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Techemet Ltd
1 Vanguard
Ninian Way
Tamworth
Staffordshire
B77 5DY

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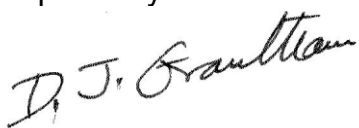
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Site Condition Report
1 Vanguard, Ninian Way, Tamworth
Staffordshire, B77 5DY

National Grid Reference:
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Report for:	
Techemet Ltd, 1 Vanguard, Ninian Way, Tamworth, Staffordshire, B77 5DY	
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Prepared by	
	
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Appendix B

Envirocheck Report

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B9 - Historical Land Use 2500

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B13 - Unexploded ordnance

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Conceptual Site Model

Appendix D

Ground Investigation

Ground Investigation for proposed extension at Techemet Ltd,
1 Vanguard Way, Wilnecote, Tamworth, Ground Investigation
Specialists Ltd, September 2023

1.0 Introduction

1.1 Background

- 1.0 Environmental Management Consultants Ltd (EMC) has drafted this report on behalf of Techemet Ltd (Client).
- 2.0 The site's location and layout is shown in Appendix A.
- 3.0 The Tamworth Borough Council (TBC) planning permissions for the existing site when occupied by Techemet Ltd are summarised in Table 2 (see page 14).

1.2 Brief, objectives and limitations

1.2.1 Brief

- 4.0 This Site Condition Report (SCR) was drafted to support an environmental permit variation for Techemet Ltd's site at 1 Vanguard, Ninian Way, Tamworth, Staffordshire, B77 5DY.
- 5.0 The permit variation is to increase the above site's waste storage and treatment capacity. The new maximum storage and treatment capacities are:
- 400 tonne hazardous waste storage;
 - 400 tonne non-hazardous waste storage;
 - 100 tonne hazardous waste treatment per day;
 - 100 tonne non-hazardous waste treatment per day.
- 6.0 This SCR will provide a baseline of soil contamination levels before the permit variation is issued. The report will help to ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other offsite receptors.
- 7.0 This SCR's soil contamination baseline information will inform future permit surrender arrangements. This is because the SCR describes and records the condition of the land and groundwater at the site at a particular point in time. It will enable Techemet Ltd to demonstrate that the land and groundwater was protected during the lifetime of the site and that the land is in a satisfactory state at the time of permit surrender.

1.2.2 Objectives

8.0 The objectives of this SCR are outlined in Environment Agency guidance documents: H5 Site condition report – guidance and templates (see section 1.3).

9.0 This CSR report will describe site plan information required by Part A of the environmental permit application form and the condition of the land at permit variation issue. This information will include:

Site plan and layout.

- locations of receptors, sources of emissions/releases, and monitoring points.
- Site drainage.
- Site surfacing.

Environmental setting including:

- geology
- hydrogeology
- surface waters

Pollution history including:

- pollution incidents that may have affected land
- historical land-uses and associated contaminants including historical Ordnance Survey plans
- any visual/olfactory evidence of existing contamination
- evidence of damage to pollution prevention measures

Evidence of historic contamination:

- historical site investigation, assessment, remediation and verification reports (where available)

Baseline soil and groundwater reference data

- including site reconnaissance

Conceptual Site Model

1.2.3 Limitations

10.0 This report contains the findings from a desk study undertaken following guidance notes and to the standards set out in the references given in section 1.3. The report considers the site defined in Appendix A Figure 3.

11.0 EMC has prepared this report solely for the Client's use and EMC accepts no responsibility or liability for the:

- use of this report by any party other than the person for whom it was commissioned; or

- consequences of the report being used for any other purpose other than that for which it was commissioned.
- 12.0 Should any third party wish to use or rely on the contents of the report, written approval should be sought. It is strongly recommended that independent advice is sought by that party with respect to its proposals or requirements.
- 13.0 The conclusions and recommendations in this report represent our professional opinion, derived from currently accepted industry practices, exercising all reasonable skill and care to be expected of a professional engineering and environmental consultancy of similar size and experience. The assessments and judgements given in this report are directed by both the finite quantity of data on which they are based and the proposed works to which they are addressed, taking account of the resources devoted to it by agreement with the Client, whether in writing or subsequent verbal instructions.
- 14.0 Environmental desk studies comprise a study of readily available information obtained from various identified sources, authorities and parties. The information reviewed is not exhaustive and has been accepted in good faith as providing representative and true data pertaining to site conditions. Any identified risks in Desk Study reports are perceived risks based on the information available at the time. Actual risks can only be assessed after carrying out a physical intrusive investigation.
- 15.0 Data acquisition during the site investigations is subject to the limitations of the investigation methods and access constraints. Exploratory holes investigate a small portion of the ground in relation to the scale of the site and thus can only be considered to provide an indication of site conditions. There may be “hot spots” not disclosed by initial investigations. Any addition to the knowledge base of this report will make it necessary to re-evaluate the recommendations of this report.
- 16.0 The findings and conditions described are relevant to the dates of the site work and should not be relied upon at substantially later dates. Site conditions will change over time due to the natural variations and human activities. Ground water, surface water and soil-gas conditions should be expected to change with diurnal, seasonal and meteorological variations. Changes in the types and concentrations of contaminants and variations in their flow paths may occur due to changes in water table levels, past disposal practice, passage of time or subsequent developments or activities on the site or adjacent.
- 17.0 The opinions expressed in this report regarding any contamination are based on simple statistical analysis and comparison with available guidance values. No liability can be accepted for the retrospective effects of any changes or amendments to these values.

1.3 Information sources and references

- 18.0 This report has been prepared taking account of English policies and guidance for the assessment of potentially contaminated land published by authoritative and non-authoritative organisation including the Environment Agency (EA), the former Department for the Environment (DoE), the Department for Food and Rural Affairs and the British Standards Institute (BSI).

19.0 **Some of the documents consulted include:**

Environment Agency, Environmental Permitting Regulations, H5 Site condition report – guidance and templates, version 3 April 2013.

Ref. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/298106/LIT_8001_38258e.pdf

H5 Site Condition Report word template V2.0 4 August 2008.

Ref. https://view.officeapps.live.com/op/view.aspx?src=https%3A%2F%2Fassets.publishing.service.gov.uk%2Fgovernment%2Fuploads%2Fsystem%2Fuploads%2Fattachment_data%2Ffile%2F305650%2Flit_8000_fbfe28.docx&wdOrigin=BROWSELINK

Environment Agency, Guidance Land contamination risk management (LCRM) Published 8 October 2020 Last updated 19 April 2021

Ref. <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

BSI 10175 (2001) Code of practice for the investigation of potentially contaminated sites;

BSI 5930 (1999) Code of practice for site investigations.

LQM, The LQM/CIEH S4UIs for Human Health Risk Assessments, 2015 (publication number S4UL 3581)

BRE, Special Digest 1: 2005 Concrete in aggressive ground.

20.0 **Site specific information collected during the preparation of this report include:**

Landmark Envirocheck Report Order No. 294147081_1 dated 16th April 2022 (see Appendix C).

Landmark Envirocheck Report Order No. 294148520_1 dated 16th April 2022 (see Appendix C).

<https://planning.tamworth.gov.uk/northgate/planningexplorer/generalsearch.aspx>

Natural England 'MAGIC' website (accessed in April 2022)

<http://www.natureonthemap.naturalengland.org.uk>

'Britain from Above' online historical aerial photography viewer (accessed in April 2022).

Google Earth satellite imagery (The GeoInformation Group 2022)

Environment Agency (EA) 'What's in Your Backyard?' website (accessed in April 2022).

British Geological Survey (BGS) 'Geology of Britain' online viewer (accessed in April 2022).

UK Health Security Agency UK Radon website (accessed in April 2022)
<https://www.ukradon.org/information/ukmaps>

2.0 Site description

2.1 Site location

- 21.0 The site address is: Techemet Ltd, 1 Vanguard, Ninian Way, Tamworth Staffordshire, B77 5DY
- 22.0 The site location is shown in Appendix A Figures 1 and 2.
- 23.0 The site has the following Ordinance Survey grid reference: 421990 300609. The grid reference is the approximate site centre.

2.2 Site description

2.2.1 Existing site layout

- 24.0 The existing site layout plan is shown in Appendix A Figure 3.
- 25.0 The nearest residential properties are adjacent to the site on the opposite side of Ninian Way (see Appendix A Figure 4).

2.2.2 Proposed site layout

- 26.0 The new site layout is unchanged from the existing site layout other than the boundary fence encompasses a larger area in the new layout (see Appendix A Figure 3).
- 27.0 A factory extension was considered prior to the permit variation application supported by this report. A site investigation (see Appendix D) was undertaken to inform the proposed factory extension.

- 28.0 The locations of receptors, sources of emissions/releases, and monitoring points are shown in Appendix A Figure 4.
- 29.0 The site drainage layout and associated site surfacing are shown in Appendix A Figure 5.

3.0 Geology, hydrogeology and hydrology

3.1 Mapped Geology

- 30.0 The British Geological Survey (BGS) record's identify the site's underlying bedrock as Pennine Middle Coal Measures formation with a rock type described as: siltstone, mudstone, and sandstone (see Appendix B1).
- 31.0 The site's Envirocheck Report describes the land area as having very low potential for collapsible ground stability hazards and landslide ground stability hazards. The site also is shown to have very low potential for shrinking or swelling clay ground stability hazards (see Appendix B2).
- 32.0 A Coal Authority coal mining report for Techemet Ltd ref. CON29M dated 19th April 2022 confirmed that "The property is in a surface area that could be affected by underground mining in 2 seams of coal at 110m to 150m depth, and last worked in 1928. Any movement in the ground due to coal mining activity associated with these workings should have stopped by now. ... The property is in a surface area that could be affected by underground mining in 1 seam of fireclay at 140m to 150m depth, and last worked in 1902" (see Appendix B3).
- 33.0 The overlying superficial geology is not recorded for the site suggesting a low depth of topsoil and subsoil above the underlying bedrock. (see Appendix B1)
- 34.0 The site's Envirocheck Report shows the site abuts a large backfilled void associated with extractive industries that formerly occupied the site (see Appendix B6). The historical records show that the site was formerly bisected by a railway sidling (Tame Valley Siding) off the main Birmingham to Derby railway line. The siding and parallel access road served a colliery (Tame Valley Colliery) and a brick works (see Appendix B8). This suggests that the overlying superficial geology is likely to be made ground resulting from the reclamation of a brownfield site containing a railway siding and access road present on site between 1884 - 1955 that served an adjacent colliery, brickworks and later engineering works.

3.2 BGS estimated soil chemistry

- 35.0 British Geological Survey (BGS) records referred to in the above Envirocheck Report estimated the site's soil chemistry as shown in Table 1 below. It is notable that estimated background lead levels are assumed to be relatively high.

Table 1. BGS Estimated Soil Chemistry For The Site

Arsenic	< 15.0	mg/kg
Cadmium	< 1.8	mg/Kg
Chromium	60 - 90	mg/Kg
Lead	300-600	mg/Kg
Nickel	15 - 30	mg/Kg

Ref. Appendix B4 - geology - soil geochemistry

3.3 Ground Gas and Radon

- 36.0 The UK radon map (Ref. <https://www.ukradon.org/information/ukmaps>) indicates the site is located in the lowest band of radon potential where less than 1% of homes are above the Action Level (see Appendix B14).
- 37.0 Landfills have been identified with 50m of the site (see Appendix B6).
- 38.0 An infilled area has been identified on adjacent land which may give rise to ground gas (see Appendix B6). The historical records indicate that the site was not part of the landfill and that the adjacent shallow landfill area was backfilled prior to 1989 (see Appendix B8). The landfill site was initially created when the site was occupied by a colliery and brick works. It is assumed that waste materials from these activities were used to at least partially fill the landfill voids. The types of backfill materials expected from these industries would not be expected to generate significant amounts of ground gas. An aerial photograph from 1928 when the colliery was active indicates site excavations have shallow depth. This suggests a low depth of backfill would be required during subsequent land reclamation works. This suggests a low depth of material that could potentially generate ground gases would be used in land reclamation works. As the reclamation works were undertaken more than 30 years previously it is assumed that the potential ground gases would largely have vented prior to 2024 given the shallow depths of fill and the type of material likely to have been used.
- 39.0 The site is in an area that could be affected by underground coal mining in seams worked in 1902 and 1928 (see Section 3.3 and Appendix B3). There is potential for ground gas migration from former coal workings onto the site. In particular in parts of the site that may not have been extensively remediated.
- 40.0 The existing factory buildings construction is a steel portal frame building with concrete floor slabs. This design will have a low risk of ground gas accumulation in the building. In addition the building will be highly ventilated as a means of controlling and collecting dusts generated by the waste processing operations. Therefore a low risk of ground gas accumulation is expected in the buildings on site.
- 41.0 Gas monitoring was not undertaken. Guidance provided in CL:AIRE Research Bulletin RB17 A Pragmatic Approach to Ground Gas Risk Assessment (November 2012) indicates that sites with natural soils with low organic content

should be classed as Characteristic Situation 1 and that gas monitoring or gas protection should not be required.

3.4 Geotechnical ground investigation

- 42.0 Appendix B describes the results of a recent (August 2023) geotechnical ground investigation. No records of previous geotechnical ground investigations at the site have been obtained. Geotechnical investigations of adjacent areas have been undertaken as evidenced by BGS borehole records (see Appendix B6).

3.5 Hydrogeology

- 43.0 The site's underlying bedrock is high vulnerability secondary A aquifer. However this is overlain by unproductive strata. The site is not within a source protection zone (Appendix B5).
- 44.0 The site is within a nitrate vulnerable zone (see Appendix B5)

3.6 Hydrology

- 45.0 The site is not within an area with potential for groundwater flooding to occur at the surface. Drainage on site is by overland flow and by surface and groundwater seepage into surface water drains discharging into the public surface water drains (see Appendix A Fig 5).
- 46.0 The western side of the site abutting Ninian Way is has low vulnerability (1 in 1000year return period) to surface water flooding (see Appendix B6). This part of the site is used for car parking. It has a bitumen hardstanding with surface water drainage gullies draining via the site's surface water drains into the public surface water drains. Therefore the impact of potential flooding is expected to be minor and short lived.

4.0 Site Perspective

4.1 Land-use history

4.1.1 Planning history held online by Tamworth Borough Council

- 47.0 A search of Techemet Ltd's planning files in Tamworth Borough Council's (TBC) online planning history identified no information relevant to this SCR (see Table 2 below). Techemet first moved into the existing industrial building at 1 Vanguard, Ninian Way, Tamworth in 2006.

Table 2. Techemet Ltd's planning history from 2006

Year	Details of permission granted
Planning Application Ref. 0383/2014 Approved 17-12-2014	Discharge of Conditions 3 (landscaping), 4 (traffic management), 5 (site drainage) and 6 (surfacing / gradient and surface water drainage for parking and servicing areas) of planning permission 0505/2011
Planning Application Ref. 0505/2011 Approved with conditions 28-11-2011	Proposed Single Storey Factory extension, service yard and access to Ninian Way
Planning Application Ref. 0053/2008 Approved with conditions 31-03-2008	Proposed factory extension forming goods in/out and dock leveller
Planning Application Ref. 0095/2007 Approved with conditions 17-04-2007	Proposed installation of roller shutter door
Planning Application Ref. 0501/2006 Approved with conditions 07-12-2006	Proposed security fence

Ref. <https://planning.tamworth.gov.uk/northgate/planningexplorer/generalsearch.aspx>

4.1.2 Land use history derived from historic maps of the site.

48.0 Table 3 summarises the information shown on historic maps (see Appendix B8);

Table 3. Land use history derived from historic maps of the site

Year	Land use
1884	The site is bisected by a railway line in a cutting across the site from north west to south east. A road called Engine Lane runs parallel with the railway line as it passes through the site. The railway line is a spur line (Valley Sidings) from the main Birmingham to Derby railway line to an adjacent colliery (Valley Colliery) and brick works site. The sidings terminate in the adjacent colliery goods yard. This is assumed to be a coal and brickworks loading area. Engine Lane is a secondary access road into the Colliery and Brickworks site. Some small buildings associated with the Colliery and Brickworks site are encroaching into the south east edge of the site.
1903	The site appears largely unchanged from 1884. Sidings adjacent to the site are more extensive suggesting the sidings have experienced increased use.
1924	The site appears unchanged from 1884 except that the sidings adjacent to the site are more extensive than in 1903 suggesting the sidings have experienced increased use. In addition the site access road has been renamed Valley Lane, the colliery has been renamed Tame Valley Colliery and the sidings renamed Tame Valley Sidings.

	 www.britainfromabove.org.uk/image/EPW024633 © Historic England Tame Valley Colliery, 1928
1938	The site appears unchanged from 1824 except that the sidings adjacent to the site are more extensive than in 1924 suggesting the sidings have experienced increased use.
1955	The site appears largely unchanged from 1938 except that the adjacent colliery and brick works are now shown as disused. A railway line and Valley Lane are still shown bisecting the site but the adjacent goods yard is no longer shown. This suggests that the railway line is no longer in use.
1965	The site appears largely unchanged from 1955. A railway line and Valley Lane are still shown bisecting the site but the railway line is no longer connected to the main line. This suggests that the railway line is no longer in use and the railway track has probably been removed. Valley Lane is probably still in use as the adjacent former colliery and brick works site is now shown occupied by Engineering Works.
1976	The site is still bisected by Valley Lane which now appears to be the main access road into the Tame Valley Industrial Estate which now occupies the site of the former Tame Valley Colliery and brick works. The former railway line through the site is no longer shown. A small building is encroaching into the site near the entrance to the Tame Valley Industrial Estate.
1989	The site appears to be a brown field site in the midst of redevelopment. Valley Lane has been removed and access into Tame Valley Industrial Estate is via a new road, Ninian Way which passes next to the site's western boundary.
1999	Tame Valley Industrial Estate has been established with a network of access roads serving large industrial buildings. The site is established as discrete property within the industrial estate. The site contains a single large industrial unit which occupies approximately half of the site's area.
2006	The site appears unchanged from 1999
2021	The sites current layout is shown. The main industrial building has been extended to include a rectangular annex which is approximately half the size of the original building. Additional industrial buildings have been added to the Tame Valley Industrial Estate including a number close to the site. A housing estate has been built opposite the site along Ninian Way. The site is now adjacent to both domestic properties, industrial units and offices.

49.0 Copies of the historical maps referred to in Table 3 above are provided in the Envirocheck Report – Historical Mapping (see Appendix B8).

4.2 Stakeholder Consultation

4.2.1 Tamworth Borough Council

50.0 The site's planning history held on Tamworth Borough Council's online planning database was used to determine whether the local authority held any relevant environmental information on the site. No information relevant to this SCR was found.

4.2.2 The Environment Agency

51.0 The Environment Agency's (EA) data is presented in the Envirocheck Report referenced elsewhere in this report and discussed in Section 4.3 below.

4.3 Landmark Envirocheck Report

52.0 The two following Landmark Envirocheck Reports provided site specific environmental data for this report:

- Landmark Envirocheck Report No. 294147081_1 dated 16th April 2022
- Landmark Envirocheck Report No. 294148520_1 dated 16th April 2022

53.0 The Envirocheck reports contain information held by the following organisations:

- Ordnance Survey;
- British Geological Survey;
- Environment Agency;
- Department for Environment, Food and Rural and Affairs;
- The Coal Authority;
- Tamworth Borough Council.

54.0 Appendix B contains Envirocheck Report information referred to in this SCR. Appendix B8 – B10 show Historical Mapping which was used to ascertain whether any potentially significant sources of contamination are present within 250m of the site

55.0 The historical mapping records show that the site is on land reclaimed from a former railway siding and access road serving a colliery and brick works (see Appendix B8).

4.4 Previous geotechnical and land contamination reports

56.0 Appendix D describes the results of a recent (September 2023) geotechnical ground investigation. No previous geotechnical reports relating to the site have been identified. Geotechnical investigations of adjacent areas have been

undertaken as evidenced by BGS borehole records (see Appendix B6). It is possible that these bore hole records are associated with the development of the wider Tame Valley Industrial Estate.

4.5 Unexploded Ordnance

- 57.0 A UXB risk map provided by Zeticauxo recorded a hazard assessment rating of 'Low' for the whole site. Ref. <https://zeticauxo.com/downloads-and-resources/risk-maps/> (See Appendix B13)

4.6 Archaeological sites and ancient monuments

- 58.0 There are no scheduled monuments within 2km of the site. A search of the Multiagency Geographic Information for the Countryside – Magic database (Ref. <http://www.natureonthemap.naturalengland.org.uk/>) indicates that the closest is more than 4km from the site.
- 59.0 There are no listed buildings within 500m of the site. A search of the Multiagency Geographic Information for the Countryside – Magic database (Ref. <http://www.natureonthemap.naturalengland.org.uk/>) indicates that the closest are grade two listed buildings which are more than 600m from the site.

4.7 Ecological systems

- 60.0 There are no trees or hedgerows which would require removal for the proposal to take place. Existing trees and hedgerows surrounding the development will be retained.
- 61.0 A search for statutory nature conservation features within 2km of the site was conducted using the Multiagency Geographic Information for the Countryside – Magic database (Ref. <http://www.natureonthemap.naturalengland.org.uk/>). The search was completed for the following designations:
- Local Nature Reserves (England);
 - Ramsar Sites (England);
 - Special Protection Areas (England);
 - Special Areas of Conservation (England);
 - Sites of Special Scientific Interest (England) (SSSI);
 - National Nature Reserves (England).
 - Ancient Woodland
- 62.0 The search showed that there were no: Ramsar sites, Special Protection Areas (England); Special Areas of Conservation (England); National Nature Reserves (England); or Ancient Woodland within 2km of the site. The two closest sites of ecological interest are a local RSPB nature reserve that is more than 1km to the west of the site and the Kingsbury brickworks SSSI that is more than 1.2km to the south of the site. This demonstrates that the site is distant from areas of ecological interest and is unlikely to present a risk to these sites.

5.0 Initial Conceptual Site Model

5.1 Ground profile

- 63.0 The site's underlying bedrock is Pennine Middle Coal Measures formation with a rock type described as: siltstone, mudstone, and sandstone (see Appendix B1).
- 64.0 The site's underlying bedrock is high vulnerability secondary A aquifer. However this is overlain by unproductive strata and the site is not within a Environmental Agency defined source protection zone (Appendix B5).
- 65.0 The site is not within a designated flood risk area.
- 66.0 The site's existing buildings will be retained. The site and neighbouring properties are built on reclaimed land formerly used by a colliery and a brick works.

5.2 Sources of ground contamination

- 67.0 The ordnance survey drawings of the site dating back to 1884 show the site was bisected by a railway siding and access road serving an adjacent colliery and brick works. Therefore potential ground contaminants are those associated with:
- railway tracks used for parking and loading steam powered goods trains with coal and bricks and other ceramics;
 - roads leading to industrial sites used for coal mining, brick works and engineering works;
 - demolished buildings associated with a colliery and brick works.
- 68.0 The 1989 ordnance survey drawings of the site show the site and surrounding areas were being remediated prior to redevelopment. Previous features including a railway siding, access road and buildings had been removed. This suggests that potential sources of ground contamination at the site are those arising from land remediated after former extractive industry use. It is assumed therefore that the site reclamation was informed by the need to prevent the uncontrolled spread of pollutants on site and to protect future site users. The land is expected to have been remediated to a standard at least suitable for commercial and industrial use.
- 69.0 The site remediation works are expected to have included a capping layer of uncontaminated material above potentially contaminated material beneath. The aim being to separate future users from potentially contaminated soils.

5.3 Migration pathways for contamination

- 70.0 The following list contains the potential exposure pathways through which contamination on site could migrate towards or come into contact with sensitive receptors:

- Skin contact with outdoor soil or dust where contaminants are exposed at surface level in soft landscaping areas;
- Ingestion of soil or dust where contaminants are exposed at surface level in soft landscaping areas;
- Inhalation of fugitive dust or soil vapour where contaminants are exposed at surface level in soft landscaping areas;
- Movement of contaminants through surface water infiltration and migration off site;
- Movement of contaminants through ground water infiltration and migration off site;
- Migration via preferential pathways (drains/service runs);
- Uptake of contaminants by vegetation;
- Uptake of contaminants by animals;
- Chemical attack by contaminants on buildings and site services.

5.4 Sensitive receptors of contamination

71.0 The following list shows the range of sensitive receptors that could be affected by ground contamination at the site:

- People (future site users)
- People (construction workers);
- Controlled waters (surface water);
- Controlled waters (ground water);
- Ecosystems (vegetation)
- Ecosystems (animals)
- Buildings (foundations of the proposed buildings and new services);
- Adjacent sites

5.5 Initial Conceptual Site Model

72.0 The initial Conceptual Site Model (CSM) aids the identification of possible pollutant exposure linkages between sources, pathways and receptors. The presence of a linkage indicates that unacceptable harm may occur to a given receptor.

73.0 Development of the CSM informs the risk assessment and is subject to refinements as more information becomes available through further investigations.

74.0 This CSM has been created using information and data gathered during the desk study and site walkover and will be used to inform a preliminary risk assessment.

75.0 The CSM is shown in Appendix C.

76.0 There are uncertainties in the CSM and associated qualitative risk assessment. There is a lack of certainty about the type and the amount of potentially contaminative materials used on site when it was used as a railway siding and

colliery access road. No evidence has been found to suggest that potential contamination may persist on site.

6.0 Preliminary Qualitative Risk Assessment

6.1 Hazard identification

- 77.0 The hazard identification stage of this risk assessment aims to establish the contaminant sources present at the site.
- 78.0 No potentially polluting liquids or solids and no visual signs of contamination / staining were observed during the recent Ground Investigation (see Appendix D).
- 79.0 The results of the desk study have shown that there are likely to be no unacceptable concentrations of contaminants associated with the soft landscaping areas because the site is assumed to have been remediated to a standard protective of site users in a commercial or industrial setting.

6.2 Hazard assessment

- 80.0 The aim of the hazard assessment is to determine whether possible pollution linkages between the source, pathway and receptors described in the CSM exist.
- 81.0 The CSM (Appendix C) shows a summary of the sources, pathways, and receptors and whether a possible pollution linkage should be defined. The proposed land use of the site is assumed to commercial and industrial with hard landscaping.

6.3 Risk estimation and evaluation

- 82.0 The aim of this risk estimation and evaluation is to determine whether possible pollution linkages pose potentially unacceptable risks of harm to human health and the environment. The risks are considered in relation to site specific receptors.

6.3.1 Human health

- 83.0 Potential human health issues are unlikely because potential contaminants are likely to be present in low concentrations if at all. In addition the site will be effectively capped by access roads, hardstanding and concrete floor slabs preventing direct contact with soils.

6.3.2 Buildings and property

- 84.0 The site buildings' construction is not likely to be at risk from potential sources of contamination and this receptor is not considered significant. This is because potential contaminants are likely to be present in low concentrations if at all and

any potential issues would be expected to have manifested themselves before now as the existing buildings on site are understood to be more than 20 years old.

6.3.3 Adjoining Land

- 85.0 Adjoining land is not likely to be at risk from potential sources of land contamination derived from site and this receptor is not considered significant. This is because potential contaminants are likely to be present in low concentrations if at all.

6.3.4 Controlled waters (groundwater and surface water)

- 86.0 Controlled waters are not likely to be at risk from potential sources of contamination at the development site and this receptor is not considered significant. This is because potential contaminants are likely to be present in low concentrations, and the low permeability of the soils and subsoils would be expected to inhibit migration to the nearest receptor(s).

6.3.5 Ecological systems

- 87.0 No disturbance of undeveloped land is proposed as part of the permit variation supported by this report.
- 88.0 Due to the low permeability of the subsoils and limited sources of surface level contamination, and the apparent health of the vegetation on site this receptor is not considered significant. In addition the areas of ecological interest are distant from site (see section 4.7).

6.3.6 Archaeological sites and ancient monuments

- 89.0 The low levels of potential contaminants present on site and low permeability of the subsoils are not expected to pose a threat to archaeological and ancient monuments in the area because there is no direct groundwater or surface water flow path between the site and the monuments. In addition the areas of archaeological interest are distant from site (see section 4.6).

6.4 Preliminary Qualitative Risk Assessment Conclusion

- 90.0 The site's geology comprises: siltstone, mudstone, and sandstone (see Appendix B1). The superficial geology is expected to be dominated by made ground from earlier land reclamation works and the sites former use as a railway siding and access road to a colliery and brickworks.
- 91.0 The site is not within an Environmental Agency defined Source Protection Zone.
- 92.0 No evidence was found to suggest that chemicals or fuels have ever been stored in or near the development site. No other potentially polluting liquids or solids

and no visual signs of contamination were observed during the recent site investigation (see Appendix D).

- 93.0 Controlled waters, and adjacent buildings and site users are valid receptors. The low concentration of possible soil contaminants expected and the absence of pathways between the potential contaminants and the sensitive receptors selects against further site investigation, and quantitative risk assessment.
- 94.0 The recent site investigation (see Appendix D) report did not identify significant soil contamination in the soil samples taken.

7.0 Intrusive site investigation

7.1 Site investigation objective

- 95.0 The intrusive site investigation's objective "was to ascertain the nature and structure of the near surface strata in order that an assessment could be made of certain geoenvironmental and geotechnical properties relating to the proposed factory extension.." The results of the site investigation enabled baseline concentrations of soil contaminants in surface soils to be established and the depth and concentration of contaminants in underlying made ground.
- 96.0 This will be used to assess whether the concentrations of soil contaminants are protective of site users and to confirm that waste processing operations on site are protecting existing soil quality.

7.2 Description of site investigation works

- 97.0 The site investigation "fieldwork was carried out between 16th August and 13th September 2023 and consisted of sinking 4no. boreholes by percussive windowless sampling methods to inspect and sample the shallow strata and 4no. deeper boreholes by rotary open hole drilling methods to confirm the presence of potential shallow mine workings." "Prior to drilling at each borehole position an inspection pit was dug by hand to a depth of 1.2 m in order to check for the presence of buried services." (ref. Appendix D)
- 98.0 The British Geological Survey (BGS) have published estimated background concentrations of given soil contaminants for the site. These are summarised in Table 1. The chemical analysis suite of soil contaminants will include the five parameters used by the BGS to indicate background contaminant levels.
- 99.0 The analytical strategy is targeted at a range of potential contaminants arising from the excavation site's former use as a railway line and access road leading to a colliery and brickworks. In addition the soils will be screened for contaminants associated with waste processing on site.

- 100.0 The following parameters have been associated with soil contaminated with anthropogenic debris:
- Arsenic;
 - Cadmium;
 - Chromium;
 - Lead;
 - Mercury;
 - Selenium;
 - Copper;
 - Nickel;
 - Zinc;
 - Boron;
 - Sulphate,
 - pH.
- 101.0 The presence of hydrocarbon fuel related contaminants can be indicated by chemical analysis of soil samples for the following parameters:
- Total Petroleum Hydrocarbons (TPH);
 - Poly Aromatic Hydrocarbons (PAH)
- 102.0 Therefore the primary contaminants of concern specified for the soil samples initial chemical analysis suite include: heavy metals, sulphate, and hydrocarbons. These chemicals are potentially associated with the site's former use and can serve as indicator chemicals for a broader range of potential pollutants. These chemicals have the potential to harm human health and the environment.
- 103.0 "Two samples of made ground comprising topsoil (WS2 at 0.2 m) and clay and sand (WS4 at 0.5m) have been tested for a general suite of likely contaminants including asbestos, arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, speciated polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons by Criteria Working Group (TPH CWG) and pH, along with their soil organic matter (SOM)." (ref. Appendix D)

8.0 Presentation and interpretation of investigation results

8.1 Description of ground conditions encountered

- 104.0 The site investigation found that "the shallow ground conditions generally comprised a little topsoil onto some pockets of made ground to depths of 0.4 to 1.3 m, underlain by soft to firm, becoming stiff, grey and brown mottled clay of the weathered PMCM (Pennine Middle Coal Measures Formation), grading to mudstone below depths of 1.8 to 2.7 m." (ref. Appendix D).
- 105.0 The ground conditions encountered on site were those expected from the desk based research of the site's geology and site's history.

- 106.0 No olfactory evidence of soil contamination was reported during the site investigation.
- 107.0 The site investigation identified contaminant concentrations elevated above laboratory detection limits in soils.

8.2 Evaluation of site investigation results against the initial conceptual site model.

- 108.0 The initial CSM (Appendix C) identified no probable pollution linkages between potential contaminants and site users.
- 109.0 The potential risk posed by the chemical contaminants found will be assessed by considering how the site will be used and over what period the site users will be exposed to the contaminants of concern.

9.0 Quantitative risk assessment

9.1 Risk assessment objectives

- 110.0 The risk assessment will be informed by the chemical analysis of the soil samples taken. The aim of the risk assessment is to determine whether possible pollution linkages between the source, pathway and receptors described in the initial CSM exist. If a linkage(s) is found to exist to then determine the risk posed to human health and the environment by the pollution source concerned.

9.2 Rationale for the chosen risk assessment approach

- 111.0 The proposed development is described in Section 1 above. The initial CSM and potential pollutant linkages are described in Appendix C. The chosen risk assessment utilises data collected in the site investigation described above. The assessment follows the source, pathway receptor approach which requires all three components to be present in order for the pollutant linkage to exist.
- 112.0 The risk assessment approach compares the concentration of chemicals in soil samples to LQM/CIEH Suitable 4 Use Levels (S4ULs) to determine the risk to human health and the wider environment. The LQM/CIEH S4ULs may be viewed as trigger values above which further consideration of the data's significance is required. Concentrations in excess of their respective LQM/CIEH S4ULs do not necessarily indicate an unacceptable level of risk.
- 113.0 "...The S4ULs have been derived in accordance with UK legislation, national as well as Environment Agency policy and using a modified version of the Environment Agency CLEA software and available guidance provided to the contaminated land practitioner community for the purposes of deriving Generic Assessment Criteria. As such they are fully based on the concept of minimal or

tolerable risk as described in SR2 (Environment Agency 2009a). The LQM/CIEH S4ULs are intended for use in assessing the potential risk posed to human health by contaminants in soil and as transparently derived and cautious trigger values above which further assessments of the risks or remedial action may be needed”.

114.0 Each contaminant considered has had LQM/CIEH S4ULs calculated for each of the following six land use scenarios:

- Residential with home grown produce;
- Residential without homegrown produce;
- Allotments;
- Commercial;
- Public open spaces near residential housing;
- Public parks.

The residential land use exposure scenario LQM/CIEH S4ULs will be used in the proposed development’s risk assessment.

115.0 Not all of the chemical parameters of interest have LQM/CIEH S4ULs values. Draft C4SL values published by Defra in 2013 will be used as threshold values for Lead. Sulphate will be assessed by reference to concentrations specified in the BRE special digest 1 dated 2005. The analytical limit of detection will be used for other parameters in the absence of any published assessment criteria.

116.0 Poly Aromatic Hydrocarbon (PAH) values assume soil with 1% soil organic matter. Soil organic matter (SOM) can affect the availability of chemical contaminants in soil. Soils with higher SOM are typically better able to hold onto contaminants and constrain their release from soil. However made ground soils can have high SOM due to the presence of hydrocarbons rather than naturally occurring soil organic matter. Therefore made ground will use the most conservative assessment criteria based on 1% SOM (rather than 3% SOM).

117.0 In summary a quantitative risk assessment has been undertaken using the following assessment criteria (see Table 5):

- LQM/CIEH S4ULs for a commercial land use assuming 1% SOM;
- Draft C4SL values for Lead for a commercial land use assuming 1% SOM;
- Limit of detection in the absence of any published assessment criteria.

Table 5. Summary of soil risk assessment threshold values for a land use exposure scenarios

Test	units	Commercial Land Use	Residential Land Use with public open space	Residential with home grown produce	
Arsenic (total)	mg/kg As	640	79	37	Inorganic Arsenic
Beryllium	mg/kg Be	12	2.2	1.7	
Boron (water soluble)	mg/kg B	240,000	21,000	290	
Cadmium (total)	mg/kg Cd	190	120	11	
Chromium (III)	mg/kg Cr III	8,600	1,500	910	Chromium III
Chromium (VI)	mg/kg Cr VI	33	7.7	6	Chromium VI
Copper (total)	mg/kg Cu	68,000	1,200	2400	
Lead (total)	mg/kg Pb	1100 - 6000	270 - 760	86 - 210	
Mercury (total)	mg/kg Hg	58	16	1.2	Elemental Mercury
Nickel (total)	mg/kg Ni	980	230	180	
Selenium (total)	mg/kg Se	12,000	1,100	250	
Vanadium	mg/kg V	9,000	2,000	410	
Zinc (total)	mg/kg Zn	730,000	81,000	3700	
pH	Units	N/A	N/A	N/A	
Sulphate (total)	mg/kg SO ₄	N/A	N/A	N/A	
PAH					
Acenaphthene	mg/kg	84,000	15,000	210	
Acenaphthylene	mg/kg	83,000	15,000	170	
Anthracene	mg/kg	520,000	7,400	2400	
Benzo (a) anthracene	mg/kg	170	29	7.2	
Benzo (a) pyrene	mg/kg	35	5.7	2.2	
Benzo (b) fluoranthene	mg/kg	44	7.1	2.6	
Benzo (ghi) perylene	mg/kg	3,900	640	320	
Benzo (k) fluoranthene	mg/kg	1,200	190	77	
Chrysene	mg/kg	350	57	15	
Dibenz (ah) anthracene	mg/kg	3.5	0.57	0.24	
Fluoranthene	mg/kg	23,000	3,100	280	
Fluorene	mg/kg	63,000	9,900	170	
Indeno (123cd) pyrene	mg/kg	500	82	27	
Naphthalene	mg/kg	190	4,900	2.3	
Phenanthrene	mg/kg	2,200	3,100	95	
Pyrene	mg/kg	54,000	7,400	620	

Notes. 1. Ref LQM/CIEH S4ULs

2. Lead draft C4SL = 86 – 210 mg/kg for residential exposure with home grown produce.

3. Poly Aromatic Hydrocarbons (PAH) values assume soil with 1% soil organic matter.

9.3 Discussion of relevant exposure scenarios

118.0 The site has two distinct zones of land use or ground types and conditions. One ground type is soft landscaping and the second ground type is the impermeable hardstanding used for buildings, service yards, storage areas, car parking and access roads.

119.0 The impermeable hardstanding areas are considered as a single averaging area as it is wholly to be used for waste processing and vehicle access or parking.

This land use is such that contaminant pathways are not accessible to site users as they are capped by impermeable surfaces. This ground type is not considered to present a health risk to site users unless disturbed.

- 120.0 The type of exposure experienced in the site's soft landscaping areas most closely resemble a commercial exposure scenario. This is because the site users period of exposure is relatively short and infrequent.
- 121.0 A commercial land use exposure scenario assumes that the critical human receptor (working female adult) is exposed to soil contaminants at work. Exposure pathways include direct soil and indoor dust ingestion, skin contact with soils and dusts, and inhalation of dust and vapours. The assumed exposure frequencies for outdoor and indoor exposure pathways are 170 and 230 days per year respectively. The time spent indoors and outdoors is assumed to be 8.3 and 0.7 hours respectively on week days only. This equates to spending approximately 3.5 hours per week outside during 34 weeks each year.
- 122.0 The Appendix D soil sample chemical analysis results indicate that the proposed development would achieve a low level of risk to human health and the environment assuming a commercial land use.

9.4 Buildings and services risk assessment

- 123.0 Potential risks to the integrity of proposed building materials and buried services are principally associated with:
- Sulphate and acid attack on concrete in below ground structures;
 - Enhanced corrosion of metal due to acidity and mineral salts;
 - Decay/permeation of plastics by organic compounds.
- 124.0 The risks to buildings from sulphate attack has been assessed by comparing total potential sulphate to threshold values defined in BRE Special Digest 1: 2005. Total potential sulphate was estimated for all of the soil samples and used to assess the Aggressive Chemical Environment for Concrete (ACEC) classification of the sample location.
- 125.0 4no. samples of the shallow soil have been tested for conditions considered aggressive to buried concrete. The highest Sulphate concentration measured was 2100mg/l. "Based on the results and following the procedure set out in section C5 and Table C1 of Special Digest 1:2005, the site should have a Design Sulphate Class (DS) of DS3 and an Aggressive Chemical Environment for Concrete Class (ACEC) of AC-2S" (ref Appendix D).
- 126.0 Plastic pipes may be susceptible to physical degradation or permeation by certain contaminants. PAHs contaminants can degrade or permeate certain plastic water supply pipes, thereby possibly impacting drinking water supplies. The contaminant levels measured are too low to be expected to harm conventional drinking water supply pipework on site.

9.5 Conceptual model reviewed following site investigation

- 127.0 The site investigation found chemical contaminants in soils elevated above laboratory detection levels. The LQM/CIEH S4ULs values for a commercial land use exposure scenario are not exceeded by the soil samples' chemical analysis results. The level of contamination is relatively low and is not likely to present a significant risk of harm to site users and the environment assuming a commercial land use exposure scenario.
- 128.0 The commercial land use exposure scenario assumes that the human receptors are transient and will be exposed to potential contaminants infrequently and for short durations of time.
- 129.0 The initial conceptual model was unchanged following the site investigation.

10.0 Site Management Objectives

- 130.0 The objectives are to maintain the current low levels of soil contamination and to protect top soil quality. This will be achieved by segregating waste handling activities from landscaped areas and by limiting waste management activities to areas with impermeable hard standing draining via oil water interceptor(s).
- 131.0 The potential human health risks associated with construction activities will be driven by dermal contact, ingestion and inhalation of contaminated soils, dusts and vapours. The risk to construction workers can be reduced by the adoption of good practice health and safety procedures. The following proposed measures represent good practice for the construction industry and include:
- Briefing the site workers about the identified contamination on site, and ensuring they are aware of the potential health effects from exposure;
 - Where appropriate workers who are exposed to a potential risk due to their working in areas of identified contamination will be provided with suitable personal protective equipment (PPE);
 - Ensuring good hygiene is enforced on site and washing facilities are maintained on site. Workers will be discouraged from smoking, eating or drinking without first washing their hands;
 - Ensuring that construction personnel report any unusual complaints such as skin rashes, nausea, light headedness etc. which may be attributable to the contamination on site;
 - Ensuring that dust suppression measures are put in place where contamination is becoming airborne;
 - Construction vehicles will be prevented from dirtying adjacent roads with soil from the site. A method for cleaning construction vehicles may be required;
 - Contractors will be expected to undertake risk assessments and comply with health and safety procedures as required under the CDM regulations.

132.0 There is a possibility that an unknown area of soil contamination may be encountered during future construction works. Should an area of contamination be identified by visual or olfactory means the following procedure will be followed:

- Immediately stop all works in the area where contamination is suspected;
- Immediately inform the site manager;
- A suitably experienced environmental professional will attend site to make a visual and olfactory assessment of the material and if necessary undertake sampling for subsequent chemical analysis;
- Provide short term storage of the suspected material while undertaking chemical analysis of soil samples. Depending upon the amounts of material under consideration this could either be stored in a skip or a suitably lined area of the site. If appropriate the excavation generating the suspected material should be kept open;
- If found to be contaminated the material concerned will be disposed of to a suitably licenced facility following appropriate waste classification. Consignment notes for all off-site disposal to be retained;
- The removal of the hotspot and collection of validation samples from the decontaminated area will be supervised by a suitable qualified environmental professional.

11.0 Conclusion and Recommendations

133.0 The site investigation found chemical contaminants in subsoils elevated above laboratory detection levels. No chemical contamination identified in this site investigation report requires remediation for the proposed development to achieve tolerably low levels of risk to human health and the environment. This assumes that a commercial land use exposure scenario is appropriate for the site users infrequent and short duration use of the site's amenities.

134.0 Anomalous contamination identified during potential future construction works is likely to be small in scale and best dealt with through waste management procedures recommended in section 10.0 above.

Recommendations

135.0 The use of appropriate risk assessments to inform construction management plans is recommended to reduce risks to construction workers from potentially contaminated soils. Appropriate mitigating measures may include dust control and provision of appropriate PPE for construction workers.

Appendix A

The site location and layout

Techemet Ltd, 1 Vanguard, Ninian Way, Tamworth, Staffordshire, B77 5DY

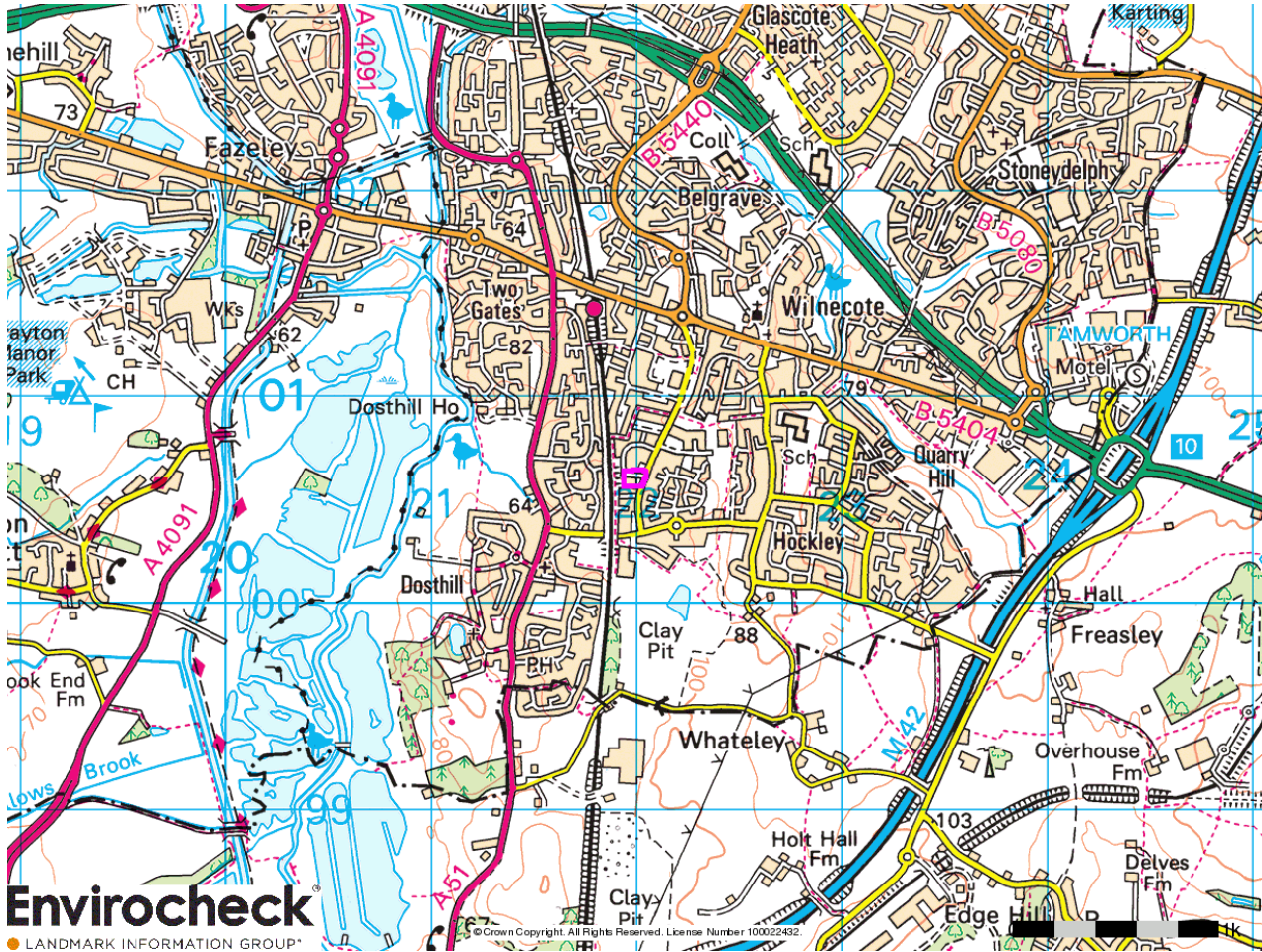


Figure 1. Location plan



Figure 2. Aerial photograph showing site location



Figure 3. Site layout plan

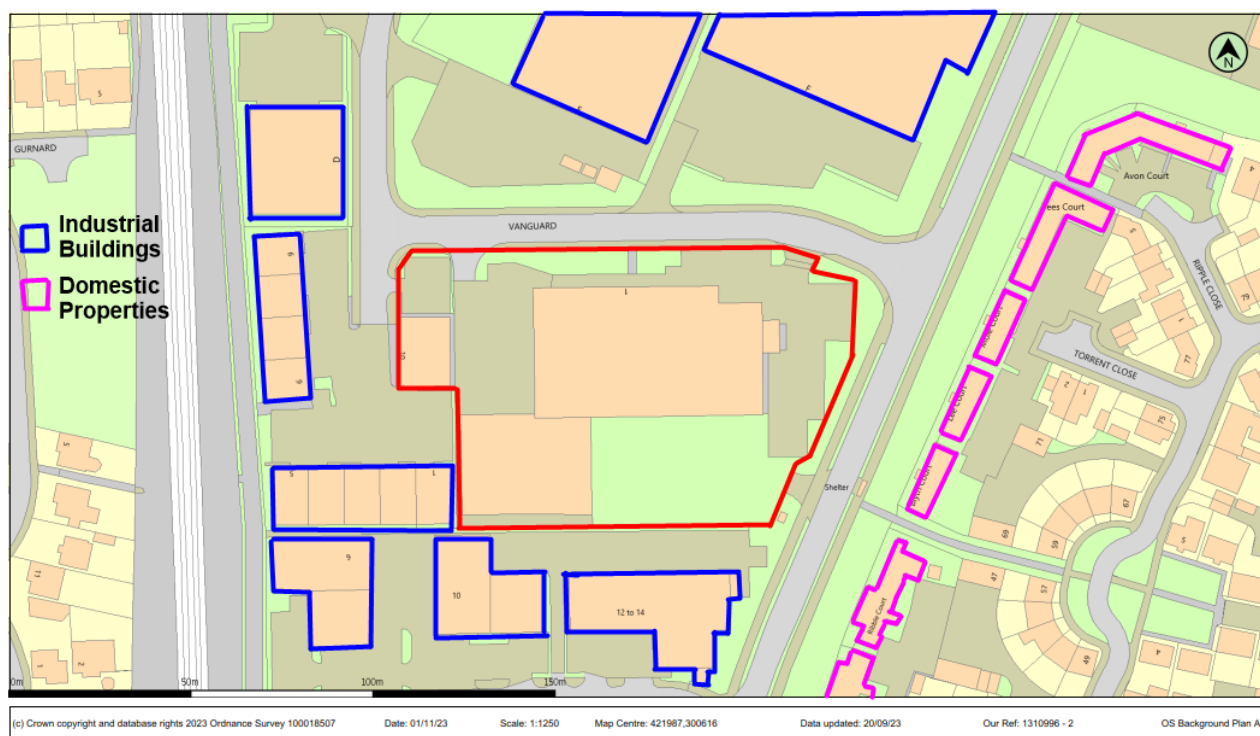


Figure 4. The locations of receptors

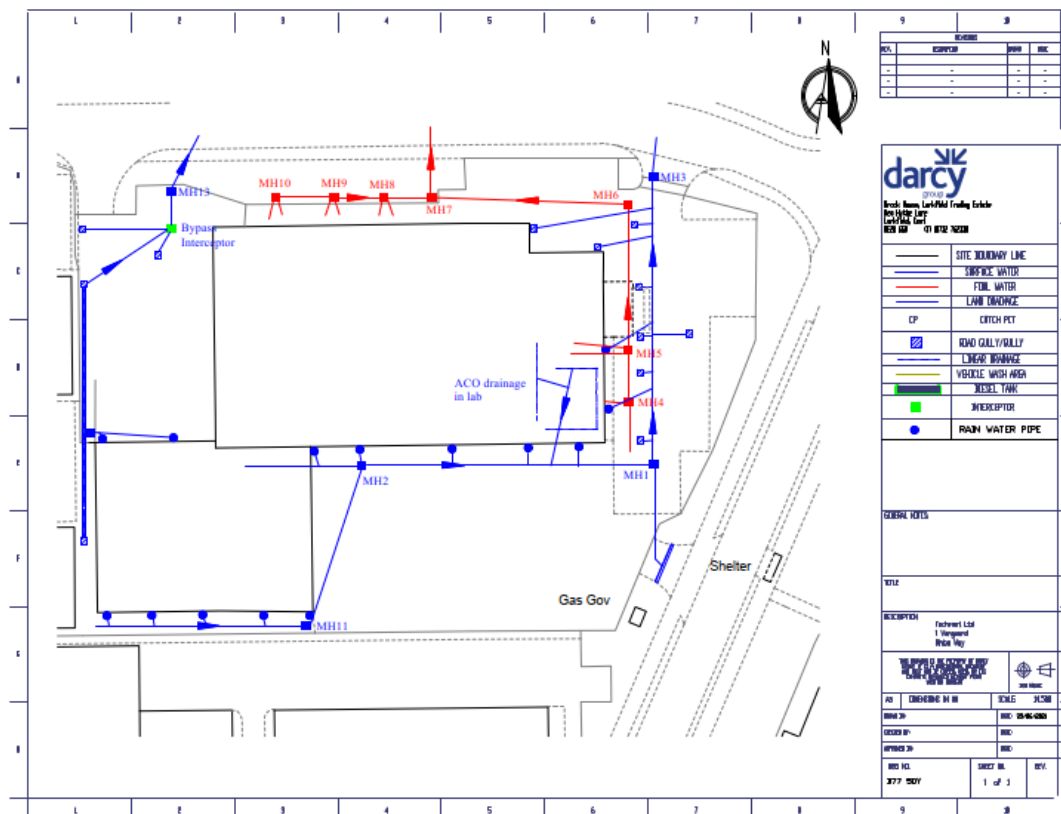
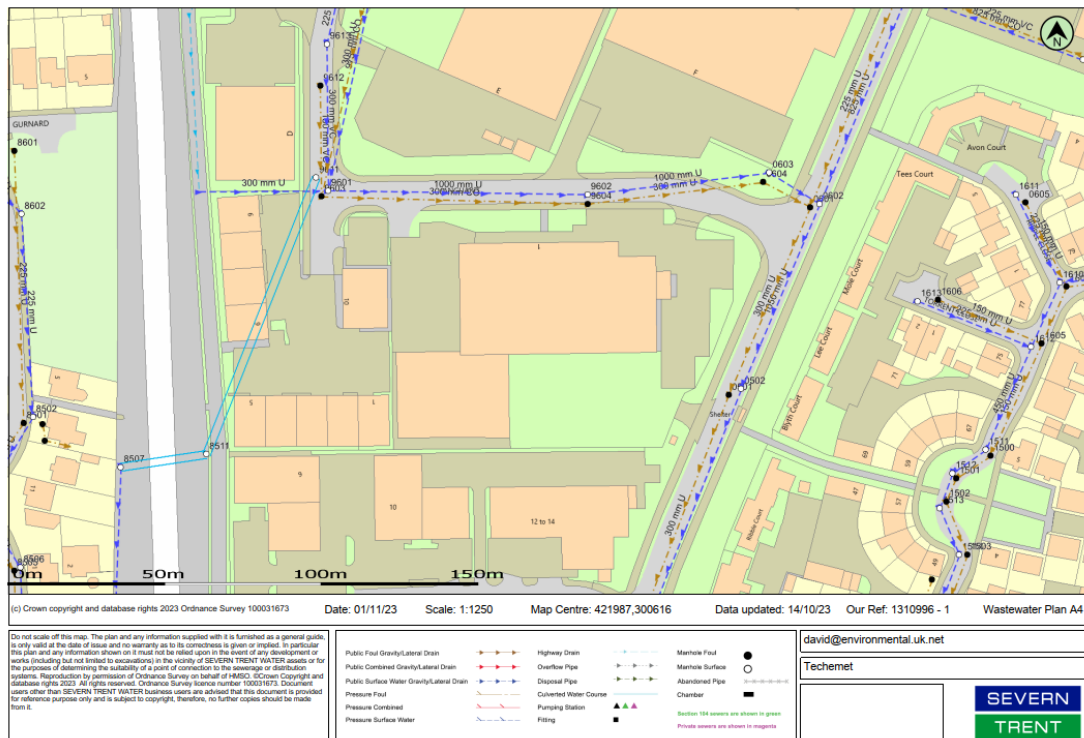


Figure 5. The site drainage layout and site surfacing

Appendix B

Envirocheck Report

Landmark Envirocheck Report Order No. 294147081_1 dated 16th April 2022

Landmark Envirocheck Report Order No. 294148520_1 dated 16th April 2022

Appendix C

Conceptual Site Model

Site Condition Report, 1 Vanguard, Ninian Way, Tamworth, Staffordshire, B77 5DY
Grid Reference: 421990 300609

Source	Pathway(s)		Receptor(s)	Level of potential risk	Comments
	Transportation mechanism	Exposure Medium			
Made Ground	Direct contact	Skin contact with soil or dust	site users	moderate to high	Potential linkage available in areas of soft landscaping. Short duration temporary exposure.
			construction workers	negligible	Potential linkage available. Short duration temporary exposure. Standard PPE should mitigate against potential risks
		Ingestion of soil or dust	site users	moderate to high	Potential linkage available in areas of soft landscaping. Short duration temporary exposure.
			construction workers	negligible	Potential linkage available. Short duration temporary exposure. Standard PPE should mitigate against potential risks
	Air borne wind blown dust or volatilisation of soil vapours	Inhalation of fugitive dust or soil vapour	site users	moderate to high	Potential linkage available in areas of soft landscaping. Short duration temporary exposure. Non-inert materials likely to have been insitu for a significant period of time allowing venting of vapour and gas decomposition products.
			construction workers	Low	Potential linkage available. Short duration temporary exposure. Standard PPE should mitigate against potential risks
			adjacent sites	Low	Potential linkage available. Potential exposure reducing with distance from site.
	Surface infiltration and leaching	Surface water flow polluting controlled waters and adjacent sites	controlled waters	Low	Potential linkage available. Much of the made ground has been insitu for a significant period of time allowing surface infiltration to remove the majority of leachable contaminants. Controlled waters distant from site.
			vegetation	Low to moderate	Potential linkage available. Much of the made ground has been insitu for a significant period of time allowing surface infiltration to remove the majority of leachable contaminants. No evidence of harm to plants
			buildings & services	Low to moderate	Sulphate resisting concrete may be required along with the protection of plastic service pipes where they come into contact with ground contamination
			adjacent sites	Low	Significant contamination of groundwater is not anticipated
		Migration via preferential pathways (drains/service runs)	controlled waters	Low	Potential linkage available. Much of the made ground has been insitu for a significant period of time allowing surface infiltration to remove the majority of leachable contaminants.
			vegetation	Low	Plant uptake damaging plants and animals and birds feeding on the plants. No evidence of harm to plants on site
			buildings & services	Low to moderate	Sulphate resisting concrete may be required along with protection of plastic service pipes, where they come into contact with ground contamination
			adjacent sites	Low	Significant contamination of groundwater is not anticipated

Notes. 1.

The following general definitions for the allocated qualitative level of risk(s) are as follows:

Low Unlikely to have significant impact on the current or proposed development of the site;
Moderate May have a significant impact on the current or proposed development of the site;
High Likely to have significant impact on the current use of proposed development of the site.

Appendix D

Ground Investigation for proposed extension at Techemet Ltd, 1 Vanguard Way, Wilnecote, Tamworth, Ground Investigation Specialists Ltd, September 2023.