

# CONTAMINATED LAND INTRUSIVE INVESTIGATION

25 Mengham Road  
Hayling Island  
Hampshire  
PO11 9EG



July 2024

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# 1 Introduction and scope of work

Apple Environmental has been appointed to undertake an intrusive soil contamination investigation at 25 Mengham Road, Hayling Island, Hampshire.

An environmental desk study report and preliminary risk assessment previously undertaken at the site by Apple Environmental (Report Ref. CL/3512/CAAD) did not identify any potential land contamination concerns; however intrusive investigation has been requested by Havant Borough Council due to their concerns over the former presence of a garage to the southwest of the site.

In considering their comments, the contaminants deemed to be potentially present included general inorganics, hydrocarbons (both petroleum and poly-aromatic), and VOCs.

An intrusive investigation was subsequently undertaken in order to determine the presence and extent of any such contamination, and to assess the overall risk more fully.

The aims of this work therefore have been to devise and implement an appropriate strategy such that it has been possible to:

- determine the nature of the sub-surface material on-site;
- determine the presence of unacceptable ground contamination in specified areas, along with its nature and extent;
- assess the degree to which the site itself could be contributing to the contamination of environmental media off-site;
- observe or presume contaminant-pathway-receptor relationships on site; and
- assess the risk to future users of the site, as well as building structures and services.

This type of assessment relies upon the visual examination of the area and sub-surface material, as well as the laboratory analysis of material samples.

As such, the specific objectives have been:

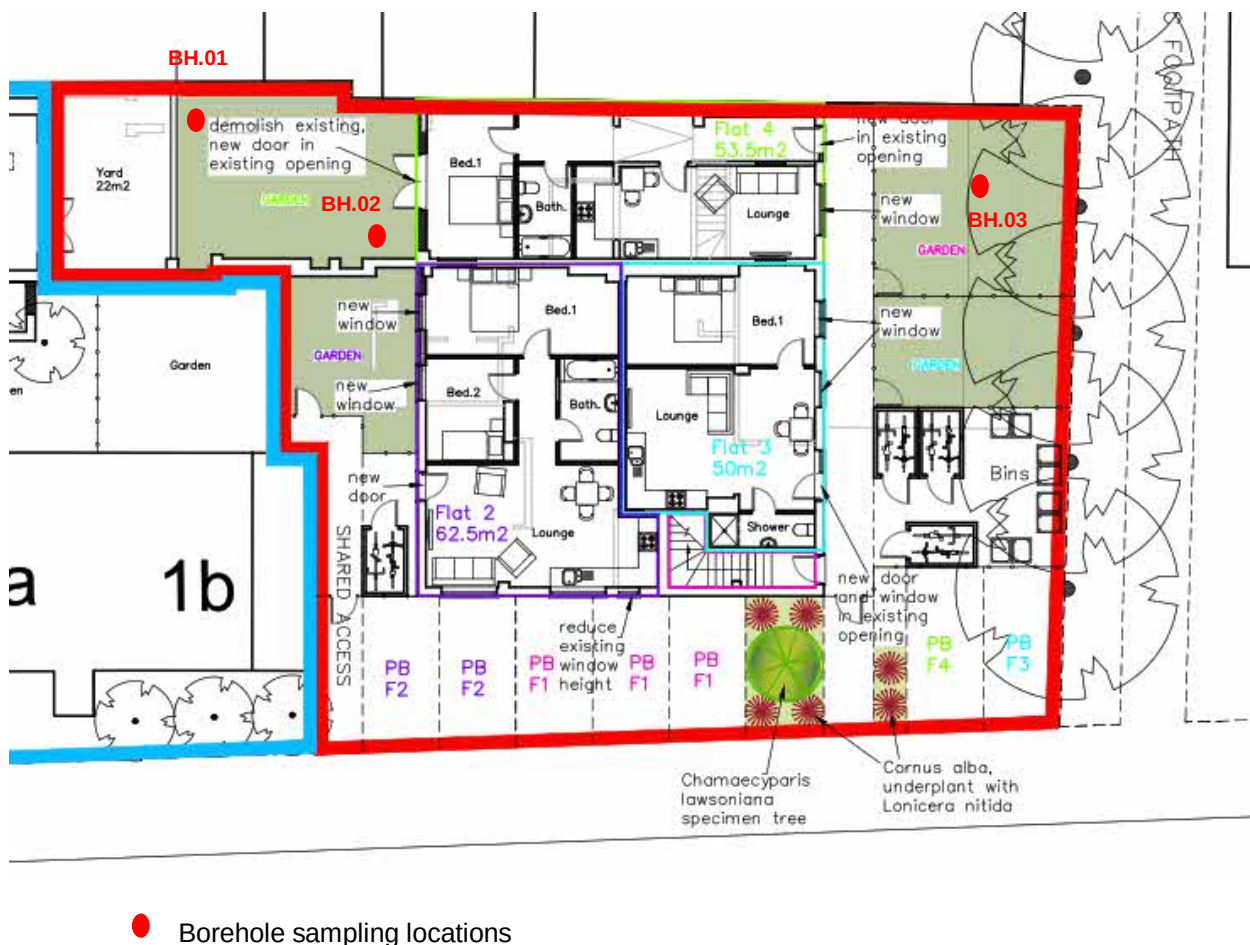
- to drill three boreholes at the site to a minimum depth of 2000mm;
- to characterise the nature of the sub-surface material at each of these locations;
- to collect at least 2 soil samples from each of the bores for laboratory analysis generally representing the direct and indirect contact zones;
- to collect additional soil samples from where there may be any other specific or noticeable contamination concern;
- to collect groundwater samples from each of the bores (where present);
- to analyse the soil and water samples for a range of contamination indicators;
- to ascertain the significance of all chemical or physical data obtained;
- to determine the risk to future users based upon residential usage; and
- to make appropriate recommendations in order to reduce and/or eliminate any risks, as identified.

## 2 Methodology

As stated above, the overall aim of this investigation is to assess the sub-surface of the site in order to determine any risk that may be present as a result of ground contamination.

For this purpose, three boreholes were drilled across the site to a minimum depth of 2000mm, at the locations shown below in Figure 1.

**Figure 1** Plan showing the sampling locations



The soil profile from each investigated location has been logged within Section 3 below, along with photographs showing the excavated arisings.

Soil samples were collected from each of the highlighted locations representing approximate depths of 200 - 300mm(bgl) (due to the thickness of the concrete), and 500 - 600mm(bgl). Groundwater samples were also obtained from two of the bores.

All of the samples were placed immediately into a sterilised container and transferred into refrigerated cold-boxes until removed for analysis.

Chemical analysis was undertaken for the following determinands:

- arsenic, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc;
- sulphate, sulphide, chloride, cyanide, ammonia and asbestos;
- benzene, toluene, ethylbenzene and xylene (all isomers);
- polycyclic aromatic hydrocarbons (speciated), petroleum hydrocarbons (banded TPHCWG); and
- phenols and non-speciated VOCs\*
- VOCs\*\*

\* Photo-ionisation detection was undertaken in-situ on the removed soil in order to detect vapours originating from any VOC residue (fuels/solvents etc.) that may be present in each excavated area.

This was performed by means of an externally calibrated Phocheck Tiger PID. Calibration certification has been appended to this report.

\*\* VOC analysis was undertaken on one groundwater sample.

All chemical analyses were undertaken by a UKAS accredited laboratory. Laboratory certification has been appended to this report.

### 3 On-site observations

The site exists as a converted former commercial building with concrete yard areas.

It is understood from BGS data that the bedrock beneath the site is characterised by the Portsmouth Sand and Whitecliff Sand Members with overlying superficial river terrace deposits. Both the superficial geology and the underlying bedrock were noted in all investigated locations.

The sub-surface material strata logs have been reproduced below in Tables 1 to 3 along with any detailed observations.

Photographs showing the removed material have been appended to each strata log (Photographs 1 to 3).

The intrusive investigation was undertaken on the 17<sup>th</sup> July 2024.

**Table 1** Strata log - Location **BH.01**

| Location ID        | Depth (mm)  | Notes                                                                                 |
|--------------------|-------------|---------------------------------------------------------------------------------------|
| <b>BH.01</b>       | 0 - 250     | Concrete                                                                              |
|                    | 250 - 1500  | Mid-brown, sandy, clayey, silty gravels with small angular flints (10-30mm diameter). |
|                    | 1500 - 1900 | Orange, coarse sand with gravels (5-15mm diameter).                                   |
|                    | 1900 - 2000 | Orange, sandy clay with angular gravels (5-20mm diameter).                            |
| <b>Groundwater</b> | -           | Groundwater was struck at a depth of 1800mm (bgl) and rested at a depth of 1000mm.    |

**Photograph 1** Removed soil material - Location BH.01



Left to right, bottom to top 0 - 2000mm

**Table 2** Strata log - Location **BH.02**

| Location ID        | Depth (mm)  | Notes                                                                              |
|--------------------|-------------|------------------------------------------------------------------------------------|
| <b>BH.02</b>       | 0 - 250     | Concrete                                                                           |
|                    | 250 - 630   | Light brown, sandy clay with very small gravels (5-10mm diameter).                 |
|                    | 630 - 950   | Orange/brown dry, firm, sandy clay with v small gravels (5-10mm diameter).         |
|                    | 950 - 1550  | Orange/brown sandy gravels (5-20mm diameter).                                      |
|                    | 1550 - 2250 | Orange/brown sand with gravels (5-20mm diameter).                                  |
|                    | 2250 - 3000 | Orange/green sandy clay.                                                           |
| <b>Groundwater</b> | -           | Groundwater was struck at a depth of 1500mm (bgl) and rested at a depth of 1200mm. |

**Photograph 2** Removed soil material - Location BH.02



Left to right, bottom to top 0 - 3000mm

**Table 3** Strata log - Location **BH.03**

| Location ID        | Depth (mm)  | Notes                                                                         |
|--------------------|-------------|-------------------------------------------------------------------------------|
| <b>BH.03</b>       | 0 - 50      | Tarmacadam.                                                                   |
|                    | 50 - 300    | Made-ground comprising concrete and brick fragments.                          |
|                    | 300 - 1500  | Mid-brown clayey sand, some of which was compacted between 1000mm and 1500mm. |
|                    | 1500 - 2000 | Mid-brown, sandy, clayey gravels (5-20mm diameter).                           |
|                    | 2000 - 3000 | Light-brown sandy clay.                                                       |
| <b>Groundwater</b> | -           | Groundwater was not detected                                                  |

**Photograph 3** Removed soil material - Location BH.03



Left to right, bottom to top 0 - 3000mm

## 4 Results from soil and groundwater analyses

The results from the soil and groundwater analyses are displayed in Tables 4 to 13 below. Any determinand detected has been highlighted in **bold** type.

**Table 4** Results for specified inorganics in soil - metals

| Determinand         | BH.01<br>(mg/kg)   |                    | BH.02<br>(mg/kg)   |                    | BH.03<br>(mg/kg)   |                    |
|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                     | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm |
| Arsenic             | <b>8</b>           | <b>7</b>           | <b>11</b>          | <b>10</b>          | <b>9</b>           | <b>9</b>           |
| Boron               | < 1                | < 1                | < 1                | < 1                | < 1                | < 1                |
| Cadmium             | < 0.2              | < 0.2              | < 0.2              | < 0.2              | < 0.2              | < 0.2              |
| Chromium            | <b>19</b>          | <b>20</b>          | <b>27</b>          | <b>24</b>          | <b>18</b>          | <b>25</b>          |
| Hexavalent chromium | < 2                | < 2                | < 2                | < 2                | < 2                | < 2                |
| Copper              | <b>12</b>          | <b>12</b>          | <b>11</b>          | <b>9</b>           | <b>14</b>          | <b>11</b>          |
| Lead                | <b>25</b>          | <b>23</b>          | <b>13</b>          | <b>12</b>          | <b>40</b>          | <b>11</b>          |
| Mercury (total)     | < 1                | < 1                | < 1                | < 1                | < 1                | < 1                |
| Nickel              | <b>13</b>          | <b>13</b>          | <b>22</b>          | <b>18</b>          | <b>11</b>          | <b>17</b>          |
| Selenium            | < 2                | < 2                | < 2                | < 2                | < 2                | < 2                |
| Zinc                | <b>45</b>          | <b>47</b>          | <b>46</b>          | <b>41</b>          | <b>59</b>          | <b>45</b>          |

**Table 5** Results for specified inorganics in soil - non-metals

| Determinand      | BH.01<br>(mg/kg)   |                    | BH.02<br>(mg/kg)   |                    | BH.03<br>(mg/kg)   |                    |
|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                  | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm |
| Cyanide (total)  | < 1                | < 1                | < 1                | < 1                | < 1                | < 1                |
| Sulphate (total) | <b>608</b>         | <b>603</b>         | <b>254</b>         | < 200              | <b>476</b>         | < 200              |
| Sulphide         | < 5                | < 5                | < 5                | < 5                | < 5                | < 5                |
| Chloride         | <b>22</b>          | <b>23</b>          | <b>11</b>          | <b>9</b>           | <b>51</b>          | <b>19</b>          |
| Asbestos         | None detected      | None detected      | None detected      | None detected      | None detected      | None detected      |

**Table 6** Results for specified hydrocarbons in soil

| Determinand  | BH.01<br>(mg/kg)   |                    | BH.02<br>(mg/kg)   |                    | BH.03<br>(mg/kg)   |                    |
|--------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|              | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm |
| Benzene      | < 0.002            | < 0.002            | < 0.002            | < 0.002            | < 0.002            | < 0.002            |
| Toluene      | < 0.005            | < 0.005            | < 0.005            | < 0.005            | < 0.005            | < 0.005            |
| Ethylbenzene | < 0.002            | < 0.002            | <b>0.006</b>       | <b>0.006</b>       | < 0.002            | < 0.002            |
| p & m-Xylene | < 0.002            | < 0.002            | <b>0.004</b>       | <b>0.004</b>       | < 0.002            | < 0.002            |
| o-Xylene     | < 0.002            | < 0.002            | < 0.002            | < 0.002            | < 0.002            | < 0.002            |
| MTBE         | < 0.005            | < 0.005            | < 0.005            | < 0.005            | < 0.005            | < 0.005            |
| Phenols      | <2                 | <2                 | <2                 | <2                 | <2                 | <2                 |

**Table 7** Non-specified VOCs - measured by photo-ionisation detection in-situ

| BH.01              |                    | BH.02              |                    | BH.03              |                    |
|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm |
| < 0.1 ppm          | < 0.1 ppm          | < 0.1 ppm          | < 0.1 ppm          | < 0.1 ppm          | < 0.1 ppm          |

**Table 8** Results for poly-aromatic hydrocarbons in soil

| Determinand           | BH.01<br>(mg/kg)   |                    | BH.02<br>(mg/kg)   |                    | BH.03<br>(mg/kg)   |                    |
|-----------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                       | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm |
| Naphthalene           | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| Acenaphthylene        | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| Acenaphthene          | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| Fluorene              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| Phenanthrene          | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| Anthracene            | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| Fluoranthene          | < 0.1              | < 0.1              | < 0.1              | < 0.1              | <b>0.19</b>        | < 0.1              |
| Pyrene                | < 0.1              | < 0.1              | < 0.1              | < 0.1              | <b>0.17</b>        | < 0.1              |
| Benzo(a)anthracene    | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| Chrysene              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | <b>0.13</b>        | < 0.1              |
| Benzo(b)fluoranthene  | < 0.1              | < 0.1              | < 0.1              | < 0.1              | <b>0.16</b>        | < 0.1              |
| Benzo(k)fluoranthene  | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| Benzo(a)pyrene        | < 0.1              | < 0.1              | < 0.1              | < 0.1              | <b>0.13</b>        | < 0.1              |
| Indeno(123-cd)pyrene  | < 0.1              | < 0.1              | < 0.1              | < 0.1              | <b>0.12</b>        | < 0.1              |
| Dibenzo(ah)anthracene | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| Benzo(ghi)perylene    | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| Coronene              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              | < 0.1              |
| <b>Total PAHs</b>     | < 1.6              | < 1.6              | < 1.6              | < 1.6              | <b>&lt; 1.6</b>    | < 1.6              |

**Table 9** Results for petroleum hydrocarbons in soil

| Determinand                          | BH.01<br>(mg/kg)   |                    | BH.02<br>(mg/kg)   |                    | BH.03<br>(mg/kg)   |                    |
|--------------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                                      | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm | Depth<br>200-300mm | Depth<br>500-600mm |
| Aliphatic C5 - C6                    | < 0.01             | < 0.01             | < 0.01             | < 0.01             | < 0.01             | < 0.01             |
| Aliphatic C6 - C8                    | < 0.05             | < 0.05             | < 0.05             | < 0.05             | < 0.05             | < 0.05             |
| Aliphatic C8 - C10                   | < 2                | < 2                | < 2                | < 2                | < 2                | < 2                |
| Aliphatic C10 - C12                  | < 2                | < 2                | < 2                | < 2                | < 2                | < 2                |
| Aliphatic C12 - C16                  | < 3                | < 3                | < 3                | < 3                | < 3                | < 3                |
| Aliphatic C16 - C21                  | < 3                | < 3                | < 3                | < 3                | < 3                | < 3                |
| Aliphatic C21 - C34                  | < 10               | < 10               | < 10               | < 10               | < 10               | < 10               |
| Aliphatic C35 - C40                  | < 10               | < 10               | < 10               | < 10               | < 10               | < 10               |
| <b>Total Aliphatic<br/>(C5 - 40)</b> | < 21               | < 21               | < 21               | < 21               | < 21               | < 21               |
|                                      |                    |                    |                    |                    |                    |                    |
| Aromatic C5 - C7                     | < 0.01             | < 0.01             | < 0.01             | < 0.01             | < 0.01             | < 0.01             |
| Aromatic C7 - C8                     | < 0.05             | < 0.05             | < 0.05             | < 0.05             | < 0.05             | < 0.05             |
| Aromatic C8 - C10                    | < 2                | < 2                | < 2                | < 2                | < 2                | < 2                |
| Aromatic C10 - C12                   | < 2                | < 2                | < 2                | < 2                | < 2                | < 2                |
| Aromatic C12 - C16                   | < 2                | < 2                | < 2                | < 2                | < 2                | < 2                |
| Aromatic C16 - C21                   | < 3                | < 2                | < 2                | < 2                | < 2                | < 3                |
| Aromatic C21 - C35                   | < 10               | < 10               | < 10               | < 10               | < 10               | < 10               |
| Aromatic C35 - C40                   | < 10               | < 10               | < 10               | < 10               | < 10               | < 10               |
| <b>Total Aromatic<br/>(C5 - 35)</b>  | < 21               | < 21               | < 21               | < 21               | < 21               | < 21               |
| <b>Total (C6 - 40)</b>               | < 42               | < 42               | < 42               | < 42               | < 42               | < 42               |

**Table 10** Results for petroleum hydrocarbons in groundwater

| Determinand                      | W.01<br>(BH.01)<br>(mg/l) | W.02<br>(BH.02)<br>(mg/l) |
|----------------------------------|---------------------------|---------------------------|
| Aliphatic C5 - C6                | < 0.01                    | < 0.01                    |
| Aliphatic C6 - C8                | < 0.01                    | < 0.01                    |
| Aliphatic C8 - C10               | < 0.01                    | < 0.01                    |
| Aliphatic C10 - C12              | < 0.01                    | < 0.01                    |
| Aliphatic C12 - C16              | < 0.01                    | < 0.01                    |
| Aliphatic C16 - C21              | < 0.01                    | < 0.01                    |
| Aliphatic C21 - C34              | < 0.01                    | < 0.01                    |
| <b>Total Aliphatic (C5 - 34)</b> | < 0.07                    | < 0.07                    |
|                                  |                           |                           |
| Aromatic C5 - C7                 | < 0.01                    | < 0.01                    |
| Aromatic C7 - C8                 | < 0.01                    | < 0.01                    |
| Aromatic C8 - C10                | < 0.01                    | < 0.01                    |
| Aromatic C10 - C12               | < 0.01                    | < 0.01                    |
| Aromatic C12 - C16               | < 0.01                    | < 0.01                    |
| Aromatic C16 - C21               | < 0.01                    | < 0.01                    |
| Aromatic C21 - C35               | < 0.01                    | < 0.01                    |
| <b>Total Aromatic (C5 -35)</b>   | < 0.07                    | < 0.07                    |
| <b>Total (C5 - 35)</b>           | < 0.14                    | < 0.14                    |

**Table 11** Results for specified hydrocarbons in groundwater

| Determinand  | W.01<br>(BH.01)<br>(mg/l) | W.02<br>(BH.02)<br>(mg/l) |
|--------------|---------------------------|---------------------------|
| Benzene      | < 0.001                   | < 0.001                   |
| Toluene      | < 0.005                   | < 0.005                   |
| Ethylbenzene | < 0.005                   | < 0.002                   |
| p & m-Xylene | < 0.01                    | < 0.01                    |
| o-Xylene     | < 0.005                   | < 0.005                   |
| MTBE         | < 0.01                    | < 0.01                    |

**Table 12** Non-specified VOCs - measured by photo-ionisation detection in-situ

| Determinand        | W.01<br>(BH.01)<br>(mg/l) | W.02<br>(BH.02)<br>(mg/l) |
|--------------------|---------------------------|---------------------------|
| Non-specified VOCs | < 0.1                     | <0.1                      |

**Table 13** Results for VOCs in groundwater

| Determinand              | W.01<br>(BH.01)<br>(mg/l) | Determinand               | W.01<br>(BH.01)<br>(mg/l) |
|--------------------------|---------------------------|---------------------------|---------------------------|
| Dichlorodifluoromethane  | < 0.005                   | Bromodichloromethane      | < 0.005                   |
| Vinyl Chloride           | < 0.005                   | Dibromomethane            | < 0.005                   |
| Chloromethane            | < 0.005                   | TAME                      | < 0.005                   |
| Chloroethane             | < 0.005                   | cis-1,3-Dichloropropene   | < 0.005                   |
| Bromomethane             | < 0.005                   | Toluene                   | < 0.005                   |
| Trichlorofluoromethane   | < 0.005                   | trans-1,3-Dichloropropene | < 0.005                   |
| 1,1-Dichloroethene       | < 0.005                   | 1,1,2-Trichloroethane     | < 0.01                    |
| MTBE                     | < 0.07                    | 1,3-Dichloropropane       | < 0.005                   |
| trans-1,2-Dichloroethene | < 0.005                   | Tetrachloroethene         | < 0.005                   |
| 1,1-Dichloroethane       | < 0.005                   | Dibromochloromethane      | < 0.005                   |
| cis-1,2-Dichloroethene   | < 0.005                   | 1,2-Dibromoethane         | < 0.005                   |
| 2,2-Dichloropropane      | < 0.005                   | Chlorobenzene             | < 0.005                   |
| Chloroform               | < 0.005                   | 1,1,1,2-Tetrachloroethane | < 0.005                   |
| Bromochloromethane       | < 0.01                    | Ethyl Benzene             | < 0.005                   |
| 1,1,1-Trichloroethane    | < 0.005                   | m,p-Xylene                | < 0.01                    |
| 1,1-Dichloropropene      | < 0.005                   | o-Xylene                  | < 0.005                   |
| Carbon Tetrachloride     | < 0.005                   | Styrene                   | < 0.005                   |
| 1,2-Dichloroethane       | < 0.01                    | Bromoform                 | < 0.01                    |
| Benzene                  | < 0.001                   | Isopropylbenzene          | < 0.005                   |
| 1,2-Dichloropropane      | < 0.005                   | 1,1,2,2-Tetrachloroethane | < 0.01                    |
| Trichloroethene          | < 0.005                   | 1,2,3-Trichloropropane    | < 0.005                   |

**Table 13 (Cont.)** Results for VOCs in groundwater

| Determinand               | W.01<br>(BH.01)<br>(mg/l) |
|---------------------------|---------------------------|
| n-Propylbenzene           | < 0.01                    |
| Bromobenzene              | < 0.01                    |
| 2-Chlorotoluene           | < 0.01                    |
| 1,3,5-Trimethylbenzene    | < 0.01                    |
| 4-Chlorotoluene           | < 0.01                    |
| tert-Butylbenzene         | < 0.01                    |
| 1,2,4-Trimethylbenzene    | < 0.01                    |
| sec-Butylbenzene          | < 0.07                    |
| p-Isopropyltoluene        | < 0.01                    |
| 1,3-Dichlorobenzene       | < 0.01                    |
| 1,4-Dichlorobenzene       | < 0.005                   |
| n-Butylbenzene            | < 0.005                   |
| 1,2-Dichlorobenzene       | < 0.005                   |
| 2-Dibromo-3-chloropropane | <0.01                     |
| Hexachlorobutadiene       | < 0.005                   |

## 5 Interpretation

Tables 14 to 19 below show the soil guideline concentrations and water quality screening values used as part of this assessment.

Where Environment Agency guideline values are unavailable, soil guideline concentrations derived using CLEA software packages and other published guidelines have been consulted. In all instances guideline values for residential end-use with home-grown produce have been considered.

For the purposes of this assessment therefore, the following guideline criteria have been referred to:

- Environment Agency Category 4 Screening Levels (2014);
- CIEH (LQM) GAC 3rd Edition (residential end-use);
- Atkins ATRISK SSVs (residential end-use with home-grown produce);
- GAC CLEA generated value for residential end-use with home-grown produce; and
- others, as available.

In the absence of any UK groundwater contamination guidelines, the following criteria have been referred to:

- UK Drinking Water Standards ;
- Environment Agency MRVs;
- WHO Drinking Water Quality Guideline values;
- Dutch Standards for Groundwater Quality; and
- Atkins ATRISK WSVs (residential end-use with home-grown produce);

Note that for some guideline values a choice of soil organic matter (SOM) concentration is provided whereby different guideline concentrations exist for SOM values of between 1% and 6%.

In this specific instance the more stringent guideline value for 1% SOM has been referred to, despite the mean organic content being determined as 0.6%; which approximates to 1% SOM.

**Table 14** Soil guideline concentrations for inorganics referred to for this assessment

| Determinand                           | Guideline concentration for 1% SOM (mg/kg) | Origin                                                             |
|---------------------------------------|--------------------------------------------|--------------------------------------------------------------------|
| Arsenic                               | 37                                         | Atkins ATRISK Category 4 Screening Level                           |
| Boron                                 | 290                                        | LQM/CIEH S4ULs (CLEA 1.06) for residential with home-grown produce |
| Cadmium                               | 22.1                                       | Atkins ATRISK Category 4 Screening Level                           |
| Chromium                              | 14300                                      | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Chromium VI                           | 20.5                                       | Atkins ATRISK Category 4 Screening Level                           |
| Copper                                | 4730                                       | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Lead                                  | 200                                        | Category 4 Screening Level <sup>(a)</sup>                          |
| Mercury (elemental)                   | 0.0863                                     | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Mercury (inorganic Hg <sup>2+</sup> ) | 180                                        | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Nickel                                | 136                                        | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Selenium                              | 375                                        | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Zinc                                  | 20000                                      | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Free Cyanide                          | 34                                         | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Sulphate                              | 10000                                      | ICRCL Action Value domestic gardens <sup>(b)</sup>                 |
| Sulphide                              | 1000                                       | ICRCL Action Value all uses <sup>(b)</sup>                         |
| Phenols (SOM 1%)                      | 267                                        | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Benzene (SOM 1%)                      | 0.137                                      | Atkins ATRISK (C4SL) for residential with home-grown produce       |
| Toluene (SOM 1%)                      | 113                                        | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Ethylbenzene (SOM 1%)                 | 50.7                                       | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| o-Xylene (SOM 1%)                     | 26.4                                       | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| m-Xylene (SOM 1%)                     | 25                                         | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| p-Xylene (SOM 1%)                     | 24                                         | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |

(a) Quoted for residential land-use 0-7 year-old child taking into account bioavailability, with exposure parameters as detailed in report SR3.

(b) This 'withdrawn' value has been quoted in the absence of any other available published guideline.

**Table 15** Soil guideline concentrations for PAHs referred to for this assessment

| Determinand           | Guideline concentration for 1% SOM (mg/kg) | Origin                                                                |
|-----------------------|--------------------------------------------|-----------------------------------------------------------------------|
| Naphthalene           | 2.3                                        | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |
| Acenaphthylene        | 608                                        | Atkins ATRISK (CLEA 1.07)<br>for residential with home-grown produce  |
| Acenaphthene          | 210                                        | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |
| Fluorene              | 735                                        | Atkins ATRISK (CLEA 1.07)<br>for residential with home-grown produce  |
| Phenanthrene          | 95                                         | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |
| Anthracene            | 10200                                      | Atkins ATRISK (CLEA 1.07)<br>for residential with home-grown produce  |
| Fluoranthene          | 983                                        | Atkins ATRISK (CLEA 1.07)<br>for residential with home-grown produce  |
| Pyrene                | 668                                        | Atkins ATRISK (CLEA 1.07)<br>for residential with home-grown produce  |
| Benzo(a)anthracene    | 7.2                                        | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |
| Chrysene              | 15                                         | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |
| Benzo(b)fluoranthene  | 2.6                                        | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |
| Benzo(k)fluoranthene  | 77                                         | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |
| Benzo(a)pyrene        | 2.2                                        | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |
| Indeno(123-cd)pyrene  | 27                                         | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |
| Dibenzo(ah)anthracene | 0.24                                       | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |
| Benzo(ghi)perylene    | 320                                        | LQM/CIEH S4ULs (CLEA 1.06)<br>for residential with home-grown produce |

**Table 16** Soil guideline concentrations for TPHs referred to for this assessment

| Determinand           | Guideline concentration for 1% SOM (mg/kg) | Origin                                                             |
|-----------------------|--------------------------------------------|--------------------------------------------------------------------|
| Aliphatic TPH C5-C6   | 42.7                                       | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aliphatic TPH C6-C8   | 99.3                                       | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aliphatic TPH C8-C10  | 13.9                                       | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aliphatic TPH C10-C12 | 81.7                                       | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aliphatic TPH C12-C16 | 385                                        | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aliphatic TPH C16-C35 | 210000                                     | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aliphatic TPH C35-C44 | 65000                                      | LQM/CIEH S4ULs (CLEA 1.06) for residential with home-grown produce |
| Aromatic TPH C5-C7    | 0.137                                      | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aromatic TPH C7-C8    | 113                                        | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aromatic TPH C8-C10   | 20.5                                       | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aromatic TPH C10-C12  | 70                                         | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aromatic TPH C12-C16  | 165                                        | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aromatic TPH C16-C21  | 319                                        | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aromatic TPH C21-C35  | 1120                                       | Atkins ATRISK (CLEA 1.07) for residential with home-grown produce  |
| Aromatic TPH C5-C35   | 1100                                       | LQM/CIEH S4ULs (CLEA 1.06) for residential with home-grown produce |

**Table 17** Water guideline concentrations for petroleum hydrocarbons referred to for this assessment

| Determinand           | Water guideline concentration mg/l | Origin                                        |
|-----------------------|------------------------------------|-----------------------------------------------|
| Aliphatic TPH C5-C6   | 1.93                               | Atkins ATRISK (CLEA 1.07) for residential use |
| Aliphatic TPH C6-C8   | 1.40                               | Atkins ATRISK (CLEA 1.07) for residential use |
| Aliphatic TPH C8-C10  | 0.0296                             | Atkins ATRISK (CLEA 1.07) for residential use |
| Aliphatic TPH C10-C12 | 0.0228                             | Atkins ATRISK (CLEA 1.07) for residential use |
| Aliphatic TPH C12-C16 | 0.00547                            | Atkins ATRISK (CLEA 1.07) for residential use |
| Aliphatic TPH C16-35  | -                                  | -                                             |
| Aliphatic TPH C35-C44 | 0.3*                               | WHO Drinking water                            |
| Aromatic TPH C5-C7    | 0.0888                             | Atkins ATRISK (CLEA 1.07) for residential use |
| Aromatic TPH C7-C8    | 96.4                               | Atkins ATRISK (CLEA 1.07) for residential use |
| Aromatic TPH C8-C10   | 0.985                              | Atkins ATRISK (CLEA 1.07) for residential use |
| Aromatic TPH C10-C12  | 3.87                               | Atkins ATRISK (CLEA 1.07) for residential use |
| Aromatic TPH C12-16   | 10.5                               | Atkins ATRISK (CLEA 1.07) for residential use |
| Aromatic TPH C16-21   | 0.543                              | Dutch SRC (February 2001) Groundwater         |
| Aromatic TPH C21-C35  | 0.0066                             | Dutch SRC (February 2001) Groundwater         |
| Aromatic TPH C35-C44  | 0.04                               | Dutch standards (2009) Groundwater            |

\* Dependent upon body weight

**Table 18** Water guideline concentrations for BTEXs referred to for this assessment

| Determinand  | Water guideline concentration mg/l | Origin                                        |
|--------------|------------------------------------|-----------------------------------------------|
| Phenols      | 1690                               | Atkins ATRISK (CLEA 1.07) for residential use |
| Benzene      | 0.0888                             | Atkins ATRISK (CLEA 1.07) for residential use |
| Toluene      | 96.4                               | Atkins ATRISK (CLEA 1.07) for residential use |
| Ethylbenzene | 13.4                               | Atkins ATRISK (CLEA 1.07) for residential use |
| o-Xylene     | 5.00                               | Atkins ATRISK (CLEA 1.07) for residential use |
| m-Xylene     | 4.10                               | Atkins ATRISK (CLEA 1.07) for residential use |
| p-Xylene     | 4.29                               | Atkins ATRISK (CLEA 1.07) for residential use |

**Table 19** Water guideline concentrations for VOCs referred to for this assessment

| Determinand              | Water guideline concentration mg/l                            | Determinand               | Water guideline concentration mg/l                          |
|--------------------------|---------------------------------------------------------------|---------------------------|-------------------------------------------------------------|
| Dichlorodifluoromethane  | -                                                             | Bromodichloromethane      | -                                                           |
| Vinyl Chloride           | 0.0005<br>(drinking water standards)                          | Dibromomethane            | -                                                           |
| Chloromethane            | 0.0531<br>Atkins ATRISK<br>(CLEA 1.07)<br>for residential use | TAME                      | -                                                           |
| Chloroethane             | 41.5<br>Atkins ATRISK<br>(CLEA 1.07)<br>for residential use   | cis-1,3-Dichloropropene   | -                                                           |
| Bromomethane             | -                                                             | Toluene                   | 4 (EA MRV)                                                  |
| Trichlorofluoromethane   | -                                                             | trans-1,3-Dichloropropene | -                                                           |
| 1,1-Dichloroethene       | -                                                             | 1,1,2-Trichloroethane     | 0.1 (EA MRV)                                                |
| MTBE                     | -                                                             | 1,3-Dichloropropane       | -                                                           |
| trans-1,2-Dichloroethene | 0.676<br>Atkins ATRISK<br>(CLEA 1.07)<br>for residential use  | Tetrachloroethene         | 1.66<br>Atkins ATRISK<br>(CLEA 1.07)<br>for residential use |
| 1,1-Dichloroethane       | 11.4<br>Atkins ATRISK<br>(CLEA 1.07)<br>for residential use   | Dibromochloromethane      | -                                                           |
| cis-1,2-Dichloroethene   | -                                                             | 1,2-Dibromoethane         | -                                                           |
| 2,2-Dichloropropane      | -                                                             | Chlorobenzene             | -                                                           |
| Chloroform               | 3.88<br>Atkins ATRISK<br>(CLEA 1.07)<br>for residential use   | 1,1,1,2-Tetrachloroethane | 6.89<br>Atkins ATRISK (CLEA 1.07)<br>for residential use    |
| Bromochloromethane       | 0.0725<br>Atkins ATRISK<br>(CLEA 1.07)<br>for residential use | Ethyl Benzene             | -                                                           |
| 1,1,1-Trichloroethane    | 0.1 (EA MRV)                                                  | m,p-Xylene                | 3 (EA MRV)                                                  |
| 1,1-Dichloropropene      | -                                                             | o-Xylene                  | 3 (EA MRV)                                                  |
| Carbon Tetrachloride     | -                                                             | Styrene                   | 38.6<br>Atkins ATRISK<br>(CLEA 1.07)<br>for residential use |

**Table 19 (Cont.)** Water guideline concentrations for VOCs referred to for this assessment

| Determinand               | Water guideline concentration mg/l                           | Determinand               | Water guideline concentration mg/l                          |
|---------------------------|--------------------------------------------------------------|---------------------------|-------------------------------------------------------------|
| 1,2-Dichloroethane        | 1 (EA MRV)                                                   | 1,2,4-Trimethylbenzene    | 0.110<br>(Atkins ATRISK (CLEA 1.07)<br>for residential use) |
| Benzene                   | 1 (EA MRV)                                                   | sec-Butylbenzene          | -                                                           |
| 1,2-Dichloropropane       | 0.0969<br>(Atkins ATRISK (CLEA 1.07)<br>for residential use) | p-Isopropyltoluene        | -                                                           |
| Trichloroethene           |                                                              | 1,3-Dichlorobenzene       | -                                                           |
| Bromoform                 | 15.9<br>Atkins ATRISK<br>(CLEA 1.07)<br>for residential use  | 1,4-Dichlorobenzene       | -                                                           |
| Isopropylbenzene          | -                                                            | n-Butylbenzene            | -                                                           |
| 1,1,2,2-Tetrachloroethane | -                                                            | 1,2-Dichlorobenzene       | -                                                           |
| 1,2,3-Trichloropropane    | -                                                            | 2-Dibromo-3-chloropropane | -                                                           |
| n-Propylbenzene           | -                                                            | Hexachlorobutadiene       | -                                                           |
| Bromobenzene              | -                                                            | 4-Chlorotoluene           | -                                                           |
| 2-Chlorotoluene           | -                                                            | tert-Butylbenzene         | -                                                           |
| 1,3,5-Trimethylbenzene    | -                                                            |                           |                                                             |

## 6 Results evaluation

As detailed above, three boreholes were drilled across the site to a maximum depth of 3000mm; from each of which two soil samples were collected for laboratory analysis, representing the direct and indirect contact zones.

IN addition to this, groundwater samples were taken from boreholes BH.01 and BH.02.

In doing so, the results reproduced in Tables 4 to 9 above have shown that although there were a number of chemical substances detected within the soil, there were no determinands identified above their corresponding referenced soil guideline criteria, when considered for residential development.

Furthermore, the results reproduced in Tables 10 to 13 above have shown that there were no chemical substances detected within the groundwater.

## 7 Review of conceptual model and risk assessment

Using the sampling results and observations made, the conceptual site model (CSM) from the Phase 1 desk study can now be reviewed and updated. In doing so any uncertainties highlighted within that report can now be readdressed and the corresponding risk reassessed.

In reviewing this conceptual model, Table 20 below highlights any perceived pollutant pathway linkages that may be present.

It should be noted that the following re-assessment of risk, has been made on the basis that there will be no soft landscaped areas as part of the new residential development.

The risk matrix used for this purpose is reproduced below in Figure 2.

**Figure 2** Risk assessment algorithm

| Potential severity | Risk rating |   |    |    |    |    | Severity of hazard                             | Probability of hazard | Overall risk  |
|--------------------|-------------|---|----|----|----|----|------------------------------------------------|-----------------------|---------------|
|                    | 5           | 5 | 10 | 15 | 20 | 25 | 5 = Fatality                                   | 1 = Improbable        | 1 - 6 Low     |
|                    | 4           | 4 | 8  | 12 | 16 | 20 | 4 = Major                                      | 2 = Remote            | 8 - 12 Medium |
|                    | 3           | 3 | 6  | 9  | 12 | 15 | 3 = Minor                                      | 3 = Possible          | 15 - 25 High  |
|                    | 2           | 2 | 4  | 6  | 8  | 10 | 2 = Negligible                                 | 4 = Probable          |               |
|                    | 1           | 1 | 2  | 3  | 4  | 5  | 1 = None                                       | 5 = Certainty         |               |
|                    |             | 1 | 2  | 3  | 4  | 5  |                                                |                       |               |
|                    | Probability |   |    |    |    |    | Severity of hazard x probability = risk rating |                       |               |

**Table 20** Perceived risk to receptors

| Contaminants identified | Potential pathways                                              | Perceived level of risk | Comments and reasoning                                                                                                                                  |
|-------------------------|-----------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| None                    | Ingestion of soil                                               | 4                       | In the absence of any identified chemical contamination, the corresponding risk from ingestion of soil is expected to be low.                           |
|                         | Dermal contact with soil                                        | 4                       | In the absence of any identified chemical contamination, the corresponding risk from direct and indirect contact with soil is expected to be low.       |
|                         | Inhalation of soil dust                                         | 4                       | In the absence of any identified chemical contamination, the corresponding risk from inhalation of the soil is expected to be low.                      |
|                         | Consumption of home-grown vegetables                            | 4                       | In the absence of any identified chemical contamination, the corresponding risk from ingesting contaminated fruit and vegetables is expected to be low. |
|                         | Inhalation or ignition of gases or vapours                      | 4                       | In the absence of any identified organic material within made-ground, the corresponding risk from gases or vapours is deemed to be low.                 |
|                         | Contact with mains services and building fabric below ground    | 4                       | In the absence of any identified chemical contamination, the corresponding risk to underground services and building fabric is expected to be low.      |
|                         | Contact with groundwater and other off-site environmental media | 4                       | In the absence of any identified soil contamination, the likelihood of impacting groundwater and other off-site media is expected to be low.            |

## 8 Summary and recommendations

### 8.1 Summary

This report has aimed to determine whether or not there is any unacceptable soil contamination beneath the surface of the site, with a particular focus on whether the site may have been impacted by an off-site former garage to the immediate southwest.

For this purpose, three boreholes were drilled, down to a minimum depth of 2000mm, allowing the subsurface to be both visually characterised, and analytically assessed for possible contamination.

Soil samples were obtained from two separate depths at each location, and analysed for the determinands highlighted in the conceptual site model (CSM). Furthermore, groundwater samples were also obtained from two of the bores.

The results have shown that there were no determinands above guideline criteria for residential development in either the soil or water samples analysed.

There were also no other visual or olfactory concerns noted.

### 8.2 Recommendations

The findings from both the soil and groundwater analyses suggest that there should be no requirement to undertake any remedial action at this site.

It is however recommended that an informal observation strategy is put in place during all groundworks that take place as part of the development. Should there be a suspicion that the soil on or beneath the site could be potentially contaminated by means of observation or odour, then work should stop immediately to allow the concern to be appropriately investigated, and the contaminated land officer at HBC notified accordingly.

## 9 Limitations

This work has been undertaken in accordance with Apple Environmental Limited's standard terms and conditions.

The findings represent the professional opinion of the report author. All work carried out is based upon Apple Environmental Limited's current professional knowledge and understanding. It is therefore stated that the conclusions of this report have been based upon information gathered from a number of sources and it can only be assumed that this information provided was accurate and correct.

Intrusive investigation undertaken as part of this work has been restricted to a level of detail required to achieve the stated objectives of this work. The results of any measurements taken may vary spatially or with time, and further confirmatory measurements may wish to be considered, as necessary.

It is also pointed out that soil and groundwater sampling, may only provide a general indication of contamination present. There is always the possibility that other undetected contaminants exist, or, that detected contaminants may exist at a greater concentration than that specified in areas of the site that have not been intrusively investigated.

It is further noted that the findings detailed in this report relate entirely to the contaminative status of the site as at the time of compiling this report, and therefore can not take account of subsequent on or off-site activities that may have impacted the site after this date.

## 10 References and specific sources of information

1. Investigation of potentially contaminated sites - code of practice (BSI 10175:2011+A2:2017)
2. Land Contamination Risk Management (LCRM) - Environment Agency (April 2021)
3. Using Soil Guideline Values - Environment Agency Science Report SC050021/SGV (March 2009)
4. The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment CIEH 3<sup>rd</sup> Ed. - Land Quality Management Ltd. (2015)
5. Atkins ATRISK SSCs (July 2017)
6. CLEA Software (Version 1.05) Handbook - Environment Agency Science Report SC050021/SR4 (January 2014)
7. ICRCCL 59/83 Trigger Concentrations - Department of the Environment (1983)
8. Land Affected by Contamination - Planning Practice Guidance - The Department for Communities and Local Government (June 2014)
9. The National Planning Policy Framework (Revised) - December 2023
10. Model procedures for the management of contaminated land (CLR-11) - Environment Agency (September 2004)
11. Contaminated Land Risk Assessment: A Guide to Good Practice (C552) - CIRIA (2001)
12. SP1010 - Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - CL:AIRE (September 2014)
13. British Geological Survey. Geology of Britain:  
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html?>

## APPENDICES

- i Laboratory data
- ii Calibration certification



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**Normec DETS Limited**  
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ME17 2JN  
t: 01622 850410

**DETS Report No:** [REDACTED]

**Site Reference:** None Supplied

**Project / Job Ref:** [REDACTED]

**Order No:** None Supplied

**Sample Receipt Date:** 22/07/2024

**Sample Scheduled Date:** 22/07/2024

**Report Issue Number:** 1

**Reporting Date:** 26/07/2024

**Authorised by:**



Steve Knight  
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



Normec DETS Limited  
Unit 1, Rose Lane Industrial Estate  
Rose Lane  
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Maidstone  
Kent ME17 2JN  
Tel : 01622 850410



| Soil Analysis Certificate      |                  |               |               |               |               |
|--------------------------------|------------------|---------------|---------------|---------------|---------------|
| DETS Report No: 24-08270       | ~Date Sampled    | 17/07/24      | 17/07/24      | 17/07/24      | 17/07/24      |
| Apple Environmental Ltd        | ~Time Sampled    | None Supplied | None Supplied | None Supplied | None Supplied |
| ~Site Reference: None Supplied | ~TP / BH No      | BH.01/01/3610 | BH.01/02/3610 | BH.02/01/3610 | BH.02/02/3610 |
| ~Project / Job Ref:            | ~Additional Refs | None Supplied | None Supplied | None Supplied | None Supplied |
| ~Order No: None Supplied       | ~Depth (m)       | None Supplied | None Supplied | None Supplied | None Supplied |
| Reporting Date: 26/07/2024     | DETS Sample No   | 727558        | 727559        | 727560        | 727561        |

| Determinand                                                                | Unit     | RL     | Accreditation |              |              |              |              |              |
|----------------------------------------------------------------------------|----------|--------|---------------|--------------|--------------|--------------|--------------|--------------|
| Asbestos Screen (S)                                                        | N/a      | N/a    | ISO17025      | Not Detected | Not Detected | Not Detected | Not Detected | Not Detected |
| pH                                                                         | pH Units | N/a    | MCERTS        | 8.2          | 8.0          | 8.2          | 8.0          | 8.5          |
| Total Cyanide                                                              | mg/kg    | < 1    | NONE          | < 1          | < 1          | < 1          | < 1          | < 1          |
| Total Sulphate as SO <sub>4</sub>                                          | mg/kg    | < 200  | MCERTS        | 608          | 603          | 254          | < 200        | 476          |
| Total Sulphate as SO <sub>4</sub>                                          | %        | < 0.02 | MCERTS        | 0.06         | 0.06         | 0.03         | < 0.02       | 0.05         |
| W/S Sulphate as SO <sub>4</sub> (2:1)                                      | mg/l     | < 10   | MCERTS        | 159          | 210          | 43           | 40           | 60           |
| W/S Sulphate as SO <sub>4</sub> (2:1)                                      | g/l      | < 0.01 | MCERTS        | 0.16         | 0.21         | 0.04         | 0.04         | 0.06         |
| Sulphide                                                                   | mg/kg    | < 5    | NONE          | < 5          | < 5          | < 5          | < 5          | < 5          |
| TOC (Total Organic Carbon)                                                 | %        | < 0.1  | MCERTS        | 0.7          | 0.8          | 0.4          | 0.4          | 1            |
| W/S Chloride (2:1)                                                         | mg/kg    | < 1    | MCERTS        | 22           | 23           | 11           | 9            | 51           |
| W/S Chloride (2:1)                                                         | mg/l     | < 0.5  | MCERTS        | 11.1         | 11.3         | 5.3          | 4.5          | 25.4         |
| Arsenic (As)                                                               | mg/kg    | < 2    | MCERTS        | 8            | 7            | 11           | 10           | 9            |
| W/S Boron                                                                  | mg/kg    | < 1    | NONE          | < 1          | < 1          | < 1          | < 1          | < 1          |
| Cadmium (Cd)                                                               | mg/kg    | < 0.2  | MCERTS        | < 0.2        | < 0.2        | < 0.2        | < 0.2        | < 0.2        |
| Chromium (Cr)                                                              | mg/kg    | < 2    | MCERTS        | 19           | 20           | 27           | 24           | 18           |
| Chromium (hexavalent)                                                      | mg/kg    | < 2    | NONE          | < 2          | < 2          | < 2          | < 2          | < 2          |
| Copper (Cu)                                                                | mg/kg    | < 4    | MCERTS        | 12           | 12           | 11           | 9            | 14           |
| Lead (Pb)                                                                  | mg/kg    | < 3    | MCERTS        | 25           | 23           | 13           | 12           | 40           |
| Mercury (Hg)                                                               | mg/kg    | < 1    | MCERTS        | < 1          | < 1          | < 1          | < 1          | < 1          |
| Nickel (Ni)                                                                | mg/kg    | < 3    | MCERTS        | 13           | 13           | 22           | 18           | 11           |
| Selenium (Se)                                                              | mg/kg    | < 2    | MCERTS        | < 2          | < 2          | < 2          | < 2          | < 2          |
| Zinc (Zn)                                                                  | mg/kg    | < 3    | MCERTS        | 45           | 47           | 46           | 41           | 59           |
| Total Phenols (monohydric)                                                 | mg/kg    | < 2    | NONE          | < 2          | < 2          | < 2          | < 2          | < 2          |
| TPH - Aliphatic >C35 - C40 :<br>EH CU 1D AL                                | mg/kg    | < 10   | NONE          | < 10         | < 10         | < 10         | < 10         | < 10         |
| TPH - Aromatic >C35 - C40 :<br>EH CU 1D AR                                 | mg/kg    | < 10   | NONE          | < 10         | < 10         | < 10         | < 10         | < 10         |
| TPH - Aliphatic / Aromatic (C6 - C40) -<br>Total : HS_1D_MS+EH_CU_1D_Total | mg/kg    | < 42   | NONE          | < 42         | < 42         | < 42         | < 42         | < 42         |

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

~Sample details provided by customer and can affect the validity of results

(hs) Please note deviating sample due to head space in container



**Normec DETS Limited**  
**Unit 1, Rose Lane Industrial Estate**  
**Rose Lane**  
**Lenham Heath**  
**Maidstone**  
**Kent ME17 2JN**  
**Tel : 01622 850410**



| Soil Analysis Certificate      |                  |               |               |               |  |
|--------------------------------|------------------|---------------|---------------|---------------|--|
| DETS Report No: 24-08270       | ~Date Sampled    | 17/07/24      | 17/07/24      | 17/07/24      |  |
| Apple Environmental Ltd        | ~Time Sampled    | None Supplied | None Supplied | None Supplied |  |
| ~Site Reference: None Supplied | ~TP / BH No      | BH.03/02/3610 | W.01/3610     | W.02/3610     |  |
| ~Project / Job Ref: [REDACTED] | ~Additional Refs | None Supplied | None Supplied | None Supplied |  |
| ~Order No: None Supplied       | ~Depth (m)       | None Supplied | None Supplied | None Supplied |  |
| Reporting Date: 26/07/2024     | DETS Sample No   | 727563        | 727564        | 727565        |  |

| Determinand                                                                | Unit     | RL     | Accreditation | (hs)         |  |  |  |
|----------------------------------------------------------------------------|----------|--------|---------------|--------------|--|--|--|
| Asbestos Screen <sup>(S)</sup>                                             | N/a      | N/a    | ISO17025      | Not Detected |  |  |  |
| pH                                                                         | pH Units | N/a    | MCERTS        | 8.1          |  |  |  |
| Total Cyanide                                                              | mg/kg    | < 1    | NONE          | < 1          |  |  |  |
| Total Sulphate as SO <sub>4</sub>                                          | mg/kg    | < 200  | MCERTS        | < 200        |  |  |  |
| Total Sulphate as SO <sub>4</sub>                                          | %        | < 0.02 | MCERTS        | < 0.02       |  |  |  |
| W/S Sulphate as SO <sub>4</sub> (2:1)                                      | mg/l     | < 10   | MCERTS        | 18           |  |  |  |
| W/S Sulphate as SO <sub>4</sub> (2:1)                                      | g/l      | < 0.01 | MCERTS        | 0.02         |  |  |  |
| Sulphide                                                                   | mg/kg    | < 5    | NONE          | < 5          |  |  |  |
| TOC (Total Organic Carbon)                                                 | %        | < 0.1  | MCERTS        | 0.5          |  |  |  |
| W/S Chloride (2:1)                                                         | mg/kg    | < 1    | MCERTS        | 19           |  |  |  |
| W/S Chloride (2:1)                                                         | mg/l     | < 0.5  | MCERTS        | 9.3          |  |  |  |
| Arsenic (As)                                                               | mg/kg    | < 2    | MCERTS        | 9            |  |  |  |
| W/S Boron                                                                  | mg/kg    | < 1    | NONE          | < 1          |  |  |  |
| Cadmium (Cd)                                                               | mg/kg    | < 0.2  | MCERTS        | < 0.2        |  |  |  |
| Chromium (Cr)                                                              | mg/kg    | < 2    | MCERTS        | 25           |  |  |  |
| Chromium (hexavalent)                                                      | mg/kg    | < 2    | NONE          | < 2          |  |  |  |
| Copper (Cu)                                                                | mg/kg    | < 4    | MCERTS        | 11           |  |  |  |
| Lead (Pb)                                                                  | mg/kg    | < 3    | MCERTS        | 11           |  |  |  |
| Mercury (Hg)                                                               | mg/kg    | < 1    | MCERTS        | < 1          |  |  |  |
| Nickel (Ni)                                                                | mg/kg    | < 3    | MCERTS        | 17           |  |  |  |
| Selenium (Se)                                                              | mg/kg    | < 2    | MCERTS        | < 2          |  |  |  |
| Zinc (Zn)                                                                  | mg/kg    | < 3    | MCERTS        | 45           |  |  |  |
| Total Phenols (monohydric)                                                 | mg/kg    | < 2    | NONE          | < 2          |  |  |  |
| TPH - Aliphatic >C35 - C40 :<br>EH CU 1D AL                                | mg/kg    | < 10   | NONE          | < 10         |  |  |  |
| TPH - Aromatic >C35 - C40 :<br>EH CU 1D AR                                 | mg/kg    | < 10   | NONE          | < 10         |  |  |  |
| TPH - Aliphatic / Aromatic (C6 - C40) -<br>Total : HS_1D_MS+EH_CU_1D_Total | mg/kg    | < 42   | NONE          | < 42         |  |  |  |

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion.  
 Subcontracted analysis (S)

~Sample details provided by customer and can affect the validity of results



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Maidstone  
Kent ME17 2JN  
Tel : 01622 850410



| Soil Analysis Certificate - Speciated PAHs |                  |               |               |               |               |
|--------------------------------------------|------------------|---------------|---------------|---------------|---------------|
| DETS Report No: 24-08270                   | ~Date Sampled    | 17/07/24      | 17/07/24      | 17/07/24      | 17/07/24      |
| Apple Environmental Ltd                    | ~Time Sampled    | None Supplied | None Supplied | None Supplied | None Supplied |
| ~Site Reference: None Supplied             | ~TP / BH No      | BH.01/01/3610 | BH.01/02/3610 | BH.02/01/3610 | BH.02/02/3610 |
| ~Project / Job Ref: [REDACTED]             | ~Additional Refs | None Supplied | None Supplied | None Supplied | None Supplied |
| ~Order No: None Supplied                   | ~Depth (m)       | None Supplied | None Supplied | None Supplied | None Supplied |
| Reporting Date: 26/07/2024                 | DETS Sample No   | 727558        | 727559        | 727560        | 727561        |

| Determinand            | Unit  | RL    | Accreditation |       |       |       |       |       |
|------------------------|-------|-------|---------------|-------|-------|-------|-------|-------|
| Naphthalene            | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Acenaphthylene         | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Acenaphthene           | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Fluorene               | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Phenanthrene           | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Anthracene             | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Fluoranthene           | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.19  |
| Pyrene                 | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.17  |
| Benzo(a)anthracene     | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Chrysene               | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.13  |
| Benzo(b)fluoranthene   | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.16  |
| Benzo(k)fluoranthene   | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Benzo(a)pyrene         | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.13  |
| Indeno(1,2,3-cd)pyrene | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.12  |
| Dibenz(a,h)anthracene  | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Benzo(ghi)perylene     | mg/kg | < 0.1 | MCERTS        | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Coronene               | mg/kg | < 0.1 | NONE          | < 0.1 | < 0.1 | < 0.1 | < 0.1 | < 0.1 |
| Total Oily Waste PAHs  | mg/kg | < 1   | MCERTS        | < 1   | < 1   | < 1   | < 1   | < 1   |
| Total Dutch 10 PAHs    | mg/kg | < 1   | MCERTS        | < 1   | < 1   | < 1   | < 1   | < 1   |
| Total EPA-16 PAHs      | mg/kg | < 1.6 | MCERTS        | < 1.6 | < 1.6 | < 1.6 | < 1.6 | < 1.6 |
| Total WAC-17 PAHs      | mg/kg | < 1.7 | NONE          | < 1.7 | < 1.7 | < 1.7 | < 1.7 | < 1.7 |

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#### Soil Analysis Certificate - Speciated PAHs

|                                |                  |               |  |  |  |  |
|--------------------------------|------------------|---------------|--|--|--|--|
| DETS Report No: 24-08270       | ~Date Sampled    | 17/07/24      |  |  |  |  |
| Apple Environmental Ltd        | ~Time Sampled    | None Supplied |  |  |  |  |
| ~Site Reference: None Supplied | ~TP / BH No      | BH.03/02/3610 |  |  |  |  |
| ~Project / Job Ref: [REDACTED] | ~Additional Refs | None Supplied |  |  |  |  |
| ~Order No: None Supplied       | ~Depth (m)       | None Supplied |  |  |  |  |
| Reporting Date: 26/07/2024     | DETS Sample No   | 727563        |  |  |  |  |

| Determinand            | Unit  | RL    | Accreditation |       |  |  |  |
|------------------------|-------|-------|---------------|-------|--|--|--|
| Naphthalene            | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Acenaphthylene         | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Acenaphthene           | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Fluorene               | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Phenanthrene           | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Anthracene             | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Fluoranthene           | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Pyrene                 | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Benzo(a)anthracene     | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Chrysene               | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Benzo(b)fluoranthene   | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Benzo(k)fluoranthene   | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Benzo(a)pyrene         | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Indeno(1,2,3-cd)pyrene | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Dibenz(a,h)anthracene  | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Benzo(ghi)perylene     | mg/kg | < 0.1 | MCERTS        | < 0.1 |  |  |  |
| Coronene               | mg/kg | < 0.1 | NONE          | < 0.1 |  |  |  |
| Total Oily Waste PAHs  | mg/kg | < 1   | MCERTS        | < 1   |  |  |  |
| Total Dutch 10 PAHs    | mg/kg | < 1   | MCERTS        | < 1   |  |  |  |
| Total EPA-16 PAHs      | mg/kg | < 1.6 | MCERTS        | < 1.6 |  |  |  |
| Total WAC-17 PAHs      | mg/kg | < 1.7 | NONE          | < 1.7 |  |  |  |

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| Soil Analysis Certificate - TPH CWG Banded |                  |               |               |               |               |               |
|--------------------------------------------|------------------|---------------|---------------|---------------|---------------|---------------|
| DETS Report No: 24-08270                   | ~Date Sampled    | 17/07/24      | 17/07/24      | 17/07/24      | 17/07/24      | 17/07/24      |
| Apple Environmental Ltd                    | ~Time Sampled    | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| ~Site Reference: None Supplied             | ~TP / BH No      | BH.01/01/3610 | BH.01/02/3610 | BH.02/01/3610 | BH.02/02/3610 | BH.03/01/3610 |
| ~Project / Job Ref:                        | ~Additional Refs | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| ~Order No: None Supplied                   | ~Depth (m)       | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Reporting Date: 26/07/2024                 | DETS Sample No   | 727558        | 727559        | 727560        | 727561        | 727562        |

| Determinand                                      | Unit  | RL     | Accreditation |        |        |        |        |        |
|--------------------------------------------------|-------|--------|---------------|--------|--------|--------|--------|--------|
| Aliphatic >C5 - C6 :<br>HS 1D_MS_AL              | mg/kg | < 0.01 | NONE          | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic >C6 - C8 :<br>HS 1D_MS_AL              | mg/kg | < 0.05 | NONE          | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Aliphatic >C8 - C10 :<br>EH_CU_1D_AL             | mg/kg | < 2    | MCERTS        | < 2    | < 2    | < 2    | < 2    | < 2    |
| Aliphatic >C10 - C12 :<br>EH_CU_1D_AL            | mg/kg | < 2    | MCERTS        | < 2    | < 2    | < 2    | < 2    | < 2    |
| Aliphatic >C12 - C16 :<br>EH_CU_1D_AL            | mg/kg | < 3    | MCERTS        | < 3    | < 3    | < 3    | < 3    | < 3    |
| Aliphatic >C16 - C21 :<br>EH_CU_1D_AL            | mg/kg | < 3    | MCERTS        | < 3    | < 3    | < 3    | < 3    | < 3    |
| Aliphatic >C21 - C34 :<br>EH_CU_1D_AL            | mg/kg | < 10   | MCERTS        | < 10   | < 10   | < 10   | < 10   | < 10   |
| Aliphatic (C5 - C34) :<br>HS_1D_MS+EH_CU_1D_AL   | mg/kg | < 21   | NONE          | < 21   | < 21   | < 21   | < 21   | < 21   |
| Aromatic >C5 - C7 :<br>HS 1D_MS_AR               | mg/kg | < 0.01 | NONE          | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aromatic >C7 - C8 :<br>HS 1D_MS_AR               | mg/kg | < 0.05 | NONE          | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Aromatic >C8 - C10 :<br>EH_CU_1D_AR              | mg/kg | < 2    | MCERTS        | < 2    | < 2    | < 2    | < 2    | < 2    |
| Aromatic >C10 - C12 :<br>EH_CU_1D_AR             | mg/kg | < 2    | MCERTS        | < 2    | < 2    | < 2    | < 2    | < 2    |
| Aromatic >C12 - C16 :<br>EH_CU_1D_AR             | mg/kg | < 2    | MCERTS        | < 2    | < 2    | < 2    | < 2    | < 2    |
| Aromatic >C16 - C21 :<br>EH_CU_1D_AR             | mg/kg | < 3    | MCERTS        | < 3    | < 3    | < 3    | < 3    | < 3    |
| Aromatic >C21 - C35 :<br>EH_CU_1D_AR             | mg/kg | < 10   | MCERTS        | < 10   | < 10   | < 10   | < 10   | < 10   |
| Aromatic (C5 - C35) :<br>HS_1D_MS+EH_CU_1D_AR    | mg/kg | < 21   | NONE          | < 21   | < 21   | < 21   | < 21   | < 21   |
| Total >C5 - C35 :<br>HS_1D_MS+EH_CU_1D_Tot<br>al | mg/kg | < 42   | NONE          | < 42   | < 42   | < 42   | < 42   | < 42   |

~Sample details provided by customer and can affect the validity of results  
(hs) Please note deviating sample due to head space in container



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**Soil Analysis Certificate - TPH CWG Banded**

|                                       |                         |               |               |               |  |  |
|---------------------------------------|-------------------------|---------------|---------------|---------------|--|--|
| <b>DETS Report No: 24-08270</b>       | <b>~Date Sampled</b>    | 17/07/24      | 17/07/24      | 17/07/24      |  |  |
| <b>Apple Environmental Ltd</b>        | <b>~Time Sampled</b>    | None Supplied | None Supplied | None Supplied |  |  |
| <b>~Site Reference: None Supplied</b> | <b>~TP / BH No</b>      | BH.03/02/3610 | W.01/3610     | W.02/3610     |  |  |
| <b>~Project / Job Ref:</b>            | <b>~Additional Refs</b> | None Supplied | None Supplied | None Supplied |  |  |
| <b>~Order No: None Supplied</b>       | <b>~Depth (m)</b>       | None Supplied | None Supplied | None Supplied |  |  |
| <b>Reporting Date: 26/07/2024</b>     | <b>DETS Sample No</b>   | 727563        | 727564        | 727565        |  |  |

| <b>Determinand</b>                               | <b>Unit</b> | <b>RL</b> | <b>Accreditation</b> | <b>(hs)</b> |  |  |  |
|--------------------------------------------------|-------------|-----------|----------------------|-------------|--|--|--|
| Aliphatic >C5 - C6 :<br>HS 1D_MS_AL              | mg/kg       | < 0.01    | NONE                 | < 0.01      |  |  |  |
| Aliphatic >C6 - C8 :<br>HS 1D_MS_AL              | mg/kg       | < 0.05    | NONE                 | < 0.05      |  |  |  |
| Aliphatic >C8 - C10 :<br>EH CU 1D_AL             | mg/kg       | < 2       | MCERTS               | < 2         |  |  |  |
| Aliphatic >C10 - C12 :<br>EH CU 1D_AL            | mg/kg       | < 2       | MCERTS               | < 2         |  |  |  |
| Aliphatic >C12 - C16 :<br>EH CU 1D_AL            | mg/kg       | < 3       | MCERTS               | < 3         |  |  |  |
| Aliphatic >C16 - C21 :<br>EH CU 1D_AL            | mg/kg       | < 3       | MCERTS               | < 3         |  |  |  |
| Aliphatic >C21 - C34 :<br>EH CU 1D_AL            | mg/kg       | < 10      | MCERTS               | < 10        |  |  |  |
| Aliphatic (C5 - C34) :<br>HS 1D_MS+EH_CU_1D_AL   | mg/kg       | < 21      | NONE                 | < 21        |  |  |  |
| Aromatic >C5 - C7 :<br>HS 1D_MS_AR               | mg/kg       | < 0.01    | NONE                 | < 0.01      |  |  |  |
| Aromatic >C7 - C8 :<br>HS 1D_MS_AR               | mg/kg       | < 0.05    | NONE                 | < 0.05      |  |  |  |
| Aromatic >C8 - C10 :<br>EH CU 1D_AR              | mg/kg       | < 2       | MCERTS               | < 2         |  |  |  |
| Aromatic >C10 - C12 :<br>EH CU 1D_AR             | mg/kg       | < 2       | MCERTS               | < 2         |  |  |  |
| Aromatic >C12 - C16 :<br>EH CU 1D_AR             | mg/kg       | < 2       | MCERTS               | < 2         |  |  |  |
| Aromatic >C16 - C21 :<br>EH CU 1D_AR             | mg/kg       | < 3       | MCERTS               | < 3         |  |  |  |
| Aromatic >C21 - C35 :<br>EH CU 1D_AR             | mg/kg       | < 10      | MCERTS               | < 10        |  |  |  |
| Aromatic (C5 - C35) :<br>HS 1D_MS+EH_CU_1D_AR    | mg/kg       | < 21      | NONE                 | < 21        |  |  |  |
| Total >C5 - C35 :<br>HS 1D_MS+EH_CU_1D_Tot<br>al | mg/kg       | < 42      | NONE                 | < 42        |  |  |  |

~Sample details provided by customer and can affect the validity of results



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**Tel : 01622 850410**



| Soil Analysis Certificate - BTEX / MTBE |                  |               |               |               |               |               |
|-----------------------------------------|------------------|---------------|---------------|---------------|---------------|---------------|
| DETS Report No: 24-08270                | ~Date Sampled    | 17/07/24      | 17/07/24      | 17/07/24      | 17/07/24      | 17/07/24      |
| Apple Environmental Ltd                 | ~Time Sampled    | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| ~Site Reference: None Supplied          | ~TP / BH No      | BH.01/01/3610 | BH.01/02/3610 | BH.02/01/3610 | BH.02/02/3610 | BH.03/01/3610 |
| ~Project / Job Ref: [REDACTED]          | ~Additional Refs | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| ~Order No: None Supplied                | ~Depth (m)       | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Reporting Date: 26/07/2024              | DETS Sample No   | 727558        | 727559        | 727560        | 727561        | 727562        |

| Determinand             | Unit  | RL  | Accreditation |     |     |     |     |     |
|-------------------------|-------|-----|---------------|-----|-----|-----|-----|-----|
| Benzene : HS_1D_MS      | ug/kg | < 2 | MCERTS        | < 2 | < 2 | < 2 | < 2 | < 2 |
| Toluene : HS_1D_MS      | ug/kg | < 5 | MCERTS        | < 5 | < 5 | < 5 | < 5 | < 5 |
| Ethylbenzene : HS_1D_MS | ug/kg | < 2 | MCERTS        | < 2 | < 2 | 6   | 6   | < 2 |
| p & m-xylene : HS_1D_MS | ug/kg | < 2 | MCERTS        | < 2 | < 2 | 4   | 4   | < 2 |
| o-xylene : HS_1D_MS     | ug/kg | < 2 | MCERTS        | < 2 | < 2 | < 2 | < 2 | < 2 |
| MTBE : HS_1D_MS         | ug/kg | < 5 | MCERTS        | < 5 | < 5 | < 5 | < 5 | < 5 |

~Sample details provided by customer and can affect the validity of results



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Maidstone  
Kent ME17 2JN  
Tel : 01622 850410



| Soil Analysis Certificate - BTEX / MTBE |                  |               |  |  |  |  |  |
|-----------------------------------------|------------------|---------------|--|--|--|--|--|
| DETS Report No: 24-08270                | ~Date Sampled    | 17/07/24      |  |  |  |  |  |
| Apple Environmental Ltd                 | ~Time Sampled    | None Supplied |  |  |  |  |  |
| ~Site Reference: None Supplied          | ~TP / BH No      | BH.03/02/3610 |  |  |  |  |  |
| ~Project / Job Ref: [REDACTED]          | ~Additional Refs | None Supplied |  |  |  |  |  |
| ~Order No: None Supplied                | ~Depth (m)       | None Supplied |  |  |  |  |  |
| Reporting Date: 26/07/2024              | DETS Sample No   | 727563        |  |  |  |  |  |

| Determinand             | Unit  | RL  | Accreditation |     |  |  |  |
|-------------------------|-------|-----|---------------|-----|--|--|--|
| Benzene : HS_1D_MS      | ug/kg | < 2 | MCERTS        | < 2 |  |  |  |
| Toluene : HS_1D_MS      | ug/kg | < 5 | MCERTS        | < 5 |  |  |  |
| Ethylbenzene : HS_1D_MS | ug/kg | < 2 | MCERTS        | < 2 |  |  |  |
| p & m-xylene : HS_1D_MS | ug/kg | < 2 | MCERTS        | < 2 |  |  |  |
| o-xylene : HS_1D_MS     | ug/kg | < 2 | MCERTS        | < 2 |  |  |  |
| MTBE : HS_1D_MS         | ug/kg | < 5 | MCERTS        | < 5 |  |  |  |

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| Water Analysis Certificate - TPH CWG Banded |                  |               |               |  |  |
|---------------------------------------------|------------------|---------------|---------------|--|--|
| DETS Report No: 24-08270                    | ~Date Sampled    | 17/07/24      | 17/07/24      |  |  |
| Apple Environmental Ltd                     | ~Time Sampled    | None Supplied | None Supplied |  |  |
| ~Site Reference: None Supplied              | ~TP / BH No      | W.01/3610     | W.02/3610     |  |  |
| ~Project / Job Ref: [REDACTED]              | ~Additional Refs | None Supplied | None Supplied |  |  |
| ~Order No: None Supplied                    | ~Depth (m)       | None Supplied | None Supplied |  |  |
| Reporting Date: 26/07/2024                  | DETS Sample No   | 727564        | 727565        |  |  |

| Determinand                                      | Unit | RL    | Accreditation | (hs)  |       |  |  |
|--------------------------------------------------|------|-------|---------------|-------|-------|--|--|
| Aliphatic >C5 - C6 :<br>HS_1D_MS_AL              | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aliphatic >C6 - C8 :<br>HS_1D_MS_AL              | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aliphatic >C8 - C10 :<br>EH_CU_1D_AL             | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aliphatic >C10 - C12 :<br>EH_CU_1D_AL            | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aliphatic >C12 - C16 :<br>EH_CU_1D_AL            | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aliphatic >C16 - C21 :<br>EH_CU_1D_AL            | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aliphatic >C21 - C34 :<br>EH_CU_1D_AL            | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aliphatic (C5 - C34) :<br>HS_1D_MS+EH_CU_1D_AL   | ug/l | < 70  | NONE          | < 70  | < 70  |  |  |
| Aromatic >C5 - C7 :<br>HS_1D_MS_AR               | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aromatic >C7 - C8 :<br>HS_1D_MS_AR               | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aromatic >C8 - C10 :<br>EH_CU_1D_AR              | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aromatic >C10 - C12 :<br>EH_CU_1D_AR             | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aromatic >C12 - C16 :<br>EH_CU_1D_AR             | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aromatic >C16 - C21 :<br>EH_CU_1D_AR             | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aromatic >C21 - C35 :<br>EH_CU_1D_AR             | ug/l | < 10  | NONE          | < 10  | < 10  |  |  |
| Aromatic (C5 - C35) :<br>HS_1D_MS+EH_CU_1D_AR    | ug/l | < 70  | NONE          | < 70  | < 70  |  |  |
| Total >C5 - C35 :<br>HS_1D_MS+EH_CU_1D_Tot<br>al | ug/l | < 140 | NONE          | < 140 | < 140 |  |  |

~Sample details provided by customer and can affect the validity of results  
(hs) Please note deviating sample due to head space in container



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**Water Analysis Certificate - BTEX / MTBE**

|                                |                  |               |               |  |  |  |
|--------------------------------|------------------|---------------|---------------|--|--|--|
| DETS Report No: 24-08270       | ~Date Sampled    | 17/07/24      | 17/07/24      |  |  |  |
| Apple Environmental Ltd        | ~Time Sampled    | None Supplied | None Supplied |  |  |  |
| ~Site Reference: None Supplied | ~TP / BH No      | W.01/3610     | W.02/3610     |  |  |  |
| ~Project / Job Ref: [REDACTED] | ~Additional Refs | None Supplied | None Supplied |  |  |  |
| ~Order No: None Supplied       | ~Depth (m)       | None Supplied | None Supplied |  |  |  |
| Reporting Date: 26/07/2024     | DETS Sample No   | 727564        | 727565        |  |  |  |

| Determinand             | Unit | RL   | Accreditation | (hs) |      |  |
|-------------------------|------|------|---------------|------|------|--|
| Benzene : HS_1D_MS      | ug/l | < 1  | ISO17025      | < 1  | < 1  |  |
| Toluene : HS_1D_MS      | ug/l | < 5  | ISO17025      | < 5  | < 5  |  |
| Ethylbenzene : HS_1D_MS | ug/l | < 5  | ISO17025      | < 5  | < 5  |  |
| p & m-xylene : HS_1D_MS | ug/l | < 10 | ISO17025      | < 10 | < 10 |  |
| o-xylene : HS_1D_MS     | ug/l | < 5  | ISO17025      | < 5  | < 5  |  |
| MTBE : HS_1D_MS         | ug/l | < 10 | ISO17025      | < 10 | < 10 |  |

~Sample details provided by customer and can affect the validity of results

(hs) Please note deviating sample due to head space in container



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**Water Analysis Certificate - Volatile Organic Compounds (VOC)**

|                                |                  |               |  |  |  |  |
|--------------------------------|------------------|---------------|--|--|--|--|
| DETS Report No: 24-08270       | ~Date Sampled    | 17/07/24      |  |  |  |  |
| Apple Environmental Ltd        | ~Time Sampled    | None Supplied |  |  |  |  |
| ~Site Reference: None Supplied | ~TP / BH No      | W.01/3610     |  |  |  |  |
| ~Project / Job Ref: [REDACTED] | ~Additional Refs | None Supplied |  |  |  |  |
| ~Order No: None Supplied       | ~Depth (m)       | None Supplied |  |  |  |  |
| Reporting Date: 26/07/2024     | DETS Sample No   | 727564        |  |  |  |  |

| Determinand                 | Unit | RL   | Accreditation |      |  |  |  |
|-----------------------------|------|------|---------------|------|--|--|--|
| Dichlorodifluoromethane     | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Vinyl Chloride              | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Chloromethane               | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Chloroethane                | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Bromomethane                | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Trichlorofluoromethane      | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,1-Dichloroethene          | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| MTBE                        | ug/l | < 10 | ISO17025      | < 10 |  |  |  |
| trans-1,2-Dichloroethene    | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,1-Dichloroethane          | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| cis-1,2-Dichloroethene      | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 2,2-Dichloropropane         | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Chloroform                  | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Bromochloromethane          | ug/l | < 10 | ISO17025      | < 10 |  |  |  |
| 1,1,1-Trichloroethane       | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,1-Dichloropropene         | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Carbon Tetrachloride        | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,2-Dichloroethane          | ug/l | < 10 | ISO17025      | < 10 |  |  |  |
| Benzene                     | ug/l | < 1  | ISO17025      | < 1  |  |  |  |
| 1,2-Dichloropropane         | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Trichloroethene             | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Bromodichloromethane        | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Dibromomethane              | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| TAME                        | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| cis-1,3-Dichloropropene     | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Toluene                     | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| trans-1,3-Dichloropropene   | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,1,2-Trichloroethane       | ug/l | < 10 | ISO17025      | < 10 |  |  |  |
| 1,3-Dichloropropane         | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Tetrachloroethene           | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Dibromochloromethane        | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,2-Dibromoethane           | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Chlorobenzene               | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,1,1,2-Tetrachloroethane   | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Ethyl Benzene               | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| m,p-Xylene                  | ug/l | < 10 | ISO17025      | < 10 |  |  |  |
| o-Xylene                    | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Styrene                     | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Bromoform                   | ug/l | < 10 | ISO17025      | < 10 |  |  |  |
| Isopropylbenzene            | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,1,2,2-Tetrachloroethane   | ug/l | < 10 | ISO17025      | < 10 |  |  |  |
| 1,2,3-Trichloropropane      | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| n-Propylbenzene             | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| Bromobenzene                | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 2-Chlorotoluene             | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,3,5-Trimethylbenzene      | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 4-Chlorotoluene             | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| tert-Butylbenzene           | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,2,4-Trimethylbenzene      | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| sec-Butylbenzene            | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| p-Isopropyltoluene          | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,3-Dichlorobenzene         | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,4-Dichlorobenzene         | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| n-Butylbenzene              | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,2-Dichlorobenzene         | ug/l | < 5  | ISO17025      | < 5  |  |  |  |
| 1,2-Dibromo-3-chloropropane | ug/l | < 10 | ISO17025      | < 10 |  |  |  |
| Hexachlorobutadiene         | ug/l | < 5  | ISO17025      | < 5  |  |  |  |

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#### Soil Analysis Certificate - Sample Descriptions

|                                |  |
|--------------------------------|--|
| DETS Report No: 24-08270       |  |
| Apple Environmental Ltd        |  |
| ~Site Reference: None Supplied |  |
| ~Project / Job Ref: [REDACTED] |  |
| ~Order No: None Supplied       |  |
| Reporting Date: 26/07/2024     |  |

| DETS Sample No | ~TP / BH No   | ~Additional Refs | ~Depth (m)    | Moisture Content (%) | Sample Matrix Description              |
|----------------|---------------|------------------|---------------|----------------------|----------------------------------------|
| 727558         | BH.01/01/3610 | None Supplied    | None Supplied | 14.3                 | Brown sandy clay                       |
| 727559         | BH.01/02/3610 | None Supplied    | None Supplied | 16.7                 | Brown sandy clay                       |
| 727560         | BH.02/01/3610 | None Supplied    | None Supplied | 15.3                 | Brown sandy clay                       |
| 727561         | BH.02/02/3610 | None Supplied    | None Supplied | 15.5                 | Brown sandy clay                       |
| 727562         | BH.03/01/3610 | None Supplied    | None Supplied | 7.2                  | Brown sandy clay with stones and brick |
| 727563         | BH.03/02/3610 | None Supplied    | None Supplied | 12.1                 | Brown sandy clay with vegetation       |

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample <sup>1/S</sup>

Unsuitable Sample <sup>U/S</sup>

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#### Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-08270

Apple Environmental Ltd

~Site Reference: None Supplied

~Project / Job Ref: [REDACTED]

~Order No: None Supplied

Reporting Date: 26/07/2024

| Matrix | Analysed On | Determinand                                                                                                                                     | Brief Method Description                                                                                                                             | Method No |
|--------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Soil   | D           | Boron - Water Soluble                                                                                                                           | Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES                                                            | E012      |
| Soil   | AR          | BTEX                                                                                                                                            | Determination of BTEX by headspace GC-MS                                                                                                             | E001      |
| Soil   | D           | Cations                                                                                                                                         | Determination of cations in soil by aqua-regia digestion followed by ICP-OES                                                                         | E002      |
| Soil   | D           | Chloride - Water Soluble (2:1)                                                                                                                  | Determination of chloride by extraction with water & analysed by ion chromatography                                                                  | E009      |
| Soil   | AR          | Chromium - Hexavalent                                                                                                                           | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry | E016      |
| Soil   | AR          | Cyanide - Complex                                                                                                                               | Determination of complex cyanide by distillation followed by colorimetry                                                                             | E015      |
| Soil   | AR          | Cyanide - Free                                                                                                                                  | Determination of free cyanide by distillation followed by colorimetry                                                                                | E015      |
| Soil   | AR          | Cyanide - Total                                                                                                                                 | Determination of total cyanide by distillation followed by colorimetry                                                                               | E015      |
| Soil   | D           | Cyclohexane Extractable Matter (CEM)                                                                                                            | Gravimetrically determined through extraction with cyclohexane                                                                                       | E011      |
| Soil   | AR          | Diesel Range Organics (C10 - C24)                                                                                                               | Determination of hexane/acetone extractable hydrocarbons by GC-FID                                                                                   | E004      |
| Soil   | AR          | Electrical Conductivity                                                                                                                         | Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement                             | E022      |
| Soil   | AR          | Electrical Conductivity                                                                                                                         | Determination of electrical conductivity by addition of water followed by electrometric measurement                                                  | E023      |
| Soil   | D           | Elemental Sulphur                                                                                                                               | Determination of elemental sulphur by solvent extraction followed by GC-MS                                                                           | E020      |
| Soil   | AR          | EPH (C10 - C40)                                                                                                                                 | Determination of acetone/hexane extractable hydrocarbons by GC-FID                                                                                   | E004      |
| Soil   | AR          | EPH Product ID                                                                                                                                  | Determination of acetone/hexane extractable hydrocarbons by GC-FID                                                                                   | E004      |
| Soil   | AR          | EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)                                                                                   | Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS                                        | E004      |
| Soil   | D           | Fluoride - Water Soluble                                                                                                                        | Determination of Fluoride by extraction with water & analysed by ion chromatography                                                                  | E009      |
| Soil   | D           | Fraction Organic Carbon (FOC)                                                                                                                   | Determination of TOC by combustion analyser.                                                                                                         | E027      |
| Soil   | D           | Organic Matter (SOM)                                                                                                                            | Determination of TOC by combustion analyser.                                                                                                         | E027      |
| Soil   | D           | TOC (Total Organic Carbon)                                                                                                                      | Determination of TOC by combustion analyser.                                                                                                         | E027      |
| Soil   | AR          | Exchangeable Ammonium                                                                                                                           | Determination of ammonium by discrete analyser.                                                                                                      | E029      |
| Soil   | D           | FOC (Fraction Organic Carbon)                                                                                                                   | Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate                     | E010      |
| Soil   | D           | Loss on Ignition @ 450oC                                                                                                                        | Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace                                       | E019      |
| Soil   | D           | Magnesium - Water Soluble                                                                                                                       | Determination of water soluble magnesium by extraction with water followed by ICP-OES                                                                | E025      |
| Soil   | D           | Metals                                                                                                                                          | Determination of metals by aqua-regia digestion followed by ICP-OES                                                                                  | E002      |
| Soil   | AR          | Mineral Oil (C10 - C40)                                                                                                                         | Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge                                                  | E004      |
| Soil   | AR          | Moisture Content                                                                                                                                | Moisture content; determined gravimetrically                                                                                                         | E003      |
| Soil   | D           | Nitrate - Water Soluble (2:1)                                                                                                                   | Determination of nitrate by extraction with water & analysed by ion chromatography                                                                   | E009      |
| Soil   | D           | Organic Matter                                                                                                                                  | Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate                                 | E010      |
| Soil   | AR          | PAH - Speciated (EPA 16)                                                                                                                        | Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards                | E005      |
| Soil   | AR          | PCB - 7 Congeners                                                                                                                               | Determination of PCB by extraction with acetone and hexane followed by GC-MS                                                                         | E008      |
| Soil   | D           | Petroleum Ether Extract (PEE)                                                                                                                   | Gravimetrically determined through extraction with petroleum ether                                                                                   | E011      |
| Soil   | AR          | pH                                                                                                                                              | Determination of pH by addition of water followed by electrometric measurement                                                                       | E007      |
| Soil   | AR          | Phenols - Total (monohydric)                                                                                                                    | Determination of phenols by distillation followed by colorimetry                                                                                     | E021      |
| Soil   | D           | Phosphate - Water Soluble (2:1)                                                                                                                 | Determination of phosphate by extraction with water & analysed by ion chromatography                                                                 | E009      |
| Soil   | D           | Sulphate (as SO4) - Total                                                                                                                       | Determination of total sulphate by extraction with 10% HCl followed by ICP-OES                                                                       | E013      |
| Soil   | D           | Sulphate (as SO4) - Water Soluble (2:1)                                                                                                         | Determination of sulphate by extraction with water & analysed by ion chromatography                                                                  | E009      |
| Soil   | D           | Sulphate (as SO4) - Water Soluble (2:1)                                                                                                         | Determination of water soluble sulphate by extraction with water followed by ICP-OES                                                                 | E014      |
| Soil   | AR          | Sulphide                                                                                                                                        | Determination of sulphide by distillation followed by colorimetry                                                                                    | E018      |
| Soil   | D           | Sulphur - Total                                                                                                                                 | Determination of total sulphur by extraction with aqua-regia followed by ICP-OES                                                                     | E024      |
| Soil   | AR          | SVOC                                                                                                                                            | Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS                                               | E006      |
| Soil   | AR          | Thiocyanate (as SCN)                                                                                                                            | Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry  | E017      |
| Soil   | D           | Toluene Extractable Matter (TEM)                                                                                                                | Gravimetrically determined through extraction with toluene                                                                                           | E011      |
| Soil   | D           | Total Organic Carbon (TOC)                                                                                                                      | Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate                                 | E010      |
| Soil   | AR          | TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)         | Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS       | E004      |
| Soil   | AR          | TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44) | Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS       | E004      |
| Soil   | AR          | VOCs                                                                                                                                            | Determination of volatile organic compounds by headspace GC-MS                                                                                       | E001      |
| Soil   | AR          | VPH (C6-C8 & C8-C10)                                                                                                                            | Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID                                                                            | E001      |

**D Dried**  
**AR As Received**

-Sample details provided by customer and can affect the validity of results



Normec DETS Limited  
Unit 1, Rose Lane Industrial Estate  
Rose Lane  
Lenham Heath  
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**Water Analysis Certificate - Methodology & Miscellaneous Information**

DETS Report No: 24-08270

Apple Environmental Ltd

~Site Reference: None Supplied

~Project / Job Ref: [REDACTED]

~Order No: None Supplied

Reporting Date: 26/07/2024

| Matrix   | Analysed On | Determinand                                                                                                                                     | Brief Method Description                                                                                                                    | Method No |
|----------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Water    | UF          | Alkalinity                                                                                                                                      | Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point                                 | E103      |
| Water    | F           | Ammoniacal Nitrogen                                                                                                                             | Determination of ammoniacal nitrogen by discrete analyser.                                                                                  | E126      |
| Water    | UF          | BTEX                                                                                                                                            | Determination of BTEX by headspace GC-MS                                                                                                    | E101      |
| Water    | F           | Cations                                                                                                                                         | Determination of cations by filtration followed by ICP-MS                                                                                   | E102      |
| Water    | U           | Chemical Oxygen Demand (COD)                                                                                                                    | Determination using a COD reactor followed by colorimetry                                                                                   | E112      |
| Water    | UF          | Biological Oxygen Demand (COD)                                                                                                                  | Determination using BOD sensors measuring the change of pressure                                                                            | E133      |
| Water    | F           | Chloride                                                                                                                                        | Determination of chloride by filtration & analysed by ion chromatography                                                                    | E109      |
| Water    | F           | Chromium - Hexavalent                                                                                                                           | Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry                            | E116      |
| Water    | UF          | Cyanide - Complex                                                                                                                               | Determination of complex cyanide by distillation followed by colorimetry                                                                    | E115      |
| Water    | UF          | Cyanide - Free                                                                                                                                  | Determination of free cyanide by distillation followed by colorimetry                                                                       | E115      |
| Water    | UF          | Cyanide - Total                                                                                                                                 | Determination of total cyanide by distillation followed by colorimetry                                                                      | E115      |
| Water    | UF          | Cyclohexane Extractable Matter (CEM)                                                                                                            | Gravimetrically determined through liquid:liquid extraction with cyclohexane                                                                | E111      |
| Water    | F           | Diesel Range Organics (C10 - C24)                                                                                                               | Determination of liquid:liquid extraction with hexane followed by GC-FID                                                                    | E104      |
| Water    | F           | Dissolved Organic Content (DOC)                                                                                                                 | Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detection                                  | E110      |
| Water    | UF          | Electrical Conductivity                                                                                                                         | Determination of electrical conductivity by electrometric measurement                                                                       | E123      |
| Water    | F           | EPH (C10 - C40)                                                                                                                                 | Determination of liquid:liquid extraction with hexane followed by GC-FID                                                                    | E104      |
| Water    | F           | EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)                                                                                   | Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS                         | E104      |
| Water    | F           | Fluoride                                                                                                                                        | Determination of Fluoride by filtration & analysed by ion chromatography                                                                    | E109      |
| Water    | F           | Hardness                                                                                                                                        | Determination of Ca and Mg by ICP-MS followed by calculation                                                                                | E102      |
| Leachate | F           | Leachate Preparation - NRA                                                                                                                      | Based on National Rivers Authority leaching test 1994                                                                                       | E301      |
| Leachate | F           | Leachate Preparation - WAC                                                                                                                      | Based on BS EN 12457 Pt1, 2, 3                                                                                                              | E302      |
| Water    | F           | Metals                                                                                                                                          | Determination of metals by filtration followed by ICP-MS                                                                                    | E102      |
| Water    | F           | Mineral Oil (C10 - C40)                                                                                                                         | Determination of liquid:liquid extraction with hexane followed by GI-FID                                                                    | E104      |
| Water    | F           | Nitrate                                                                                                                                         | Determination of nitrate by filtration & analysed by ion chromatography                                                                     | E109      |
| Water    | UF          | Monohydric Phenol                                                                                                                               | Determination of phenols by distillation followed by colorimetry                                                                            | E121      |
| Water    | F           | PAH - Speciated (EPA 16)                                                                                                                        | Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS                      | E105      |
| Water    | F           | PCB - 7 Congeners                                                                                                                               | Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS                      | E108      |
| Water    | UF          | Petroleum Ether Extract (PEE)                                                                                                                   | Gravimetrically determined through liquid:liquid extraction with petroleum ether                                                            | E111      |
| Water    | UF          | pH                                                                                                                                              | Determination of pH by electrometric measurement                                                                                            | E107      |
| Water    | F           | Phosphate                                                                                                                                       | Determination of phosphate by filtration & analysed by ion chromatography                                                                   | E109      |
| Water    | UF          | Redox Potential                                                                                                                                 | Determination of redox potential by electrometric measurement                                                                               | E113      |
| Water    | F           | Sulphate (as SO4)                                                                                                                               | Determination of sulphate by filtration & analysed by ion chromatography                                                                    | E109      |
| Water    | UF          | Sulphide                                                                                                                                        | Determination of sulphide by distillation followed by colorimetry                                                                           | E118      |
| Water    | F           | SVOC                                                                                                                                            | Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS    | E106      |
| Water    | UF          | Toluene Extractable Matter (TEM)                                                                                                                | Gravimetrically determined through liquid:liquid extraction with toluene                                                                    | E111      |
| Water    | UF          | Total Organic Carbon (TOC)                                                                                                                      | Low heat with persulphate addition followed by IR detection                                                                                 | E110      |
| Water    | F           | TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)          | Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS | E104      |
| Water    | F           | TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44) | Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS | E104      |
| Water    | UF          | VOCs                                                                                                                                            | Determination of volatile organic compounds by headspace GC-MS                                                                              | E101      |
| Water    | UF          | VPH (C6-C8 & C8-C10)                                                                                                                            | Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID                                                                   | E101      |

Key

F Filtered

UF Unfiltered

~Sample details provided by customer and can affect the validity of results



Normec DETS Limited  
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#### List of HWOL Acronyms and Operators

DETS Report No: 24-08270

Apple Environmental Ltd

~Site Reference: None Supplied

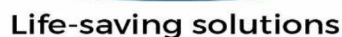
~Project / Job Ref: [REDACTED]

~Order No: None Supplied

Reporting Date: 26/07/2024

| Acronym | Description                                                                |
|---------|----------------------------------------------------------------------------|
| HS      | Headspace analysis                                                         |
| EH      | Extractable Hydrocarbons - i.e. everything extracted by the solvent        |
| CU      | Clean-up - e.g. by florisil, silica gel                                    |
| 1D      | GC - Single coil gas chromatography                                        |
| 2D      | GC-GC - Double coil gas chromatography                                     |
| Total   | Aliphatics & Aromatics                                                     |
| AL      | Aliphatics only                                                            |
| AR      | Aromatics only                                                             |
| #1      | EH_2D_Total but with humics mathematically subtracted                      |
| #2      | EH_2D_Total but with fatty acids mathematically subtracted                 |
| _       | Operator - underscore to separate acronyms (exception for +)               |
| +       | Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total          |
| ~       | Sample details provided by customer and can affect the validity of results |

Benzene - HS\_1D\_MS  
Ethylbenzene - HS\_1D\_MS  
MTBE - HS\_1D\_MS  
TPH CWG - Aliphatic >C10 - C12 - EH\_CU\_1D\_AL  
TPH CWG - Aliphatic >C12 - C16 - EH\_CU\_1D\_AL  
TPH CWG - Aliphatic >C16 - C21 - EH\_CU\_1D\_AL  
TPH CWG - Aliphatic >C21 - C34 - EH\_CU\_1D\_AL  
TPH CWG - Aliphatic >C35 - C40 - EH\_CU\_1D\_AL  
TPH CWG - Aliphatic >C5 - C34 - HS\_1D\_MS+EH\_CU\_1D\_AL  
TPH CWG - Aliphatic >C5 - C6 - HS\_1D\_MS\_AL  
TPH CWG - Aliphatic >C6 - C8 - HS\_1D\_MS\_AL  
TPH CWG - Aliphatic >C8 - C10 - EH\_CU\_1D\_AL  
TPH CWG - Aliphatic C5 - C34 - HS\_1D\_MS+EH\_CU\_1D\_AL  
TPH CWG - Aromatic >C10 - C12 - EH\_CU\_1D\_AR  
TPH CWG - Aromatic >C12 - C16 - EH\_CU\_1D\_AR  
TPH CWG - Aromatic >C16 - C21 - EH\_CU\_1D\_AR  
TPH CWG - Aromatic >C21 - C35 - EH\_CU\_1D\_AR  
TPH CWG - Aromatic >C35 - C40 - EH\_CU\_1D\_AR  
TPH CWG - Aromatic >C5 - C35 - HS\_1D\_MS+EH\_CU\_1D\_AR  
TPH CWG - Aromatic >C5 - C7 - HS\_1D\_MS\_AR  
TPH CWG - Aromatic >C7 - C8 - HS\_1D\_MS\_AR  
TPH CWG - Aromatic >C8 - C10 - EH\_CU\_1D\_AR  
TPH CWG - Aromatic C5 - C35 - HS\_1D\_MS+EH\_CU\_1D\_AR  
TPH CWG - Total >C5 - C35 - HS\_1D\_MS+EH\_CU\_1D\_Total  
TPH CWG - Total >C6 - C40 - HS\_1D\_MS+EH\_CU\_1D\_Total  
Toluene - HS\_1D\_MS  
m & p-xylene - HS\_1D\_MS  
o-Xylene - HS\_1D\_MS



CUSTOMER: Apple Environmental Ltd

FIRMWARE: 9.04  
UPGRADED TO: 9.28

| TESTS                            | Pre Service | Post Service |
|----------------------------------|-------------|--------------|
| Charger Test                     |             | ok           |
| Battery charge Test              |             | ok           |
| Lamp Test                        | see notes   | ok           |
| Air Flow Test ≥<br>220ml/min     |             | 250ml/min    |
| Block Flow Test ≤<br>15ml/min    |             | 7ml/min      |
| Moisture Sensitivity =<br>0.0ppm |             | 0.00ppm      |
| Switch Test                      |             | ok           |
| Sensor Test                      |             | ok           |
| Alarm Test                       |             | ok           |
| PC Comms Test                    |             | ok           |
| Datalog Test                     |             | ok           |
| Display Test                     |             | ok           |
| Physical Inspection              |             | ok           |
| PAT Test                         | see notes   | ok           |
| Firmware Upgrade                 | see notes   | ok           |
| Software Upgrade (usb)           | n/a         |              |
| Function Test                    |             | ok           |
| Run Time                         |             | 28hours8mins |

Unit in for service and calibration  
Firmware upgraded to latest version 9.28  
Replaced select stack, sensor seal, inlet/ outlet seals and PTFE filter as per service  
Cleaned lamp with aluminium oxide  
Flowrate 250ml/min, Block 7ml/min  
Unit sent in without Benzene tube holder assembly, supplied a new one  
Unit calibrated and bump tested  
Settings retained as received: Measuring gas TAC RF 0.5  
Power supply PAT tested

DATE: 02/08/2023



Life-saving solutions

## CERTIFICATE OF CALIBRATION

Tiger Select

**CALIBRATION CERTIFICATE NO: 77217**

ISSUED BY: SHAWCITY LIMITED  
DATE: 02/08/2023

APPROVED SIGNATORY:



NAME: Joe Herbert

CUSTOMER: Apple Environmental Ltd  
INSTRUMENT: Tiger Select  
SERIAL NUMBER: T-113211

CALIBRATION METHOD: CM03  
AMBIENT CONDITIONS: 20°C ± 2°C and 50% (± 20%) RH

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Prior to calibration the instrument was allowed to stabilise in the laboratory for at least 30 minutes.  
The instrument was calibrated by exposing the sensor to known values of gas concentrations.  
All gases were sampled through the complete probe and in line filter, where applicable.  
The reference value is that generated by the certified source and the indicated value is that measured by the instrument.

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### CALIBRATION RESULTS

| GAS         | LOT No     | REF. VALUE | INDICATED VALUE |
|-------------|------------|------------|-----------------|
| Isobutylene | WO397588-2 | 100 ppm    | 100 ppm         |
| Isobutylene | WO380827-2 | 1000 ppm   | 1000 ppm        |
| Benzene     | WO407569-2 | 5 ppm      | 5 ppm           |

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#### COMMENTS:

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ .  
This provides a level of confidence of uncertainty of approximately 95%.  
The uncertainty of measurement is  $\pm 2\%$   
The results indicate that the instrument conforms to the applicable parts of the published specification.

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#### HEALTH & SAFETY, OCCUPATIONAL HYGIENE AND ENVIRONMENTAL MONITORING INSTRUMENTS

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