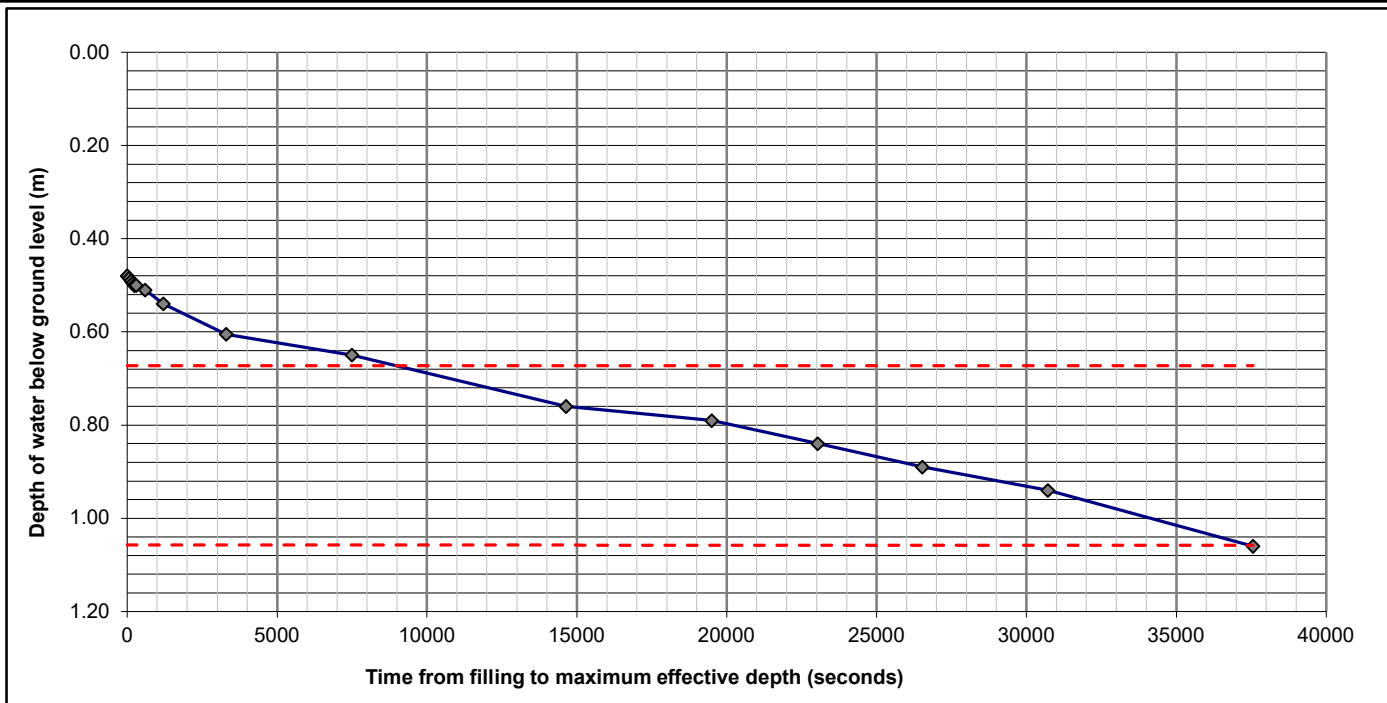
DATE:	02/04/2024
PROJECT No:	784-B046193
PROJECT NAME:	Princess Theatre
CLIENT:	Neath Port Talbot Council
TRIAL PIT ID:	SA03
TEST NUMBER:	1

SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION



Time Elapsed (s)	Time Elapsed (mins)	Distance to water surface from ground level (m)				
	0.00	0.420				
60	1.00	0.440				
120	2.00	0.450				
180	3.00	0.455				
240	4.00	0.460				
300	5.00	0.465				
600	10.00	0.490				
900	15.00	0.510				
1500	25.00	0.545				
2100	35.00	0.570				
3240	54.00	0.620				
9000	150.00	0.740				
12600	210.00	0.840				
15180	253.00	0.910				
21300	355.00	1.050				

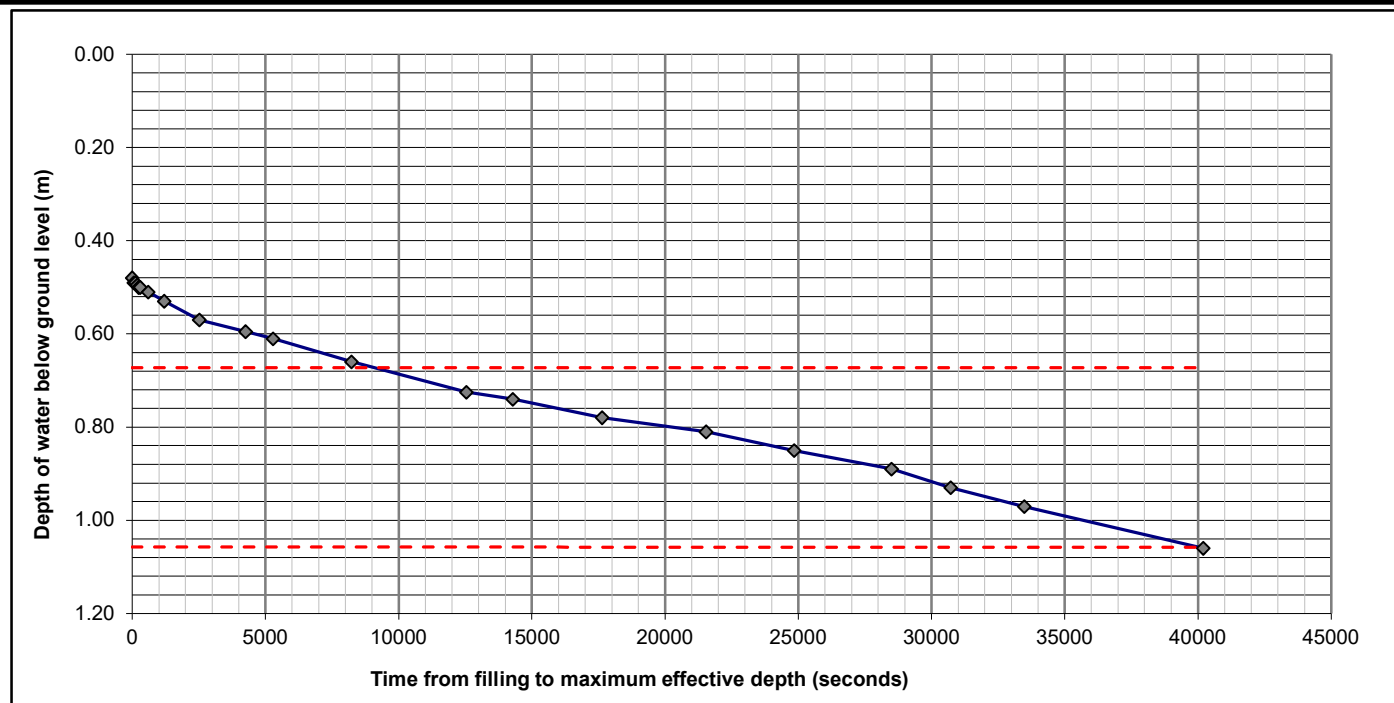
SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION



Time Elapsed (s)	Time Elapsed (mins)	Distance to water surface from ground level (m)	Pit construction			
			PIT LENGTH (m):	1.20	Open - No gravel	
			PIT WIDTH (m):	0.40		
			PIT DEPTH (m):	1.25		
			INPUT PARAMETERS:			
			Total volume of pit	(m ³)	0.37	
			Pit volume between 75% and 25% depths = L x W x ½D	(m ³)	0.18	
			Effective depth of Pit	(m)	0.77	
			Proportion of pit volume occupied by gravel solids	(0-1)	0.00	
			Maximum potential volume of Water	(m ³)	0.37	
			Level of water in pit at 75% effective depth (p ₇₅)	(m)	0.19	
			Level of water in pit at 25% effective depth (p ₂₅)	(m)	0.58	
			Effective volume between 75% & 25% depth V _{p75-25} = V x P _g	(m ³)	0.18	
			Surface area of pit up to 50% effective depth (A _{p50})	(m ²)	1.71	
			Time at 75% effective depth (p ₇₅)	(s)	8962	
			Time at 25% effective depth (p ₂₅)	(s)	37423	
			Time for outflow for 75% and 25% effective depth (Tp75-25)	(s)	28461	
			OUTPUT:			
			SOIL INFILTRATION RATE (f)	V _{p75 - 25}	(m/s)	3.79E-06
				A _{p50} × T _{p75 - 25}		
			WATER INPUT: 500 l 5 mins			
			GEOLOGY OF TEST SECTION:			
			Made Ground			

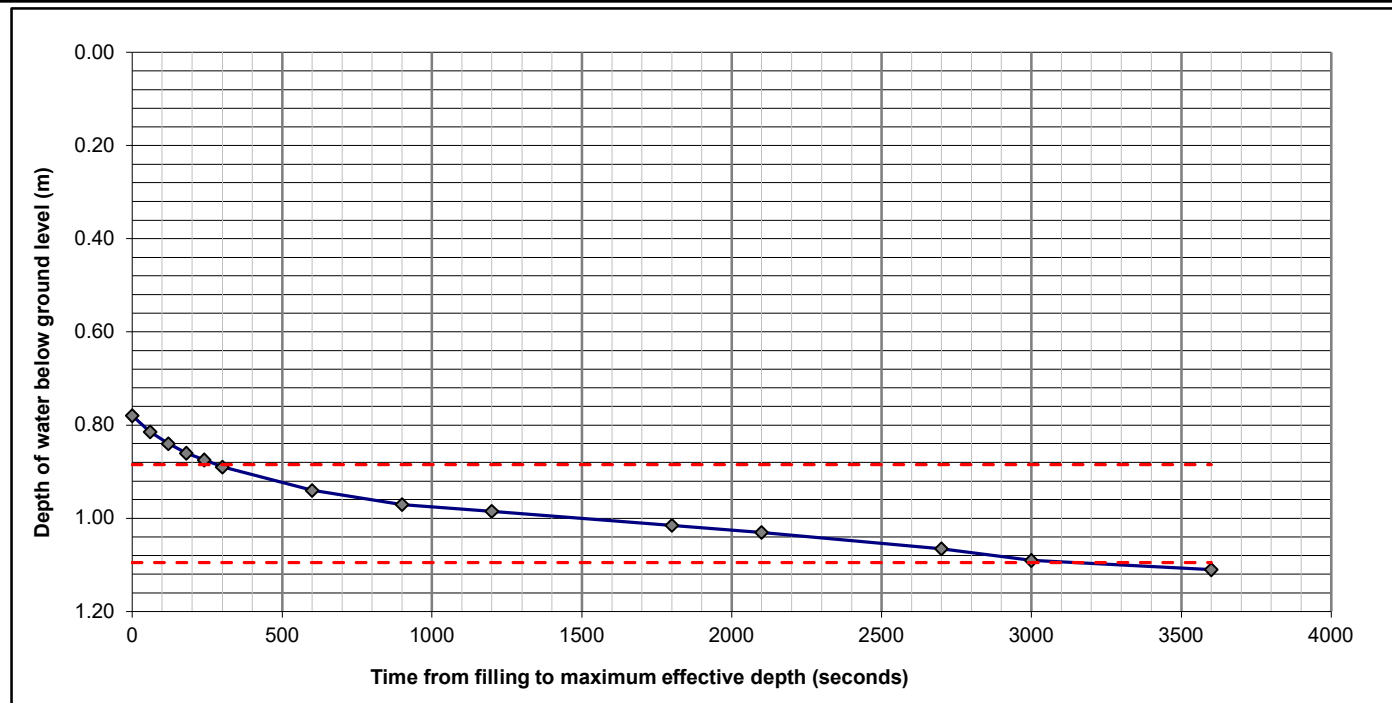
DATE:	04/04/2024
PROJECT No:	784-B046193
PROJECT NAME:	Princess Theatre
CLIENT:	Neath Port Talbot Council
TRIAL PIT ID:	SA03
TEST NUMBER:	3

SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION



Time Elapsed (s)	Time Elapsed (mins)	Distance to water surface from ground level (m)	PIT LENGTH (m):		1.20	Pit construction	
			PIT WIDTH (m):		0.40	Open - No gravel	
			PIT DEPTH (m):		1.25		
	0.00	0.480	INPUT PARAMETERS:				
60	1.00	0.490	Total volume of pit		(m ³)	0.37	
120	2.00	0.490	Pit volume between 75% and 25% depths = L x W x ½D		(m ³)	0.18	
180	3.00	0.495	Effective depth of Pit		(m)	0.77	
240	4.00	0.500	Proportion of pit volume occupied by gravel solids		(0-1)	0.00	
300	5.00	0.500	Maximum potential volume of Water		(m ³)	0.37	
600	10.00	0.510	Level of water in pit at 75% effective depth (p ₇₅)		(m)	0.19	
1200	20.00	0.530	Level of water in pit at 25% effective depth (p ₂₅)		(m)	0.58	
2520	42.00	0.570					
4260	71.00	0.595	Effective volume between 75% & 25% depth V _{p75-25} = V x P _g		(m ³)	0.18	
5280	88.00	0.610	Surface area of pit up to 50% effective depth (A _{p50})		(m ²)	1.71	
8220	137.00	0.660					
12540	209.00	0.725	Time at 75% effective depth (p ₇₅)		(s)	9052	
14280	238.00	0.740	Time at 25% effective depth (p ₂₅)		(s)	40021	
17640	294.00	0.780	Time for outflow for 75% and 25% effective depth (Tp75-25)		(s)	30969	
21540	359.00	0.810	OUTPUT:				
24840	414.00	0.850	SOIL INFILTRATION RATE (f)		V _{p75 - 25}	(m/s)	3.49E-06
28500	475.00	0.890			A _{p50} x T _{p75 - 25}		
30720	512.00	0.930					
33480	558.00	0.970	WATER INPUT:		500	I	5 mins
40200	670.00	1.060	GEOLOGY OF TEST SECTION:				
			Made Ground				

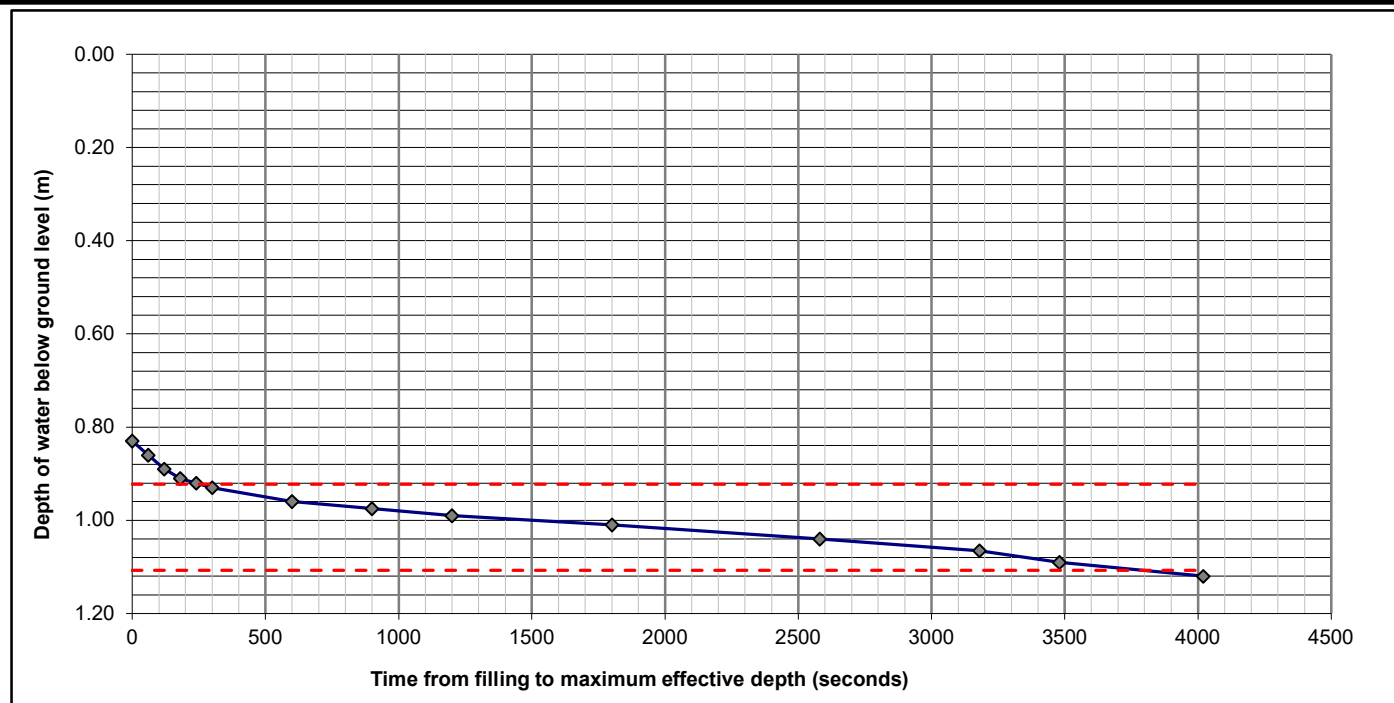
SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION



Time Elapsed (s)	Time Elapsed (mins)	Distance to water surface from ground level (m)	Pit construction			
			PIT LENGTH (m):	1.20	Open - No gravel	
			PIT WIDTH (m):	0.40		
			PIT DEPTH (m):	1.20		
			INPUT PARAMETERS:			
			Total volume of pit	(m ³)	0.20	
			Pit volume between 75% and 25% depths = L x W x ½D	(m ³)	0.10	
			Effective depth of Pit	(m)	0.42	
			Proportion of pit volume occupied by gravel solids	(0-1)	0.00	
			Maximum potential volume of Water	(m ³)	0.20	
			Level of water in pit at 75% effective depth (p ₇₅)	(m)	0.11	
			Level of water in pit at 25% effective depth (p ₂₅)	(m)	0.32	
			Effective volume between 75% & 25% depth V _{p75-25} = V x P _g	(m ³)	0.10	
			Surface area of pit up to 50% effective depth (A _{p50})	(m ²)	1.15	
			Time at 75% effective depth (p ₇₅)	(s)	280	
			Time at 25% effective depth (p ₂₅)	(s)	3151	
			Time for outflow for 75% and 25% effective depth (Tp75-25)	(s)	2870	
			OUTPUT:			
			SOIL INFILTRATION RATE (f)	V _{p75 - 25}	(m/s)	3.05E-05
				A _{p50} × T _{p75 - 25}		
			WATER INPUT: 500 l 5 mins			
			GEOLOGY OF TEST SECTION:			
			Made Ground			

DATE:	03/04/2024
PROJECT No:	784-B046193
PROJECT NAME:	Princess Theatre
CLIENT:	Neath Port Talbot Council
TRIAL PIT ID:	SA04
TEST NUMBER:	3

SOAKAWAY TEST - SOIL INFILTRATION RATE/PERMEABILITY CALCULATION



Time Elapsed (s)	Time Elapsed (mins)	Distance to water surface from ground level (m)	PIT LENGTH (m):		1.20	Pit construction		
			PIT WIDTH (m):		0.40	Open - No gravel		
			PIT DEPTH (m):		1.20			
	0.00	0.830	INPUT PARAMETERS:					
60	1.00	0.860	Total volume of pit		(m ³)	0.18		
120	2.00	0.890	Pit volume between 75% and 25% depths = L x W x ½D		(m ³)	0.09		
180	3.00	0.910	Effective depth of Pit		(m)	0.37		
240	4.00	0.920	Proportion of pit volume occupied by gravel solids		(0-1)	0.00		
300	5.00	0.930	Maximum potential volume of Water		(m ³)	0.18		
600	10.00	0.960	Level of water in pit at 75% effective depth (p ₇₅)		(m)	0.09		
900	15.00	0.975	Level of water in pit at 25% effective depth (p ₂₅)		(m)	0.28		
1200	20.00	0.990						
1800	30.00	1.010	Effective volume between 75% & 25% depth V _{p75-25} = V x P _g		(m ³)	0.09		
2580	43.00	1.040	Surface area of pit up to 50% effective depth (A _{p50})		(m ²)	1.07		
3180	53.00	1.065						
3480	58.00	1.090	Time at 75% effective depth (p ₇₅)		(s)	255		
4020	67.00	1.120	Time at 25% effective depth (p ₂₅)		(s)	3796		
			Time for outflow for 75% and 25% effective depth (Tp75-25)		(s)	3541		
			OUTPUT:					
			SOIL INFILTRATION RATE (f)		V _{p75 - 25}		(m/s)	2.34E-05
					A _{p50} × T _{p75 - 25}			
			WATER INPUT:		500 l		5 mins	
			GEOLOGY OF TEST SECTION:					
			Made Ground					

APPENDIX D: CBR TEST DATA

Atlantic House, Greenwood Close, Cardiff Gate Business Park, Pontprennau, Cardiff, CF23 8RD
Tel: 02920 829200
Fax: 02920 455321
Environmental Consultancy
Ground Engineering Services

PROJECT No.: 784-B046183

PROJECT NAME: Princess Royal Theatre

CLIENT: Morgan Sindell

FIGURE No.: SA01

DCP-CBR Corellation

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10} (\text{mm/blow})$$

DCP -Modulus E Corellation

$$E = 17.6 (\text{CBR})^{0.64} \text{ MPa}$$

In situ CBR by TRL Probe

Reference: 1

Position: SA01

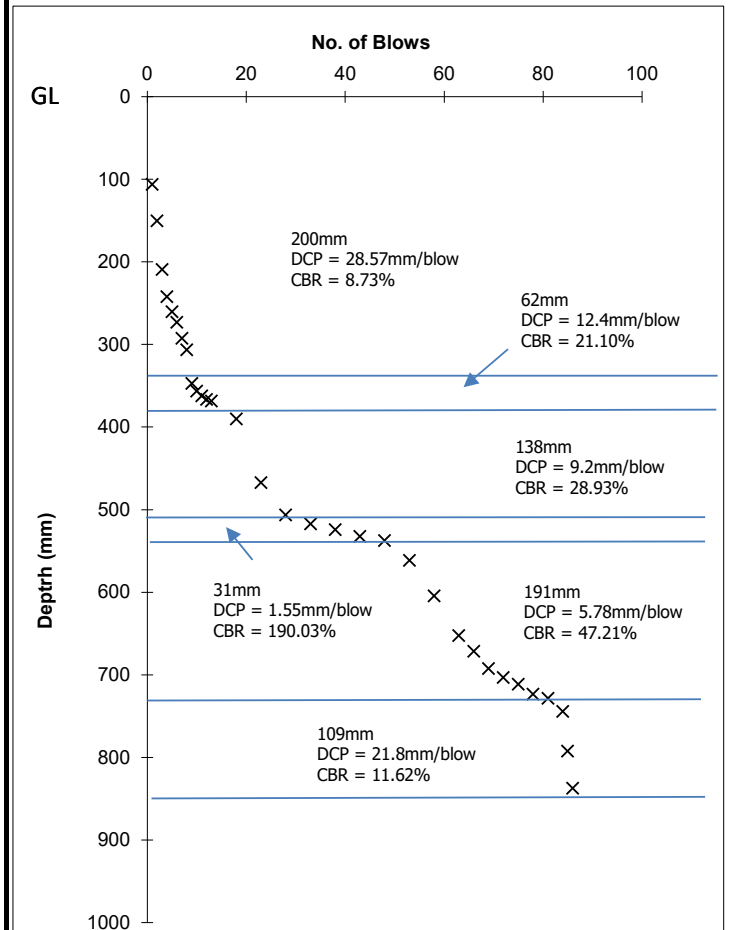
Date: 05 April 2024

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
106	1	219	106				
44	2	263	150				
59	3	322	209				
33	4	355	242				
18	5	373	260				
13	6	386	273				
19	7	405	292				
14	8	419	306				
41	9	460	347				
9	10	469	356				
6	11	475	362				
4	12	479	366				
2	13	481	368				
22	18	503	390				
77	23	580	467				
39	28	619	506				
11	33	630	517				
7	38	637	524				
8	43	645	532				
5	48	650	537				
24	53	674	561				
43	58	717	604				
48	63	765	652				
19	66	784	671				
21	69	805	692				
11	72	816	703				
8	75	824	711				
12	78	836	723				
5	81	841	728				
16	84	857	744				
48	85	905	792				
45	86	950	837				
-950	33		-113				
	34		-113				
	35		-113				
	36		-113				
	37		-113				
	38		-113				
	39		-113				
	40		-113				
	41		-113				
	42		-113				
	43		-113				
	44		-113				
	45		-113				
	46		-113				
	47		-113				
	48		-113				
	49		-113				
	50		-113				

Test started at: 0 m below ground level

Zero Reading: 113 mm

Zero reading = start depth below ground surface



Data compiled by: TR
Data checked by: PV

Atlantic House, Greenwood Close, Cardiff Gate Business Park, Pontprennau, Cardiff, CF23 8RD
 Tel: 02920 829200
 Fax: 02920 455321
 Environmental Consultancy
 Ground Engineering Services

PROJECT No.: 784-B046183

PROJECT NAME: Princess Royal Theatre

CLIENT: Morgan Sindell

FIGURE No.: SA02

DCP-CBR Corellation

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10} (\text{mm/blow})$$

DCP -Modulus E Corellation

$$E = 17.6 (\text{CBR})^{0.64} \text{ MPa}$$

In situ CBR by TRL Probe

Reference: 1

Position: SA02

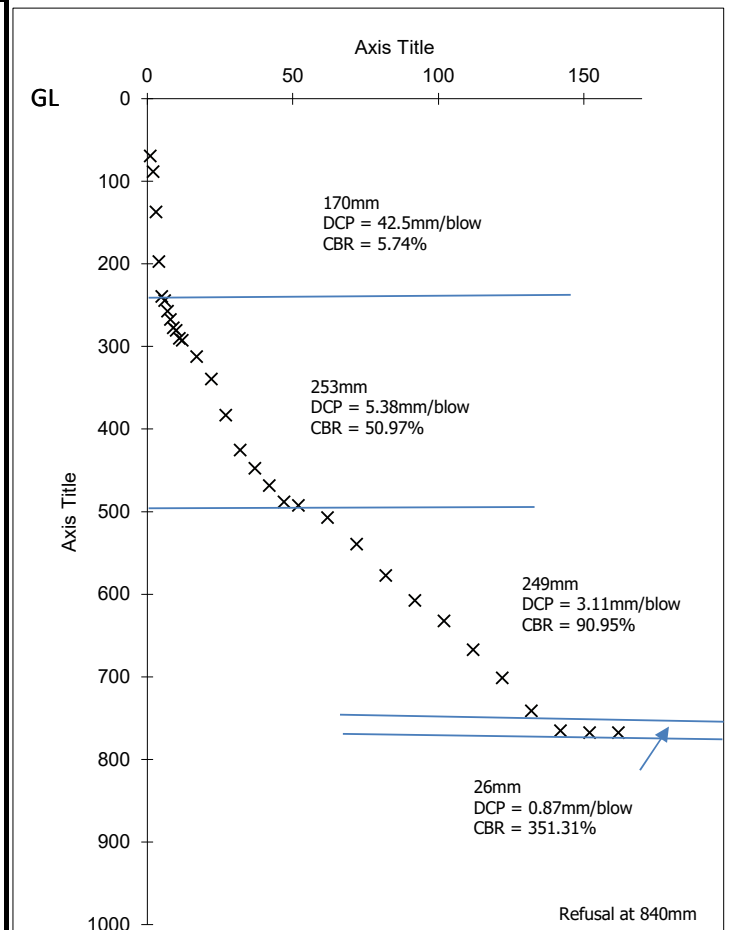
Date: 05 April 2024

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
69	1	142	69				
19	2	161	88				
49	3	210	137				
60	4	270	197				
42	5	312	239				
5	6	317	244				
13	7	330	257				
10	8	340	267				
10	9	350	277				
3	10	353	280				
10	11	363	290				
2	12	365	292				
20	17	385	312				
27	22	412	339				
44	27	456	383				
42	32	498	425				
22	37	520	447				
21	42	541	468				
20	47	561	488				
4	52	565	492				
15	62	580	507				
32	72	612	539				
38	82	650	577				
30	92	680	607				
25	102	705	632				
35	112	740	667				
34	122	774	701				
40	132	814	741				
24	142	838	765				
2	152	840	767				
	162	840	767				
-840	32		-73				
	33		-73				
	34		-73				
	35		-73				
	36		-73				
	37		-73				
	38		-73				
	39		-73				
	40		-73				
	41		-73				
	42		-73				
	43		-73				
	44		-73				
	45		-73				
	46		-73				
	47		-73				
	48		-73				
	49		-73				
	50		-73				

Test started at: 0 m below ground level

Zero Reading: 73 mm

Zero reading = start depth below ground surface



Data compiled by: TR
 Data checked by: PV

Atlantic House, Greenwood Close, Cardiff Gate Business Park, Pontprenau, Cardiff, CF23 8RD
 Tel: 02920 829200
 Fax: 02920 455321
 Environmental Consultancy
 Ground Engineering Services

PROJECT No.: 784-B046183

PROJECT NAME: Princess Royal Theatre

CLIENT: Morgan Sindell

FIGURE No.: SA03

DCP-CBR Corellation

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10} (\text{mm/blow})$$

DCP -Modulus E Corellation

$$E = 17.6 (\text{CBR})^{0.64} \text{ MPa}$$

In situ CBR by TRL Probe

Reference: 1

Position: SA03

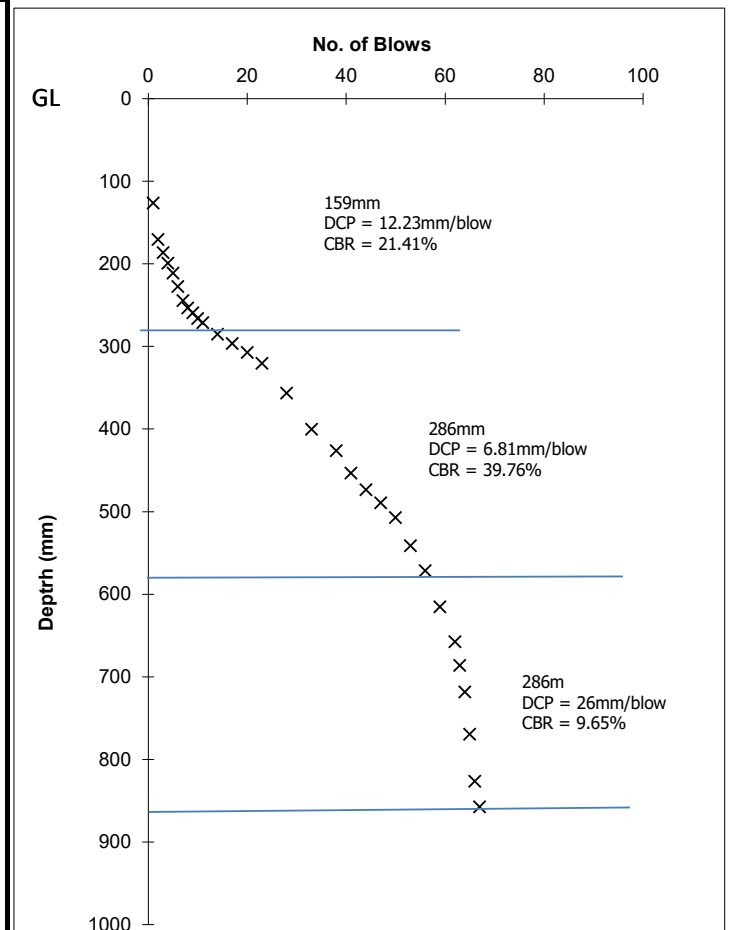
Date: 05 April 2024

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
126	1	231	126				
44	2	275	170				
16	3	291	186				
13	4	304	199				
12	5	316	211				
16	6	332	227				
17	7	349	244				
9	8	358	253				
6	9	364	259				
7	10	371	266				
5	11	376	271				
14	14	390	285				
11	17	401	296				
11	20	412	307				
13	23	425	320				
36	28	461	356				
44	33	505	400				
26	38	531	426				
27	41	558	453				
20	44	578	473				
16	47	594	489				
18	50	612	507				
34	53	646	541				
30	56	676	571				
44	59	720	615				
42	62	762	657				
29	63	791	686				
32	64	823	718				
51	65	874	769				
57	66	931	826				
31	67	962	857				
-962	32		-105				
	33		-105				
	34		-105				
	35		-105				
	36		-105				
	37		-105				
	38		-105				
	39		-105				
	40		-105				
	41		-105				
	42		-105				
	43		-105				
	44		-105				
	45		-105				
	46		-105				
	47		-105				
	48		-105				
	49		-105				
	50		-105				

Test started at: 0 m below ground level

Zero Reading: 105 mm

Zero reading = start depth below ground surface



Data compiled by: TR
 Data checked by: PV

Atlantic House, Greenwood Close, Cardiff Gate Business Park, Pontprennau, Cardiff, CF23 8RD

Tel: 02920 829200

Fax: 02920 455321

Environmental Consultancy

Ground Engineering Services

PROJECT No.: 784-B046183

PROJECT NAME: Princess Royal Theatre

CLIENT: Morgan Sindell

FIGURE No.: SA04

DCP-CBR Corellation

$$\text{Log}_{10}(\text{CBR}) = 2.48 - 1.057 \times \text{Log}_{10} (\text{mm/blow})$$

DCP -Modulus E Corellation

$$E = 17.6 (\text{CBR})^{0.64} \text{ MPa}$$

In situ CBR by TRL Probe

Reference: 1

Position: SA04

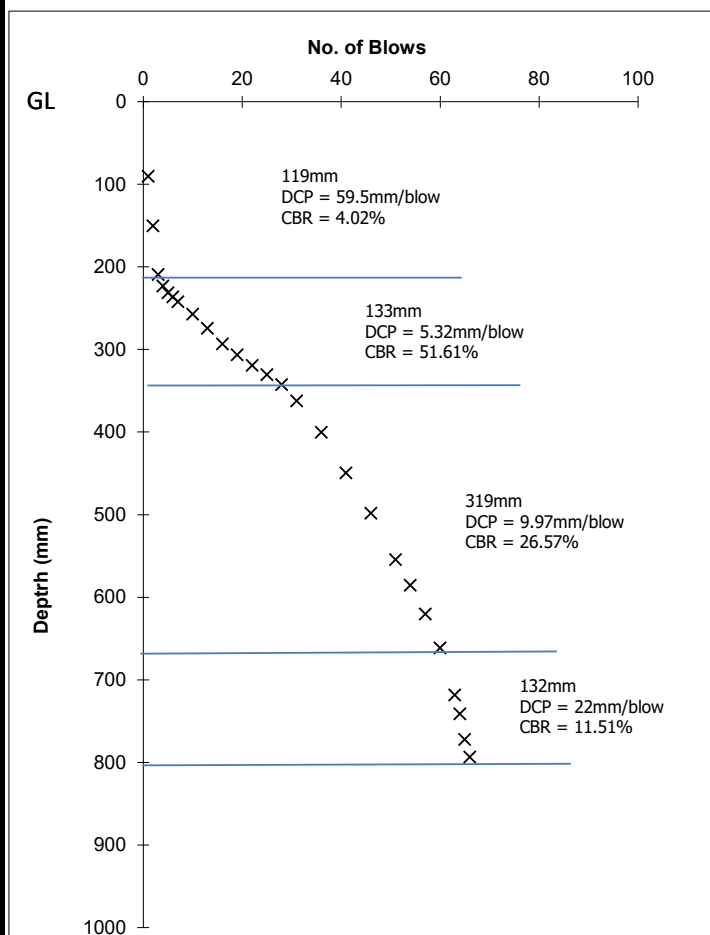
Date: 05 April 2024

mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)	mm per blow	Σ Blows	Reading on Scale (mm)	Depth from Ground Level (mm)
90	1	241	90				
60	2	301	150				
59	3	360	209				
14	4	374	223				
8	5	382	231				
5	6	387	236				
6	7	393	242				
15	10	408	257				
17	13	425	274				
19	16	444	293				
13	19	457	306				
13	22	470	319				
11	25	481	330				
12	28	493	342				
20	31	513	362				
38	36	551	400				
49	41	600	449				
49	46	649	498				
56	51	705	554				
31	54	736	585				
35	57	771	620				
41	60	812	661				
57	63	869	718				
23	64	892	741				
31	65	923	772				
21	66	944	793				
-944	27		-151				
	28		-151				
	29		-151				
	30		-151				
	31		-151				
	32		-151				
	33		-151				
	34		-151				
	35		-151				
	36		-151				
	37		-151				
	38		-151				
	39		-151				
	40		-151				
	41		-151				
	42		-151				
	43		-151				
	44		-151				
	45		-151				
	46		-151				
	47		-151				
	48		-151				
	49		-151				
	50		-151				

Test started at: 0 m below ground level

Zero Reading: 151 mm

Zero reading = start depth below ground surface



Data compiled by: TR
Data checked by: PV

APPENDIX E: LABORATORY TEST RESULTS

Tetra Tech.
Atlantic House
Greenwood Close
Cardiff Gate Business Park
Pontprennau
Cardiff
CF23 8RD

e: paul.vincent@tetrattech.com

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 24-014697

Project / Site name:	Princess Theatre	Samples received on:	09/04/2024
Your job number:	784-B046183	Samples instructed on/ Analysis started on:	18/04/2024
Your order number:	7015444	Analysis completed by:	26/04/2024
Report Issue Number:	1	Report issued on:	29/04/2024
Samples Analysed:	7 soil samples - 6 leachate samples		

Signed:



Joanna Szwagrak
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-014697
Project / Site name: Princess Theatre

Lab Sample Number	173626	173627	173628	173629	173630
Sample Reference	SA01	SA03	WS01	WS03	WS07
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.60	0.50	0.80	0.65	0.50
Date Sampled	03/04/2024	03/04/2024	03/04/2024	03/04/2024	04/04/2024
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	56.9	< 0.1
Moisture Content	%	0.01	NONE	13	18	5.5	9.6	20
Total mass of sample received	kg	0.1	NONE	1.1	1.2	1.1	1.2	1.1

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	WEM	WEM	WEM	WEM	WEM

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	9.2	8.4	8.4	8.2	7.9
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	150	17	11	230	27
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	73	8.55	5.63	117	13.6
Organic Matter	%	0.1	MCERTS	-	-	-	-	16
Organic Matter (automated)	%	0.1	MCERTS	3.1	8.1	< 0.1	4.8	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.16	0.2	< 0.05	0.4	0.47
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.15	0.09
Acenaphthene	mg/kg	0.05	MCERTS	0.37	< 0.05	< 0.05	0.42	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.22	< 0.05	< 0.05	0.59	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.4	0.75	< 0.05	6.5	0.86
Anthracene	mg/kg	0.05	MCERTS	0.29	0.12	< 0.05	2.3	0.26
Fluoranthene	mg/kg	0.05	MCERTS	2.5	1.2	< 0.05	18	2
Pyrene	mg/kg	0.05	MCERTS	1.9	0.98	< 0.05	14	1.8
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.5	0.69	< 0.05	11	1.4
Chrysene	mg/kg	0.05	MCERTS	1.8	0.93	< 0.05	12	1.6
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.1	0.74	< 0.05	13	2.1
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.81	0.35	< 0.05	7	1
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.5	0.63	< 0.05	10	1.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.77	0.4	< 0.05	4.6	1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.27	0.11	< 0.05	1.7	0.25
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.87	0.44	< 0.05	4.8	1.1

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	16.4	7.59	< 0.80	107	15.4
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Analytical Report Number: 24-014697
Project / Site name: Princess Theatre

Lab Sample Number	173626	173627	173628	173629	173630
Sample Reference	SA01	SA03	WS01	WS03	WS07
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.60	0.50	0.80	0.65	0.50
Date Sampled	03/04/2024	03/04/2024	03/04/2024	03/04/2024	04/04/2024
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	16	27	7.8	51	62
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.3	< 0.2	0.3	0.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	2.1	0.3	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	13	6.4	26	16
Copper (aqua regia extractable)	mg/kg	1	MCERTS	36	470	4	200	880
Lead (aqua regia extractable)	mg/kg	1	MCERTS	69	160	9	96	1000
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.4	< 0.3	< 0.3	1.1
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	31	3.6	20	36
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	870	13	160	350

Petroleum Hydrocarbons

TPH (C10 - C40) EH_CU_ID_TOTAL	mg/kg	10	MCERTS	70	22	< 10	380	100
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-014697
Project / Site name: Princess Theatre

Lab Sample Number	173631	173632
Sample Reference	SA02	WS09
Sample Number	None Supplied	None Supplied
Depth (m)	0.60	0.80
Date Sampled	03/04/2024	04/04/2024
Time Taken	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection
		Accreditation Status

Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	15
Total mass of sample received	kg	0.1	NONE	1.1	1.1

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	WEM	WEM

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.5	8
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	150	43
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	72.7	21.7
Organic Matter	%	0.1	MCERTS	-	-
Organic Matter (automated)	%	0.1	MCERTS	2.8	5.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.15	0.35
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.17
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.12
Phenanthrene	mg/kg	0.05	MCERTS	0.17	1.6
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.34
Fluoranthene	mg/kg	0.05	MCERTS	0.23	3.6
Pyrene	mg/kg	0.05	MCERTS	0.2	2.9
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.19	2.3
Chrysene	mg/kg	0.05	MCERTS	0.29	2.6
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.29	3
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.15	1.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	2.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.13	1.1
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.15	1.3

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	1.93	23.2
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Analytical Report Number: 24-014697
Project / Site name: Princess Theatre

Lab Sample Number				173631	173632
Sample Reference				SA02	WS09
Sample Number				None Supplied	None Supplied
Depth (m)				0.60	0.80
Date Sampled				03/04/2024	04/04/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection
				Accreditation Status	

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	38
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	15	18
Copper (aqua regia extractable)	mg/kg	1	MCERTS	62	140
Lead (aqua regia extractable)	mg/kg	1	MCERTS	88	600
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	24
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	180	420

Petroleum Hydrocarbons

TPH (C10 - C40) EH_CU_ID_TOTAL	mg/kg	10	MCERTS	< 10	31
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-014697
Project / Site name: Princess Theatre

Lab Sample Number	173626	173627	173628	173629	173630
Sample Reference	SA01	SA03	WS01	WS03	WS07
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.60	0.50	0.80	0.65	0.50
Date Sampled	03/04/2024	03/04/2024	03/04/2024	03/04/2024	04/04/2024
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status		

General Inorganics

pH (automated)	pH Units	N/A	ISO 17025	8.3	7.9	8.8	8.1	7.2
Total Cyanide (Low Level 1 µg/l)	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Sulphate as SO ₄	mg/l	0.045	ISO 17025	1.64	1.08	0.281	1.67	1.22

Total Phenols

Total Phenols (monohydric) low level	µg/l	1	NONE	3.7	2.9	2.4	3.4	2.9
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	0.4	0.22	0.28	< 0.01	0.43
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	0.61	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	0.17	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	1.6	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	1.1	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	0.25	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	0.22	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	0.4	4.2	0.28	< 0.16	0.43
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	1.1	8.4	< 1.0	7.1	3.5
Boron (dissolved)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10	< 10
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Chromium (dissolved)	µg/l	0.4	ISO 17025	3	1.4	1.3	< 0.4	4.4
Copper (dissolved)	µg/l	0.7	ISO 17025	12	24	6.7	9.1	42
Lead (dissolved)	µg/l	1	ISO 17025	< 1.0	11	< 1.0	< 1.0	17
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	1	1.6	< 0.3	0.3	5.8
Zinc (dissolved)	µg/l	0.4	ISO 17025	3.2	44	5	5.2	62

Petroleum Hydrocarbons

TPH (C10 - C40) EH_ID_TOTAL_MS	µg/l	10	NONE	< 10	70	< 10	< 10	< 10
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-014697
Project / Site name: Princess Theatre

Lab Sample Number				173632
Sample Reference				WS09
Sample Number				None Supplied
Depth (m)				0.80
Date Sampled				04/04/2024
Time Taken				None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status	

General Inorganics

pH (automated)	pH Units	N/A	ISO 17025	7.9
Total Cyanide (Low Level 1 µg/l)	µg/l	1	NONE	< 1.0
Sulphate as SO ₄	mg/l	0.045	ISO 17025	2.08

Total Phenols

Total Phenols (monohydric) low level	µg/l	1	NONE	3
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	0.69
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	0.69
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	6.1
Boron (dissolved)	µg/l	10	ISO 17025	< 10
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08
Chromium (dissolved)	µg/l	0.4	ISO 17025	2.6
Copper (dissolved)	µg/l	0.7	ISO 17025	36
Lead (dissolved)	µg/l	1	ISO 17025	33
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	2.9
Zinc (dissolved)	µg/l	0.4	ISO 17025	70

Petroleum Hydrocarbons

TPH (C10 - C40) EH_ID_TOTAL_MS	µg/l	10	NONE	< 10
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 24-014697

Project / Site name: Princess Theatre

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
173626	SA01	None Supplied	0.6	Brown loam and clay with gravel and vegetation
173627	SA03	None Supplied	0.5	Brown loam and gravel
173628	WS01	None Supplied	0.8	Brown loam and sand with gravel
173629	WS03	None Supplied	0.65	Brown loam with stones
173630	WS07	None Supplied	0.5	Brown loam and gravel
173631	SA02	None Supplied	0.6	Brown loam with gravel and vegetation
173632	WS09	None Supplied	0.8	Brown loam with gravel and vegetation

Analytical Report Number : 24-014697
Project / Site name: Princess Theatre

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L023B	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons by GC-MS/GC-MS HS in leachate	Determination of total petroleum hydrocarbons in leachate by GC-MS/GC-MS HS	In-house method	L070B/L088	W	NONE
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	MCERTS
Monohydric phenols (low level) in leachate	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Total cyanide (low level) in leachate	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS

Analytical Report Number : 24-014697
Project / Site name: Princess Theatre

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS
pH at 20°C in leachate (automated)	Determination of pH in leachate by electrometric measurement	In-house method	L099	W	ISO 17025
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in leachate	SVOCs and PAHs in leachate	In-house method	L102B		ISO 17025

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 300C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report



Analytical Report Number : 24-014697

Project / Site name: Princess Theatre

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
SA01	N/A	S	173626	c	Total cyanide in soil	L080	c
SA01	N/A	S	173626	c	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088	c
SA02	N/A	S	173631	c	Total cyanide in soil	L080	c
SA02	N/A	S	173631	c	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088	c
SA03	N/A	S	173627	c	Total cyanide in soil	L080	c
SA03	N/A	S	173627	c	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088	c
WS01	N/A	S	173628	c	Total cyanide in soil	L080	c
WS01	N/A	S	173628	c	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088	c
WS03	N/A	S	173629	c	Total cyanide in soil	L080	c
WS03	N/A	S	173629	c	Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	L076B/L088	c
WS07	N/A	S	173630	c	Total cyanide in soil	L080	c
WS09	N/A	S	173632	c	Total cyanide in soil	L080	c

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Analytical Report Number : 24-017301

Project / Site name:	Princess Theatre	Samples received on:	29/04/2024
Your job number:	784 B046183	Samples instructed on/ Analysis started on:	01/05/2024
Your order number:	7015444	Analysis completed by:	10/05/2024
Report Issue Number:	1	Report issued on:	10/05/2024
Samples Analysed:	2 soil samples - 1 leachate sample		

Signed:



Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-017301
Project / Site name: Princess Theatre

Lab Sample Number	186468	186469
Sample Reference	WS10	WS11
Sample Number	None Supplied	None Supplied
Depth (m)	0.60	0.60
Date Sampled	24/04/2024	24/04/2024
Time Taken	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection
		Accreditation Status

Stone Content	%	0.1	NONE	51.4	37.9
Moisture Content	%	0.01	NONE	9.5	8.9
Total mass of sample received	kg	0.1	NONE	1.2	1.1

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	SSZ	SSZ

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	9.2	10.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Total Sulphate as SO ₄	%	0.005	MCERTS	0.027	0.048
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	67	160
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	33.4	79.8
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	6.9	4.5
Total Sulphur	mg/kg	50	MCERTS	140	280
Total Sulphur	%	0.005	MCERTS	0.014	0.028
Ammoniacal Nitrogen as NH ₄ ⁺	mg/kg	0.5	MCERTS	< 0.5	< 0.5
Ammonium as NH ₄ ⁺ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	< 0.05	< 0.05
Organic Matter (automated)	%	0.1	MCERTS	1.3	1.1
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	< 2.0	< 2.0
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.25	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.07	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.24	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.61	0.21
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.1	0.52
Pyrene	mg/kg	0.05	MCERTS	0.12	0.49
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.05	0.34
Chrysene	mg/kg	0.05	MCERTS	0.1	0.4
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.05	0.41
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.17
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.17
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.06
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.19

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	1.59	3.26
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Analytical Report Number: 24-017301
Project / Site name: Princess Theatre

Lab Sample Number				186468	186469
Sample Reference				WS10	WS11
Sample Number				None Supplied	None Supplied
Depth (m)				0.60	0.60
Date Sampled				24/04/2024	24/04/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.8	12
Boron (water soluble)	mg/kg	0.2	MCERTS	0.2	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.6
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	11	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	14	16
Lead (aqua regia extractable)	mg/kg	1	MCERTS	17	34
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	29	23
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	84	97

Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5	< 2.5
Magnesium (water soluble)	mg/kg	5	NONE	< 5.0	< 5.0

Petroleum Hydrocarbons

TPH (C10 - C40) EH_CU_ID_TOTAL	mg/kg	10	MCERTS	170	< 10
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-017301
Project / Site name: Princess Theatre

Lab Sample Number				186468
Sample Reference				WS10
Sample Number				None Supplied
Depth (m)				0.60
Date Sampled				24/04/2024
Time Taken				None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status	

General Inorganics

pH (automated)	pH Units	N/A	ISO 17025	7.7
Total Cyanide (Low Level 1 µg/l)	µg/l	1	NONE	< 1.0
Sulphate as SO ₄	mg/l	0.045	ISO 17025	4.47

Total Phenols

Total Phenols (monohydric) low level	µg/l	1	NONE	1.1
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0
Boron (dissolved)	µg/l	10	ISO 17025	14
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08
Chromium (dissolved)	µg/l	0.4	ISO 17025	< 0.4
Copper (dissolved)	µg/l	0.7	ISO 17025	6.1
Lead (dissolved)	µg/l	1	ISO 17025	< 1.0
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	< 0.3
Zinc (dissolved)	µg/l	0.4	ISO 17025	1.2

Petroleum Hydrocarbons

TPH (C10 - C40) EH_ID_TOTAL_MS	µg/l	10	NONE	< 10
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U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 24-017301

Project / Site name: Princess Theatre

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
186468	WS10	None Supplied	0.6	Brown clay and sand with gravel and stones
186469	WS11	None Supplied	0.6	Brown clay and loam with gravel and stones

Analytical Report Number : 24-017301
Project / Site name: Princess Theatre

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES	In-house method based on TRL 447	L038B	D	NONE
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L039B	W	ISO 17025
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
Total petroleum hydrocarbons by GC-MS/GC-MS HS in leachate	Determination of total petroleum hydrocarbons in leachate by GC-MS/GC-MS HS	In-house method	L070B/L088	W	NONE
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction	L078B	W	NONE
Monohydric phenols (low level) in leachate	Determination of phenols in leachate by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	NONE

Analytical Report Number : 24-017301
Project / Site name: Princess Theatre

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Total cyanide (low level) in leachate	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	D	MCERTS
Ammonium as NH ₄ in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS
pH at 20°C in leachate (automated)	Determination of pH in leachate by electrometric measurement	In-house method	L099	W	ISO 17025
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in leachate	SVOCs and PAHs in leachate	In-house method	L102B		ISO 17025

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report



Analytical Report Number : 24-017301

Project / Site name: Princess Theatre

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS10	N/A	S	186468	c	Total cyanide in soil	L080	c
WS11	N/A	S	186469	c	Total cyanide in soil	L080	c

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Analytical Report Number : 24-017511

Replaces Analytical Report Number: 24-017511, issue no. 1
Result correction by laboratory.
Signatory added by laboratory.

Project / Site name:	Princess Theatre	Samples received on:	09/04/2024
Your job number:	784-B046183	Samples instructed on/ Analysis started on:	02/05/2024
Your order number:	7015444	Analysis completed by:	08/05/2024
Report Issue Number:	2	Report issued on:	09/05/2024
Samples Analysed:	7 soil samples		

Signed:



Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-017511
Project / Site name: Princess Theatre
Your Order No: 7015444

Lab Sample Number	187667	187668	187669	187670	187671
Sample Reference	WS01	WS01	WS03	WS03	WS04
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.30	1.50	0.30	1.30	0.20
Date Sampled	03/04/2024	03/04/2024	03/04/2024	03/04/2024	03/04/2024
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Stone Content	%	0.1	NONE	74.4	38.2	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	2.9	4.4	14	16	13
Total mass of sample received	kg	0.1	NONE	0.9	0.9	0.9	0.9	0.9

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	9.3	8.7	8.7	8	11.3
Total Sulphate as SO ₄	%	0.005	MCERTS	0.027	0.018	0.122	0.037	0.155
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	53	49	120	32	140
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	26.4	24.2	58.6	15.9	71.2
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	10	2.5	5.4	1.7	39
Total Sulphur	mg/kg	50	MCERTS	110	81	710	250	680
Total Sulphur	%	0.005	MCERTS	0.011	0.008	0.071	0.025	0.068
Ammoniacal Nitrogen as NH ₄ ⁺	mg/kg	0.5	MCERTS	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ammonium as NH ₄ ⁺ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	< 2.0	< 2.0	2.8	< 2.0	3
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

Heavy Metals / Metalloids

Magnesium (leachate equivalent)	mg/l	2.5	NONE	6	5.3	4.6	2.9	< 2.5
Magnesium (water soluble)	mg/kg	5	NONE	12	11	9.2	5.9	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number: 24-017511
Project / Site name: Princess Theatre
Your Order No: 7015444

Lab Sample Number	187672	187673
Sample Reference	WS09	WS09
Sample Number	None Supplied	None Supplied
Depth (m)	0.20	1.30
Date Sampled	03/04/2024	03/04/2024
Time Taken	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection Accreditation Status

Stone Content	%	0.1	NONE	< 0.1	61.4
Moisture Content	%	0.01	NONE	27	15
Total mass of sample received	kg	0.1	NONE	0.9	0.9

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.2	8.5
Total Sulphate as SO ₄	%	0.005	MCERTS	0.101	0.201
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	110	180
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	55.9	92.2
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	3.6	11
Total Sulphur	mg/kg	50	MCERTS	450	800
Total Sulphur	%	0.005	MCERTS	0.045	0.08
Ammoniacal Nitrogen as NH ₄ ⁺	mg/kg	0.5	MCERTS	< 0.5	< 0.5
Ammonium as NH ₄ ⁺ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	< 0.05	< 0.05
Water Soluble Nitrate (2:1) as N	mg/kg	2	NONE	< 2.0	5.4
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0	3.1

Heavy Metals / Metalloids

Magnesium (leachate equivalent)	mg/l	2.5	NONE	5.3	5.6
Magnesium (water soluble)	mg/kg	5	NONE	11	11

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 24-017511

Project / Site name: Princess Theatre

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
187667	WS01	None Supplied	0.3	Brown sand with gravel and stones
187668	WS01	None Supplied	1.5	Brown sand with gravel and stones
187669	WS03	None Supplied	0.3	Brown loam and clay with gravel and vegetation
187670	WS03	None Supplied	1.3	Brown clay and sand with gravel
187671	WS04	None Supplied	0.2	Brown clay and sand with gravel
187672	WS09	None Supplied	0.2	Brown loam and clay with gravel and vegetation
187673	WS09	None Supplied	1.3	Brown loam and clay with gravel and stones

Analytical Report Number : 24-017511

Project / Site name: Princess Theatre

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES	In-house method based on TRL 447	L038B	D	NONE
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction	L078B	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	D	MCERTS
Ammonium as NH ₄ in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Sample Deviation Report



Analytical Report Number : 24-017511

Project / Site name: Princess Theatre

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS01	N/A	S	187667	c	Ammonium as NH4 in soil	L082B	c
WS01	N/A	S	187667	c	Chloride, water soluble, in soil	L082B	c
WS01	N/A	S	187667	c	Water Soluble Nitrate (2:1) as N in soil	L078	c
WS01	N/A	S	187667	c	Water Soluble Nitrate (2:1) as N in soil	L078B	c
WS01	N/A	S	187667	c	pH in soil (automated)	L099	c
WS01	N/A	S	187668	c	Ammonium as NH4 in soil	L082B	c
WS01	N/A	S	187668	c	Chloride, water soluble, in soil	L082B	c
WS01	N/A	S	187668	c	Water Soluble Nitrate (2:1) as N in soil	L078	c
WS01	N/A	S	187668	c	Water Soluble Nitrate (2:1) as N in soil	L078B	c
WS01	N/A	S	187668	c	pH in soil (automated)	L099	c
WS03	N/A	S	187669	c	Ammonium as NH4 in soil	L082B	c
WS03	N/A	S	187669	c	Chloride, water soluble, in soil	L082B	c
WS03	N/A	S	187669	c	Water Soluble Nitrate (2:1) as N in soil	L078	c
WS03	N/A	S	187669	c	Water Soluble Nitrate (2:1) as N in soil	L078B	c
WS03	N/A	S	187669	c	pH in soil (automated)	L099	c
WS03	N/A	S	187670	c	Ammonium as NH4 in soil	L082B	c
WS03	N/A	S	187670	c	Chloride, water soluble, in soil	L082B	c
WS03	N/A	S	187670	c	Water Soluble Nitrate (2:1) as N in soil	L078	c
WS03	N/A	S	187670	c	Water Soluble Nitrate (2:1) as N in soil	L078B	c
WS03	N/A	S	187670	c	pH in soil (automated)	L099	c
WS04	N/A	S	187671	c	Ammonium as NH4 in soil	L082B	c
WS04	N/A	S	187671	c	Chloride, water soluble, in soil	L082B	c
WS04	N/A	S	187671	c	Water Soluble Nitrate (2:1) as N in soil	L078	c
WS04	N/A	S	187671	c	Water Soluble Nitrate (2:1) as N in soil	L078B	c
WS04	N/A	S	187671	c	pH in soil (automated)	L099	c
WS09	N/A	S	187672	c	Ammonium as NH4 in soil	L082B	c
WS09	N/A	S	187672	c	Chloride, water soluble, in soil	L082B	c
WS09	N/A	S	187672	c	Water Soluble Nitrate (2:1) as N in soil	L078	c
WS09	N/A	S	187672	c	Water Soluble Nitrate (2:1) as N in soil	L078B	c
WS09	N/A	S	187672	c	pH in soil (automated)	L099	c
WS09	N/A	S	187673	c	Ammonium as NH4 in soil	L082B	c
WS09	N/A	S	187673	c	Chloride, water soluble, in soil	L082B	c
WS09	N/A	S	187673	c	Water Soluble Nitrate (2:1) as N in soil	L078	c
WS09	N/A	S	187673	c	Water Soluble Nitrate (2:1) as N in soil	L078B	c
WS09	N/A	S	187673	c	pH in soil (automated)	L099	c

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



RR6UZ-Y0G5X-XZI79

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

24-014697_HWOL

Description/Comments

Project

784-B046183

Site

Princess Theatre

Classified by

Name: **Sarah Roberts**
 Date: **05 Aug 2024 22:21 GMT**
 Telephone: **02920 829 227**
 Company: **Tetra Tech**
5th Floor, Longcross Court, 47 Newport Road
Cardiff
CF24 0AD

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification

Date

08 Jun 2023

Next 3 year Refresher due by Jun 2026

Purpose of classification

2 - Material Characterisation

Address of the waste

Princess Royal Theatre, Port Talbot

Post Code **N/A**

SIC for the process giving rise to the waste

41201 Construction of commercial buildings

Description of industry/producer giving rise to the waste

Redevelopment and extension of Theatre Building

Description of the specific process, sub-process and/or activity that created the waste

Waste created from footings and foundations

Description of the waste

Made Ground

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	SA01--03042024-0.60		Non Hazardous		3
2	SA03--03042024-0.50		Non Hazardous		5
3	WS01--03042024-0.80		Non Hazardous		7
4	WS03--03042024-0.65		Non Hazardous		9
5	WS07--03042024-0.50		Non Hazardous		11
6	SA02--03042024-0.60		Non Hazardous		13
7	WS09--03042024-0.80		Non Hazardous		15

Related documents

#	Name	Description
1	24-014697_HWOL.hwol	i2 Analytical .hwol file used to populate the Job

Report

Created by: Sarah Roberts

Created date: 05 Aug 2024 22:21 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	17
Appendix B: Rationale for selection of metal species	18
Appendix C: Version	19

Classification of sample: SA01--03042024-0.60

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
SA01--03042024-0.60	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
13%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	monohydric phenols				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
			P1186							
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	boron { boric acid; [1] boric acid; [2] }				0.4 mg/kg	5.719	1.99 mg/kg	0.000199 %	✓	
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]							
4	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %		<LOD
	048-009-00-9	233-331-6	10124-36-4							
5	chromium { chromium(III) oxide (worst case) }				25 mg/kg	1.462	31.789 mg/kg	0.00318 %	✓	
		215-160-9	1308-38-9							
6	copper { copper sulphate }				36 mg/kg	2.512	78.666 mg/kg	0.00787 %	✓	
	029-004-00-0	231-847-6	7758-98-7							
7	nickel { nickel diiodide }				16 mg/kg	5.324	74.114 mg/kg	0.00741 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
8	lead { lead chromate }			1	69 mg/kg	1.56	93.636 mg/kg	0.006 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
9	zinc { zinc sulphate }				110 mg/kg	2.469	236.312 mg/kg	0.0236 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				16 mg/kg	1.895	26.372 mg/kg	0.00264 %	✓	
	033-005-00-1									
11	mercury { mercury(II) sulfide }				<0.3 mg/kg	1.16	<0.348 mg/kg	<0.0000348 %		<LOD
		215-696-3	1344-48-5							
12	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
13	acenaphthene				0.37 mg/kg		0.322 mg/kg	0.0000322 %	✓	
		201-469-6	83-32-9							
14	anthracene				0.29 mg/kg		0.252 mg/kg	0.0000252 %	✓	
		204-371-1	120-12-7							
15	benzo[a]anthracene				1.5 mg/kg		1.305 mg/kg	0.000131 %	✓	
	601-033-00-9	200-280-6	56-55-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	benzo[a]pyrene; benzo[def]chrysene				1.5 mg/kg		1.305 mg/kg	0.000131 %	✓	
	601-032-00-3	200-028-5	50-32-8							
17	benzo[b]fluoranthene				2.1 mg/kg		1.827 mg/kg	0.000183 %	✓	
	601-034-00-4	205-911-9	205-99-2							
18	benzo[k]fluoranthene				0.81 mg/kg		0.705 mg/kg	0.0000705 %	✓	
	601-036-00-5	205-916-6	207-08-9							
19	benzo[ghi]perylene				0.87 mg/kg		0.757 mg/kg	0.0000757 %	✓	
		205-883-8	191-24-2							
20	chrysene				1.8 mg/kg		1.566 mg/kg	0.000157 %	✓	
	601-048-00-0	205-923-4	218-01-9							
21	dibenz[a,h]anthracene				0.27 mg/kg		0.235 mg/kg	0.0000235 %	✓	
	601-041-00-2	200-181-8	53-70-3							
22	fluoranthene				2.5 mg/kg		2.175 mg/kg	0.000217 %	✓	
		205-912-4	206-44-0							
23	fluorene				0.22 mg/kg		0.191 mg/kg	0.0000191 %	✓	
		201-695-5	86-73-7							
24	indeno[123-cd]pyrene				0.77 mg/kg		0.67 mg/kg	0.000067 %	✓	
		205-893-2	193-39-5							
25	naphthalene				0.16 mg/kg		0.139 mg/kg	0.0000139 %	✓	
	601-052-00-2	202-049-5	91-20-3							
26	phenanthrene				1.4 mg/kg		1.218 mg/kg	0.000122 %	✓	
		201-581-5	85-01-8							
27	pyrene				1.9 mg/kg		1.653 mg/kg	0.000165 %	✓	
		204-927-3	129-00-0							
28	pH				9.2 pH		9.2 pH	9.2 pH		
			PH							
29	TPH (C6 to C40) petroleum group				70 mg/kg		60.9 mg/kg	0.00609 %	✓	
			TPH							
Total:								0.0588 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: no free product, generally low concentrations

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00609%)

Classification of sample: SA03--03042024-0.50

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
SA03--03042024-0.50	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
18%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 18% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	monohydric phenols				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
			P1186							
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	boron { boric acid; [1] boric acid; [2] }				0.3 mg/kg	5.719	1.407 mg/kg	0.000141 %	✓	
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]							
4	cadmium { cadmium sulfate }				2.1 mg/kg	1.855	3.194 mg/kg	0.000319 %	✓	
	048-009-00-9	233-331-6	10124-36-4							
5	chromium { chromium(III) oxide (worst case) }				13 mg/kg	1.462	15.58 mg/kg	0.00156 %	✓	
		215-160-9	1308-38-9							
6	copper { copper sulphate }				470 mg/kg	2.512	968.01 mg/kg	0.0968 %	✓	
	029-004-00-0	231-847-6	7758-98-7							
7	nickel { nickel diiodide }				31 mg/kg	5.324	135.344 mg/kg	0.0135 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
8	lead { lead chromate }			1	160 mg/kg	1.56	204.648 mg/kg	0.0131 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
9	zinc { zinc sulphate }				870 mg/kg	2.469	1761.596 mg/kg	0.176 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				27 mg/kg	1.895	41.945 mg/kg	0.00419 %	✓	
	033-005-00-1									
11	mercury { mercury(II) sulfide }				0.4 mg/kg	1.16	0.38 mg/kg	0.000038 %	✓	
		215-696-3	1344-48-5							
12	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
13	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
14	anthracene				0.12 mg/kg		0.0984 mg/kg	0.00000984 %	✓	
		204-371-1	120-12-7							
15	benzo[a]anthracene				0.69 mg/kg		0.566 mg/kg	0.0000566 %	✓	
	601-033-00-9	200-280-6	56-55-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	benzo[a]pyrene; benzo[def]chrysene				0.63 mg/kg		0.517 mg/kg	0.0000517 %	✓	
	601-032-00-3	200-028-5	50-32-8							
17	benzo[b]fluoranthene				0.74 mg/kg		0.607 mg/kg	0.0000607 %	✓	
	601-034-00-4	205-911-9	205-99-2							
18	benzo[k]fluoranthene				0.35 mg/kg		0.287 mg/kg	0.0000287 %	✓	
	601-036-00-5	205-916-6	207-08-9							
19	benzo[ghi]perylene				0.44 mg/kg		0.361 mg/kg	0.0000361 %	✓	
		205-883-8	191-24-2							
20	chrysene				0.93 mg/kg		0.763 mg/kg	0.0000763 %	✓	
	601-048-00-0	205-923-4	218-01-9							
21	dibenz[a,h]anthracene				0.11 mg/kg		0.0902 mg/kg	0.00000902 %	✓	
	601-041-00-2	200-181-8	53-70-3							
22	fluoranthene				1.2 mg/kg		0.984 mg/kg	0.0000984 %	✓	
		205-912-4	206-44-0							
23	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
24	indeno[123-cd]pyrene				0.4 mg/kg		0.328 mg/kg	0.0000328 %	✓	
		205-893-2	193-39-5							
25	naphthalene				0.2 mg/kg		0.164 mg/kg	0.0000164 %	✓	
	601-052-00-2	202-049-5	91-20-3							
26	phenanthrene				0.75 mg/kg		0.615 mg/kg	0.0000615 %	✓	
		201-581-5	85-01-8							
27	pyrene				0.98 mg/kg		0.804 mg/kg	0.0000804 %	✓	
		204-927-3	129-00-0							
28	pH				8.4 pH		8.4 pH	8.4 pH		
			PH							
29	TPH (C6 to C40) petroleum group				22 mg/kg		18.04 mg/kg	0.0018 %	✓	
			TPH							
Total:								0.309 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: no free product, generally low concentrations

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0018%)

Classification of sample: WS01--03042024-0.80

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
WS01--03042024-0.80	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
5.5%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 5.5% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	boron { boric acid; [1] boric acid; [2] }				<0.2 mg/kg	5.719	<1.144 mg/kg	<0.000114 %		<LOD
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]							
4	cadmium { cadmium sulfate }				0.3 mg/kg	1.855	0.526 mg/kg	0.0000526 %	✓	
	048-009-00-9	233-331-6	10124-36-4							
5	chromium { chromium(III) oxide (worst case) }				6.4 mg/kg	1.462	8.839 mg/kg	0.000884 %	✓	
		215-160-9	1308-38-9							
6	copper { copper sulphate }				4 mg/kg	2.512	9.494 mg/kg	0.000949 %	✓	
	029-004-00-0	231-847-6	7758-98-7							
7	nickel { nickel diiodide }				3.6 mg/kg	5.324	18.113 mg/kg	0.00181 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
8	lead { lead chromate }			1	9 mg/kg	1.56	13.266 mg/kg	0.000851 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
9	zinc { zinc sulphate }				13 mg/kg	2.469	30.335 mg/kg	0.00303 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				7.8 mg/kg	1.895	13.965 mg/kg	0.0014 %	✓	
	033-005-00-1									
11	mercury { mercury(II) sulfide }				<0.3 mg/kg	1.16	<0.348 mg/kg	<0.0000348 %		<LOD
		215-696-3	1344-48-5							
12	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
13	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
14	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
15	benzo[a]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
17	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
18	benzo[k]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
19	benzo[ghi]perylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2							
20	chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
21	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
22	fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0							
23	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
24	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5							
25	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
26	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8							
27	pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0							
28	pH				8.4 pH		8.4 pH	8.4 pH		
			PH							
29	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
Total:								0.0105 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS03--03042024-0.65

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
WS03--03042024-0.65	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
9.6%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 9.6% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	monohydric phenols				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
			P1186							
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	boron { boric acid; [1] boric acid; [2] }				0.3 mg/kg	5.719	1.551 mg/kg	0.000155 %	✓	
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]							
4	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %		<LOD
	048-009-00-9	233-331-6	10124-36-4							
5	chromium { chromium(III) oxide (worst case) }				26 mg/kg	1.462	34.352 mg/kg	0.00344 %	✓	
		215-160-9	1308-38-9							
6	copper { copper sulphate }				200 mg/kg	2.512	454.116 mg/kg	0.0454 %	✓	
	029-004-00-0	231-847-6	7758-98-7							
7	nickel { nickel diiodide }				20 mg/kg	5.324	96.263 mg/kg	0.00963 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
8	lead { lead chromate }			1	96 mg/kg	1.56	135.367 mg/kg	0.00868 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
9	zinc { zinc sulphate }				160 mg/kg	2.469	357.159 mg/kg	0.0357 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				51 mg/kg	1.895	87.345 mg/kg	0.00873 %	✓	
	033-005-00-1									
11	mercury { mercury(II) sulfide }				<0.3 mg/kg	1.16	<0.348 mg/kg	<0.0000348 %		<LOD
		215-696-3	1344-48-5							
12	acenaphthylene				0.15 mg/kg		0.136 mg/kg	0.0000136 %	✓	
		205-917-1	208-96-8							
13	acenaphthene				0.42 mg/kg		0.38 mg/kg	0.000038 %	✓	
		201-469-6	83-32-9							
14	anthracene				2.3 mg/kg		2.079 mg/kg	0.000208 %	✓	
		204-371-1	120-12-7							
15	benzo[a]anthracene				11 mg/kg		9.944 mg/kg	0.000994 %	✓	
	601-033-00-9	200-280-6	56-55-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	benzo[a]pyrene; benzo[def]chrysene				10 mg/kg		9.04 mg/kg	0.000904 %	✓	
	601-032-00-3	200-028-5	50-32-8							
17	benzo[b]fluoranthene				13 mg/kg		11.752 mg/kg	0.00118 %	✓	
	601-034-00-4	205-911-9	205-99-2							
18	benzo[k]fluoranthene				7 mg/kg		6.328 mg/kg	0.000633 %	✓	
	601-036-00-5	205-916-6	207-08-9							
19	benzo[ghi]perylene				4.8 mg/kg		4.339 mg/kg	0.000434 %	✓	
		205-883-8	191-24-2							
20	chrysene				12 mg/kg		10.848 mg/kg	0.00108 %	✓	
	601-048-00-0	205-923-4	218-01-9							
21	dibenz[a,h]anthracene				1.7 mg/kg		1.537 mg/kg	0.000154 %	✓	
	601-041-00-2	200-181-8	53-70-3							
22	fluoranthene				18 mg/kg		16.272 mg/kg	0.00163 %	✓	
		205-912-4	206-44-0							
23	fluorene				0.59 mg/kg		0.533 mg/kg	0.0000533 %	✓	
		201-695-5	86-73-7							
24	indeno[123-cd]pyrene				4.6 mg/kg		4.158 mg/kg	0.000416 %	✓	
		205-893-2	193-39-5							
25	naphthalene				0.4 mg/kg		0.362 mg/kg	0.0000362 %	✓	
	601-052-00-2	202-049-5	91-20-3							
26	phenanthrene				6.5 mg/kg		5.876 mg/kg	0.000588 %	✓	
		201-581-5	85-01-8							
27	pyrene				14 mg/kg		12.656 mg/kg	0.00127 %	✓	
		204-927-3	129-00-0							
28	pH				8.2 pH		8.2 pH	8.2 pH		
			PH							
29	TPH (C6 to C40) petroleum group				380 mg/kg		343.52 mg/kg	0.0344 %	✓	
			TPH							
Total:								0.156 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: no free product, generally low concentrations

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0344%)

Classification of sample: WS07--03042024-0.50

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
WS07--03042024-0.50	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
20%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	monohydric phenols				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
			P1186							
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	boron { boric acid; [1] boric acid; [2] }				0.3 mg/kg	5.719	1.373 mg/kg	0.000137 %	✓	
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]							
4	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %		<LOD
	048-009-00-9	233-331-6	10124-36-4							
5	chromium { chromium(III) oxide (worst case) }				16 mg/kg	1.462	18.708 mg/kg	0.00187 %	✓	
		215-160-9	1308-38-9							
6	copper { copper sulphate }				880 mg/kg	2.512	1768.238 mg/kg	0.177 %	✓	
	029-004-00-0	231-847-6	7758-98-7							
7	nickel { nickel diiodide }				36 mg/kg	5.324	153.34 mg/kg	0.0153 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
8	lead { lead chromate }			1	1000 mg/kg	1.56	1247.852 mg/kg	0.08 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
9	zinc { zinc sulphate }				350 mg/kg	2.469	691.403 mg/kg	0.0691 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				62 mg/kg	1.895	93.968 mg/kg	0.0094 %	✓	
	033-005-00-1									
11	mercury { mercury(II) sulfide }				1.1 mg/kg	1.16	1.021 mg/kg	0.000102 %	✓	
		215-696-3	1344-48-5							
12	acenaphthylene				0.09 mg/kg		0.072 mg/kg	0.0000072 %	✓	
		205-917-1	208-96-8							
13	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
14	anthracene				0.26 mg/kg		0.208 mg/kg	0.0000208 %	✓	
		204-371-1	120-12-7							
15	benzo[a]anthracene				1.4 mg/kg		1.12 mg/kg	0.000112 %	✓	
	601-033-00-9	200-280-6	56-55-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	benzo[a]pyrene; benzo[def]chrysene				1.5 mg/kg		1.2 mg/kg	0.00012 %	✓	
	601-032-00-3	200-028-5	50-32-8							
17	benzo[b]fluoranthene				2.1 mg/kg		1.68 mg/kg	0.000168 %	✓	
	601-034-00-4	205-911-9	205-99-2							
18	benzo[k]fluoranthene				1 mg/kg		0.8 mg/kg	0.00008 %	✓	
	601-036-00-5	205-916-6	207-08-9							
19	benzo[ghi]perylene				1.1 mg/kg		0.88 mg/kg	0.000088 %	✓	
		205-883-8	191-24-2							
20	chrysene				1.6 mg/kg		1.28 mg/kg	0.000128 %	✓	
	601-048-00-0	205-923-4	218-01-9							
21	dibenz[a,h]anthracene				0.25 mg/kg		0.2 mg/kg	0.00002 %	✓	
	601-041-00-2	200-181-8	53-70-3							
22	fluoranthene				2 mg/kg		1.6 mg/kg	0.00016 %	✓	
		205-912-4	206-44-0							
23	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
24	indeno[123-cd]pyrene				1 mg/kg		0.8 mg/kg	0.00008 %	✓	
		205-893-2	193-39-5							
25	naphthalene				0.47 mg/kg		0.376 mg/kg	0.0000376 %	✓	
	601-052-00-2	202-049-5	91-20-3							
26	phenanthrene				0.86 mg/kg		0.688 mg/kg	0.0000688 %	✓	
		201-581-5	85-01-8							
27	pyrene				1.8 mg/kg		1.44 mg/kg	0.000144 %	✓	
		204-927-3	129-00-0							
28	pH				7.9 pH		7.9 pH	7.9 pH		
			PH							
29	TPH (C6 to C40) petroleum group				100 mg/kg		80 mg/kg	0.008 %	✓	
			TPH							
Total:								0.362 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: no free product, generally low concentrations

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.008%)

Classification of sample: SA02--03042024-0.60

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
SA02--03042024-0.60	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
12%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 12% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	monohydric phenols				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
			P1186							
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	boron { boric acid; [1] boric acid; [2] }				0.4 mg/kg	5.719	2.013 mg/kg	0.000201 %	✓	
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]							
4	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %		<LOD
	048-009-00-9	233-331-6	10124-36-4							
5	chromium { chromium(III) oxide (worst case) }				15 mg/kg	1.462	19.293 mg/kg	0.00193 %	✓	
		215-160-9	1308-38-9							
6	copper { copper sulphate }				62 mg/kg	2.512	137.038 mg/kg	0.0137 %	✓	
	029-004-00-0	231-847-6	7758-98-7							
7	nickel { nickel diiodide }				18 mg/kg	5.324	84.337 mg/kg	0.00843 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
8	lead { lead chromate }			1	88 mg/kg	1.56	120.792 mg/kg	0.00774 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
9	zinc { zinc sulphate }				180 mg/kg	2.469	391.137 mg/kg	0.0391 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				18 mg/kg	1.895	30.009 mg/kg	0.003 %	✓	
	033-005-00-1									
11	mercury { mercury(II) sulfide }				<0.3 mg/kg	1.16	<0.348 mg/kg	<0.0000348 %		<LOD
		215-696-3	1344-48-5							
12	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
13	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
14	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
15	benzo[a]anthracene				0.19 mg/kg		0.167 mg/kg	0.0000167 %	✓	
	601-033-00-9	200-280-6	56-55-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
17	benzo[b]fluoranthene				0.29 mg/kg		0.255 mg/kg	0.0000255 %	✓	
	601-034-00-4	205-911-9	205-99-2							
18	benzo[k]fluoranthene				0.15 mg/kg		0.132 mg/kg	0.0000132 %	✓	
	601-036-00-5	205-916-6	207-08-9							
19	benzo[ghi]perylene				0.15 mg/kg		0.132 mg/kg	0.0000132 %	✓	
		205-883-8	191-24-2							
20	chrysene				0.29 mg/kg		0.255 mg/kg	0.0000255 %	✓	
	601-048-00-0	205-923-4	218-01-9							
21	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
22	fluoranthene				0.23 mg/kg		0.202 mg/kg	0.0000202 %	✓	
		205-912-4	206-44-0							
23	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
24	indeno[123-cd]pyrene				0.13 mg/kg		0.114 mg/kg	0.0000114 %	✓	
		205-893-2	193-39-5							
25	naphthalene				0.15 mg/kg		0.132 mg/kg	0.0000132 %	✓	
	601-052-00-2	202-049-5	91-20-3							
26	phenanthrene				0.17 mg/kg		0.15 mg/kg	0.000015 %	✓	
		201-581-5	85-01-8							
27	pyrene				0.2 mg/kg		0.176 mg/kg	0.0000176 %	✓	
		204-927-3	129-00-0							
28	pH				8.5 pH		8.5 pH	8.5 pH		
			PH							
29	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
Total:								0.0757 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS09--03042024-0.80

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
WS09--03042024-0.80	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
15%	Entry:
(wet weight correction)	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	monohydric phenols				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
			P1186							
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	boron { boric acid; [1] boric acid; [2] }				0.4 mg/kg	5.719	1.945 mg/kg	0.000194 %	✓	
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]							
4	cadmium { cadmium sulfate }				<0.2 mg/kg	1.855	<0.371 mg/kg	<0.0000371 %		<LOD
	048-009-00-9	233-331-6	10124-36-4							
5	chromium { chromium(III) oxide (worst case) }				18 mg/kg	1.462	22.362 mg/kg	0.00224 %	✓	
		215-160-9	1308-38-9							
6	copper { copper sulphate }				140 mg/kg	2.512	298.893 mg/kg	0.0299 %	✓	
	029-004-00-0	231-847-6	7758-98-7							
7	nickel { nickel diiodide }				24 mg/kg	5.324	108.616 mg/kg	0.0109 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
8	lead { lead chromate }			1	600 mg/kg	1.56	795.506 mg/kg	0.051 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
9	zinc { zinc sulphate }				420 mg/kg	2.469	881.539 mg/kg	0.0882 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
10	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				38 mg/kg	1.895	61.193 mg/kg	0.00612 %	✓	
	033-005-00-1									
11	mercury { mercury(II) sulfide }				5 mg/kg	1.16	4.929 mg/kg	0.000493 %	✓	
		215-696-3	1344-48-5							
12	acenaphthylene				0.05 mg/kg		0.0425 mg/kg	0.00000425 %	✓	
		205-917-1	208-96-8							
13	acenaphthene				0.17 mg/kg		0.145 mg/kg	0.0000145 %	✓	
		201-469-6	83-32-9							
14	anthracene				0.34 mg/kg		0.289 mg/kg	0.0000289 %	✓	
		204-371-1	120-12-7							
15	benzo[a]anthracene				2.3 mg/kg		1.955 mg/kg	0.000195 %	✓	
	601-033-00-9	200-280-6	56-55-3							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	benzo[a]pyrene; benzo[def]chrysene				2.3 mg/kg		1.955 mg/kg	0.000195 %	✓	
	601-032-00-3	200-028-5	50-32-8							
17	benzo[b]fluoranthene				3 mg/kg		2.55 mg/kg	0.000255 %	✓	
	601-034-00-4	205-911-9	205-99-2							
18	benzo[k]fluoranthene				1.5 mg/kg		1.275 mg/kg	0.000127 %	✓	
	601-036-00-5	205-916-6	207-08-9							
19	benzo[ghi]perylene				1.3 mg/kg		1.105 mg/kg	0.000111 %	✓	
		205-883-8	191-24-2							
20	chrysene				2.6 mg/kg		2.21 mg/kg	0.000221 %	✓	
	601-048-00-0	205-923-4	218-01-9							
21	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
22	fluoranthene				3.6 mg/kg		3.06 mg/kg	0.000306 %	✓	
		205-912-4	206-44-0							
23	fluorene				0.12 mg/kg		0.102 mg/kg	0.0000102 %	✓	
		201-695-5	86-73-7							
24	indeno[123-cd]pyrene				1.1 mg/kg		0.935 mg/kg	0.0000935 %	✓	
		205-893-2	193-39-5							
25	naphthalene				0.35 mg/kg		0.298 mg/kg	0.0000298 %	✓	
	601-052-00-2	202-049-5	91-20-3							
26	phenanthrene				1.6 mg/kg		1.36 mg/kg	0.000136 %	✓	
		201-581-5	85-01-8							
27	pyrene				2.9 mg/kg		2.465 mg/kg	0.000246 %	✓	
		204-927-3	129-00-0							
28	pH				8 pH		8 pH	8pH		
			PH							
29	TPH (C6 to C40) petroleum group				31 mg/kg		26.35 mg/kg	0.00264 %	✓	
			TPH							
Total:								0.194 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: no free product, generally low concentrations

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00264%)

Appendix A: Classifier defined and non GB MCL determinands

▪ **monohydric phenols** (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)

Data source: CLP combined data

Data source date: 26 Mar 2019

Hazard Statements: Muta. 2; H341 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 2; H373 , Skin Corr. 1B; H314 , Skin Corr. 1B; H314 >= 3 % , Skin Irrit. 2; H315 1 <= conc. < 3 % , Eye Irrit. 2; H319 1 <= conc. < 3 % , Aquatic Chronic 2; H411

▪ **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

▪ **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **mercury(II) sulfide** (EC Number: 215-696-3, CAS Number: 1344-48-5)

Description/Comments: Data from ECHA's C&L and SDS Sigma Aldrich V6 dated 17/9/2019

Threshold for EUH031 based on calculation method in WM3 Box C12.1

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/8530>

Data source date: 14 May 2020

Hazard Statements: EUH031 >= 1 % , EUH031 , Skin Sens. 1; H317 , STOT RE 2; H373

▪ **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

▪ **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

▪ **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 06 Aug 2015
 Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 06 Aug 2015
 Hazard Statements: Carc. 2; H351

• **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 06 Aug 2015
 Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

• **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 21 Aug 2015
 Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

• **pH** (CAS Number: PH)

Description/Comments: Appendix C4
 Data source: WM3 1st Edition 2015
 Data source date: 25 May 2015
 Hazard Statements: None.

• **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
 Data source: WM3 1st Edition 2015
 Data source date: 25 May 2015
 Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

worst case

boron {boric acid; [1] boric acid; [2]}

worst case, most likely

cadmium {cadmium sulfate}

worst case, most likely

chromium {chromium(III) oxide (worst case)}

worst case, most likely

copper {copper sulphate}

worst case, most likely

nickel {nickel diiodide}

worst case,

lead {lead chromate}

worst case, most likely

zinc {zinc sulphate}

worst case, most likely

arsenic {arsenic acid and its salts with the exception of those specified elsewhere in this Annex}

worst case

mercury {mercury(II) sulfide}

worst case, most likely

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2024.213.6193.11387 (31 Jul 2024)

HazWasteOnline Database: 2024.213.6193.11387 (31 Jul 2024)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

GB MCL List v2.0 - version 2.0 of 20th October 2023

GB MCL List v3.0 - version 3.0 of 11th January 2024

GB MCL List v4.0 - version 4.0 of 2nd March 2024

GB MCL List v5.0 - version 5.0 of 26th June 2024

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



EBAVA-BG4PN-IETTR

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

24-017301_HWOL

Description/Comments

Project

784-B046183

Site

Princess Theatre

Classified by

Name: **Sarah Roberts**
 Date: **05 Aug 2024 22:25 GMT**
 Telephone: **02920 829 227**
 Company: **Tetra Tech**
5th Floor, Longcross Court, 47 Newport Road
Cardiff
CF24 0AD

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification

Date

08 Jun 2023

Next 3 year Refresher due by Jun 2026

Purpose of classification

2 - Material Characterisation

Address of the waste

Princess Royal Theatre, Port Talbot

Post Code **N/A**

SIC for the process giving rise to the waste

41201 Construction of commercial buildings

Description of industry/producer giving rise to the waste

Redevelopment and extension of Theatre Building

Description of the specific process, sub-process and/or activity that created the waste

Waste created from footings and foundations

Description of the waste

Made Ground

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS10--24042024-0.60		Non Hazardous		3
2	WS11--24042024-0.60		Non Hazardous		5

Related documents

#	Name	Description
1	24-017301_HWOL.hwol	i2 Analytical .hwol file used to populate the Job

Report

Created by: Sarah Roberts

Created date: 05 Aug 2024 22:25 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	7
Appendix B: Rationale for selection of metal species	8
Appendix C: Version	9

Classification of sample: WS10--24042024-0.60

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
WS10--24042024-0.60	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
9.5%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 9.5% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	pH		PH		9.2 pH		9.2 pH	9.2 pH		
4	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				9.8 mg/kg	1.895	16.803 mg/kg	0.00168 %	✓	
	033-005-00-1									
5	boron { boric acid; [1] boric acid; [2] }				0.2 mg/kg	5.719	1.035 mg/kg	0.000104 %	✓	
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]							
6	cadmium { cadmium sulfate }				0.3 mg/kg	1.855	0.504 mg/kg	0.0000504 %	✓	
	048-009-00-9	233-331-6	10124-36-4							
7	chromium { chromium(III) oxide (worst case) }				11 mg/kg	1.462	14.55 mg/kg	0.00145 %	✓	
		215-160-9	1308-38-9							
8	copper { copper sulphate pentahydrate }				14 mg/kg	3.929	49.781 mg/kg	0.00498 %	✓	
	029-023-00-4	231-847-6	7758-99-8							
9	mercury { mercury(II) sulfide }				<0.3 mg/kg	1.16	<0.348 mg/kg	<0.0000348 %		<LOD
		215-696-3	1344-48-5							
10	nickel { nickel diiodide }				29 mg/kg	5.324	139.736 mg/kg	0.014 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
11	lead { lead chromate }			1	17 mg/kg	1.56	23.998 mg/kg	0.00154 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
12	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				84 mg/kg	4.398	334.33 mg/kg	0.0334 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
13	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				0.07 mg/kg		0.0634 mg/kg	0.00000634 %	✓	
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
16	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.05 mg/kg		0.0453 mg/kg	0.00000453 %	✓	
17	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
18	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.05 mg/kg		0.0453 mg/kg	0.00000453 %	✓	
19	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
20	benzo[ghi]perylene		205-883-8	191-24-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
21	chrysene	601-048-00-0	205-923-4	218-01-9	0.1 mg/kg		0.0905 mg/kg	0.00000905 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
23	fluoranthene		205-912-4	206-44-0	0.1 mg/kg		0.0905 mg/kg	0.00000905 %	✓	
24	fluorene		201-695-5	86-73-7	0.24 mg/kg		0.217 mg/kg	0.0000217 %	✓	
25	indeno[123-cd]pyrene		205-893-2	193-39-5	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
26	naphthalene	601-052-00-2	202-049-5	91-20-3	0.25 mg/kg		0.226 mg/kg	0.0000226 %	✓	
27	phenanthrene		201-581-5	85-01-8	0.61 mg/kg		0.552 mg/kg	0.0000552 %	✓	
28	pyrene		204-927-3	129-00-0	0.12 mg/kg		0.109 mg/kg	0.0000109 %	✓	
29	TPH (C6 to C40) petroleum group			TPH	170 mg/kg		153.85 mg/kg	0.0154 %	✓	
Total:								0.0731 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous Property to non-hazardous for cumulative determinand results below the threshold of: 1000 mg/kg (0.1%) because: no free product, generally low concentrations

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0154%)

Classification of sample: WS11--24042024-0.60

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
WS11--24042024-0.60	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
8.9%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 8.9% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	monohydric phenols		P1186		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
2	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
3	pH		PH		10.1 pH		10.1 pH	10.1 pH		
4	arsenic { arsenic acid and its salts with the exception of those specified elsewhere in this Annex }				12 mg/kg	1.895	20.711 mg/kg	0.00207 %	✓	
	033-005-00-1									
5	boron { boric acid; [1] boric acid; [2] }				0.4 mg/kg	5.719	2.084 mg/kg	0.000208 %	✓	
	005-007-00-2	233-139-2 [1] 234-343-4 [2]	10043-35-3 [1] 11113-50-1 [2]							
6	cadmium { cadmium sulfate }				0.6 mg/kg	1.855	1.014 mg/kg	0.000101 %	✓	
	048-009-00-9	233-331-6	10124-36-4							
7	chromium { chromium(III) oxide (worst case) }				12 mg/kg	1.462	15.978 mg/kg	0.0016 %	✓	
		215-160-9	1308-38-9							
8	copper { copper sulphate pentahydrate }				16 mg/kg	3.929	57.27 mg/kg	0.00573 %	✓	
	029-023-00-4	231-847-6	7758-99-8							
9	mercury { mercury(II) sulfide }				<0.3 mg/kg	1.16	<0.348 mg/kg	<0.0000348 %		<LOD
		215-696-3	1344-48-5							
10	nickel { nickel diiodide }				23 mg/kg	5.324	111.56 mg/kg	0.0112 %	✓	
	028-029-00-4	236-666-6	13462-90-3							
11	lead { lead chromate }			1	34 mg/kg	1.56	48.314 mg/kg	0.0031 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
12	zinc { zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2] }				97 mg/kg	4.398	388.632 mg/kg	0.0389 %	✓	
	030-006-00-9	231-793-3 [1] 231-793-3 [2]	7446-19-7 [1] 7733-02-0 [2]							
13	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
14	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
15	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
16	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.34 mg/kg		0.31 mg/kg	0.000031 %	✓	
17	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.3 mg/kg		0.273 mg/kg	0.0000273 %	✓	
18	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.41 mg/kg		0.374 mg/kg	0.0000374 %	✓	
19	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.17 mg/kg		0.155 mg/kg	0.0000155 %	✓	
20	benzo[ghi]perylene	205-883-8	191-24-2		0.19 mg/kg		0.173 mg/kg	0.0000173 %	✓	
21	chrysene	601-048-00-0	205-923-4	218-01-9	0.4 mg/kg		0.364 mg/kg	0.0000364 %	✓	
22	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.06 mg/kg		0.0547 mg/kg	0.00000547 %	✓	
23	fluoranthene	205-912-4	206-44-0		0.52 mg/kg		0.474 mg/kg	0.0000474 %	✓	
24	fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		0.17 mg/kg		0.155 mg/kg	0.0000155 %	✓	
26	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	phenanthrene	201-581-5	85-01-8		0.21 mg/kg		0.191 mg/kg	0.0000191 %	✓	
28	pyrene	204-927-3	129-00-0		0.49 mg/kg		0.446 mg/kg	0.0000446 %	✓	
29	TPH (C6 to C40) petroleum group		TPH		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
Total:								0.0645 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non GB MCL determinands

■ monohydric phenols (CAS Number: P1186)

Description/Comments: Combined hazards statements from harmonised entries in CLP for phenol, cresols and xylenols (604-001-00-2, 604-004-00-9, 604-006-00-X)

Data source: CLP combined data

Data source date: 26 Mar 2019

Hazard Statements: Muta. 2; H341 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301 , STOT RE 2; H373 , Skin Corr. 1B; H314 , Skin Corr. 1B; H314 >= 3 % , Skin Irrit. 2; H315 1 <= conc. < 3 % , Eye Irrit. 2; H319 1 <= conc. < 3 % , Aquatic Chronic 2; H411

■ salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

■ pH (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

■ chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ mercury(II) sulfide (EC Number: 215-696-3, CAS Number: 1344-48-5)

Description/Comments: Data from ECHA's C&L and SDS Sigma Aldrich V6 dated 17/9/2019

Threshold for EUH031 based on calculation method in WM3 Box C12.1

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/8530>

Data source date: 14 May 2020

Hazard Statements: EUH031 >= 1 % , EUH031 , Skin Sens. 1; H317 , STOT RE 2; H373

■ acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

■ acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

■ anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 21 Aug 2015
 Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 06 Aug 2015
 Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 06 Aug 2015
 Hazard Statements: Carc. 2; H351

■ **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 06 Aug 2015
 Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

■ **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
 Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
 Data source date: 21 Aug 2015
 Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
 Data source: WM3 1st Edition 2015
 Data source date: 25 May 2015
 Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

Appendix B: Rationale for selection of metal species

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

worst case

arsenic {arsenic acid and its salts with the exception of those specified elsewhere in this Annex}

worst case

boron {boric acid; [1] boric acid; [2]}

worst case, most likely

cadmium {cadmium sulfate}

worst case, most likely

chromium {chromium(III) oxide (worst case)}

worst case, most likely

copper {copper sulphate pentahydrate}

worst case, most likely

mercury {mercury(II) sulfide}

worst case, most likely

nickel {nickel diiodide}

worst case,

lead {lead chromate}

worst case, most likely

zinc {zinc sulphate (hydrous) (mono-, hexa- and hepta hydrate); [1] zinc sulphate (anhydrous) [2]}

worst case, most likely

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2024.213.6193.11387 (31 Jul 2024)

HazWasteOnline Database: 2024.213.6193.11387 (31 Jul 2024)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

GB MCL List v2.0 - version 2.0 of 20th October 2023

GB MCL List v3.0 - version 3.0 of 11th January 2024

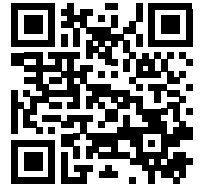
GB MCL List v4.0 - version 4.0 of 2nd March 2024

GB MCL List v5.0 - version 5.0 of 26th June 2024

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



C8VMI-UFAR0-5L7KO

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

24-017511_HWOL

Description/Comments

Project

784-B046183

Site

Princess Theatre

Classified by

Name: **Sarah Roberts**
 Date: **05 Aug 2024 22:23 GMT**
 Telephone: **02920 829 227**
 Company: **Tetra Tech**
5th Floor, Longcross Court, 47 Newport Road
Cardiff
CF24 0AD

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification

Date

08 Jun 2023

Next 3 year Refresher due by Jun 2026

Purpose of classification

2 - Material Characterisation

Address of the waste

Princess Royal Theatre, Port Talbot

Post Code **N/A**

SIC for the process giving rise to the waste

41201 Construction of commercial buildings

Description of industry/producer giving rise to the waste

Redevelopment and extension of Theatre Building

Description of the specific process, sub-process and/or activity that created the waste

Waste created from footings and foundations

Description of the waste

Made Ground

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS01--03042024-0.30		Non Hazardous		3
2	WS01--03042024-1.50		Non Hazardous		4
3	WS03--03042024-0.30		Non Hazardous		5
4	WS03--03042024-1.30		Non Hazardous		6
5	WS04--03042024-0.20		Non Hazardous		7
6	WS09--03042024-0.20		Non Hazardous		8
7	WS09--03042024-1.30		Non Hazardous		9

Related documents

#	Name	Description
1	24-017511_HWOL.hwol	i2 Analytical .hwol file used to populate the Job

Report

Created by: Sarah Roberts

Created date: 05 Aug 2024 22:23 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	10
Appendix B: Rationale for selection of metal species	10
Appendix C: Version	10

Classification of sample: WS01--03042024-0.30

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:	
WS01--03042024-0.30	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
2.9% (wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 2.9% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	• pH				9.3 pH		9.3 pH	9.3 pH		
			PH							
Total:								0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS01--03042024-1.50



Non Hazardous Waste
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
WS01--03042024-1.50	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
4.4% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 4.4% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		8.7 pH		8.7 pH	8.7 pH		
Total:								0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS03--03042024-0.30

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:	
WS03--03042024-0.30	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
14% (wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	• pH				8.7 pH		8.7 pH	8.7 pH		
			PH							
Total:								0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS03--03042024-1.30

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:	
WS03--03042024-1.30	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
16% (wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 16% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	 pH		PH		8 pH		8 pH	8pH		
Total:								0%		

Key

- User supplied data
-  Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS04--03042024-0.20

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:	
WS04--03042024-0.20	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
13% (wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	• pH				11.3 pH		11.3 pH	11.3 pH		
			PH							
Total:								0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS09--03042024-0.20



Non Hazardous Waste
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:
WS09--03042024-0.20	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
27% (wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 27% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	pH		PH		7.2 pH		7.2 pH	7.2 pH		
Total:								0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: WS09--03042024-1.30

 **Non Hazardous Waste**
 Classified as **17 05 04**
 in the List of Waste

Sample details

Sample name:	LoW Code:	
WS09--03042024-1.30	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
15% (wet weight correction)		

Hazard properties

None identified

Determinands

Moisture content: 15% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	• pH				8.5 pH		8.5 pH	8.5 pH		
			PH							
Total:								0%		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Appendix A: Classifier defined and non GB MCL determinands

■ pH (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

Appendix B: Rationale for selection of metal species

None used in this classification

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2024.213.6193.11387 (31 Jul 2024)

HazWasteOnline Database: 2024.213.6193.11387 (31 Jul 2024)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

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Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

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The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

GB MCL List v2.0 - version 2.0 of 20th October 2023

GB MCL List v3.0 - version 3.0 of 11th January 2024

GB MCL List v4.0 - version 4.0 of 2nd March 2024

GB MCL List v5.0 - version 5.0 of 26th June 2024

APPENDIX F: GROUNDWATER AND GROUND GAS MONITORING RESULTS

5th Floor, Longcross Court, 47 Newport Road, Cardiff, CF24 0AD
100 St John Street, London, EC1M 4EH
39 George Street, Edinburgh, EH2 2HN
Arndale Court, Headingley, Leeds, LS6 2UJ
Newstead Court, Little Oak Drive, Sherwood Business Park, Annesley, Nottinghamshire, NG15 0DR
Quay West at MediaCityUK, Trafford Wharf Road, Trafford Park, Manchester, M17 1HH

Tetra Tech

LANDGAS AND GROUNDWATER MONITORING RESULTS

Atlantic House, Greenwood Close, Cardiff Gate Business Park, Pontprennau, Cardiff, CF23 8RD.



Site Name: Princess Royal Theatre
Job No.: B046183
Client: Morgan Sindall

Date Monitored:
Monitoring Engineer:
Weather:

24/04/24
JM
Sunny

EQUIPMENT USED			
Type	Make	Serial	Last Calibrated
Gas Analyser	Landtec GA5000	G502044	Apr-23
Interface Meter	Solinst	122-004988-1	n/a

LANDGAS CONCENTRATIONS - INSTALLATION CONDITIONS												
Exploratory Hole No	Peak		Steady									Remarks
	CH ₄ (% vol)	CO ₂ (% vol)	CH ₄ (% vol)	CO ₂ (% vol)	O ₂ (% vol)	BAL (%)	PID (ppm)	H ₂ S (ppm)	HCN (ppm)	CO (ppm)	Time	
WS01	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		
WS07	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt		

LANDGAS - PHYSICAL PARAMETERS							
Exploratory Hole No	Atmos Pressure (m bar)	Atmos Temp (°C)	BH Flow		BH Pressure		Remarks
			Peak (L/hr)	Steady (L/hr)	Peak (mbar)	Steady (mbar)	
WS01	1020	10.0	nt	nt	nt	nt	
WS07	1020	1.0	nt	nt	nt	nt	

AMBIENT ATMOSPHERIC CONDITIONS				ATMOSPHERIC PRESSURE CONDITIONS			
Parameter		Before Monitoring	After Monitoring				
CH ₄ (% vol)		nt	nt	3 days prior (m bar)		1032	
CO ₂ (% vol)		nt	nt	2 days prior (m bar)		1029	
O ₂ (% vol)		nt	nt	1 day prior (m bar)		1025	
PID (ppm)		nt	nt	during (m bar) am,midday,pm		1020, 1017, 1015	
Atmos Press. (m bar)		1020	1020	1 day post (m bar)		1005	

GROUNDWATER / NAPL - PHYSIO-CHEMICAL PARAMETERS													
Exploratory Hole No	Water Surface (mbgl)	Base Depth (mbgl)	LNAPL Surface (mbgl)	DNAPL Surface (mbgl)	Water Quality Indicators								Remarks
					ORP (mV)	SPC (µs/cm)	C (µs/cm)	Ph (value)	DO (mg/L)	Dissolved Solids (ppt)	Resistivity (Ω-cm)	Temp (°C)	
WS01	DRY	2.40	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	
WS07	DRY	1.90	nd	nd	nt	nt	nt	nt	nt	nt	nt	nt	

Notes

nt = not tested
nd = not detected

Data Compiled by: JM
Data Checked by: PV

5th Floor, Longcross Court, 47 Newport Road, Cardiff, CF24 0AD
100 St John Street, London, EC1M 4EH
39 George Street, Edinburgh, EH2 2HN
Arndale Court, Headingley, Leeds, LS6 2UJ
Newstead Court, Little Oak Drive, Sherwood Business Park, Annesley, Nottinghamshire, NG15 0DR
Quay West at MediaCityUK, Trafford Wharf Road, Trafford Park, Manchester, M17 1HH

Tetra Tech

LANDGAS AND GROUNDWATER MONITORING RESULTS

5th Floor, Longcross Court, 47 Newport Road, Cardiff, CF24 0AD



Site Name: Princess Royal Theatre
Job No.: B046183
Client: Morgan Sindall

Date Monitored:
Monitoring Engineer:
Weather:

30/04/24
CS
Light rain

EQUIPMENT USED			
Type	Make	Serial	Last Calibrated
Gas Analyser	Landtec GA5000	G502044	Apr-23
Interface Meter	Solinst	122-004988-1	n/a

LANDGAS CONCENTRATIONS - INSTALLATION CONDITIONS												
Exploratory Hole No	Peak		Steady									
	CH ₄ (% vol)	CO ₂ (% vol)	CH ₄ (% vol)	CO ₂ (% vol)	O ₂ (% vol)	BAL (%)	PID (ppm)	H ₂ S (ppm)	HCN (ppm)	CO (ppm)	Time	Remarks
WS01	0.0	0.1	0.0	0.1	21.0	78.8	nt	0	nt	0	13:30	
WS07	0.0	2.4	0.0	2.4	17.5	80.1	nt	0	nt	0	13:45	

LANDGAS - PHYSICAL PARAMETERS							
Exploratory Hole No	Atmos Pressure (m bar)	Atmos Temp (°C)	BH Flow		BH Pressure		Remarks
			Peak (L/hr)	Steady (L/hr)	Peak (mbar)	Steady (mbar)	
WS01	1006	12.0	0.6	0.6	-15.4	-15.4	
WS07	1005	12.0	0.5	0.5	14.2	14.2	

AMBIENT ATMOSPHERIC CONDITIONS				ATMOSPHERIC PRESSURE CONDITIONS			
Parameter		Before Monitoring	After Monitoring				
CH ₄ (% vol)		0.0	0.0	3 days prior (m bar)		1004	
CO ₂ (% vol)		0.1	0.1	2 days prior (m bar)		1009	
O ₂ (% vol)		21.1	21.1	1 day prior (m bar)		1010	
PID (ppm)		nt	nt	during (m bar) am,midday,pm		1006, 1007, 1008	
Atmos Press. (m bar)		1006	1005	1 day post (m bar)		1010	

GROUNDWATER / NAPL - PHYSIO-CHEMICAL PARAMETERS													
Exploratory Hole No	Water Surface (mbgl)	Base Depth (mbgl)	LNAPL Surface (mbgl)	DNAPL Surface (mbgl)	Water Quality Indicators								Remarks
					ORP (mV)	SPC (µs/cm)	C (µs/cm)	Ph (value)	DO (mg/L)	Dissolved Solids (ppt)	Resistivity (Ω-cm)	Temp (°C)	
WS01	Dry	2.49	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	
WS07	Dry	2.00	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	

Notes

nt = not tested
nd = not detected

Data Compiled by: CS
Data Checked by: PV

APPENDIX G: CIRIA C552 RISK METHODOLOGY

The following tables are derived from CIRIA C552 and have been used to define the risk rating presented in the Qualitative Risk Assessment matrix.

Classification of consequence

Classification	Definition
Severe	Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short term risk of pollution (note; Water Resources Act contains no scope for considering significant pollution) of sensitive water resource. Catastrophic damage to building/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem. (Note the definitions of ecological systems within the Draft Circular on Contaminated Land DETR, 2000).
Medium	Chronic damage to human health ('significant harm', as defined In DETR, 2000). Pollution of sensitive water resources (note; Water Resources Act contains no scope for considering significant pollution). A significant change in a particular ecosystem, or an organism forming part of such an ecosystem. (Note the definitions of ecological systems within the Draft Circular on Contaminated Land DETR, 2000).
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm', as defined In DETR, 2000). Damage to sensitive buildings/structures/services or the environment.
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.

Classification of probability

Classification	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Likely	There is a pollutant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period that such an event would take place, and is even less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

Matrix of consequence against probability to gain a risk classification

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk