



**PLOT NUMBER: 129**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 25/09/2019**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 400 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >200 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 130**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 25/09/2019**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 400 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >200 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                                     |
|-------------------------------------|
| Additional Comments:                |
| Samples taken at 0.20 and 0.50 mbgl |

**GARDEN VALIDATION: PASS**



## **SUITABILITY CRITERIA**



**Table 4: Validation Testing Summary**

| Determinand                                                                | Units | Screening Value for Use within Private Gardens | Maximum Concentration within Topsoil | Maximum Concentration within Subsoil | Screening Value Source |
|----------------------------------------------------------------------------|-------|------------------------------------------------|--------------------------------------|--------------------------------------|------------------------|
| <b>Inorganics – Metals and Asbestos</b>                                    |       |                                                |                                      |                                      |                        |
| Arsenic                                                                    | mg/kg | 37                                             | 20                                   | 18                                   | (i)                    |
| Cadmium                                                                    | mg/kg | 11                                             | 2.40                                 | 2                                    | (i)                    |
| Chromium VI                                                                | mg/kg | 6                                              | <1.20                                | <1.20                                | (i)                    |
| Lead                                                                       | mg/kg | 200                                            | 83                                   | 80                                   | (iv)                   |
| Inorganic Mercury                                                          | mg/kg | 40                                             | <0.30                                | <0.30                                | (i)                    |
| Nickel                                                                     | mg/kg | 130                                            | 17                                   | 18                                   | (i)                    |
| Selenium                                                                   | mg/kg | 250                                            | <1                                   | 1.40                                 | (i)                    |
| Copper                                                                     | mg/kg | 2,400                                          | 120                                  | 88                                   | (i)                    |
| Zinc                                                                       | mg/kg | 3,700                                          | 100                                  | 96                                   | (i)                    |
| Cyanide                                                                    | mg/kg | 3.4                                            | <1                                   | <1                                   | (v)                    |
| Asbestos                                                                   | %     | Not Detected                                   | Not Detected                         | Not Detected                         | N/A                    |
|                                                                            |       |                                                |                                      |                                      |                        |
| Phenol                                                                     | mg/kg | 550                                            | <1                                   | <1                                   | (ii)                   |
| Naphthalene                                                                | mg/kg | 5.6                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthylene                                                             | mg/kg | 420                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthene                                                               | mg/kg | 510                                            | <0.05                                | <0.05                                | (ii)                   |
| Fluorene                                                                   | mg/kg | 400                                            | <0.05                                | <0.05                                | (ii)                   |
| Phenanthrene                                                               | mg/kg | 220                                            | 1.20                                 | 0.60                                 | (ii)                   |
| Anthracene                                                                 | mg/kg | 2,400                                          | 0.24                                 | 0.13                                 | (ii)                   |
| Fluoranthene                                                               | mg/kg | 280                                            | 2.20                                 | 0.13                                 | (ii)                   |
| Pyrene                                                                     | mg/kg | 1200                                           | 2.20                                 | 1.20                                 | (ii)                   |
| Benzo(a)Anthracene                                                         | mg/kg | 2.7                                            | 1.10                                 | 0.71                                 | (ii)                   |
| Chrysene                                                                   | mg/kg | 22                                             | 1.20                                 | 0.72                                 | (ii)                   |
| Benzo(b)Fluoranthene                                                       | mg/kg | 3.3                                            | 0.92                                 | 0.71                                 | (ii)                   |
| Benzo(k)Fluoranthene                                                       | mg/kg | 93                                             | 0.97                                 | 0.50                                 | (ii)                   |
| Benzo(a)Pyrene                                                             | mg/kg | 2.7                                            | 1.10                                 | 0.72                                 | (ii)                   |
| Indeno(123-cd)Pyrene                                                       | mg/kg | 36                                             | 0.73                                 | 0.51                                 | (ii)                   |
| Dibenzo(a,h)Anthracene                                                     | mg/kg | 0.28                                           | 0.22                                 | <0.05                                | (ii)                   |
| Benzo(ghi)Perylene                                                         | mg/kg | 340                                            | 0.96                                 | 0.68                                 | (ii)                   |
|                                                                            |       |                                                |                                      |                                      |                        |
| TPH C <sub>5</sub> -C <sub>6</sub>                                         | mg/kg | 78                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>6</sub> -C <sub>8</sub>                                         | mg/kg | 230                                            | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>8</sub> -C <sub>10</sub>                                        | mg/kg | 65                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>10</sub> -C <sub>12</sub>                                       | mg/kg | 180                                            | <1.0                                 | <1.0                                 | (iii)                  |
| TPH C <sub>12</sub> -C <sub>16</sub>                                       | mg/kg | 330                                            | <2.0                                 | <2.0                                 | (iii)                  |
| TPH C <sub>16</sub> -C <sub>21</sub>                                       | mg/kg | 540                                            | <8.0                                 | <8.0                                 | (iii)                  |
| TPH C <sub>21</sub> -C <sub>35</sub>                                       | mg/kg | 1,500                                          | <8.0                                 | <8.0                                 | (iii)                  |
| TPH C <sub>35</sub> -C <sub>44</sub>                                       | mg/kg | 1,500                                          | <8.4                                 | <8.4                                 | (iii)                  |
| <b>Screening Value Source</b>                                              |       |                                                |                                      |                                      |                        |
| (i) LQM/CIEH Suitable For Use Level (S4UL) (2015);                         |       |                                                |                                      |                                      |                        |
| (ii) S4UL –Assessment Approach of 2.5% SOM;                                |       |                                                |                                      |                                      |                        |
| (iii) S4UL –2.5% SOM and assumed worst case aliphatic / aromatic compound; |       |                                                |                                      |                                      |                        |
| (iv) Defra Category 4 Screening Level (2014);                              |       |                                                |                                      |                                      |                        |
| (v) CLEA v1.06 Derived Value.                                              |       |                                                |                                      |                                      |                        |





## **SOIL CHEMICAL ANALYSIS**

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## **Analytical Report Number : 19-63079**

|                             |                 |                               |            |
|-----------------------------|-----------------|-------------------------------|------------|
| <b>Project / Site name:</b> | Scotchbarn Lane | <b>Samples received on:</b>   | 26/09/2019 |
| <b>Your job number:</b>     | 103358          | <b>Samples instructed on:</b> | 30/09/2019 |
| <b>Your order number:</b>   |                 | <b>Analysis completed by:</b> | 07/10/2019 |
| <b>Report Issue Number:</b> | 1               | <b>Report issued on:</b>      | 07/10/2019 |
| <b>Samples Analysed:</b>    | 9 soil samples  |                               |            |

**Signed:** 

Zina Abdul Razzak  
Senior Quality Specialist  
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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

Analytical Report Number: 19-63079  
Project / Site name: Scotchbarn Lane

| Lab Sample Number                    |       |                    |                      | 16960         | 16961         | 16962         | 16963         | 16964         |
|--------------------------------------|-------|--------------------|----------------------|---------------|---------------|---------------|---------------|---------------|
| Sample Reference                     |       |                    |                      | Plot 130      | Plot 130      | Plot 44       | Plot 44       | Plot 46       |
| Sample Number                        |       |                    |                      | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                            |       |                    |                      | 0.20          | 0.50          | 0.20          | 0.40          | 0.20          |
| Date Sampled                         |       |                    |                      | 25/09/2019    | 25/09/2019    | 25/09/2019    | 25/09/2019    | 25/09/2019    |
| Time Taken                           |       |                    |                      | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter (Soil Analysis) | Units | Limit of detection | Accreditation Status |               |               |               |               |               |
| <b>SOILS</b>                         |       |                    |                      |               |               |               |               |               |
| Stone Content                        | %     | 0.1                | NONE                 | < 0.1         | < 0.1         | < 0.1         | < 0.1         | < 0.1         |
| Moisture Content                     | %     | N/A                | NONE                 | 20            | 21            | 22            | 13            | 17            |
| Total mass of sample received        | kg    | 0.001              | NONE                 | 1.2           | 1.3           | 1.5           | 1.2           | 1.5           |

|                  |      |     |           |              |              |              |              |              |
|------------------|------|-----|-----------|--------------|--------------|--------------|--------------|--------------|
| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected | Not-detected | Not-detected | Not-detected |
|------------------|------|-----|-----------|--------------|--------------|--------------|--------------|--------------|

#### General Inorganics

|                                                                         |          |         |        |       |       |       |       |       |
|-------------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|-------|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 7.9   | 7.8   | 6.7   | 8.2   | 7.3   |
| Total Cyanide                                                           | mg/kg    | 1       | MCERTS | < 1   | < 1   | < 1   | < 1   | < 1   |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)         | mg/kg    | 2.5     | MCERTS | 130   | 120   | 76    | 130   | 87    |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.064 | 0.062 | 0.038 | 0.066 | 0.043 |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 64.1  | 62.3  | 38.2  | 65.5  | 43.4  |
| Organic Matter                                                          | %        | 0.1     | MCERTS | 4.3   | 4.7   | 5.1   | 2.4   | 3.4   |
| Fraction Organic Carbon (FOC)                                           | N/A      | 0.001   | MCERTS | 0.025 | 0.027 | 0.030 | 0.014 | 0.020 |

#### Total Phenols

|                            |       |   |        |       |       |       |       |       |
|----------------------------|-------|---|--------|-------|-------|-------|-------|-------|
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
|----------------------------|-------|---|--------|-------|-------|-------|-------|-------|

#### Speciated PAHs

|                        |       |      |        |        |        |        |        |        |
|------------------------|-------|------|--------|--------|--------|--------|--------|--------|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 1.2    | 0.60   | 1.0    | 0.31   | 0.37   |
| Anthracene             | mg/kg | 0.05 | MCERTS | 0.24   | 0.13   | 0.20   | < 0.05 | < 0.05 |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 2.2    | 1.2    | 1.3    | 0.56   | 0.67   |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 2.2    | 1.2    | 1.2    | 0.54   | 0.65   |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 1.1    | 0.71   | 0.82   | 0.36   | 0.43   |
| Chrysene               | mg/kg | 0.05 | MCERTS | 1.2    | 0.72   | 0.68   | 0.33   | 0.44   |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.92   | 0.71   | 0.71   | 0.33   | 0.40   |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.97   | 0.50   | 0.38   | 0.23   | 0.30   |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 1.1    | 0.72   | 0.62   | 0.33   | 0.44   |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 0.73   | 0.51   | 0.36   | 0.23   | 0.31   |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | 0.22   | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | 0.96   | 0.68   | 0.48   | 0.32   | 0.40   |

#### Total PAH

|                             |       |     |        |      |      |      |      |      |
|-----------------------------|-------|-----|--------|------|------|------|------|------|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 13.1 | 7.66 | 7.83 | 3.54 | 4.41 |
|-----------------------------|-------|-----|--------|------|------|------|------|------|

#### Heavy Metals / Metalloids

|                                    |       |      |           |       |       |       |       |       |
|------------------------------------|-------|------|-----------|-------|-------|-------|-------|-------|
| Antimony (aqua regia extractable)  | mg/kg | 1    | ISO 17025 | < 1.0 | 2.5   | 3.0   | 2.5   | < 1.0 |
| Arsenic (aqua regia extractable)   | mg/kg | 1    | MCERTS    | 20    | 18    | 17    | 9.4   | 11    |
| Barium (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 87    | 100   | 92    | 69    | 61    |
| Beryllium (aqua regia extractable) | mg/kg | 0.06 | MCERTS    | 0.78  | 0.78  | 0.86  | 0.65  | 0.45  |
| Boron (water soluble)              | mg/kg | 0.2  | MCERTS    | 0.8   | 1.0   | 0.5   | 0.6   | 0.8   |
| Cadmium (aqua regia extractable)   | mg/kg | 0.2  | MCERTS    | 2.0   | 2.0   | 2.4   | 0.8   | < 0.2 |
| Chromium (hexavalent)              | mg/kg | 1.2  | MCERTS    | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 |
| Chromium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 23    | 20    | 24    | 22    | 22    |
| Copper (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 100   | 88    | 120   | 44    | 29    |
| Lead (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 81    | 80    | 83    | 41    | 43    |
| Mercury (aqua regia extractable)   | mg/kg | 0.3  | MCERTS    | < 0.3 | < 0.3 | < 0.3 | 0.7   | < 0.3 |
| Nickel (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 17    | 18    | 15    | 18    | 12    |
| Selenium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | < 1.0 | < 1.0 | < 1.0 | 1.4   | < 1.0 |
| Vanadium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 24    | 24    | 23    | 21    | 17    |
| Zinc (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 91    | 96    | 100   | 57    | 53    |



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|                                         |       |                       |                         |               |               |               |               |               |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|
| Lab Sample Number                       |       |                       |                         | 16960         | 16961         | 16962         | 16963         | 16964         |
| Sample Reference                        |       |                       |                         | Plot 130      | Plot 130      | Plot 44       | Plot 44       | Plot 46       |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                       |                         | 0.20          | 0.50          | 0.20          | 0.40          | 0.20          |
| Date Sampled                            |       |                       |                         | 25/09/2019    | 25/09/2019    | 25/09/2019    | 25/09/2019    | 25/09/2019    |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |               |               |               |

Analytical Report Number: 19-63079

Project / Site name: Scotchbarn Lane

|                                         |               |                       |                         |               |               |
|-----------------------------------------|---------------|-----------------------|-------------------------|---------------|---------------|
| Lab Sample Number                       | 16960         | 16961                 | 16962                   | 16963         | 16964         |
| Sample Reference                        | Plot 130      | Plot 130              | Plot 44                 | Plot 44       | Plot 46       |
| Sample Number                           | None Supplied | None Supplied         | None Supplied           | None Supplied | None Supplied |
| Depth (m)                               | 0.20          | 0.50                  | 0.20                    | 0.40          | 0.20          |
| Date Sampled                            | 25/09/2019    | 25/09/2019            | 25/09/2019              | 25/09/2019    | 25/09/2019    |
| Time Taken                              | None Supplied | None Supplied         | None Supplied           | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units         | Limit of<br>detection | Accreditation<br>Status |               |               |

#### Monoaromatics & Oxygenates

|                                    |       |   |        |       |       |       |       |       |
|------------------------------------|-------|---|--------|-------|-------|-------|-------|-------|
| Benzene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Toluene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| p & m-xylene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| o-xylene                           | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |

#### Petroleum Hydrocarbons

|                                         |       |       |        |         |         |         |         |         |
|-----------------------------------------|-------|-------|--------|---------|---------|---------|---------|---------|
| TPH-CWG - Aliphatic >EC5 - EC6          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC6 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aliphatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   | < 2.0   | < 2.0   | < 2.0   |
| TPH-CWG - Aliphatic >EC16 - EC21        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   | < 8.0   |
| TPH-CWG - Aliphatic >EC21 - EC35        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   | < 8.0   |
| TPH-CWG - Aliphatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |
| <b>TPH-CWG - Aliphatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | < 10    | < 10    |
| <b>TPH-CWG - Aliphatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | < 10    | < 10    | < 10    | < 10    |

|                                        |       |       |        |         |         |         |         |         |
|----------------------------------------|-------|-------|--------|---------|---------|---------|---------|---------|
| TPH-CWG - Aromatic >EC5 - EC7          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC7 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aromatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | 2.3     | < 2.0   | 2.4     | < 2.0   |
| TPH-CWG - Aromatic >EC16 - EC21        | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | < 10    | < 10    |
| TPH-CWG - Aromatic >EC21 - EC35        | mg/kg | 10    | MCERTS | 14      | 21      | 17      | 20      | 12      |
| TPH-CWG - Aromatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |
| <b>TPH-CWG - Aromatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | 23      | 30      | 20      | 29      | 18      |
| <b>TPH-CWG - Aromatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | 23      | 30      | 20      | 29      | 18      |

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number: 19-63079  
Project / Site name: Scotchbarn Lane

| Lab Sample Number                    |       |                    |                      | 16965         | 16966          | 16967          | 16968          |
|--------------------------------------|-------|--------------------|----------------------|---------------|----------------|----------------|----------------|
| Sample Reference                     |       |                    |                      | Plot 46       | Plot 59 - TS01 | Plot 59 - TS02 | Plot 59 - TS03 |
| Sample Number                        |       |                    |                      | None Supplied | None Supplied  | None Supplied  | None Supplied  |
| Depth (m)                            |       |                    |                      | 0.40          | 0.20           | 0.30           | 0.10           |
| Date Sampled                         |       |                    |                      | 25/09/2019    | 25/09/2019     | 25/09/2019     | 25/09/2019     |
| Time Taken                           |       |                    |                      | None Supplied | None Supplied  | None Supplied  | None Supplied  |
| Analytical Parameter (Soil Analysis) | Units | Limit of detection | Accreditation Status |               |                |                |                |
| <b>SOILS</b>                         |       |                    |                      |               |                |                |                |
| Stone Content                        | %     | 0.1                | NONE                 | < 0.1         | < 0.1          | < 0.1          | < 0.1          |
| Moisture Content                     | %     | N/A                | NONE                 | 14            | 17             | 18             | 21             |
| Total mass of sample received        | kg    | 0.001              | NONE                 | 1.4           | 1.3            | 1.4            | 0.55           |

|                  |      |     |           |              |              |              |              |
|------------------|------|-----|-----------|--------------|--------------|--------------|--------------|
| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected | Not-detected | Not-detected |
|------------------|------|-----|-----------|--------------|--------------|--------------|--------------|

#### General Inorganics

|                                                                         |          |         |        |       |       |       |       |
|-------------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 8.3   | 7.0   | 7.6   | 7.8   |
| Total Cyanide                                                           | mg/kg    | 1       | MCERTS | < 1   | < 1   | < 1   | < 1   |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)         | mg/kg    | 2.5     | MCERTS | 220   | 68    | 110   | 44    |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.11  | 0.034 | 0.053 | 0.022 |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 110   | 34.0  | 53.0  | 21.9  |
| Organic Matter                                                          | %        | 0.1     | MCERTS | 2.5   | 6.4   | 5.4   | 6.1   |
| Fraction Organic Carbon (FOC)                                           | N/A      | 0.001   | MCERTS | 0.015 | 0.037 | 0.031 | 0.036 |

#### Total Phenols

|                            |       |   |        |       |       |       |       |
|----------------------------|-------|---|--------|-------|-------|-------|-------|
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
|----------------------------|-------|---|--------|-------|-------|-------|-------|

#### Speciated PAHs

|                        |       |      |        |        |        |        |        |
|------------------------|-------|------|--------|--------|--------|--------|--------|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 1.3    | 0.44   | 0.40   | 0.89   |
| Anthracene             | mg/kg | 0.05 | MCERTS | 0.25   | < 0.05 | < 0.05 | 0.15   |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 1.4    | 0.72   | 0.72   | 1.1    |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 1.4    | 0.68   | 0.71   | 0.98   |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 0.69   | 0.42   | 0.45   | 0.55   |
| Chrysene               | mg/kg | 0.05 | MCERTS | 0.66   | 0.51   | 0.44   | 0.56   |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.67   | 0.39   | 0.43   | 0.59   |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.34   | 0.32   | 0.30   | 0.22   |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 0.63   | 0.40   | 0.42   | 0.46   |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 0.38   | 0.26   | 0.29   | 0.30   |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | 0.51   | 0.34   | 0.38   | 0.42   |

#### Total PAH

|                             |       |     |        |      |      |      |      |
|-----------------------------|-------|-----|--------|------|------|------|------|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 8.19 | 4.48 | 4.54 | 6.20 |
|-----------------------------|-------|-----|--------|------|------|------|------|

#### Heavy Metals / Metalloids

|                                    |       |      |           |       |       |       |       |
|------------------------------------|-------|------|-----------|-------|-------|-------|-------|
| Antimony (aqua regia extractable)  | mg/kg | 1    | ISO 17025 | < 1.0 | 1.4   | 2.5   | 2.4   |
| Arsenic (aqua regia extractable)   | mg/kg | 1    | MCERTS    | 7.7   | 10    | 17    | 7.3   |
| Barium (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 69    | 45    | 64    | 41    |
| Beryllium (aqua regia extractable) | mg/kg | 0.06 | MCERTS    | 0.55  | 0.33  | 0.54  | 0.33  |
| Boron (water soluble)              | mg/kg | 0.2  | MCERTS    | 0.7   | 0.2   | 0.6   | 0.4   |
| Cadmium (aqua regia extractable)   | mg/kg | 0.2  | MCERTS    | 0.7   | 0.2   | 0.9   | 0.4   |
| Chromium (hexavalent)              | mg/kg | 1.2  | MCERTS    | < 1.2 | < 1.2 | < 1.2 | < 1.2 |
| Chromium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 19    | 8.2   | 15    | 10    |
| Copper (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 36    | 27    | 54    | 30    |
| Lead (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 36    | 40    | 60    | 48    |
| Mercury (aqua regia extractable)   | mg/kg | 0.3  | MCERTS    | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 16    | 7.0   | 12    | 8.6   |
| Selenium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 22    | 11    | 15    | 11    |
| Zinc (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 56    | 40    | 63    | 38    |



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|                                         |  |  |  |               |                       |                         |                |  |
|-----------------------------------------|--|--|--|---------------|-----------------------|-------------------------|----------------|--|
| Lab Sample Number                       |  |  |  | 16965         | 16966                 | 16967                   | 16968          |  |
| Sample Reference                        |  |  |  | Plot 46       | Plot 59 - TS01        | Plot 59 - TS02          | Plot 59 - TS03 |  |
| Sample Number                           |  |  |  | None Supplied | None Supplied         | None Supplied           | None Supplied  |  |
| Depth (m)                               |  |  |  | 0.40          | 0.20                  | 0.30                    | 0.10           |  |
| Date Sampled                            |  |  |  | 25/09/2019    | 25/09/2019            | 25/09/2019              | 25/09/2019     |  |
| Time Taken                              |  |  |  | None Supplied | None Supplied         | None Supplied           | None Supplied  |  |
| Analytical Parameter<br>(Soil Analysis) |  |  |  | Units         | Limit of<br>detection | Accreditation<br>Status |                |  |
|                                         |  |  |  |               |                       |                         |                |  |

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| Lab Sample Number                       |       |                       |                         | 16965         | 16966          | 16967          | 16968          |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|----------------|----------------|----------------|
| Sample Reference                        |       |                       |                         | Plot 46       | Plot 59 - TS01 | Plot 59 - TS02 | Plot 59 - TS03 |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied  | None Supplied  | None Supplied  |
| Depth (m)                               |       |                       |                         | 0.40          | 0.20           | 0.30           | 0.10           |
| Date Sampled                            |       |                       |                         | 25/09/2019    | 25/09/2019     | 25/09/2019     | 25/09/2019     |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied  | None Supplied  | None Supplied  |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |                |                |                |

#### Monoaromatics & Oxygenates

|                                    |       |   |        |       |       |       |       |
|------------------------------------|-------|---|--------|-------|-------|-------|-------|
| Benzene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Toluene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| p & m-xylene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| o-xylene                           | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |

#### Petroleum Hydrocarbons

|                                         |       |       |        |         |         |         |         |
|-----------------------------------------|-------|-------|--------|---------|---------|---------|---------|
| TPH-CWG - Aliphatic >EC5 - EC6          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC6 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aliphatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   | < 2.0   | < 2.0   |
| TPH-CWG - Aliphatic >EC16 - EC21        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   |
| TPH-CWG - Aliphatic >EC21 - EC35        | mg/kg | 8     | MCERTS | < 8.0   | 8.8     | < 8.0   | < 8.0   |
| TPH-CWG - Aliphatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |
| <b>TPH-CWG - Aliphatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | < 10    |
| <b>TPH-CWG - Aliphatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | < 10    | < 10    | < 10    |

|                                        |       |       |        |         |         |         |         |
|----------------------------------------|-------|-------|--------|---------|---------|---------|---------|
| TPH-CWG - Aromatic >EC5 - EC7          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC7 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aromatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   | 2.3     | < 2.0   |
| TPH-CWG - Aromatic >EC16 - EC21        | mg/kg | 10    | MCERTS | < 10    | < 10    | 11      | < 10    |
| TPH-CWG - Aromatic >EC21 - EC35        | mg/kg | 10    | MCERTS | < 10    | 11      | 37      | < 10    |
| TPH-CWG - Aromatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |
| <b>TPH-CWG - Aromatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | 18      | 49      | < 10    |
| <b>TPH-CWG - Aromatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | 18      | 49      | < 10    |

U/S = Unsuitable Sample I/S = Insufficient Sample



**Analytical Report Number : 19-63079**

**Project / Site name: Scotchbarn Lane**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description *                 |
|-------------------|------------------|---------------|-----------|--------------------------------------|
| 16960             | Plot 130         | None Supplied | 0.20      | Brown clay with vegetation.          |
| 16961             | Plot 130         | None Supplied | 0.50      | Brown clay and loam with vegetation. |
| 16962             | Plot 44          | None Supplied | 0.20      | Brown clay and loam with vegetation. |
| 16963             | Plot 44          | None Supplied | 0.40      | Brown clay and sand.                 |
| 16964             | Plot 46          | None Supplied | 0.20      | Brown clay and loam.                 |
| 16965             | Plot 46          | None Supplied | 0.40      | Brown clay and sand with gravel.     |
| 16966             | Plot 59 - TS01   | None Supplied | 0.20      | Brown clay and loam.                 |
| 16967             | Plot 59 - TS02   | None Supplied | 0.30      | Brown clay and loam.                 |
| 16968             | Plot 59 - TS03   | None Supplied | 0.10      | Brown clay and sand.                 |

**Analytical Report Number : 19-63079**

**Project / Site name: Scotchbarn Lane**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name                               | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                                                                       | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Asbestos identification in soil                    | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.                                     | In house method based on HSG 248                                                                                                  | A001-PL       | D                  | ISO 17025            |
| Boron, water soluble, in soil                      | Determination of water soluble boron in soil by hot water extract followed by ICP-OES.                                                                    | In-house method based on Second Site Properties version 3                                                                         | L038-PL       | D                  | MCERTS               |
| BTEX and MTBE in soil (Monoaromatics)              | Determination of BTEX in soil by headspace GC-MS.                                                                                                         | In-house method based on USEPA8260                                                                                                | L073B-PL      | W                  | MCERTS               |
| Fraction of Organic Carbon in soil                 | Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                 | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests                                                  | L009-PL       | D                  | MCERTS               |
| Hexavalent chromium in soil (Lower Level)          | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.     | In-house method                                                                                                                   | L080-PL       | W                  | MCERTS               |
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                                              | L038-PL       | D                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically.                                                                                                             | In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests                                                  | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                    | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)                   | L080-PL       | W                  | MCERTS               |
| Organic matter (Automated) in soil                 | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                             | BS1377 Part 3, 1990, Chemical and Electrochemical Tests""                                                                         | L009-PL       | D                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                         | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests                                                  | L099-PL       | D                  | MCERTS               |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.    | In-house method based on USEPA 8270                                                                                               | L064-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                               | In-house method based on British Standard Methods and MCERTS requirements.                                                        | L019-UK/PL    | D                  | NONE                 |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES. | L038-PL       | D                  | MCERTS               |
| Total cyanide in soil                              | Determination of total cyanide by distillation followed by colorimetry.                                                                                   | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)                   | L080-PL       | W                  | MCERTS               |
| TPH in (Soil)                                      | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                                             | In-house method, TPH with carbon banding.                                                                                         | L076-PL       | D                  | NONE                 |
| TPHCWG (Soil)                                      | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.                                                                                 | In-house method                                                                                                                   | L088/76-PL    | W                  | MCERTS               |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**

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

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

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The results included within the report are representative of the samples submitted for analysis.

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John Fenlon  
**Bellway Homes Limited (North West)**  
2 Alderman Road  
Hunts Cross  
Liverpool  
Merseyside  
L24 9LR

Ref: 18v103358  
Date: 5<sup>th</sup> November 2019

**By email only: [john.fenlon@bellway.co.uk](mailto:john.fenlon@bellway.co.uk)**

Dear John,

### **Garden Validation – Scotchbarn Lane, Knowsley – Plots 61 - 63**

#### **Background and Objectives**

In accordance with the Remediation Strategy ref 103358p2r2, dated November 2017, the following remedial measures are required in all areas of the site:

#### **Depth Requirement for Gardens**

- ▶ A total clean cover system comprising a minimum thickness of 600 mm;
- ▶ A minimum topsoil thickness of 150 mm; and,
- ▶ The remainder of the clean cover system shall be comprised of subsoil.

#### **Validation Requirement**

- ▶ Independent validation of works by Geo-Environmental Consultant;
- ▶ Visual inspection and chemical laboratory validation sampling; and
- ▶ Production of validation letter reports for the clean cover system.

Required sample numbers for chemical validation are summarised in Table 1.

**Table 1: Chemical Validation Testing Requirement**

| Source               | Source of Material      |                          |                          |                          |
|----------------------|-------------------------|--------------------------|--------------------------|--------------------------|
|                      | Greenfield              | Remediated               | Brownfield               | Unknown                  |
| Gardens              | 1 per 250m <sup>3</sup> | 1 per 100 m <sup>3</sup> | 1 per 50 m <sup>3</sup>  | 1 per 50 m <sup>3</sup>  |
| Soft Landscaping     | 1 per 250m <sup>3</sup> | 1 per 150 m <sup>3</sup> | 1 per 150 m <sup>3</sup> | 1 per 150 m <sup>3</sup> |
| Other Fill Materials | 1 per 250m <sup>3</sup> | 1 per 250m <sup>3</sup>  | 1 per 250m <sup>3</sup>  | 1 per 250m <sup>3</sup>  |



## Validation Works Completed

Table 2 summarises plots validated.

**Table 2: Summary of Validated Plots**

| Validated Plots<br>[w/ 600mm Cover System] | Letter Reference |
|--------------------------------------------|------------------|
| 7-10                                       | 01v103358        |
| 1-2, 5                                     | 02v103358        |
| 6, 34-39, 118-119                          | 03v103358        |
| 41-43 & 117                                | 04v103358        |
| 11 & 40                                    | 05v103358        |
| 12-13                                      | 06v103358        |
| 14-16                                      | 07v103358        |
| 17-19                                      | 08v103358        |
| 120-123                                    | 09v103358        |
| 124-128                                    | 10v103358        |
| 20 – 26                                    | 11v103358        |
| 27, 31-33                                  | 12v103358        |
| 28-30                                      | 13v103358        |
| 50-55                                      | 14v103358        |
| 56-59                                      | 15v103358        |
| 48, 49, 60                                 | 16v103358        |
| 129, 130, 44 – 47, 59                      | 17v103358        |
| 61 - 63                                    | 18v103358        |

Table 3 summarises approximate volumes of soil validated to date within the rear gardens.

**Table 3: Approximate total soil volumes of rear gardens**

| Material | Volume (m <sup>3</sup> ) |
|----------|--------------------------|
| Topsoil  | 2,300                    |
| Subsoil  | 6,900                    |

## Validation Visit – 24<sup>th</sup> October 2019

REC attended site on 24<sup>th</sup> October 2019 to confirm the correct thickness of topsoil and subsoil has been used in the rear gardens of properties in Plots 61 to 63 and to collect samples for laboratory analysis.

One hand dug pit was completed in each garden and the depths and descriptions of each strata encountered recorded.

REC's independent inspection shows that the required 600mm of clean cover is present within the rear gardens of Plots 61 to 63.

A visual inspection of the topsoil and subsoil within each pit confirms them to be free of potentially deleterious or unsuitable materials discernible by the naked eye such as ceramic materials, metal objects, plastics, treated wood or textiles.

Topsoil and subsoil samples were collected and analysed for the constituents of concern noted in Table 4 (enclosed to this letter) to the correct frequency as specified in Table 1 above and have been



subsequently assessed against their suitability for a residential with gardens and plant uptake end use development.

#### **Laboratory Testing of Site Won Soil**

REC visited site on the 17<sup>th</sup>- 19<sup>th</sup> May 2016 and 15<sup>th</sup> March 2017 to undertake intrusive ground investigations. Sampling and testing of site won topsoil as part of this work determined it suitable for use within gardens. Laboratory test certificates are attached to this report.

#### **Laboratory Testing of Placed Topsoil**

Topsoil has been purchased from the R Draper LTD soil merchant. One sample of topsoil and one sample of subsoil were tested at a frequency of 1 per 50m<sup>3</sup> within Plots 61-63. Laboratory analysis confirms its suitability for use within the gardens (Table 4). Laboratory test certificates are attached to this report.

#### **Summary**

REC can confirm that the topsoil and subsoil installed in the rear gardens of Plots 61 to 63 meet the specified requirements as a suitable growing medium and is suitable for its intended use.

Yours Sincerely,

**For and on behalf of REC Ltd**

**Matthew Dee**  
**Consultant**

**Approved and Authorised**

**Martin Lucass**  
**Associate Director**

Enclosed:

Location Plan of Validated Plots

Plot Inspection Records (including photographs and description)

Table 4: Screening Values for Materials within Residential Soft Landscaping Areas

Chemical Analysis Certificates



**Figure 1: Sketch Plot Validation Pit Location**



- - Validated Plots during Site Visit on 24<sup>th</sup> October 2019
- - Previously Validated Plots



## **PLOT INSPECTION RECORDS**



**PLOT NUMBER: 61**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 24/10/2019**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 400 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >200 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 62**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 24/10/2019**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 350 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >250 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                                        |
|----------------------------------------|
| Additional Comments:                   |
| Samples taken at 0.20mbgl and 0.40mbgl |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 63**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 24/10/2019**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



## **SUITABILITY CRITERIA**



**Table 4: Validation Testing Summary**

| Determinand                                                                | Units | Screening Value for Use within Private Gardens | Maximum Concentration within Topsoil | Maximum Concentration within Subsoil | Screening Value Source |
|----------------------------------------------------------------------------|-------|------------------------------------------------|--------------------------------------|--------------------------------------|------------------------|
| <b>Inorganics – Metals and Asbestos</b>                                    |       |                                                |                                      |                                      |                        |
| Arsenic                                                                    | mg/kg | 37                                             | 7.5                                  | 11                                   | (i)                    |
| Cadmium                                                                    | mg/kg | 11                                             | 0.4                                  | 1.4                                  | (i)                    |
| Chromium VI                                                                | mg/kg | 6                                              | <1.2                                 | <1.2                                 | (i)                    |
| Lead                                                                       | mg/kg | 200                                            | 47                                   | 74                                   | (iv)                   |
| Inorganic Mercury                                                          | mg/kg | 40                                             | <0.3                                 | <0.3                                 | (i)                    |
| Nickel                                                                     | mg/kg | 130                                            | 13                                   | 17                                   | (i)                    |
| Selenium                                                                   | mg/kg | 250                                            | <1.0                                 | <1.0                                 | (i)                    |
| Copper                                                                     | mg/kg | 2,400                                          | 44                                   | 79                                   | (i)                    |
| Zinc                                                                       | mg/kg | 3,700                                          | 71                                   | 86                                   | (i)                    |
| Cyanide                                                                    | mg/kg | 3.4                                            | <1.0                                 | <1.0                                 | (v)                    |
| Asbestos                                                                   | %     | Not Detected                                   | Not Detected                         | Not Detected                         | N/A                    |
|                                                                            |       |                                                |                                      |                                      |                        |
| Phenol                                                                     | mg/kg | 550                                            | <1.0                                 | <1.0                                 | (ii)                   |
| Naphthalene                                                                | mg/kg | 5.6                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthylene                                                             | mg/kg | 420                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthene                                                               | mg/kg | 510                                            | <0.05                                | <0.05                                | (ii)                   |
| Fluorene                                                                   | mg/kg | 400                                            | <0.05                                | <0.05                                | (ii)                   |
| Phenanthrene                                                               | mg/kg | 220                                            | <0.05                                | 0.32                                 | (ii)                   |
| Anthracene                                                                 | mg/kg | 2,400                                          | <0.05                                | <0.05                                | (ii)                   |
| Fluoranthene                                                               | mg/kg | 280                                            | <0.05                                | 0.73                                 | (ii)                   |
| Pyrene                                                                     | mg/kg | 1200                                           | <0.05                                | 0.70                                 | (ii)                   |
| Benzo(a)Anthracene                                                         | mg/kg | 2.7                                            | <0.05                                | 0.36                                 | (ii)                   |
| Chrysene                                                                   | mg/kg | 22                                             | <0.05                                | 0.52                                 | (ii)                   |
| Benzo(b)Fluoranthene                                                       | mg/kg | 3.3                                            | <0.05                                | 0.65                                 | (ii)                   |
| Benzo(k)Fluoranthene                                                       | mg/kg | 93                                             | <0.05                                | 0.23                                 | (ii)                   |
| Benzo(a)Pyrene                                                             | mg/kg | 2.7                                            | <0.05                                | 0.46                                 | (ii)                   |
| Indeno(123-cd)Pyrene                                                       | mg/kg | 36                                             | <0.05                                | 0.22                                 | (ii)                   |
| Dibenzo(a,h)Anthracene                                                     | mg/kg | 0.28                                           | <0.05                                | <0.05                                | (ii)                   |
| Benzo(ghi)Perylene                                                         | mg/kg | 340                                            | <0.05                                | 0.34                                 | (ii)                   |
|                                                                            |       |                                                |                                      |                                      |                        |
| TPH C <sub>5</sub> -C <sub>6</sub>                                         | mg/kg | 78                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>6</sub> -C <sub>8</sub>                                         | mg/kg | 230                                            | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>8</sub> -C <sub>10</sub>                                        | mg/kg | 65                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>10</sub> -C <sub>12</sub>                                       | mg/kg | 180                                            | <1.0                                 | <1.0                                 | (iii)                  |
| TPH C <sub>12</sub> -C <sub>16</sub>                                       | mg/kg | 330                                            | <2.0                                 | <2.0                                 | (iii)                  |
| TPH C <sub>16</sub> -C <sub>21</sub>                                       | mg/kg | 540                                            | <8.0                                 | <8.0                                 | (iii)                  |
| TPH C <sub>21</sub> -C <sub>35</sub>                                       | mg/kg | 1,500                                          | <8.0                                 | <8.0                                 | (iii)                  |
| TPH C <sub>35</sub> -C <sub>44</sub>                                       | mg/kg | 1,500                                          | <8.4                                 | <8.4                                 | (iii)                  |
| <b>Screening Value Source</b>                                              |       |                                                |                                      |                                      |                        |
| (i) LQM/CIEH Suitable For Use Level (S4UL) (2015);                         |       |                                                |                                      |                                      |                        |
| (ii) S4UL –Assessment Approach of 2.5% SOM;                                |       |                                                |                                      |                                      |                        |
| (iii) S4UL –2.5% SOM and assumed worst case aliphatic / aromatic compound; |       |                                                |                                      |                                      |                        |
| (iv) Defra Category 4 Screening Level (2014);                              |       |                                                |                                      |                                      |                        |
| (v) CLEA v1.06 Derived Value.                                              |       |                                                |                                      |                                      |                        |



## **SOIL CHEMICAL ANALYSIS**

John Fenlon  
**Bellway Homes Limited (North West)**  
2 Alderman Road  
Hunts Cross  
Liverpool  
Merseyside  
L24 9LR

Ref: 19v103358  
Date: 17<sup>th</sup> December 2019

**By email only: john.fenlon@bellway.co.uk**

Dear John,

### **Garden Validation – Scotchbarn Lane, Knowsley – Plots 65 – 67**

#### **Background and Objectives**

In accordance with the Remediation Strategy ref 103358p2r2, dated November 2017, the following remedial measures are required in all areas of the site:

#### **Depth Requirement for Gardens**

- ▶ A total clean cover system comprising a minimum thickness of 600 mm;
- ▶ A minimum topsoil thickness of 150 mm; and,
- ▶ The remainder of the clean cover system shall be comprised of subsoil.

#### **Validation Requirement**

- ▶ Independent validation of works by Geo-Environmental Consultant;
- ▶ Visual inspection and chemical laboratory validation sampling; and
- ▶ Production of validation letter reports for the clean cover system.

Required sample numbers for chemical validation are summarised in Table 1.

**Table 1: Chemical Validation Testing Requirement**

| Source               | Source of Material      |                          |                          |
|----------------------|-------------------------|--------------------------|--------------------------|
|                      | Greenfield              | Remediated               | Brownfield / Unknown     |
| Gardens              | 1 per 250m <sup>3</sup> | 1 per 100 m <sup>3</sup> | 1 per 50 m <sup>3</sup>  |
| Soft Landscaping     |                         | 1 per 150 m <sup>3</sup> | 1 per 150 m <sup>3</sup> |
| Other Fill Materials |                         | 1 per 250m <sup>3</sup>  | 1 per 250m <sup>3</sup>  |



## Validation Works Completed

Table 2 summarises plots inspected as part of each visit and the corresponding letter.

**Table 2: Summary of Validated Plots**

| Validated Plots       | Letter Reference |
|-----------------------|------------------|
| 7-10                  | 01v103358        |
| 1-2, 5                | 02v103358        |
| 6, 34-39, 118-119     | 03v103358        |
| 41-43 & 117           | 04v103358        |
| 11 & 40               | 05v103358        |
| 12-13                 | 06v103358        |
| 14-16                 | 07v103358        |
| 17-19                 | 08v103358        |
| 120-123               | 09v103358        |
| 124-128               | 10v103358        |
| 20 – 26               | 11v103358        |
| 27, 31-33             | 12v103358        |
| 28-30                 | 13v103358        |
| 50-55                 | 14v103358        |
| 56-59                 | 15v103358        |
| 48, 49, 60            | 16v103358        |
| 129, 130, 44 – 47, 59 | 17v103358        |
| 61 - 63               | 18v103358        |
| 65-67                 | 19v103358        |

### Validation Visit – 2<sup>nd</sup> December 2019

REC attended site on 2<sup>nd</sup> December 2019 to confirm the correct thickness of topsoil and subsoil has been used in the rear gardens of properties in Plots 65 to 67 and to collect samples for laboratory analysis.

One hand dug pit was completed in each garden and the depths and descriptions of each strata encountered recorded.

REC's independent inspection shows that the required 600mm of clean cover is present within the rear gardens of Plots 65 to 67.

A visual inspection of the topsoil and subsoil within each pit confirms them to be free of potentially deleterious or unsuitable materials discernible by the naked eye such as ceramic materials, metal objects, plastics, treated wood or textiles.

Topsoil and subsoil samples were collected and analysed for the constituents of concern noted in Table 4 (enclosed to this letter) to the correct frequency as specified in Table 1 above and have been subsequently assessed against their suitability for a residential with gardens and plant uptake end use development.

### Laboratory Testing of Site Won Soil

REC visited site on the 17<sup>th</sup>- 19<sup>th</sup> May 2016 and 15<sup>th</sup> March 2017 to undertake intrusive ground investigations. Sampling and testing of site won topsoil as part of this work determined it suitable for use within gardens. Laboratory test certificates are attached to this report.



### **Laboratory Testing of Placed Topsoil**

Topsoil has been purchased from the R Draper LTD soil merchant. One sample of topsoil and one sample of subsoil were tested at a frequency of 1 per 50m<sup>3</sup> from Plot 66. Both samples reported the presence of loose asbestos fibres.

As such, on the basis of the testing completed Plots 65 to 67 are not validated as containing clean cover material at this time. It is recommended that additional sampling of soils is undertaken from plot 66 and the surrounding plots 65 and 67 to confirm if asbestos is isolated to plot 66.

### **Summary**

Additional works are required with respect to validation of Plots 65 to 67 before these pots can be confirmed as validated.

Yours Sincerely,

**For and on behalf of REC Ltd**

**Matthew Dee**  
**Consultant**

**Approved and Authorised**

**Martin Lucass**  
**Associate Director**

Enclosed:

Location Plan of Validated Plots

Plot Inspection Records (including photographs and description)

Table 4: Screening Values for Materials within Residential Soft Landscaping Areas

Chemical Analysis Certificates



**Figure 1: Sketch Plot Validation Pit Location**



- - Validated Plots during Site Visit on 2<sup>nd</sup> December 2019
- - Previously Validated Plots



## **PLOT INSPECTION RECORDS**



**PLOT NUMBER: 65**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 02/12/2019**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 400 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >200 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 66**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 02/12/2019**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 350 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >250 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                                     |
|-------------------------------------|
| Additional Comments:                |
| Samples taken at 0.20 and 0.50 mbgl |

**GARDEN VALIDATION: FAIL (Lab Testing Results)**



**PLOT NUMBER: 67**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 24/10/2019**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



## **SUITABILITY CRITERIA**



**Table 4: Validation Testing Summary**

| Determinand                                                                | Units | Screening Value for Use within Private Gardens | Maximum Concentration within Topsoil | Maximum Concentration within Subsoil | Screening Value Source |
|----------------------------------------------------------------------------|-------|------------------------------------------------|--------------------------------------|--------------------------------------|------------------------|
| <b>Inorganics – Metals and Asbestos</b>                                    |       |                                                |                                      |                                      |                        |
| Arsenic                                                                    | mg/kg | 37                                             | 5.4                                  | 16                                   | (i)                    |
| Cadmium                                                                    | mg/kg | 11                                             | 0.4                                  | 2.6                                  | (i)                    |
| Chromium VI                                                                | mg/kg | 6                                              | <1.2                                 | <1.2                                 | (i)                    |
| Lead                                                                       | mg/kg | 200                                            | 42                                   | 140                                  | (iv)                   |
| Inorganic Mercury                                                          | mg/kg | 40                                             | <0.3                                 | <0.3                                 | (i)                    |
| Nickel                                                                     | mg/kg | 130                                            | 8.7                                  | 27                                   | (i)                    |
| Selenium                                                                   | mg/kg | 250                                            | <1.0                                 | <1.0                                 | (i)                    |
| Copper                                                                     | mg/kg | 2,400                                          | 34                                   | 160                                  | (i)                    |
| Zinc                                                                       | mg/kg | 3,700                                          | 51                                   | 200                                  | (i)                    |
| Cyanide                                                                    | mg/kg | 3.4                                            | <1.0                                 | <1.0                                 | (v)                    |
| Asbestos                                                                   | %     | Not Detected                                   | Detected                             | Detected                             | N/A                    |
|                                                                            |       |                                                |                                      |                                      |                        |
| Phenol                                                                     | mg/kg | 550                                            | <1.0                                 | <1.0                                 | (ii)                   |
| Naphthalene                                                                | mg/kg | 5.6                                            | <0.05                                | 0.45                                 | (ii)                   |
| Acenaphthylene                                                             | mg/kg | 420                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthene                                                               | mg/kg | 510                                            | <0.05                                | <0.05                                | (ii)                   |
| Fluorene                                                                   | mg/kg | 400                                            | <0.05                                | <0.05                                | (ii)                   |
| Phenanthrene                                                               | mg/kg | 220                                            | <0.05                                | 2.9                                  | (ii)                   |
| Anthracene                                                                 | mg/kg | 2,400                                          | <0.05                                | 0.24                                 | (ii)                   |
| Fluoranthene                                                               | mg/kg | 280                                            | 0.37                                 | 3.4                                  | (ii)                   |
| Pyrene                                                                     | mg/kg | 1200                                           | 0.37                                 | 3.0                                  | (ii)                   |
| Benzo(a)Anthracene                                                         | mg/kg | 2.7                                            | 0.31                                 | 1.6                                  | (ii)                   |
| Chrysene                                                                   | mg/kg | 22                                             | 0.24                                 | 1.3                                  | (ii)                   |
| Benzo(b)Fluoranthene                                                       | mg/kg | 3.3                                            | 0.25                                 | 1.7                                  | (ii)                   |
| Benzo(k)Fluoranthene                                                       | mg/kg | 93                                             | 0.16                                 | 0.69                                 | (ii)                   |
| Benzo(a)Pyrene                                                             | mg/kg | 2.7                                            | 0.26                                 | 1.5                                  | (ii)                   |
| Indeno(123-cd)Pyrene                                                       | mg/kg | 36                                             | <0.05                                | 0.88                                 | (ii)                   |
| Dibenzo(a,h)Anthracene                                                     | mg/kg | 0.28                                           | <0.05                                | <0.05                                | (ii)                   |
| Benzo(ghi)Perylene                                                         | mg/kg | 340                                            | <0.05                                | 0.92                                 | (ii)                   |
|                                                                            |       |                                                |                                      |                                      |                        |
| TPH C <sub>5</sub> -C <sub>6</sub>                                         | mg/kg | 78                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>6</sub> -C <sub>8</sub>                                         | mg/kg | 230                                            | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>8</sub> -C <sub>10</sub>                                        | mg/kg | 65                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>10</sub> -C <sub>12</sub>                                       | mg/kg | 180                                            | <1.0                                 | <1.0                                 | (iii)                  |
| TPH C <sub>12</sub> -C <sub>16</sub>                                       | mg/kg | 330                                            | <2.0                                 | <2.0                                 | (iii)                  |
| TPH C <sub>16</sub> -C <sub>21</sub>                                       | mg/kg | 540                                            | <8.0                                 | <8.0                                 | (iii)                  |
| TPH C <sub>21</sub> -C <sub>35</sub>                                       | mg/kg | 1,500                                          | <8.0                                 | <8.0                                 | (iii)                  |
| TPH C <sub>35</sub> -C <sub>44</sub>                                       | mg/kg | 1,500                                          | <8.4                                 | <8.4                                 | (iii)                  |
| <b>Screening Value Source</b>                                              |       |                                                |                                      |                                      |                        |
| (i) LQM/CIEH Suitable For Use Level (S4UL) (2015);                         |       |                                                |                                      |                                      |                        |
| (ii) S4UL –Assessment Approach of 2.5% SOM;                                |       |                                                |                                      |                                      |                        |
| (iii) S4UL –2.5% SOM and assumed worst case aliphatic / aromatic compound; |       |                                                |                                      |                                      |                        |
| (iv) Defra Category 4 Screening Level (2014);                              |       |                                                |                                      |                                      |                        |
| (v) CLEA v1.06 Derived Value.                                              |       |                                                |                                      |                                      |                        |



## **SOIL CHEMICAL ANALYSIS**

**Matthew Dee**

Resource Environmental Consultants Ltd  
Osprey House  
Pacific Quay  
Broadway  
Manchester  
M50 2UE

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

e: matthew.dee@recltd.co.uk

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

## **Analytical Report Number : 19-75543**

|                             |                |                               |            |
|-----------------------------|----------------|-------------------------------|------------|
| <b>Project / Site name:</b> | Scotchbarn     | <b>Samples received on:</b>   | 03/12/2019 |
| <b>Your job number:</b>     | 103358         | <b>Samples instructed on:</b> | 03/12/2019 |
| <b>Your order number:</b>   |                | <b>Analysis completed by:</b> | 11/12/2019 |
| <b>Report Issue Number:</b> | 1              | <b>Report issued on:</b>      | 11/12/2019 |
| <b>Samples Analysed:</b>    | 2 soil samples |                               |            |

**Signed:** Karolina Marek

Karolina Marek  
Technical Reviewer (Reporting Team)

**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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

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

Iss No 19-75543-1 Scotchbarn 103358

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report are representative of the samples submitted for analysis.

Page 1 of 5

Analytical Report Number: 19-75543

Project / Site name: Scotchbarn

|                                         |       |                       |                         |               |               |  |  |  |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|--|--|--|
| Lab Sample Number                       |       |                       |                         | 1381523       | 1381524       |  |  |  |
| Sample Reference                        |       |                       |                         | Plot 66 TS01  | Plot 66 SS01  |  |  |  |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied |  |  |  |
| Depth (m)                               |       |                       |                         | 0.20          | 0.50          |  |  |  |
| Date Sampled                            |       |                       |                         | 02/12/2019    | 02/12/2019    |  |  |  |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied |  |  |  |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |  |  |  |
| Stone Content                           | %     | 0.1                   | NONE                    | < 0.1         | < 0.1         |  |  |  |
| Moisture Content                        | %     | N/A                   | NONE                    | 19            | 22            |  |  |  |
| Total mass of sample received           | kg    | 0.001                 | NONE                    | 1.2           | 1.2           |  |  |  |

|                                               |      |     |           |                          |                             |  |  |  |
|-----------------------------------------------|------|-----|-----------|--------------------------|-----------------------------|--|--|--|
| Asbestos in Soil Screen / Identification Name | Type | N/A | ISO 17025 | Amosite- Loose<br>Fibres | Chrysotile- Loose<br>Fibres |  |  |  |
| Asbestos in Soil                              | Type | N/A | ISO 17025 | Detected                 | Detected                    |  |  |  |

#### General Inorganics

|                                                                            |          |         |        |       |       |  |  |  |
|----------------------------------------------------------------------------|----------|---------|--------|-------|-------|--|--|--|
| pH - Automated                                                             | pH Units | N/A     | MCERTS | 7.2   | 7.4   |  |  |  |
| Total Cyanide                                                              | mg/kg    | 1       | MCERTS | < 1   | < 1   |  |  |  |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)            | mg/kg    | 2.5     | MCERTS | 61    | 90    |  |  |  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate<br>Equivalent) | g/l      | 0.00125 | MCERTS | 0.030 | 0.045 |  |  |  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate<br>Equivalent) | mg/l     | 1.25    | MCERTS | 30.4  | 44.8  |  |  |  |
| Organic Matter                                                             | %        | 0.1     | MCERTS | 3.4   | 4.4   |  |  |  |
| Fraction Organic Carbon (FOC)                                              | N/A      | 0.001   | MCERTS | 0.019 | 0.025 |  |  |  |

#### Total Phenols

|                            |       |   |        |       |       |  |  |  |
|----------------------------|-------|---|--------|-------|-------|--|--|--|
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
|----------------------------|-------|---|--------|-------|-------|--|--|--|

#### Speciated PAHs

|                        |       |      |        |        |        |  |  |  |
|------------------------|-------|------|--------|--------|--------|--|--|--|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | 0.45   |  |  |  |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 |  |  |  |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 |  |  |  |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 |  |  |  |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | < 0.05 | 2.9    |  |  |  |
| Anthracene             | mg/kg | 0.05 | MCERTS | < 0.05 | 0.24   |  |  |  |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 0.37   | 3.4    |  |  |  |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 0.37   | 3.0    |  |  |  |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 0.31   | 1.6    |  |  |  |
| Chrysene               | mg/kg | 0.05 | MCERTS | 0.24   | 1.3    |  |  |  |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.25   | 1.7    |  |  |  |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.16   | 0.69   |  |  |  |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 0.26   | 1.5    |  |  |  |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.88   |  |  |  |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 |  |  |  |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | < 0.05 | 0.92   |  |  |  |

#### Total PAH

|                             |       |     |        |      |      |  |  |  |
|-----------------------------|-------|-----|--------|------|------|--|--|--|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 1.96 | 18.6 |  |  |  |
|-----------------------------|-------|-----|--------|------|------|--|--|--|

#### Heavy Metals / Metalloids

|                                    |       |      |           |       |       |  |  |  |
|------------------------------------|-------|------|-----------|-------|-------|--|--|--|
| Antimony (aqua regia extractable)  | mg/kg | 1    | ISO 17025 | 1.4   | 3.4   |  |  |  |
| Arsenic (aqua regia extractable)   | mg/kg | 1    | MCERTS    | 5.4   | 16    |  |  |  |
| Barium (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 57    | 180   |  |  |  |
| Beryllium (aqua regia extractable) | mg/kg | 0.06 | MCERTS    | 0.38  | 1.2   |  |  |  |
| Boron (water soluble)              | mg/kg | 0.2  | MCERTS    | 0.3   | 0.8   |  |  |  |
| Cadmium (aqua regia extractable)   | mg/kg | 0.2  | MCERTS    | 0.4   | 2.6   |  |  |  |
| Chromium (hexavalent)              | mg/kg | 1.2  | MCERTS    | < 1.2 | < 1.2 |  |  |  |
| Chromium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 11    | 25    |  |  |  |
| Copper (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 34    | 160   |  |  |  |
| Lead (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 42    | 140   |  |  |  |
| Mercury (aqua regia extractable)   | mg/kg | 0.3  | MCERTS    | < 0.3 | 0.5   |  |  |  |
| Nickel (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 8.7   | 27    |  |  |  |
| Selenium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | < 1.0 | < 1.0 |  |  |  |
| Vanadium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 14    | 34    |  |  |  |
| Zinc (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 51    | 200   |  |  |  |

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|                                         |  |  |  |               |                       |                         |  |  |
|-----------------------------------------|--|--|--|---------------|-----------------------|-------------------------|--|--|
| Lab Sample Number                       |  |  |  | 1381523       | 1381524               |                         |  |  |
| Sample Reference                        |  |  |  | Plot 66 TS01  | Plot 66 SS01          |                         |  |  |
| Sample Number                           |  |  |  | None Supplied | None Supplied         |                         |  |  |
| Depth (m)                               |  |  |  | 0.20          | 0.50                  |                         |  |  |
| Date Sampled                            |  |  |  | 02/12/2019    | 02/12/2019            |                         |  |  |
| Time Taken                              |  |  |  | None Supplied | None Supplied         |                         |  |  |
| Analytical Parameter<br>(Soil Analysis) |  |  |  | Units         | Limit of<br>detection | Accreditation<br>Status |  |  |

#### Monoaromatics & Oxygenates

|                                    |       |   |        |       |       |  |  |  |
|------------------------------------|-------|---|--------|-------|-------|--|--|--|
| Benzene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
| Toluene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
| Ethylbenzene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
| p & m-xylene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
| o-xylene                           | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |

#### Petroleum Hydrocarbons

|                                         |       |       |        |         |         |  |  |  |
|-----------------------------------------|-------|-------|--------|---------|---------|--|--|--|
| TPH-CWG - Aliphatic >EC5 - EC6          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aliphatic >EC6 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aliphatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aliphatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   |  |  |  |
| TPH-CWG - Aliphatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   |  |  |  |
| TPH-CWG - Aliphatic >EC16 - EC21        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   |  |  |  |
| TPH-CWG - Aliphatic >EC21 - EC35        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   |  |  |  |
| TPH-CWG - Aliphatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   |  |  |  |
| <b>TPH-CWG - Aliphatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | < 10    |  |  |  |
| <b>TPH-CWG - Aliphatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | < 10    |  |  |  |

|                                        |       |       |        |         |         |  |  |  |
|----------------------------------------|-------|-------|--------|---------|---------|--|--|--|
| TPH-CWG - Aromatic >EC5 - EC7          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aromatic >EC7 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aromatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aromatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | 3.8     |  |  |  |
| TPH-CWG - Aromatic >EC12 - EC16        | mg/kg | 2     | MCERTS | 4.3     | 3.9     |  |  |  |
| TPH-CWG - Aromatic >EC16 - EC21        | mg/kg | 10    | MCERTS | 10      | 15      |  |  |  |
| TPH-CWG - Aromatic >EC21 - EC35        | mg/kg | 10    | MCERTS | 30      | 38      |  |  |  |
| TPH-CWG - Aromatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   |  |  |  |
| <b>TPH-CWG - Aromatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | 44      | 60      |  |  |  |
| <b>TPH-CWG - Aromatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | 44      | 60      |  |  |  |



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**Project / Site name: Scotchbarn**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description *                            |
|-------------------|------------------|---------------|-----------|-------------------------------------------------|
| 1381523           | Plot 66 TS01     | None Supplied | 0.20      | Brown sandy clay with vegetation.               |
| 1381524           | Plot 66 SS01     | None Supplied | 0.50      | Brown loam and clay with gravel and vegetation. |

**Analytical Report Number : 19-75543**

**Project / Site name: Scotchbarn**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name                               | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                                                                       | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Asbestos identification in soil                    | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.                                     | In house method based on HSG 248                                                                                                  | A001-PL       | D                  | ISO 17025            |
| Boron, water soluble, in soil                      | Determination of water soluble boron in soil by hot water extract followed by ICP-OES.                                                                    | In-house method based on Second Site Properties version 3                                                                         | L038-PL       | D                  | MCERTS               |
| BTEX and MTBE in soil (Monoaromatics)              | Determination of BTEX in soil by headspace GC-MS.                                                                                                         | In-house method based on USEPA8260                                                                                                | L073B-PL      | W                  | MCERTS               |
| Fraction of Organic Carbon in soil                 | Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                 | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests                                                  | L009-PL       | D                  | MCERTS               |
| Hexavalent chromium in soil (Lower Level)          | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.     | In-house method                                                                                                                   | L080-PL       | W                  | MCERTS               |
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                                              | L038-PL       | D                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                     | In-house method based on BS1377 Part 2, 1990, Classification tests                                                                | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                    | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)                   | L080-PL       | W                  | MCERTS               |
| Organic matter (Automated) in soil                 | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                             | BS1377 Part 3, 1990, Chemical and Electrochemical Tests""                                                                         | L009-PL       | D                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                         | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests                                                  | L099-PL       | D                  | MCERTS               |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.    | In-house method based on USEPA 8270                                                                                               | L064-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                               | In-house method based on British Standard Methods and MCERTS requirements.                                                        | L019-UK/PL    | D                  | NONE                 |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES. | L038-PL       | D                  | MCERTS               |
| Total cyanide in soil                              | Determination of total cyanide by distillation followed by colorimetry.                                                                                   | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)                   | L080-PL       | W                  | MCERTS               |
| TPH in (Soil)                                      | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                                             | In-house method, TPH with carbon banding and silica gel split/cleanup.                                                            | L076-PL       | D                  | NONE                 |
| TPHCWG (Soil)                                      | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.                                                                                 | In-house method with silica gel split/clean up.                                                                                   | L088/76-PL    | W                  | MCERTS               |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**

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

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

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The results included within the report are representative of the samples submitted for analysis.

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John Fenlon  
**Bellway Homes Limited (North West)**  
2 Alderman Road  
Hunts Cross  
Liverpool  
Merseyside  
L24 9LR

Ref: 20v103358  
Date: 7<sup>th</sup> January 2020

**By email only: john.fenlon@bellway.co.uk**

Dear John,

**Garden Validation – Scotchbarn Lane, Knowsley – Plots 65 – 67 (re-validation) & Plot 68.**

**Background and Objectives**

In accordance with the Remediation Strategy ref 103358p2r2, dated November 2017, the following remedial measures are required in all areas of the site:

**Depth Requirement for Gardens**

- ▶ A total clean cover system comprising a minimum thickness of 600 mm;
- ▶ A minimum topsoil thickness of 150 mm; and,
- ▶ The remainder of the clean cover system shall be comprised of subsoil.

**Validation Requirement**

- ▶ Independent validation of works by Geo-Environmental Consultant;
- ▶ Visual inspection and chemical laboratory validation sampling; and
- ▶ Production of validation letter reports for the clean cover system.

Required sample numbers for chemical validation are summarised in Table 1.

**Table 1: Chemical Validation Testing Requirement**

| Source               | Source of Material      |                          |                          |
|----------------------|-------------------------|--------------------------|--------------------------|
|                      | Greenfield              | Remediated               | Brownfield / Unknown     |
| Gardens              | 1 per 250m <sup>3</sup> | 1 per 100 m <sup>3</sup> | 1 per 50 m <sup>3</sup>  |
| Soft Landscaping     |                         | 1 per 150 m <sup>3</sup> | 1 per 150 m <sup>3</sup> |
| Other Fill Materials |                         | 1 per 250m <sup>3</sup>  | 1 per 250m <sup>3</sup>  |



## Validation Works Completed

Table 2 summarises plots inspected as part of each visit and the corresponding letter.

**Table 2: Summary of Validated Plots**

| Validated Plots                 | Letter Reference |
|---------------------------------|------------------|
| 7-10                            | 01v103358        |
| 1-2, 5                          | 02v103358        |
| 6, 34-39, 118-119               | 03v103358        |
| 41-43 & 117                     | 04v103358        |
| 11 & 40                         | 05v103358        |
| 12-13                           | 06v103358        |
| 14-16                           | 07v103358        |
| 17-19                           | 08v103358        |
| 120-123                         | 09v103358        |
| 124-128                         | 10v103358        |
| 20 – 26                         | 11v103358        |
| 27, 31-33                       | 12v103358        |
| 28-30                           | 13v103358        |
| 50-55                           | 14v103358        |
| 56-59                           | 15v103358        |
| 48, 49, 60                      | 16v103358        |
| 129, 130, 44 – 47, 59           | 17v103358        |
| 61 - 63                         | 18v103358        |
| 65-67 (further action required) | 19v103358        |
| 65-68 (revalidation)            | 20v103358        |

### Validation Visit – 7<sup>th</sup> January 2020

REC attended site on 7<sup>th</sup> January 2020 to confirm the correct thickness of topsoil and subsoil has been used in the rear gardens of Plot 68 and to collect samples for laboratory analysis from Plots 65-67 which had not passed validation on the previous visit.

One hand dug pit was completed in gardens 65, 67 and 68 and the depths and descriptions of each strata encountered recorded. 3no. hand dug pits were completed in garden 66 in order to provide representative samples of the plot following the identification of asbestos fibres in samples of its topsoil (0.20mbgl) and subsoil (0.50mbgl) during the previous visit.

REC's independent inspection shows that the required 600mm of clean cover is present within the rear gardens of Plots 65 to 68.

A visual inspection of the topsoil and subsoil within each pit confirms them to be free of potentially deleterious or unsuitable materials discernible by the naked eye such as ceramic materials, metal objects, plastics, treated wood or textiles.

Topsoil and subsoil samples were collected and analysed for the constituents of concern noted in Table 4 (enclosed to this letter) to the correct frequency as specified in Table 1 above and have been subsequently assessed against their suitability for a residential with gardens and plant uptake end use development.



### **Laboratory Testing of Site Won Soil**

REC visited site on the 17<sup>th</sup>- 19<sup>th</sup> May 2016 and 15<sup>th</sup> March 2017 to undertake intrusive ground investigations. Sampling and testing of site won topsoil as part of this work determined it suitable for use within gardens. Laboratory test certificates are attached to this report.

### **Laboratory Testing of Placed Topsoil**

Topsoil has been purchased from the R Draper LTD soil merchant. Laboratory test certificates are attached to this report.

One sample of topsoil and one sample of subsoil were tested from both Plots 65 and 67. Laboratory analysis from Plots 65 and 67 confirms its suitability for use within the gardens (Table 4) and the absence of asbestos fibres.

Three samples of both topsoil and subsoil were tested from Plot 66. Two samples returned positive for asbestos, which was subsequently quantified and reported as <0.001%.

On the basis that 4 samples have returned positive identifications for asbestos fibres over 2 visits made by REC it is recommended that this material be stripped and replaced followed by revalidation of Plot 66.

### **Summary**

REC can confirm that the topsoil and subsoil installed in the rear gardens of Plots 65, 67 and 68 meet the specified requirements as a suitable growing medium and is suitable for its intended use.

It is recommended that this material be stripped and replaced followed by revalidation of Plot 66.

Yours Sincerely,

**For and on behalf of REC Ltd**

**Matthew Dee**  
**Consultant**

**Approved and Authorised**

**Martin Lucass**  
**Associate Director**

Enclosed:

Location Plan of Validated Plots

Plot Inspection Records (including photographs and description)

Table 4: Screening Values for Materials within Residential Soft Landscaping Areas

Chemical Analysis Certificates



**Figure 1: Sketch Plot Validation Pit Location**



- - Validated Plots during Site Visit on 7<sup>th</sup> January 2020.
- - Previously Validated Plots



## **PLOT INSPECTION RECORDS**



**PLOT NUMBER: 65**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 07/01/2020**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 400 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >200 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                                      |
|--------------------------------------|
| Additional Comments:                 |
| Samples taken at 0.20 and 0.50 m bgl |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 66**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 07/01/2020**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 350 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >250 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                                                               |
|---------------------------------------------------------------|
| Additional Comments:                                          |
| Samples taken at 0.10, 0.20, 0.30, 0.40, 0.50 and 0.60 m bgl. |

**GARDEN VALIDATION: FAIL**



**PLOT NUMBER: 67**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 07/01/2020**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                                       |
|---------------------------------------|
| Additional Comments:                  |
| Samples taken at 0.20 and 0.60 m bgl. |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 68**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 07/01/2020**  
**Consultant: M. Dee**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



## **SUITABILITY CRITERIA**



**Table 4: Validation Testing Summary**

| Determinand                                                                | Units | Screening Value for Use within Private Gardens | Maximum Concentration within Topsoil | Maximum Concentration within Subsoil | Screening Value Source |
|----------------------------------------------------------------------------|-------|------------------------------------------------|--------------------------------------|--------------------------------------|------------------------|
| <b>Inorganics – Metals and Asbestos</b>                                    |       |                                                |                                      |                                      |                        |
| Arsenic                                                                    | mg/kg | 37                                             | 10                                   | 9.9                                  | (i)                    |
| Cadmium                                                                    | mg/kg | 11                                             | 1.4                                  | 1.4                                  | (i)                    |
| Chromium VI                                                                | mg/kg | 6                                              | <1.2                                 | 17                                   | (i)                    |
| Lead                                                                       | mg/kg | 200                                            | 200                                  | 90                                   | (iv)                   |
| Inorganic Mercury                                                          | mg/kg | 40                                             | <0.3                                 | <0.3                                 | (i)                    |
| Nickel                                                                     | mg/kg | 130                                            | 17                                   | 17                                   | (i)                    |
| Selenium                                                                   | mg/kg | 250                                            | <1.0                                 | <1.0                                 | (i)                    |
| Copper                                                                     | mg/kg | 2,400                                          | 100                                  | 88                                   | (i)                    |
| Zinc                                                                       | mg/kg | 3,700                                          | 140                                  | 120                                  | (i)                    |
| Cyanide                                                                    | mg/kg | 3.4                                            | <1                                   | <1                                   | (v)                    |
| Asbestos                                                                   | %     | Not Detected                                   | Detected                             | Detected                             | N/A                    |
|                                                                            |       |                                                |                                      |                                      |                        |
| Phenol                                                                     | mg/kg | 550                                            | <1.0                                 | <1.0                                 | (ii)                   |
| Naphthalene                                                                | mg/kg | 5.6                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthylene                                                             | mg/kg | 420                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthene                                                               | mg/kg | 510                                            | <0.05                                | 0.22                                 | (ii)                   |
| Fluorene                                                                   | mg/kg | 400                                            | <0.05                                | <0.05                                | (ii)                   |
| Phenanthrene                                                               | mg/kg | 220                                            | 0.79                                 | 0.8                                  | (ii)                   |
| Anthracene                                                                 | mg/kg | 2,400                                          | 0.17                                 | 0.19                                 | (ii)                   |
| Fluoranthene                                                               | mg/kg | 280                                            | 1.7                                  | 1.8                                  | (ii)                   |
| Pyrene                                                                     | mg/kg | 1200                                           | 1.5                                  | 1.7                                  | (ii)                   |
| Benzo(a)Anthracene                                                         | mg/kg | 2.7                                            | 1.2                                  | 0.88                                 | (ii)                   |
| Chrysene                                                                   | mg/kg | 22                                             | 0.78                                 | 0.61                                 | (ii)                   |
| Benzo(b)Fluoranthene                                                       | mg/kg | 3.3                                            | 1.2                                  | 0.71                                 | (ii)                   |
| Benzo(k)Fluoranthene                                                       | mg/kg | 93                                             | 0.5                                  | 0.47                                 | (ii)                   |
| Benzo(a)Pyrene                                                             | mg/kg | 2.7                                            | 0.89                                 | 0.63                                 | (ii)                   |
| Indeno(123-cd)Pyrene                                                       | mg/kg | 36                                             | 0.45                                 | 0.34                                 | (ii)                   |
| Dibenzo(a,h)Anthracene                                                     | mg/kg | 0.28                                           | <0.05                                | <0.05                                | (ii)                   |
| Benzo(ghi)Perylene                                                         | mg/kg | 340                                            | 0.53                                 | 0.44                                 | (ii)                   |
|                                                                            |       |                                                |                                      |                                      |                        |
| TPH C <sub>5</sub> -C <sub>6</sub>                                         | mg/kg | 78                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>6</sub> -C <sub>8</sub>                                         | mg/kg | 230                                            | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>8</sub> -C <sub>10</sub>                                        | mg/kg | 65                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>10</sub> -C <sub>12</sub>                                       | mg/kg | 180                                            | <1.0                                 | 1.4                                  | (iii)                  |
| TPH C <sub>12</sub> -C <sub>16</sub>                                       | mg/kg | 330                                            | <2.0                                 | 3.5                                  | (iii)                  |
| TPH C <sub>16</sub> -C <sub>21</sub>                                       | mg/kg | 540                                            | <8.0                                 | 12                                   | (iii)                  |
| TPH C <sub>21</sub> -C <sub>35</sub>                                       | mg/kg | 1,500                                          | <8.0                                 | 27                                   | (iii)                  |
| TPH C <sub>35</sub> -C <sub>44</sub>                                       | mg/kg | 1,500                                          | <8.4                                 | <8.4                                 | (iii)                  |
| <b>Screening Value Source</b>                                              |       |                                                |                                      |                                      |                        |
| (i) LQM/CIEH Suitable For Use Level (S4UL) (2015);                         |       |                                                |                                      |                                      |                        |
| (ii) S4UL –Assessment Approach of 2.5% SOM;                                |       |                                                |                                      |                                      |                        |
| (iii) S4UL –2.5% SOM and assumed worst case aliphatic / aromatic compound; |       |                                                |                                      |                                      |                        |
| (iv) Defra Category 4 Screening Level (2014);                              |       |                                                |                                      |                                      |                        |
| (v) CLEA v1.06 Derived Value.                                              |       |                                                |                                      |                                      |                        |



## **SOIL CHEMICAL ANALYSIS**

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## **Analytical Report Number : 20-80247**

Replaces Analytical Report Number : 20-80247, issue no. 1

|                             |                 |                               |            |
|-----------------------------|-----------------|-------------------------------|------------|
| <b>Project / Site name:</b> | Scotchbarn Lane | <b>Samples received on:</b>   | 09/01/2020 |
| <b>Your job number:</b>     | 103358          | <b>Samples instructed on:</b> | 09/01/2020 |
| <b>Your order number:</b>   | 7939            | <b>Analysis completed by:</b> | 22/01/2020 |
| <b>Report Issue Number:</b> | 2               | <b>Report issued on:</b>      | 22/01/2020 |
| <b>Samples Analysed:</b>    | 10 soil samples |                               |            |

**Signed:** 

Zina Abdul Razzak  
Senior Quality Specialist

**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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

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

Iss No 20-80247-2 Scotchbarn Lane 103358

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number: 20-80247

Project / Site name: Scotchbarn Lane

Your Order No: 7939

| Lab Sample Number                       | 1407946       | 1407947               | 1407948                 | 1407949       | 1407950       |
|-----------------------------------------|---------------|-----------------------|-------------------------|---------------|---------------|
| Sample Reference                        | Plot 65       | Plot 65               | Plot 66                 | Plot 66       | Plot 66       |
| Sample Number                           | ES1           | ES2                   | ES1                     | ES            | ES3           |
| Depth (m)                               | 0.20          | 0.50                  | 0.10                    | 0.40          | 0.20          |
| Date Sampled                            | 07/01/2020    | 07/01/2020            | 07/01/2020              | 07/01/2020    | 07/01/2020    |
| Time Taken                              | None Supplied | None Supplied         | None Supplied           | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units         | Limit of<br>detection | Accreditation<br>Status |               |               |
| Stone Content                           | %             | 0.1                   | NONE                    | < 0.1         | < 0.1         |
| Moisture Content                        | %             | N/A                   | NONE                    | 22            | 23            |
| Total mass of sample received           | kg            | 0.001                 | NONE                    | 1.3           | 1.1           |

| Asbestos in Soil Screen / Identification Name | Type | N/A   | ISO 17025 | -            | -            | -            | Chrysotile | -            |
|-----------------------------------------------|------|-------|-----------|--------------|--------------|--------------|------------|--------------|
| Asbestos in Soil                              | Type | N/A   | ISO 17025 | Not-detected | Not-detected | Not-detected | Detected   | Not-detected |
| Asbestos Quantification (Stage 2)             | %    | 0.001 | ISO 17025 | -            | -            | -            | < 0.001    | -            |
| Asbestos Quantification Total                 | %    | 0.001 | ISO 17025 | -            | -            | -            | < 0.001    | -            |

#### General Inorganics

| pH - Automated                                                          | pH Units | N/A     | MCERTS | 7.0   | 7.0   | 7.1   | 7.0   | 7.1   |
|-------------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|-------|
| Total Cyanide                                                           | mg/kg    | 1       | MCERTS | < 1   | < 1   | < 1   | < 1   | < 1   |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)         | mg/kg    | 2.5     | MCERTS | 77    | 68    | 77    | 84    | 55    |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.039 | 0.034 | 0.038 | 0.042 | 0.028 |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 38.7  | 34.0  | 38.3  | 42.2  | 27.6  |
| Organic Matter                                                          | %        | 0.1     | MCERTS | 4.2   | 3.8   | 3.4   | 3.9   | 2.7   |
| Fraction Organic Carbon (FOC)                                           | N/A      | 0.001   | MCERTS | 0.024 | 0.022 | 0.020 | 0.023 | 0.016 |

#### Total Phenols

| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
|----------------------------|-------|---|--------|-------|-------|-------|-------|-------|
|----------------------------|-------|---|--------|-------|-------|-------|-------|-------|

#### Speciated PAHs

| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
|------------------------|-------|------|--------|--------|--------|--------|--------|--------|
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 0.41   | 0.48   | 0.20   | 0.34   | 0.30   |
| Anthracene             | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 0.75   | 1.1    | 0.48   | 0.91   | 0.31   |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 0.71   | 1.1    | 0.45   | 0.83   | 0.29   |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 0.44   | 0.56   | 0.35   | 0.58   | < 0.05 |
| Chrysene               | mg/kg | 0.05 | MCERTS | 0.46   | 0.61   | 0.25   | 0.59   | < 0.05 |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.41   | 0.54   | 0.34   | 0.65   | < 0.05 |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.28   | 0.38   | 0.15   | 0.45   | < 0.05 |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 0.36   | 0.53   | 0.28   | 0.53   | < 0.05 |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 0.21   | 0.27   | < 0.05 | 0.34   | < 0.05 |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | 0.27   | 0.35   | < 0.05 | 0.44   | < 0.05 |

#### Total PAH

| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 4.30 | 5.92 | 2.50 | 5.66 | 0.90 |
|-----------------------------|-------|-----|--------|------|------|------|------|------|
|-----------------------------|-------|-----|--------|------|------|------|------|------|

#### Heavy Metals / Metalloids

| Antimony (aqua regia extractable)  | mg/kg | 1    | ISO 17025 | 1.7   | 2.2   | 1.7   | 2.4   | < 1.0 |
|------------------------------------|-------|------|-----------|-------|-------|-------|-------|-------|
| Arsenic (aqua regia extractable)   | mg/kg | 1    | MCERTS    | 7.9   | 9.3   | 7.1   | 9.9   | 3.8   |
| Barium (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 85    | 99    | 84    | 120   | 43    |
| Beryllium (aqua regia extractable) | mg/kg | 0.06 | MCERTS    | 0.51  | 0.62  | 0.48  | 0.70  | 0.27  |
| Boron (water soluble)              | mg/kg | 0.2  | MCERTS    | 0.7   | 1.0   | 0.9   | 0.9   | 0.5   |
| Cadmium (aqua regia extractable)   | mg/kg | 0.2  | MCERTS    | 1.0   | 1.3   | 0.9   | 1.4   | < 0.2 |
| Chromium (hexavalent)              | mg/kg | 1.2  | MCERTS    | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 |
| Chromium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 15    | 17    | 14    | 17    | 10    |
| Copper (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 64    | 78    | 55    | 88    | 24    |
| Lead (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 75    | 84    | 60    | 90    | 33    |
| Mercury (aqua regia extractable)   | mg/kg | 0.3  | MCERTS    | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 12    | 15    | 12    | 17    | 7.1   |
| Selenium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 19    | 22    | 18    | 23    | 11    |



**Analytical Report Number: 20-80247**  
**Project / Site name: Scotchbarn Lane**  
**Your Order No: 7939**

|                                                 |              |                               |                                 |               |               |               |               |               |
|-------------------------------------------------|--------------|-------------------------------|---------------------------------|---------------|---------------|---------------|---------------|---------------|
| <b>Lab Sample Number</b>                        |              |                               |                                 | 1407946       | 1407947       | 1407948       | 1407949       | 1407950       |
| <b>Sample Reference</b>                         |              |                               |                                 | Plot 65       | Plot 65       | Plot 66       | Plot 66       | Plot 66       |
| <b>Sample Number</b>                            |              |                               |                                 | ES1           | ES2           | ES1           | ES            | ES3           |
| <b>Depth (m)</b>                                |              |                               |                                 | 0.20          | 0.50          | 0.10          | 0.40          | 0.20          |
| <b>Date Sampled</b>                             |              |                               |                                 | 07/01/2020    | 07/01/2020    | 07/01/2020    | 07/01/2020    | 07/01/2020    |
| <b>Time Taken</b>                               |              |                               |                                 | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| <b>Analytical Parameter<br/>(Soil Analysis)</b> | <b>Units</b> | <b>Limit of<br/>detection</b> | <b>Accreditation<br/>Status</b> |               |               |               |               |               |
| Zinc (aqua regia extractable)                   | mg/kg        | 1                             | MCERTS                          | 110           | 120           | 75            | 120           | 44            |

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|                                         |               |                       |                         |               |               |
|-----------------------------------------|---------------|-----------------------|-------------------------|---------------|---------------|
| Lab Sample Number                       | 1407946       | 1407947               | 1407948                 | 1407949       | 1407950       |
| Sample Reference                        | Plot 65       | Plot 65               | Plot 66                 | Plot 66       | Plot 66       |
| Sample Number                           | ES1           | ES2                   | ES1                     | ES            | ES3           |
| Depth (m)                               | 0.20          | 0.50                  | 0.10                    | 0.40          | 0.20          |
| Date Sampled                            | 07/01/2020    | 07/01/2020            | 07/01/2020              | 07/01/2020    | 07/01/2020    |
| Time Taken                              | None Supplied | None Supplied         | None Supplied           | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units         | Limit of<br>detection | Accreditation<br>Status |               |               |

#### Monoaromatics & Oxygenates

|                                    |       |   |        |       |       |       |       |       |
|------------------------------------|-------|---|--------|-------|-------|-------|-------|-------|
| Benzene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Toluene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| p & m-xylene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| o-xylene                           | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |

#### Petroleum Hydrocarbons

|                                         |       |       |        |         |         |         |         |         |
|-----------------------------------------|-------|-------|--------|---------|---------|---------|---------|---------|
| TPH-CWG - Aliphatic >EC5 - EC6          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC6 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aliphatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   | < 2.0   | < 2.0   | < 2.0   |
| TPH-CWG - Aliphatic >EC16 - EC21        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   | < 8.0   |
| TPH-CWG - Aliphatic >EC21 - EC35        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   | < 8.0   |
| TPH-CWG - Aliphatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |
| <b>TPH-CWG - Aliphatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | < 10    | < 10    |
| <b>TPH-CWG - Aliphatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | < 10    | < 10    | < 10    | < 10    |

|                                        |       |       |        |         |         |         |         |         |
|----------------------------------------|-------|-------|--------|---------|---------|---------|---------|---------|
| TPH-CWG - Aromatic >EC5 - EC7          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC7 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC10 - EC12        | mg/kg | 1     | MCERTS | 1.4     | < 1.0   | < 1.0   | 1.4     | < 1.0   |
| TPH-CWG - Aromatic >EC12 - EC16        | mg/kg | 2     | MCERTS | 6.5     | < 2.0   | < 2.0   | 3.5     | < 2.0   |
| TPH-CWG - Aromatic >EC16 - EC21        | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | < 10    | < 10    |
| TPH-CWG - Aromatic >EC21 - EC35        | mg/kg | 10    | MCERTS | 15      | < 10    | < 10    | 27      | < 10    |
| TPH-CWG - Aromatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |
| <b>TPH-CWG - Aromatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | 32      | 11      | 10      | 41      | < 10    |
| <b>TPH-CWG - Aromatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | 32      | 11      | 10      | 41      | < 10    |

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Project / Site name: Scotchbarn Lane

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| Lab Sample Number                       | 1407951       | 1407952               | 1407953                 | 1407954       | 1407955       |
|-----------------------------------------|---------------|-----------------------|-------------------------|---------------|---------------|
| Sample Reference                        | Plot 66       | Plot 66               | Plot 66                 | Plot 67       | Plot 67       |
| Sample Number                           | ES4           | ES5                   | ES6                     | ES1           | ES2           |
| Depth (m)                               | 0.60          | 0.30                  | 0.50                    | 0.20          | 0.60          |
| Date Sampled                            | 07/01/2020    | 07/01/2020            | 07/01/2020              | 07/01/2020    | 07/01/2020    |
| Time Taken                              | None Supplied | None Supplied         | None Supplied           | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units         | Limit of<br>detection | Accreditation<br>Status |               |               |
| Stone Content                           | %             | 0.1                   | NONE                    | < 0.1         | < 0.1         |
| Moisture Content                        | %             | N/A                   | NONE                    | 17            | 16            |
| Total mass of sample received           | kg            | 0.001                 | NONE                    | 1.5           | 1.3           |

| Asbestos in Soil Screen / Identification Name | Type | N/A   | ISO 17025 | -            | Chrysotile- Loose<br>Fibres | -            | -            | -            |
|-----------------------------------------------|------|-------|-----------|--------------|-----------------------------|--------------|--------------|--------------|
| Asbestos in Soil                              | Type | N/A   | ISO 17025 | Not-detected | Detected                    | Not-detected | Not-detected | Not-detected |
| Asbestos Quantification (Stage 2)             | %    | 0.001 | ISO 17025 | -            | -                           | -            | -            | -            |
| Asbestos Quantification Total                 | %    | 0.001 | ISO 17025 | -            | -                           | -            | -            | -            |

#### General Inorganics

| pH - Automated                                                             | pH Units | N/A     | MCERTS | 7.0   | 7.2   | 7.1   | 7.2   | 7.8   |
|----------------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|-------|
| Total Cyanide                                                              | mg/kg    | 1       | MCERTS | < 1   | < 1   | < 1   | < 1   | < 1   |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)            | mg/kg    | 2.5     | MCERTS | 42    | 60    | 89    | 64    | 180   |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate<br>Equivalent) | g/l      | 0.00125 | MCERTS | 0.021 | 0.030 | 0.045 | 0.032 | 0.088 |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate<br>Equivalent) | mg/l     | 1.25    | MCERTS | 21.1  | 30.0  | 44.6  | 31.9  | 87.8  |
| Organic Matter                                                             | %        | 0.1     | MCERTS | 2.9   | 3.5   | 2.7   | 3.1   | 2.6   |
| Fraction Organic Carbon (FOC)                                              | N/A      | 0.001   | MCERTS | 0.017 | 0.020 | 0.016 | 0.018 | 0.015 |

#### Total Phenols

| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
|----------------------------|-------|---|--------|-------|-------|-------|-------|-------|
|----------------------------|-------|---|--------|-------|-------|-------|-------|-------|

#### Speciated PAHs

|                        |       |      |        |        |        |        |        |        |
|------------------------|-------|------|--------|--------|--------|--------|--------|--------|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | 0.22   |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | < 0.05 | 0.79   | < 0.05 | 0.70   | 0.80   |
| Anthracene             | mg/kg | 0.05 | MCERTS | < 0.05 | 0.14   | < 0.05 | 0.17   | 0.19   |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | < 0.05 | 1.7    | 0.30   | 1.2    | 1.8    |
| Pyrene                 | mg/kg | 0.05 | MCERTS | < 0.05 | 1.5    | 0.29   | 1.1    | 1.7    |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | < 0.05 | 1.2    | < 0.05 | 0.55   | 0.88   |
| Chrysene               | mg/kg | 0.05 | MCERTS | < 0.05 | 0.78   | < 0.05 | 0.45   | 0.61   |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | < 0.05 | 1.2    | < 0.05 | 0.51   | 0.71   |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | < 0.05 | 0.50   | < 0.05 | 0.22   | 0.47   |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | < 0.05 | 0.89   | < 0.05 | 0.36   | 0.63   |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.45   | < 0.05 | < 0.05 | 0.34   |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | < 0.05 | 0.53   | < 0.05 | < 0.05 | 0.35   |

#### Total PAH

| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | < 0.80 | 9.56 | < 0.80 | 5.24 | 8.71 |
|-----------------------------|-------|-----|--------|--------|------|--------|------|------|
|-----------------------------|-------|-----|--------|--------|------|--------|------|------|

#### Heavy Metals / Metalloids

|                                    |       |      |           |       |       |       |       |       |
|------------------------------------|-------|------|-----------|-------|-------|-------|-------|-------|
| Antimony (aqua regia extractable)  | mg/kg | 1    | ISO 17025 | 1.1   | 2.5   | 1.2   | 1.2   | 1.0   |
| Arsenic (aqua regia extractable)   | mg/kg | 1    | MCERTS    | 4.5   | 10    | 5.7   | 5.3   | 5.4   |
| Barium (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 47    | 120   | 54    | 56    | 54    |
| Beryllium (aqua regia extractable) | mg/kg | 0.06 | MCERTS    | 0.30  | 0.71  | 0.31  | 0.36  | 0.40  |
| Boron (water soluble)              | mg/kg | 0.2  | MCERTS    | 0.6   | 1.1   | 0.5   | 0.6   | 0.5   |
| Cadmium (aqua regia extractable)   | mg/kg | 0.2  | MCERTS    | < 0.2 | 1.4   | 0.3   | < 0.2 | 0.3   |
| Chromium (hexavalent)              | mg/kg | 1.2  | MCERTS    | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 |
| Chromium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 11    | 17    | 11    | 12    | 13    |
| Copper (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 18    | 100   | 29    | 21    | 24    |
| Lead (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 42    | 200   | 42    | 45    | 54    |
| Mercury (aqua regia extractable)   | mg/kg | 0.3  | MCERTS    | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 8.2   | 17    | 7.9   | 9.9   | 10    |
| Selenium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 13    | 23    | 13    | 15    | 16    |



**Analytical Report Number: 20-80247**  
**Project / Site name: Scotchbarn Lane**  
**Your Order No: 7939**

|                                         |       |                       |                         |               |               |               |               |               |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|
| Lab Sample Number                       |       |                       |                         | 1407951       | 1407952       | 1407953       | 1407954       | 1407955       |
| Sample Reference                        |       |                       |                         | Plot 66       | Plot 66       | Plot 66       | Plot 67       | Plot 67       |
| Sample Number                           |       |                       |                         | ES4           | ES5           | ES6           | ES1           | ES2           |
| Depth (m)                               |       |                       |                         | 0.60          | 0.30          | 0.50          | 0.20          | 0.60          |
| Date Sampled                            |       |                       |                         | 07/01/2020    | 07/01/2020    | 07/01/2020    | 07/01/2020    | 07/01/2020    |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |               |               |               |
|                                         |       |                       |                         |               |               |               |               |               |
| Zinc (aqua regia extractable)           | mg/kg | 1                     | MCERTS                  | 38            | 140           | 46            | 44            | 51            |

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| Lab Sample Number                       |  |  |  | 1407951       | 1407952               | 1407953                 | 1407954       | 1407955       |
|-----------------------------------------|--|--|--|---------------|-----------------------|-------------------------|---------------|---------------|
| Sample Reference                        |  |  |  | Plot 66       | Plot 66               | Plot 66                 | Plot 67       | Plot 67       |
| Sample Number                           |  |  |  | ES4           | ES5                   | ES6                     | ES1           | ES2           |
| Depth (m)                               |  |  |  | 0.60          | 0.30                  | 0.50                    | 0.20          | 0.60          |
| Date Sampled                            |  |  |  | 07/01/2020    | 07/01/2020            | 07/01/2020              | 07/01/2020    | 07/01/2020    |
| Time Taken                              |  |  |  | None Supplied | None Supplied         | None Supplied           | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) |  |  |  | Units         | Limit of<br>detection | Accreditation<br>Status |               |               |
|                                         |  |  |  |               |                       |                         |               |               |

#### Monoaromatics & Oxygenates

|                                    |       |   |        |       |       |       |       |       |
|------------------------------------|-------|---|--------|-------|-------|-------|-------|-------|
| Benzene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Toluene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| p & m-xylene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| o-xylene                           | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |

#### Petroleum Hydrocarbons

|                                         |       |       |        |         |         |         |         |         |
|-----------------------------------------|-------|-------|--------|---------|---------|---------|---------|---------|
| TPH-CWG - Aliphatic >EC5 - EC6          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC6 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aliphatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   | < 2.0   | < 2.0   | < 2.0   |
| TPH-CWG - Aliphatic >EC16 - EC21        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   | < 8.0   |
| TPH-CWG - Aliphatic >EC21 - EC35        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   | < 8.0   |
| TPH-CWG - Aliphatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |
| <b>TPH-CWG - Aliphatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | < 10    | < 10    |
| <b>TPH-CWG - Aliphatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | < 10    | < 10    | < 10    | < 10    |

|                                        |       |       |        |         |         |         |         |         |
|----------------------------------------|-------|-------|--------|---------|---------|---------|---------|---------|
| TPH-CWG - Aromatic >EC5 - EC7          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC7 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aromatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   | < 2.0   | < 2.0   | < 2.0   |
| TPH-CWG - Aromatic >EC16 - EC21        | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | 10      | 12      |
| TPH-CWG - Aromatic >EC21 - EC35        | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | 16      | 25      |
| TPH-CWG - Aromatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |
| <b>TPH-CWG - Aromatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | 10      | < 10    | 29      | 38      |
| <b>TPH-CWG - Aromatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | 10      | < 10    | 29      | 38      |



**Analytical Report Number:** 20-80247  
**Project / Site name:** Scotchbarn Lane  
**Your Order No:** 7939

## Certificate of Analysis - Asbestos Quantification

### Methods:

#### Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

#### Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

| Sample Number | Sample ID | Sample Depth (m) | Sample Weight (g) | Asbestos Containing Material Types Detected (ACM) | PLM Results              | Asbestos by hand picking/weighing (%) | Total % Asbestos in Sample |
|---------------|-----------|------------------|-------------------|---------------------------------------------------|--------------------------|---------------------------------------|----------------------------|
| 1407949       | Plot 66   | 0.40             | 173               | Loose Fibres                                      | Chrysotile               | < 0.001                               | < 0.001                    |
| 1407952       | Plot 66   | 0.30             | -                 | -                                                 | Chrysotile- Loose Fibres | -                                     | -                          |

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



**Analytical Report Number : 20-80247**

**Project / Site name: Scotchbarn Lane**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description *                            |
|-------------------|------------------|---------------|-----------|-------------------------------------------------|
| 1407946           | Plot 65          | ES1           | 0.20      | Brown loam and clay with gravel and vegetation. |
| 1407947           | Plot 65          | ES2           | 0.50      | Brown loam and clay with gravel and vegetation. |
| 1407948           | Plot 66          | ES1           | 0.10      | Brown loam and clay with gravel and vegetation. |
| 1407949           | Plot 66          | ES            | 0.40      | Brown loam and clay with gravel and vegetation. |
| 1407950           | Plot 66          | ES3           | 0.20      | Brown loam and clay with gravel and vegetation. |
| 1407951           | Plot 66          | ES4           | 0.60      | Brown loam and clay with gravel and vegetation. |
| 1407952           | Plot 66          | ES5           | 0.30      | Brown loam and clay with gravel and vegetation. |
| 1407953           | Plot 66          | ES6           | 0.50      | Brown loam and clay with gravel and vegetation. |
| 1407954           | Plot 67          | ES1           | 0.20      | Brown loam and clay with gravel and vegetation. |
| 1407955           | Plot 67          | ES2           | 0.60      | Brown loam and clay with gravel and vegetation. |

**Analytical Report Number : 20-80247**

**Project / Site name: Scotchbarn Lane**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name                               | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                                                                       | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Asbestos identification in soil                    | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.                                     | In house method based on HSG 248                                                                                                  | A001-PL       | D                  | ISO 17025            |
| Asbestos Quantification - Gravimetric              | Asbestos quantification by gravimetric method - in house method based on references.                                                                      | HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).                                                                 | A006-PL       | D                  | ISO 17025            |
| Boron, water soluble, in soil                      | Determination of water soluble boron in soil by hot water extract followed by ICP-OES.                                                                    | In-house method based on Second Site Properties version 3                                                                         | L038-PL       | D                  | MCERTS               |
| BTEX and MTBE in soil (Monoaromatics)              | Determination of BTEX in soil by headspace GC-MS.                                                                                                         | In-house method based on USEPA8260                                                                                                | L073B-PL      | W                  | MCERTS               |
| Fraction of Organic Carbon in soil                 | Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                 | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests                                                  | L009-PL       | D                  | MCERTS               |
| Hexavalent chromium in soil (Lower Level)          | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.     | In-house method                                                                                                                   | L080-PL       | W                  | MCERTS               |
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                                              | L038-PL       | D                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                     | In-house method based on BS1377 Part 2, 1990, Classification tests                                                                | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                    | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)                   | L080-PL       | W                  | MCERTS               |
| Organic matter (Automated) in soil                 | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                             | BS1377 Part 3, 1990, Chemical and Electrochemical Tests""                                                                         | L009-PL       | D                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                         | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests                                                  | L099-PL       | D                  | MCERTS               |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.    | In-house method based on USEPA 8270                                                                                               | L064-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                               | In-house method based on British Standard Methods and MCERTS requirements.                                                        | L019-UK/PL    | D                  | NONE                 |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES. | L038-PL       | D                  | MCERTS               |
| Total cyanide in soil                              | Determination of total cyanide by distillation followed by colorimetry.                                                                                   | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)                   | L080-PL       | W                  | MCERTS               |
| TPH in (Soil)                                      | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                                             | In-house method, TPH with carbon banding and silica gel split/cleanup.                                                            | L076-PL       | D                  | NONE                 |
| TPHCWG (Soil)                                      | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.                                                                                 | In-house method with silica gel split/clean up.                                                                                   | L088/76-PL    | W                  | MCERTS               |

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The results included within the report are representative of the samples submitted for analysis.

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**Analytical Report Number : 20-80247**

**Project / Site name: Scotchbarn Lane**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name | Analytical Method Description | Analytical Method Reference | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------|-------------------------------|-----------------------------|---------------|--------------------|----------------------|
|----------------------|-------------------------------|-----------------------------|---------------|--------------------|----------------------|

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

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

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

John Fenlon  
**Bellway Homes Limited (North West)**  
2 Alderman Road  
Hunts Cross  
Liverpool  
Merseyside  
L24 9LR

Ref: 21v103358  
Date: 31<sup>st</sup> January 2020

**By email only: john.fenlon@bellway.co.uk**

Dear John,

### **Garden Validation – Scotchbarn Lane, Knowsley – Plots 112 - 116**

#### **Background and Objectives**

In accordance with the Remediation Strategy ref 103358p2r2, dated November 2017, the following remedial measures are required in all areas of the site:

#### **Depth Requirement for Gardens**

- ▶ A total clean cover system comprising a minimum thickness of 600 mm;
- ▶ A minimum topsoil thickness of 150 mm; and,
- ▶ The remainder of the clean cover system shall be comprised of subsoil.

#### **Validation Requirement**

- ▶ Independent validation of works by Geo-Environmental Consultant;
- ▶ Visual inspection and chemical laboratory validation sampling; and
- ▶ Production of validation letter reports for the clean cover system.

Required sample numbers for chemical validation are summarised in Table 1.

**Table 1: Chemical Validation Testing Requirement**

| Source               | Source of Material      |                          |                          |
|----------------------|-------------------------|--------------------------|--------------------------|
|                      | Greenfield              | Remediated               | Brownfield / Unknown     |
| Gardens              | 1 per 250m <sup>3</sup> | 1 per 100 m <sup>3</sup> | 1 per 50 m <sup>3</sup>  |
| Soft Landscaping     |                         | 1 per 150 m <sup>3</sup> | 1 per 150 m <sup>3</sup> |
| Other Fill Materials |                         | 1 per 250m <sup>3</sup>  | 1 per 250m <sup>3</sup>  |



## Validation Works Completed

Table 2 summarises plots inspected as part of each visit and the corresponding letter.

**Table 2: Summary of Validated Plots**

| Validated Plots<br>[w/ 600mm Cover System]  | Letter Reference |
|---------------------------------------------|------------------|
| 7-10                                        | 01v103358        |
| 1-2, 5                                      | 02v103358        |
| 6, 34-39, 118-119                           | 03v103358        |
| 41-43 & 117                                 | 04v103358        |
| 11 & 40                                     | 05v103358        |
| 12-13                                       | 06v103358        |
| 14-16                                       | 07v103358        |
| 17-19                                       | 08v103358        |
| 120-123                                     | 09v103358        |
| 124-128                                     | 10v103358        |
| 20 – 26                                     | 11v103358        |
| 27, 31-33                                   | 12v103358        |
| 28-30                                       | 13v103358        |
| 50-55                                       | 14v103358        |
| 56-59                                       | 15v103358        |
| 48, 49, 60                                  | 16v103358        |
| 129, 130, 44 – 47, 59                       | 17v103358        |
| 61 - 63                                     | 18v103358        |
| 65-67 (further action required)             | 19v103358        |
| 65-68 (further action required for Plot 66) | 20v103358        |
| 112 - 116                                   | 21v103358        |

### Validation Visit – 22<sup>nd</sup> January 2020

REC attended site on 22<sup>nd</sup> January 2020 to confirm the correct thickness of topsoil and subsoil has been used in the rear gardens of properties in Plots 112 to 116 and to collect samples for laboratory analysis.

One hand dug pit was completed in gardens 112 - 116 and the depths and descriptions of each strata encountered recorded.

REC's independent inspection shows that the required 600mm of clean cover is present within the rear gardens of Plots 112 – 116.

A visual inspection of the topsoil and subsoil within each pit confirms them to be free of potentially deleterious or unsuitable materials discernible by the naked eye such as ceramic materials, metal objects, plastics, treated wood or textiles.

Topsoil and subsoil samples were collected and analysed for the constituents of concern noted in Table 4 (enclosed to this letter) to the correct frequency as specified in Table 1 above and have been subsequently assessed against their suitability for a residential with gardens and plant uptake end use development.



### **Laboratory Testing of Site Won Soil**

REC visited site on the 17<sup>th</sup>- 19<sup>th</sup> May 2016 and 15<sup>th</sup> March 2017 to undertake intrusive ground investigations. Sampling and testing of site won topsoil as part of this work determined it suitable for use within gardens. Laboratory test certificates are attached to this report.

### **Laboratory Testing of Placed Topsoil**

Topsoil has been purchased from the R Draper LTD soil merchant. One sample of topsoil and one sample of subsoil were tested at a frequency of 1 per 50m<sup>3</sup> within Plots 112 - 116. Laboratory analysis confirms its suitability for use within the gardens (Table 4). Laboratory test certificates are attached to this report.

### **Summary**

REC can confirm that the topsoil and subsoil installed in the rear gardens of Plots 112 to 116 meet the specified requirements as a suitable growing medium and is suitable for its intended use.

Yours Sincerely,

**For and on behalf of REC Ltd**

**Liam Moore**  
**Consultant**

**Approved and Authorised**

**Martin Lucass**  
**Associate Director**

Enclosed:

Location Plan of Validated Plots

Plot Inspection Records (including photographs and description)

Table 4: Screening Values for Materials within Residential Soft Landscaping Areas

Chemical Analysis Certificates



**Figure 1: Sketch Plot Validation Pit Location**



- - Validated Plots during Site Visit on 22<sup>nd</sup> January 2020.
- - Previously Validated Plots



## **PLOT INSPECTION RECORDS**



**PLOT NUMBER: 112**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 22/01/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 400 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >200 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                                    |
|------------------------------------|
| Additional Comments:               |
| Sampled at 0.20m bgl and 0.50m bgl |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 113**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 22/01/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 350 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >250 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 114**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 22/01/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 115**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 22/01/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                                    |
|------------------------------------|
| Additional Comments:               |
| Sampled at 0.20m bgl and 0.50m bgl |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 116**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 22/01/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



## **SUITABILITY CRITERIA**



**Table 4: Validation Testing Summary**

| Determinand                                                                | Units | Screening Value for Use within Private Gardens | Maximum Concentration within Topsoil | Maximum Concentration within Subsoil | Screening Value Source |
|----------------------------------------------------------------------------|-------|------------------------------------------------|--------------------------------------|--------------------------------------|------------------------|
| <b>Inorganics – Metals and Asbestos</b>                                    |       |                                                |                                      |                                      |                        |
| Arsenic                                                                    | mg/kg | 37                                             | 7.6                                  | 11                                   | (i)                    |
| Cadmium                                                                    | mg/kg | 11                                             | 0.8                                  | 2.0                                  | (i)                    |
| Chromium VI                                                                | mg/kg | 6                                              | <1.2                                 | <1.2                                 | (i)                    |
| Lead                                                                       | mg/kg | 200                                            | 61                                   | 97                                   | (iv)                   |
| Inorganic Mercury                                                          | mg/kg | 40                                             | <0.3                                 | <0.3                                 | (i)                    |
| Nickel                                                                     | mg/kg | 130                                            | 14                                   | 19                                   | (i)                    |
| Selenium                                                                   | mg/kg | 250                                            | <1.0                                 | <1.0                                 | (i)                    |
| Copper                                                                     | mg/kg | 2,400                                          | 47                                   | 93                                   | (i)                    |
| Zinc                                                                       | mg/kg | 3,700                                          | 58                                   | 140                                  | (i)                    |
| Cyanide                                                                    | mg/kg | 3.4                                            | <1.0                                 | <1.0                                 | (v)                    |
| Asbestos                                                                   | %     | Not Detected                                   | N.D.                                 | N.D.                                 | N/A                    |
|                                                                            |       |                                                |                                      |                                      |                        |
| Phenol                                                                     | mg/kg | 550                                            | <1.0                                 | <1.0                                 | (ii)                   |
| Naphthalene                                                                | mg/kg | 5.6                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthylene                                                             | mg/kg | 420                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthene                                                               | mg/kg | 510                                            | <0.05                                | <0.05                                | (ii)                   |
| Fluorene                                                                   | mg/kg | 400                                            | <0.05                                | <0.05                                | (ii)                   |
| Phenanthrene                                                               | mg/kg | 220                                            | 0.84                                 | 2.1                                  | (ii)                   |
| Anthracene                                                                 | mg/kg | 2,400                                          | 0.16                                 | 0.22                                 | (ii)                   |
| Fluoranthene                                                               | mg/kg | 280                                            | 1.8                                  | 2.7                                  | (ii)                   |
| Pyrene                                                                     | mg/kg | 1200                                           | 1.7                                  | 2.6                                  | (ii)                   |
| Benzo(a)Anthracene                                                         | mg/kg | 2.7                                            | 0.82                                 | 1.0                                  | (ii)                   |
| Chrysene                                                                   | mg/kg | 22                                             | 0.92                                 | 1.3                                  | (ii)                   |
| Benzo(b)Fluoranthene                                                       | mg/kg | 3.3                                            | 0.78                                 | 0.75                                 | (ii)                   |
| Benzo(k)Fluoranthene                                                       | mg/kg | 93                                             | 0.54                                 | 0.77                                 | (ii)                   |
| Benzo(a)Pyrene                                                             | mg/kg | 2.7                                            | 0.80                                 | 0.94                                 | (ii)                   |
| Indeno(123-cd)Pyrene                                                       | mg/kg | 36                                             | 0.40                                 | 0.45                                 | (ii)                   |
| Dibenzo(a,h)Anthracene                                                     | mg/kg | 0.28                                           | <0.05                                | <0.05                                | (ii)                   |
| Benzo(ghi)Perylene                                                         | mg/kg | 340                                            | 0.34                                 | 0.50                                 | (ii)                   |
|                                                                            |       |                                                |                                      |                                      |                        |
| TPH C <sub>5</sub> -C <sub>6</sub>                                         | mg/kg | 78                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>6</sub> -C <sub>8</sub>                                         | mg/kg | 230                                            | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>8</sub> -C <sub>10</sub>                                        | mg/kg | 65                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>10</sub> -C <sub>12</sub>                                       | mg/kg | 180                                            | <1.0                                 | <1.0                                 | (iii)                  |
| TPH C <sub>12</sub> -C <sub>16</sub>                                       | mg/kg | 330                                            | <2.0                                 | 5.1                                  | (iii)                  |
| TPH C <sub>16</sub> -C <sub>21</sub>                                       | mg/kg | 540                                            | <10.0                                | 11                                   | (iii)                  |
| TPH C <sub>21</sub> -C <sub>35</sub>                                       | mg/kg | 1,500                                          | <10                                  | 36                                   | (iii)                  |
| TPH C <sub>35</sub> -C <sub>44</sub>                                       | mg/kg | 1,500                                          | <8.4                                 | <8.4                                 | (iii)                  |
| <b>Screening Value Source</b>                                              |       |                                                |                                      |                                      |                        |
| (i) LQM/CIEH Suitable For Use Level (S4UL) (2015);                         |       |                                                |                                      |                                      |                        |
| (ii) S4UL –Assessment Approach of 2.5% SOM;                                |       |                                                |                                      |                                      |                        |
| (iii) S4UL –2.5% SOM and assumed worst case aliphatic / aromatic compound; |       |                                                |                                      |                                      |                        |
| (iv) Defra Category 4 Screening Level (2014);                              |       |                                                |                                      |                                      |                        |
| (v) CLEA v1.06 Derived Value.                                              |       |                                                |                                      |                                      |                        |



## **SOIL CHEMICAL ANALYSIS**

**Liam Moore**

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## **Analytical Report Number : 20-82604**

|                             |                |                               |            |
|-----------------------------|----------------|-------------------------------|------------|
| <b>Project / Site name:</b> | Scotchbarn     | <b>Samples received on:</b>   | 22/01/2020 |
| <b>Your job number:</b>     | 103358         | <b>Samples instructed on:</b> | 22/01/2020 |
| <b>Your order number:</b>   |                | <b>Analysis completed by:</b> | 29/01/2020 |
| <b>Report Issue Number:</b> | 1              | <b>Report issued on:</b>      | 29/01/2020 |
| <b>Samples Analysed:</b>    | 4 soil samples |                               |            |

**Signed:**

Rachel Bradley

Deputy Quality Manager  
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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

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

Iss No 20-82604-1 Scotchbarn 103358

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report are representative of the samples submitted for analysis.

Page 1 of 5

Analytical Report Number: 20-82604

Project / Site name: Scotchbarn

| Lab Sample Number                       |       |                       |                         | 1419807       | 1419808       | 1419809       | 1419810       |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|---------------|---------------|
| Sample Reference                        |       |                       |                         | Plot 112 TS01 | Plot 112 SS01 | Plot 115 TS01 | Plot 115 SS01 |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied |
| Depth (m)                               |       |                       |                         | 0.20          | 0.50          | 0.20          | 0.50          |
| Date Sampled                            |       |                       |                         | 21/01/2020    | 21/01/2020    | 21/01/2020    | 21/01/2020    |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |               |               |
| Stone Content                           | %     | 0.1                   | NONE                    | < 0.1         | < 0.1         | < 0.1         | < 0.1         |
| Moisture Content                        | %     | N/A                   | NONE                    | 17            | 21            | 20            | 22            |
| Total mass of sample received           | kg    | 0.001                 | NONE                    | 0.55          | 0.52          | 0.58          | 0.60          |

| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected | Not-detected | Not-detected |
|------------------|------|-----|-----------|--------------|--------------|--------------|--------------|
|------------------|------|-----|-----------|--------------|--------------|--------------|--------------|

#### General Inorganics

|                                                                         |          |         |        |       |       |       |       |
|-------------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 7.9   | 7.8   | 7.7   | 7.8   |
| Total Cyanide                                                           | mg/kg    | 1       | MCERTS | < 1   | < 1   | < 1   | < 1   |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)         | mg/kg    | 2.5     | MCERTS | 74    | 70    | 99    | 69    |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.037 | 0.035 | 0.049 | 0.034 |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 36.8  | 35.0  | 49.4  | 34.3  |
| Organic Matter                                                          | %        | 0.1     | MCERTS | 3.2   | 4.2   | 3.3   | 4.7   |
| Fraction Organic Carbon (FOC)                                           | N/A      | 0.001   | MCERTS | 0.019 | 0.024 | 0.019 | 0.027 |

#### Total Phenols

|                            |       |   |        |       |       |       |       |
|----------------------------|-------|---|--------|-------|-------|-------|-------|
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
|----------------------------|-------|---|--------|-------|-------|-------|-------|

#### Speciated PAHs

|                        |       |      |        |        |        |        |        |
|------------------------|-------|------|--------|--------|--------|--------|--------|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 0.48   | 0.64   | 0.84   | 2.1    |
| Anthracene             | mg/kg | 0.05 | MCERTS | < 0.05 | 0.11   | 0.16   | 0.22   |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 0.65   | 1.2    | 1.8    | 2.7    |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 0.59   | 1.2    | 1.7    | 2.6    |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 0.29   | 0.65   | 0.82   | 1.0    |
| Chrysene               | mg/kg | 0.05 | MCERTS | 0.35   | 0.60   | 0.92   | 1.3    |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.30   | 0.63   | 0.78   | 0.75   |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.13   | 0.30   | 0.54   | 0.77   |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 0.26   | 0.59   | 0.80   | 0.94   |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.29   | 0.40   | 0.45   |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | < 0.05 | 0.36   | 0.34   | 0.50   |

#### Total PAH

|                             |       |     |        |      |      |      |      |
|-----------------------------|-------|-----|--------|------|------|------|------|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 3.05 | 6.54 | 9.10 | 13.4 |
|-----------------------------|-------|-----|--------|------|------|------|------|

#### Heavy Metals / Metalloids

|                                    |       |      |           |       |       |       |       |
|------------------------------------|-------|------|-----------|-------|-------|-------|-------|
| Antimony (aqua regia extractable)  | mg/kg | 1    | ISO 17025 | 1.5   | 2.8   | 1.9   | 2.5   |
| Arsenic (aqua regia extractable)   | mg/kg | 1    | MCERTS    | 7.6   | 10    | 7.5   | 11    |
| Barium (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 65    | 88    | 68    | 99    |
| Beryllium (aqua regia extractable) | mg/kg | 0.06 | MCERTS    | 0.52  | 0.77  | 0.56  | 0.80  |
| Boron (water soluble)              | mg/kg | 0.2  | MCERTS    | 0.3   | 0.9   | 0.5   | 0.8   |
| Cadmium (aqua regia extractable)   | mg/kg | 0.2  | MCERTS    | 0.7   | 1.8   | 0.8   | 2.0   |
| Chromium (hexavalent)              | mg/kg | 1.2  | MCERTS    | < 1.2 | < 1.2 | < 1.2 | < 1.2 |
| Chromium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 17    | 27    | 20    | 26    |
| Copper (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 41    | 88    | 47    | 93    |
| Lead (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 53    | 78    | 61    | 97    |
| Mercury (aqua regia extractable)   | mg/kg | 0.3  | MCERTS    | < 0.3 | < 0.3 | < 0.3 | < 0.3 |
| Nickel (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 13    | 17    | 14    | 19    |
| Selenium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Vanadium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 18    | 24    | 19    | 27    |
| Zinc (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 55    | 140   | 58    | 98    |

Analytical Report Number: 20-82604

Project / Site name: Scotchbarn

|                                         |  |  |  |               |                       |                         |               |  |
|-----------------------------------------|--|--|--|---------------|-----------------------|-------------------------|---------------|--|
| Lab Sample Number                       |  |  |  | 1419807       | 1419808               | 1419809                 | 1419810       |  |
| Sample Reference                        |  |  |  | Plot 112 TS01 | Plot 112 SS01         | Plot 115 TS01           | Plot 115 SS01 |  |
| Sample Number                           |  |  |  | None Supplied | None Supplied         | None Supplied           | None Supplied |  |
| Depth (m)                               |  |  |  | 0.20          | 0.50                  | 0.20                    | 0.50          |  |
| Date Sampled                            |  |  |  | 21/01/2020    | 21/01/2020            | 21/01/2020              | 21/01/2020    |  |
| Time Taken                              |  |  |  | None Supplied | None Supplied         | None Supplied           | None Supplied |  |
| Analytical Parameter<br>(Soil Analysis) |  |  |  | Units         | Limit of<br>detection | Accreditation<br>Status |               |  |

#### Monoaromatics & Oxygenates

|                                    |       |   |        |       |       |       |       |  |
|------------------------------------|-------|---|--------|-------|-------|-------|-------|--|
| Benzene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| Toluene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| Ethylbenzene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| p & m-xylene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| o-xylene                           | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |

#### Petroleum Hydrocarbons

|                                         |       |       |        |         |         |         |         |  |
|-----------------------------------------|-------|-------|--------|---------|---------|---------|---------|--|
| TPH-CWG - Aliphatic >EC5 - EC6          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aliphatic >EC6 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aliphatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aliphatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   |  |
| TPH-CWG - Aliphatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   | < 2.0   | < 2.0   |  |
| TPH-CWG - Aliphatic >EC16 - EC21        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   |  |
| TPH-CWG - Aliphatic >EC21 - EC35        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   |  |
| TPH-CWG - Aliphatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |  |
| <b>TPH-CWG - Aliphatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | < 10    |  |
| <b>TPH-CWG - Aliphatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | < 10    | < 10    | < 10    |  |

|                                        |       |       |        |         |         |         |         |  |
|----------------------------------------|-------|-------|--------|---------|---------|---------|---------|--|
| TPH-CWG - Aromatic >EC5 - EC7          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aromatic >EC7 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aromatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aromatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   |  |
| TPH-CWG - Aromatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | 5.1     | < 2.0   | 4.9     |  |
| TPH-CWG - Aromatic >EC16 - EC21        | mg/kg | 10    | MCERTS | < 10    | 11      | < 10    | 11      |  |
| TPH-CWG - Aromatic >EC21 - EC35        | mg/kg | 10    | MCERTS | < 10    | 26      | < 10    | 36      |  |
| TPH-CWG - Aromatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |  |
| <b>TPH-CWG - Aromatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | 42      | < 10    | 52      |  |
| <b>TPH-CWG - Aromatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | 42      | < 10    | 52      |  |



**Analytical Report Number : 20-82604**

**Project / Site name: Scotchbarn**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description *                            |
|-------------------|------------------|---------------|-----------|-------------------------------------------------|
| 1419807           | Plot 112 TS01    | None Supplied | 0.20      | Brown loam and clay with gravel and vegetation. |
| 1419808           | Plot 112 SS01    | None Supplied | 0.50      | Brown loam and clay with gravel and vegetation. |
| 1419809           | Plot 115 TS01    | None Supplied | 0.20      | Brown loam and clay with gravel and vegetation. |
| 1419810           | Plot 115 SS01    | None Supplied | 0.50      | Brown loam and clay with gravel and vegetation. |

**Analytical Report Number : 20-82604**

**Project / Site name: Scotchbarn**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name                               | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                                                     | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Asbestos identification in soil                    | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.                                     | In house method based on HSG 248                                                                                | A001-PL       | D                  | ISO 17025            |
| Boron, water soluble, in soil                      | Determination of water soluble boron in soil by hot water extract followed by ICP-OES.                                                                    | In-house method based on Second Site Properties version 3                                                       | L038-PL       | D                  | MCERTS               |
| BTEX and MTBE in soil (Monoaromatics)              | Determination of BTEX in soil by headspace GC-MS.                                                                                                         | In-house method based on USEPA8260                                                                              | L073B-PL      | W                  | MCERTS               |
| Fraction of Organic Carbon in soil                 | Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                 | In house method.                                                                                                | L009-PL       | D                  | MCERTS               |
| Hexavalent chromium in soil (Lower Level)          | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.     | In-house method                                                                                                 | L080-PL       | W                  | MCERTS               |
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                            | L038-PL       | D                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                     | In house method.                                                                                                | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                    | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL       | W                  | MCERTS               |
| Organic matter (Automated) in soil                 | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                             | In house method.                                                                                                | L009-PL       | D                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                         | In house method.                                                                                                | L099-PL       | D                  | MCERTS               |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.    | In-house method based on USEPA 8270                                                                             | L064-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                               | In-house method based on British Standard Methods and MCERTS requirements.                                      | L019-UK/PL    | D                  | NONE                 |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| Total cyanide in soil                              | Determination of total cyanide by distillation followed by colorimetry.                                                                                   | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar) | L080-PL       | W                  | MCERTS               |
| TPH in (Soil)                                      | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                                             | In-house method, TPH with carbon banding and silica gel split/cleanup.                                          | L076-PL       | D                  | NONE                 |
| TPHCWG (Soil)                                      | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.                                                                                 | In-house method with silica gel split/cleanup.                                                                  | L088/76-PL    | W                  | MCERTS               |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**

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

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

Iss No 20-82604-1 Scotchbarn 103358

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The results included within the report are representative of the samples submitted for analysis.

Page 5 of 5

John Fenlon  
**Bellway Homes Limited (North West)**  
2 Alderman Road  
Hunts Cross  
Liverpool  
Merseyside  
L24 9LR

Ref: 22v103358  
Date: 20<sup>th</sup> February 2020

**By email only: john.fenlon@bellway.co.uk**

Dear John,

### **Garden Validation – Scotchbarn Lane, Knowsley – Plots 108 - 111**

#### **Background and Objectives**

In accordance with the Remediation Strategy ref 103358p2r2, dated November 2017, the following remedial measures are required in all areas of the site:

#### **Depth Requirement for Gardens**

- ▶ A total clean cover system comprising a minimum thickness of 600 mm;
- ▶ A minimum topsoil thickness of 150 mm; and,
- ▶ The remainder of the clean cover system shall be comprised of subsoil.

#### **Validation Requirement**

- ▶ Independent validation of works by Geo-Environmental Consultant;
- ▶ Visual inspection and chemical laboratory validation sampling; and
- ▶ Production of validation letter reports for the clean cover system.

Required sample numbers for chemical validation are summarised in Table 1.

**Table 1: Chemical Validation Testing Requirement**

| Source               | Source of Material      |                          |                          |
|----------------------|-------------------------|--------------------------|--------------------------|
|                      | Greenfield              | Remediated               | Brownfield / Unknown     |
| Gardens              | 1 per 250m <sup>3</sup> | 1 per 100 m <sup>3</sup> | 1 per 50 m <sup>3</sup>  |
| Soft Landscaping     |                         | 1 per 150 m <sup>3</sup> | 1 per 150 m <sup>3</sup> |
| Other Fill Materials |                         | 1 per 250m <sup>3</sup>  | 1 per 250m <sup>3</sup>  |



## Validation Works Completed

Table 2 summarises plots inspected as part of each visit and the corresponding letter.

**Table 2: Summary of Validated Plots**

| Validated Plots<br>[w/ 600mm Cover System]  | Letter Reference |
|---------------------------------------------|------------------|
| 7-10                                        | 01v103358        |
| 1-2, 5                                      | 02v103358        |
| 6, 34-39, 118-119                           | 03v103358        |
| 41-43 & 117                                 | 04v103358        |
| 11 & 40                                     | 05v103358        |
| 12-13                                       | 06v103358        |
| 14-16                                       | 07v103358        |
| 17-19                                       | 08v103358        |
| 120-123                                     | 09v103358        |
| 124-128                                     | 10v103358        |
| 20 – 26                                     | 11v103358        |
| 27, 31-33                                   | 12v103358        |
| 28-30                                       | 13v103358        |
| 50-55                                       | 14v103358        |
| 56-59                                       | 15v103358        |
| 48, 49, 60                                  | 16v103358        |
| 129, 130, 44 – 47, 59                       | 17v103358        |
| 61 - 63                                     | 18v103358        |
| 65-67 (further action required)             | 19v103358        |
| 65-68 (further action required for Plot 66) | 20v103358        |
| 112 - 116                                   | 21v103358        |
| 108 – 111                                   | 22v103358        |

### Validation Visit – 5<sup>th</sup> February 2020

REC attended site on 5<sup>th</sup> February 2020 to confirm the correct thickness of topsoil and subsoil has been used in the rear gardens of properties in Plots 108 to 111 and to collect samples for laboratory analysis.

One hand dug pit was completed in gardens 108 - 111 and the depths and descriptions of each strata encountered recorded.

REC's independent inspection shows that the required 600mm of clean cover is present within the rear gardens of Plots 108 – 111.

A visual inspection of the topsoil and subsoil within each pit confirms them to be free of potentially deleterious or unsuitable materials discernible by the naked eye such as ceramic materials, metal objects, plastics, treated wood or textiles.

Topsoil and subsoil samples were collected and analysed for the constituents of concern noted in Table 4 (enclosed to this letter) to the correct frequency as specified in Table 1 above and have been subsequently assessed against their suitability for a residential with gardens and plant uptake end use development.



### **Laboratory Testing of Site Won Soil**

REC visited site on the 17<sup>th</sup>- 19<sup>th</sup> May 2016 and 15<sup>th</sup> March 2017 to undertake intrusive ground investigations. Sampling and testing of site won topsoil as part of this work determined it suitable for use within gardens. Laboratory test certificates are attached to this report.

### **Laboratory Testing of Placed Topsoil**

Topsoil has been purchased from the R Draper LTD soil merchant. One sample of topsoil and one sample of subsoil were tested at a frequency of 1 per 50m<sup>3</sup> within Plots 108 - 111. Laboratory analysis confirms its suitability for use within the gardens (Table 4). Laboratory test certificates are attached to this report.

### **Summary**

REC can confirm that the topsoil and subsoil installed in the rear gardens of Plots 108 to 111 meet the specified requirements as a suitable growing medium and is suitable for its intended use.

Yours Sincerely,

**For and on behalf of REC Ltd**

**Liam Moore**  
**Consultant**

**Approved and Authorised**

**Martin Lucass**  
**Associate Director**

Enclosed:

Location Plan of Validated Plots

Plot Inspection Records (including photographs and description)

Table 4: Screening Values for Materials within Residential Soft Landscaping Areas

Chemical Analysis Certificates



**Figure 1: Sketch Plot Validation Pit Location**



- - Validated Plots during Site Visit on 5<sup>th</sup> February 2020.
- - Previously Validated Plots



## **PLOT INSPECTION RECORDS**



**PLOT NUMBER: 108**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 05/02/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 400 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >200 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                                    |
|------------------------------------|
| Additional Comments:               |
| Sampled at 0.20m bgl and 0.50m bgl |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 109**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 05/02/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 350 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >250 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 110**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 05/02/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 111**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 05/02/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



**PLOT NUMBER: 116**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 22/01/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**



## **SUITABILITY CRITERIA**



**Table 4: Validation Testing Summary**

| Determinand                                                                | Units | Screening Value for Use within Private Gardens | Maximum Concentration within Topsoil | Maximum Concentration within Subsoil | Screening Value Source |
|----------------------------------------------------------------------------|-------|------------------------------------------------|--------------------------------------|--------------------------------------|------------------------|
| <b>Inorganics – Metals and Asbestos</b>                                    |       |                                                |                                      |                                      |                        |
| Arsenic                                                                    | mg/kg | 37                                             | 9.0                                  | 9.7                                  | (i)                    |
| Cadmium                                                                    | mg/kg | 11                                             | 1.2                                  | 1.6                                  | (i)                    |
| Chromium VI                                                                | mg/kg | 6                                              | < 1.2                                | < 1.2                                | (i)                    |
| Lead                                                                       | mg/kg | 200                                            | 68                                   | 74                                   | (iv)                   |
| Inorganic Mercury                                                          | mg/kg | 40                                             | < 0.3                                | < 0.3                                | (i)                    |
| Nickel                                                                     | mg/kg | 130                                            | 15                                   | 16                                   | (i)                    |
| Selenium                                                                   | mg/kg | 250                                            | < 1.0                                | < 1.0                                | (i)                    |
| Copper                                                                     | mg/kg | 2,400                                          | 58                                   | 75                                   | (i)                    |
| Zinc                                                                       | mg/kg | 3,700                                          | 73                                   | 80                                   | (i)                    |
| Cyanide                                                                    | mg/kg | 3.4                                            | < 1                                  | < 1                                  | (v)                    |
| Asbestos                                                                   | %     | Not Detected                                   | Not Detected                         | Not Detected                         | N/A                    |
|                                                                            |       |                                                |                                      |                                      |                        |
| Phenol                                                                     | mg/kg | 550                                            | < 1.0                                | < 1.0                                | (ii)                   |
| Naphthalene                                                                | mg/kg | 5.6                                            | < 0.05                               | < 0.05                               | (ii)                   |
| Acenaphthylene                                                             | mg/kg | 420                                            | < 0.05                               | < 0.05                               | (ii)                   |
| Acenaphthene                                                               | mg/kg | 510                                            | < 0.05                               | < 0.05                               | (ii)                   |
| Fluorene                                                                   | mg/kg | 400                                            | < 0.05                               | < 0.05                               | (ii)                   |
| Phenanthrene                                                               | mg/kg | 220                                            | 0.43                                 | 1.7                                  | (ii)                   |
| Anthracene                                                                 | mg/kg | 2,400                                          | < 0.05                               | 0.32                                 | (ii)                   |
| Fluoranthene                                                               | mg/kg | 280                                            | 0.57                                 | 2.8                                  | (ii)                   |
| Pyrene                                                                     | mg/kg | 1200                                           | 0.56                                 | 2.5                                  | (ii)                   |
| Benzo(a)Anthracene                                                         | mg/kg | 2.7                                            | 0.27                                 | 1.5                                  | (ii)                   |
| Chrysene                                                                   | mg/kg | 22                                             | 0.32                                 | 1.4                                  | (ii)                   |
| Benzo(b)Fluoranthene                                                       | mg/kg | 3.3                                            | 0.33                                 | 1.5                                  | (ii)                   |
| Benzo(k)Fluoranthene                                                       | mg/kg | 93                                             | 0.16                                 | 0.78                                 | (ii)                   |
| Benzo(a)Pyrene                                                             | mg/kg | 2.7                                            | 0.29                                 | 1.4                                  | (ii)                   |
| Indeno(123-cd)Pyrene                                                       | mg/kg | 36                                             | < 0.05                               | 0.62                                 | (ii)                   |
| Dibenzo(a,h)Anthracene                                                     | mg/kg | 0.28                                           | < 0.05                               | < 0.05                               | (ii)                   |
| Benzo(ghi)Perylene                                                         | mg/kg | 340                                            | < 0.05                               | 0.81                                 | (ii)                   |
|                                                                            |       |                                                |                                      |                                      |                        |
| TPH C <sub>5</sub> -C <sub>6</sub>                                         | mg/kg | 78                                             | < 0.001                              | < 0.001                              | (iii)                  |
| TPH C <sub>6</sub> -C <sub>8</sub>                                         | mg/kg | 230                                            | < 0.001                              | < 0.001                              | (iii)                  |
| TPH C <sub>8</sub> -C <sub>10</sub>                                        | mg/kg | 65                                             | < 0.001                              | < 0.001                              | (iii)                  |
| TPH C <sub>10</sub> -C <sub>12</sub>                                       | mg/kg | 180                                            | < 1.0                                | < 1.0                                | (iii)                  |
| TPH C <sub>12</sub> -C <sub>16</sub>                                       | mg/kg | 330                                            | < 2.0                                | < 2.0                                | (iii)                  |
| TPH C <sub>16</sub> -C <sub>21</sub>                                       | mg/kg | 540                                            | < 8.0                                | < 8.0                                | (iii)                  |
| TPH C <sub>21</sub> -C <sub>35</sub>                                       | mg/kg | 1,500                                          | < 8.4                                | < 8.4                                | (iii)                  |
| TPH C <sub>35</sub> -C <sub>44</sub>                                       | mg/kg | 1,500                                          | < 8.4                                | < 8.4                                | (iii)                  |
| <b>Screening Value Source</b>                                              |       |                                                |                                      |                                      |                        |
| (i) LQM/CIEH Suitable For Use Level (S4UL) (2015);                         |       |                                                |                                      |                                      |                        |
| (ii) S4UL –Assessment Approach of 2.5% SOM;                                |       |                                                |                                      |                                      |                        |
| (iii) S4UL –2.5% SOM and assumed worst case aliphatic / aromatic compound; |       |                                                |                                      |                                      |                        |
| (iv) Defra Category 4 Screening Level (2014);                              |       |                                                |                                      |                                      |                        |
| (v) CLEA v1.06 Derived Value.                                              |       |                                                |                                      |                                      |                        |



## **SOIL CHEMICAL ANALYSIS**

**Catarina Lima**

Resource Environmental Consultants Ltd  
Osprey House  
Pacific Quay  
Broadway  
Manchester  
M50 2UE

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7 Woodshots Meadow,  
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WD18 8YS

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## **Analytical Report Number : 20-86375**

|                             |                |                               |            |
|-----------------------------|----------------|-------------------------------|------------|
| <b>Project / Site name:</b> | Scotchbarn     | <b>Samples received on:</b>   | 10/02/2020 |
| <b>Your job number:</b>     | 103358         | <b>Samples instructed on:</b> | 12/02/2020 |
| <b>Your order number:</b>   | 8112           | <b>Analysis completed by:</b> | 19/02/2020 |
| <b>Report Issue Number:</b> | 1              | <b>Report issued on:</b>      | 19/02/2020 |
| <b>Samples Analysed:</b>    | 2 soil samples |                               |            |

**Signed:** 

Katarzyna Lewicka  
Head of Reporting Section

**For & on behalf of i2 Analytical Ltd.**

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

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

|                                                                                    |           |                           |
|------------------------------------------------------------------------------------|-----------|---------------------------|
| Standard sample disposal times, unless otherwise agreed with the laboratory, are : | soils     | - 4 weeks from reporting  |
|                                                                                    | leachates | - 2 weeks from reporting  |
|                                                                                    | waters    | - 2 weeks from reporting  |
|                                                                                    | asbestos  | - 6 months from reporting |

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

Analytical Report Number: 20-86375

Project / Site name: Scotchbarn

Your Order No: 8112

|                                         |  |  |  |               |                       |                         |       |       |
|-----------------------------------------|--|--|--|---------------|-----------------------|-------------------------|-------|-------|
| Lab Sample Number                       |  |  |  | 1439673       | 1439674               |                         |       |       |
| Sample Reference                        |  |  |  | Plot 108      | Plot 108              |                         |       |       |
| Sample Number                           |  |  |  | TS            | SS                    |                         |       |       |
| Depth (m)                               |  |  |  | 0.20          | 0.50                  |                         |       |       |
| Date Sampled                            |  |  |  | 05/02/2020    | 05/02/2020            |                         |       |       |
| Time Taken                              |  |  |  | None Supplied | None Supplied         |                         |       |       |
| Analytical Parameter<br>(Soil Analysis) |  |  |  | Units         | Limit of<br>detection | Accreditation<br>Status |       |       |
| Stone Content                           |  |  |  | %             | 0.1                   | NONE                    | < 0.1 | < 0.1 |
| Moisture Content                        |  |  |  | %             | N/A                   | NONE                    | 20    | 20    |
| Total mass of sample received           |  |  |  | kg            | 0.001                 | NONE                    | 0.50  | 0.50  |

|                  |      |     |           |              |              |  |  |  |
|------------------|------|-----|-----------|--------------|--------------|--|--|--|
| Asbestos in Soil | Type | N/A | ISO 17025 | Not-detected | Not-detected |  |  |  |
|------------------|------|-----|-----------|--------------|--------------|--|--|--|

#### General Inorganics

|                                                                         |          |         |        |       |       |  |  |  |
|-------------------------------------------------------------------------|----------|---------|--------|-------|-------|--|--|--|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 7.6   | 7.6   |  |  |  |
| Total Cyanide                                                           | mg/kg    | 1       | MCERTS | < 1   | < 1   |  |  |  |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)         | mg/kg    | 2.5     | MCERTS | 160   | 130   |  |  |  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.081 | 0.063 |  |  |  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 81.4  | 62.7  |  |  |  |
| Organic Matter                                                          | %        | 0.1     | MCERTS | 3.7   | 3.8   |  |  |  |
| Fraction Organic Carbon (FOC)                                           | N/A      | 0.001   | MCERTS | 0.021 | 0.022 |  |  |  |

#### Total Phenols

|                            |       |   |        |       |       |  |  |  |
|----------------------------|-------|---|--------|-------|-------|--|--|--|
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
|----------------------------|-------|---|--------|-------|-------|--|--|--|

#### Speciated PAHs

|                        |       |      |        |        |        |  |  |  |
|------------------------|-------|------|--------|--------|--------|--|--|--|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 |  |  |  |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 |  |  |  |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 |  |  |  |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 |  |  |  |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 0.43   | 1.7    |  |  |  |
| Anthracene             | mg/kg | 0.05 | MCERTS | < 0.05 | 0.32   |  |  |  |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 0.57   | 2.8    |  |  |  |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 0.56   | 2.5    |  |  |  |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 0.27   | 1.5    |  |  |  |
| Chrysene               | mg/kg | 0.05 | MCERTS | 0.32   | 1.4    |  |  |  |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.33   | 1.5    |  |  |  |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.16   | 0.78   |  |  |  |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 0.29   | 1.4    |  |  |  |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | 0.62   |  |  |  |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 |  |  |  |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | < 0.05 | 0.81   |  |  |  |

#### Total PAH

|                             |       |     |        |      |      |  |  |  |
|-----------------------------|-------|-----|--------|------|------|--|--|--|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 2.93 | 15.3 |  |  |  |
|-----------------------------|-------|-----|--------|------|------|--|--|--|

Analytical Report Number: 20-86375

Project / Site name: Scotchbarn

Your Order No: 8112

|                                         |               |                       |                         |  |  |
|-----------------------------------------|---------------|-----------------------|-------------------------|--|--|
| Lab Sample Number                       | 1439673       | 1439674               |                         |  |  |
| Sample Reference                        | Plot 108      | Plot 108              |                         |  |  |
| Sample Number                           | TS            | SS                    |                         |  |  |
| Depth (m)                               | 0.20          | 0.50                  |                         |  |  |
| Date Sampled                            | 05/02/2020    | 05/02/2020            |                         |  |  |
| Time Taken                              | None Supplied | None Supplied         |                         |  |  |
| Analytical Parameter<br>(Soil Analysis) | Units         | Limit of<br>detection | Accreditation<br>Status |  |  |

#### Heavy Metals / Metalloids

|                                    |       |      |           |       |       |  |  |  |
|------------------------------------|-------|------|-----------|-------|-------|--|--|--|
| Antimony (aqua regia extractable)  | mg/kg | 1    | ISO 17025 | 2.3   | 3.0   |  |  |  |
| Arsenic (aqua regia extractable)   | mg/kg | 1    | MCERTS    | 9.0   | 9.7   |  |  |  |
| Barium (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 80    | 84    |  |  |  |
| Beryllium (aqua regia extractable) | mg/kg | 0.06 | MCERTS    | 0.68  | 0.77  |  |  |  |
| Boron (water soluble)              | mg/kg | 0.2  | MCERTS    | 0.4   | 0.8   |  |  |  |
| Cadmium (aqua regia extractable)   | mg/kg | 0.2  | MCERTS    | 1.2   | 1.6   |  |  |  |
| Chromium (hexavalent)              | mg/kg | 1.2  | MCERTS    | < 1.2 | < 1.2 |  |  |  |
| Chromium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 19    | 20    |  |  |  |
| Copper (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 58    | 75    |  |  |  |
| Lead (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 68    | 74    |  |  |  |
| Mercury (aqua regia extractable)   | mg/kg | 0.3  | MCERTS    | < 0.3 | < 0.3 |  |  |  |
| Nickel (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 15    | 16    |  |  |  |
| Selenium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | < 1.0 | < 1.0 |  |  |  |
| Vanadium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 21    | 23    |  |  |  |
| Zinc (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 73    | 80    |  |  |  |

#### Monoaromatics & Oxygenates

|                                    |       |   |        |       |       |  |  |  |
|------------------------------------|-------|---|--------|-------|-------|--|--|--|
| Benzene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
| Toluene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
| Ethylbenzene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
| p & m-xylene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
| o-xylene                           | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 |  |  |  |

#### Petroleum Hydrocarbons

|                                   |       |       |        |         |         |  |  |  |
|-----------------------------------|-------|-------|--------|---------|---------|--|--|--|
| TPH-CWG - Aliphatic >EC5 - EC6    | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aliphatic >EC6 - EC8    | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aliphatic >EC8 - EC10   | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aliphatic >EC10 - EC12  | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   |  |  |  |
| TPH-CWG - Aliphatic >EC12 - EC16  | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   |  |  |  |
| TPH-CWG - Aliphatic >EC16 - EC21  | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   |  |  |  |
| TPH-CWG - Aliphatic >EC21 - EC35  | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   |  |  |  |
| TPH-CWG - Aliphatic > EC35 - EC44 | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   |  |  |  |
| TPH-CWG - Aliphatic (EC5 - EC35)  | mg/kg | 10    | MCERTS | < 10    | < 10    |  |  |  |
| TPH-CWG - Aliphatic (EC5 - EC44)  | mg/kg | 10    | NONE   | < 10    | < 10    |  |  |  |
| TPH-CWG - Aromatic >EC5 - EC7     | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aromatic >EC7 - EC8     | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aromatic >EC8 - EC10    | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 |  |  |  |
| TPH-CWG - Aromatic >EC10 - EC12   | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   |  |  |  |
| TPH-CWG - Aromatic >EC12 - EC16   | mg/kg | 2     | MCERTS | < 2.0   | 3.0     |  |  |  |
| TPH-CWG - Aromatic >EC16 - EC21   | mg/kg | 10    | MCERTS | < 10    | 13      |  |  |  |
| TPH-CWG - Aromatic >EC21 - EC35   | mg/kg | 10    | MCERTS | < 10    | < 10    |  |  |  |
| TPH-CWG - Aromatic > EC35 - EC44  | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   |  |  |  |
| TPH-CWG - Aromatic (EC5 - EC35)   | mg/kg | 10    | MCERTS | < 10    | 25      |  |  |  |
| TPH-CWG - Aromatic (EC5 - EC44)   | mg/kg | 10    | NONE   | < 10    | 25      |  |  |  |



**Analytical Report Number : 20-86375**

**Project / Site name: Scotchbarn**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description *                            |
|-------------------|------------------|---------------|-----------|-------------------------------------------------|
| 1439673           | Plot 108         | TS            | 0.20      | Brown loam and clay with gravel and vegetation. |
| 1439674           | Plot 108         | SS            | 0.50      | Brown loam and clay with gravel and vegetation. |

**Analytical Report Number : 20-86375**

**Project / Site name: Scotchbarn**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name                               | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                                                     | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Asbestos identification in soil                    | Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.                                     | In house method based on HSG 248                                                                                | A001-PL       | D                  | ISO 17025            |
| Boron, water soluble, in soil                      | Determination of water soluble boron in soil by hot water extract followed by ICP-OES.                                                                    | In-house method based on Second Site Properties version 3                                                       | L038-PL       | D                  | MCERTS               |
| BTEX and MTBE in soil (Monoaromatics)              | Determination of BTEX in soil by headspace GC-MS.                                                                                                         | In-house method based on USEPA8260                                                                              | L0738-PL      | W                  | MCERTS               |
| Fraction of Organic Carbon in soil                 | Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                 | In house method.                                                                                                | L009-PL       | D                  | MCERTS               |
| Hexavalent chromium in soil (Lower Level)          | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.     | In-house method                                                                                                 | L080-PL       | W                  | MCERTS               |
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                            | L038-PL       | D                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                     | In house method.                                                                                                | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                    | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL       | W                  | MCERTS               |
| Organic matter (Automated) in soil                 | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                             | In house method.                                                                                                | L009-PL       | D                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                         | In house method.                                                                                                | L099-PL       | D                  | MCERTS               |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.    | In-house method based on USEPA 8270                                                                             | L064-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                               | In-house method based on British Standard Methods and MCERTS requirements.                                      | L019-UK/PL    | D                  | NONE                 |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| Total cyanide in soil                              | Determination of total cyanide by distillation followed by colorimetry.                                                                                   | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar) | L080-PL       | W                  | MCERTS               |
| TPH in (Soil)                                      | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                                             | In-house method, TPH with carbon banding and silica gel split/cleanup.                                          | L076-PL       | D                  | NONE                 |
| TPHCWG (Soil)                                      | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.                                                                                 | In-house method with silica gel split/cleanup.                                                                  | L088/76-PL    | W                  | MCERTS               |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**

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

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

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The results included within the report are representative of the samples submitted for analysis.

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| Sample ID | Other ID | Sample Type | Job      | Sample Number | Sample Deviation Code | test_name             | test_ref | Test Deviation code |
|-----------|----------|-------------|----------|---------------|-----------------------|-----------------------|----------|---------------------|
| Plot 108  | SS       | S           | 20-86375 | 1439674       | c                     | Total cyanide in soil | L080-PL  | c                   |
| Plot 108  | TS       | S           | 20-86375 | 1439673       | c                     | Total cyanide in soil | L080-PL  | c                   |



John Fenlon  
**Bellway Homes Limited (North West)**  
2 Alderman Road  
Hunts Cross  
Liverpool  
Merseyside  
L24 9LR

Ref: 23v103358  
Date: 16<sup>th</sup> April 2020

**By email only: john.fenlon@bellway.co.uk**

Dear John,

### **Garden Validation – Scotchbarn Lane, Knowsley – Plots 104 - 108**

#### **Background and Objectives**

In accordance with the Remediation Strategy ref 103358p2r2, dated November 2017, the following remedial measures are required in all areas of the site:

#### **Depth Requirement for Gardens**

- A total clean cover system comprising a minimum thickness of 600 mm;
- A minimum topsoil thickness of 150 mm; and,
- The remainder of the clean cover system shall be comprised of subsoil.

#### **Validation Requirement**

- Independent validation of works by Geo-Environmental Consultant;
- Visual inspection and chemical laboratory validation sampling; and
- Production of validation letter reports for the clean cover system.

Required sample numbers for chemical validation are summarised in Table 1.

**Table 1: Chemical Validation Testing Requirement**

| Source               | Source of Material      |                          |                          |
|----------------------|-------------------------|--------------------------|--------------------------|
|                      | Greenfield              | Remediated               | Brownfield / Unknown     |
| Gardens              | 1 per 250m <sup>3</sup> | 1 per 100 m <sup>3</sup> | 1 per 50 m <sup>3</sup>  |
| Soft Landscaping     |                         | 1 per 150 m <sup>3</sup> | 1 per 150 m <sup>3</sup> |
| Other Fill Materials |                         | 1 per 250m <sup>3</sup>  | 1 per 250m <sup>3</sup>  |

## Validation Works Completed

Table 2 summarises plots inspected as part of each visit and the corresponding letter.

**Table 2: Summary of Validated Plots**

| Validated Plots<br>[w/ 600mm Cover System]  | Letter Reference |
|---------------------------------------------|------------------|
| 7-10                                        | 01v103358        |
| 1-2, 5                                      | 02v103358        |
| 6, 34-39, 118-119                           | 03v103358        |
| 41-43 & 117                                 | 04v103358        |
| 11 & 40                                     | 05v103358        |
| 12-13                                       | 06v103358        |
| 14-16                                       | 07v103358        |
| 17-19                                       | 08v103358        |
| 120-123                                     | 09v103358        |
| 124-128                                     | 10v103358        |
| 20 – 26                                     | 11v103358        |
| 27, 31-33                                   | 12v103358        |
| 28-30                                       | 13v103358        |
| 50-55                                       | 14v103358        |
| 56-59                                       | 15v103358        |
| 48, 49, 60                                  | 16v103358        |
| 129, 130, 44 – 47, 59                       | 17v103358        |
| 61 - 63                                     | 18v103358        |
| 65-67 (further action required)             | 19v103358        |
| 65-68 (further action required for Plot 66) | 20v103358        |
| 112 - 116                                   | 21v103358        |
| 108 – 111                                   | 22v103358        |
| 104 – 108                                   | 23v103358        |

### Validation Visit – 16<sup>th</sup> March 2020

Ensafe Consultants (formerly known as REC) attended site on 16<sup>th</sup> March 2020 to confirm the correct thickness of topsoil and subsoil has been used in the rear gardens of properties in Plots 104 to 108 and to collect samples for laboratory analysis.

One hand dug pit was completed in gardens 104 - 108 and the depths and descriptions of each strata encountered recorded.

Ensafe's independent inspection shows that the required 600mm of clean cover is present within the rear gardens of Plots 104 – 108.

A visual inspection of the topsoil and subsoil within each pit confirms them to be free of potentially deleterious or unsuitable materials discernible by the naked eye such as ceramic materials, metal objects, plastics, treated wood or textiles.

Topsoil and subsoil samples were collected and analysed for the constituents of concern noted in Table 4 (enclosed to this letter) to the correct frequency as specified in Table 1 above and have been subsequently assessed against their suitability for a residential with gardens and plant uptake end use development.

**Laboratory Testing of Site Won Soil**

Ensafe visited site on 16<sup>th</sup> March 2020 to undertake intrusive ground investigations. Sampling and testing of site won topsoil as part of this work determined it suitable for use within gardens. Laboratory test certificates are attached to this report.

**Laboratory Testing of Placed Topsoil**

Topsoil has been purchased from the R Draper LTD soil merchant. One sample of topsoil and one sample of subsoil were tested at a frequency of 1 per 50m<sup>3</sup> within Plots 104 - 108. Laboratory analysis confirms its suitability for use within the gardens (Table 4). Laboratory test certificates are attached to this report.

**Summary**

Ensafe can confirm that the topsoil and subsoil installed in the rear gardens of Plots 104 to 108 meet the specified requirements as a suitable growing medium and is suitable for its intended use.

Yours Sincerely,

**For and on behalf of Ensaf Consultants**



**Liam Moore**  
**Consultant**

**Approved and Authorised**



**Philip Thompson**  
**Associate Director**

Enclosed:

Location Plan of Validated Plots

Plot Inspection Records (including photographs and description)

Table 4: Screening Values for Materials within Residential Soft Landscaping Areas

Chemical Analysis Certificates



**Figure 1: Sketch Plot Validation Pit Location**



- - Validated Plots during Site Visit on 16<sup>th</sup> March 2020.
- - Previously Validated Plots

## **PLOT INSPECTION RECORDS**

**PLOT NUMBER: 104**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 16/03/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 400 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >200 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                                    |
|------------------------------------|
| Additional Comments:               |
| Sampled at 0.20m bgl and 0.50m bgl |

**GARDEN VALIDATION: PASS**

**PLOT NUMBER: 105**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 16/03/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 350 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >250 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**

**PLOT NUMBER: 106**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 16/03/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**

**PLOT NUMBER: 107**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 16/03/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**

**PLOT NUMBER: 108**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 16/03/2020**  
**Consultant: L. Moore**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**

## **SUITABILITY CRITERIA**

**Table 4: Validation Testing Summary**

| Determinand                                                                | Units | Screening Value for Use within Private Gardens | Maximum Concentration within Topsoil | Maximum Concentration within Subsoil | Screening Value Source |
|----------------------------------------------------------------------------|-------|------------------------------------------------|--------------------------------------|--------------------------------------|------------------------|
| <b>Inorganics – Metals and Asbestos</b>                                    |       |                                                |                                      |                                      |                        |
| Arsenic                                                                    | mg/kg | 37                                             | 7.9                                  | 8.0                                  | (i)                    |
| Cadmium                                                                    | mg/kg | 11                                             | <0.2                                 | <0.2                                 | (i)                    |
| Chromium VI                                                                | mg/kg | 6                                              | <1.2                                 | <1.2                                 | (i)                    |
| Lead                                                                       | mg/kg | 200                                            | 49                                   | 52                                   | (iv)                   |
| Inorganic Mercury                                                          | mg/kg | 40                                             | <0.3                                 | <0.3                                 | (i)                    |
| Nickel                                                                     | mg/kg | 130                                            | 12                                   | 14                                   | (i)                    |
| Selenium                                                                   | mg/kg | 250                                            | <0.1                                 | <0.1                                 | (i)                    |
| Copper                                                                     | mg/kg | 2,400                                          | 23                                   | 31                                   | (i)                    |
| Zinc                                                                       | mg/kg | 3,700                                          | 50                                   | 51                                   | (i)                    |
| Cyanide                                                                    | mg/kg | 3.4                                            | <1                                   | <1                                   | (v)                    |
| Asbestos                                                                   | %     | Not Detected                                   | N.D.                                 | N.D.                                 | N/A                    |
|                                                                            |       |                                                |                                      |                                      |                        |
| Phenol                                                                     | mg/kg | 550                                            | <1                                   | <1                                   | (ii)                   |
| Naphthalene                                                                | mg/kg | 5.6                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthylene                                                             | mg/kg | 420                                            | <0.05                                | <0.05                                | (ii)                   |
| Acenaphthene                                                               | mg/kg | 510                                            | <0.05                                | 0.20                                 | (ii)                   |
| Fluorene                                                                   | mg/kg | 400                                            | <0.05                                | <0.05                                | (ii)                   |
| Phenanthrene                                                               | mg/kg | 220                                            | 0.55                                 | 1.2                                  | (ii)                   |
| Anthracene                                                                 | mg/kg | 2,400                                          | 0.15                                 | 0.26                                 | (ii)                   |
| Fluoranthene                                                               | mg/kg | 280                                            | 0.56                                 | 1.4                                  | (ii)                   |
| Pyrene                                                                     | mg/kg | 1200                                           | 0.54                                 | 1.3                                  | (ii)                   |
| Benzo(a)Anthracene                                                         | mg/kg | 2.7                                            | 0.30                                 | 0.74                                 | (ii)                   |
| Chrysene                                                                   | mg/kg | 22                                             | 0.32                                 | 0.78                                 | (ii)                   |
| Benzo(b)Fluoranthene                                                       | mg/kg | 3.3                                            | 0.29                                 | 0.69                                 | (ii)                   |
| Benzo(k)Fluoranthene                                                       | mg/kg | 93                                             | 0.18                                 | 0.27                                 | (ii)                   |
| Benzo(a)Pyrene                                                             | mg/kg | 2.7                                            | 0.25                                 | 0.55                                 | (ii)                   |
| Indeno(123-cd)Pyrene                                                       | mg/kg | 36                                             | <0.05                                | 0.25                                 | (ii)                   |
| Dibenzo(a,h)Anthracene                                                     | mg/kg | 0.28                                           | <0.05                                | <0.05                                | (ii)                   |
| Benzo(ghi)Perylene                                                         | mg/kg | 340                                            | <0.05                                | 0.32                                 | (ii)                   |
|                                                                            |       |                                                |                                      |                                      |                        |
| TPH C <sub>5</sub> -C <sub>6</sub>                                         | mg/kg | 78                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>6</sub> -C <sub>8</sub>                                         | mg/kg | 230                                            | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>8</sub> -C <sub>10</sub>                                        | mg/kg | 65                                             | <0.001                               | <0.001                               | (iii)                  |
| TPH C <sub>10</sub> -C <sub>12</sub>                                       | mg/kg | 180                                            | 3.9                                  | <1.0                                 | (iii)                  |
| TPH C <sub>12</sub> -C <sub>16</sub>                                       | mg/kg | 330                                            | 10                                   | 2.0                                  | (iii)                  |
| TPH C <sub>16</sub> -C <sub>21</sub>                                       | mg/kg | 540                                            | 25                                   | <10                                  | (iii)                  |
| TPH C <sub>21</sub> -C <sub>35</sub>                                       | mg/kg | 1,500                                          | 44                                   | 15                                   | (iii)                  |
| TPH C <sub>35</sub> -C <sub>44</sub>                                       | mg/kg | 1,500                                          | <8.4                                 | <8.4                                 | (iii)                  |
| <b>Screening Value Source</b>                                              |       |                                                |                                      |                                      |                        |
| (i) LQM/CIEH Suitable For Use Level (S4UL) (2015);                         |       |                                                |                                      |                                      |                        |
| (ii) S4UL –Assessment Approach of 2.5% SOM;                                |       |                                                |                                      |                                      |                        |
| (iii) S4UL –2.5% SOM and assumed worst case aliphatic / aromatic compound; |       |                                                |                                      |                                      |                        |
| (iv) Defra Category 4 Screening Level (2014);                              |       |                                                |                                      |                                      |                        |
| (v) CLEA v1.06 Derived Value.                                              |       |                                                |                                      |                                      |                        |

## SOIL CHEMICAL ANALYSIS

**Catarina Lima**

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## **Analytical Report Number : 20-93422**

|                             |                |                               |            |
|-----------------------------|----------------|-------------------------------|------------|
| <b>Project / Site name:</b> | Scotchbarn     | <b>Samples received on:</b>   | 17/03/2020 |
| <b>Your job number:</b>     | 103358         | <b>Samples instructed on:</b> | 18/03/2020 |
| <b>Your order number:</b>   | PO008267       | <b>Analysis completed by:</b> | 01/04/2020 |
| <b>Report Issue Number:</b> | 1              | <b>Report issued on:</b>      | 08/04/2020 |
| <b>Samples Analysed:</b>    | 4 soil samples |                               |            |

**Signed:** *A. Czerwińska*

Agnieszka Czerwińska

Technical Reviewer (Reporting Team)  
**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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

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

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This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report are representative of the samples submitted for analysis.

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Environmental Science

Analytical Report Number: 20-93422

Project / Site name: Scotchbarn

Your Order No: P0008267

| Lab Sample Number                       |       |                       |                         | 1476600       | 1476601       | 1476602       | 1476603       |  |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|---------------|---------------|--|
| Sample Reference                        |       |                       |                         | HP105         | HP105 (SS)    | HP107         | HP107 (SS)    |  |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied |  |
| Depth (m)                               |       |                       |                         | 0.10          | 0.40          | 0.20          | 0.50          |  |
| Date Sampled                            |       |                       |                         | 16/03/2020    | 16/03/2020    | 16/03/2020    | 16/03/2020    |  |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied |  |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |               |               |  |
| Stone Content                           | %     | 0.1                   | NONE                    | < 0.1         | < 0.1         | < 0.1         | < 0.1         |  |
| Moisture Content                        | %     | N/A                   | NONE                    | 23            | 19            | 15            | 15            |  |
| Total mass of sample received           | kg    | 0.001                 | NONE                    | 0.46          | 0.54          | 0.51          | 0.55          |  |

**General Inorganics**

|                                                                         |          |         |        |       |       |       |       |  |
|-------------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|--|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 6.9   | 7.5   | 7.4   | 7.8   |  |
| Total Cyanide                                                           | mg/kg    | 1       | MCERTS | < 1   | < 1   | < 1   | < 1   |  |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)         | mg/kg    | 2.5     | MCERTS | 180   | 170   | 98    | 160   |  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.090 | 0.084 | 0.049 | 0.078 |  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 90.1  | 83.8  | 49.2  | 77.6  |  |
| Organic Matter                                                          | %        | 0.1     | MCERTS | 3.8   | 3.6   | 2.5   | 2.3   |  |
| Fraction Organic Carbon (FOC)                                           | N/A      | 0.001   | MCERTS | 0.022 | 0.021 | 0.014 | 0.013 |  |

**Total Phenols**

|                            |       |   |        |       |       |       |       |  |
|----------------------------|-------|---|--------|-------|-------|-------|-------|--|
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
|----------------------------|-------|---|--------|-------|-------|-------|-------|--|

**Speciated PAHs**

|                        |       |      |        |        |        |        |        |  |
|------------------------|-------|------|--------|--------|--------|--------|--------|--|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |  |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |  |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 0.20   | < 0.05 |  |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |  |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | < 0.05 | 0.24   | 0.55   | 1.2    |  |
| Anthracene             | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | 0.15   | 0.26   |  |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 0.51   | 0.56   | 0.57   | 1.4    |  |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 0.43   | 0.54   | 0.55   | 1.3    |  |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 0.27   | 0.30   | 0.37   | 0.74   |  |
| Chrysene               | mg/kg | 0.05 | MCERTS | 0.29   | 0.32   | 0.38   | 0.78   |  |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | < 0.05 | 0.29   | 0.38   | 0.69   |  |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | < 0.05 | 0.18   | 0.13   | 0.27   |  |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | < 0.05 | 0.25   | 0.31   | 0.55   |  |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | 0.25   |  |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |  |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | 0.32   |  |

**Total PAH**

|                             |       |     |        |      |      |      |      |  |
|-----------------------------|-------|-----|--------|------|------|------|------|--|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 1.50 | 2.68 | 3.59 | 7.76 |  |
|-----------------------------|-------|-----|--------|------|------|------|------|--|

**Heavy Metals / Metalloids**

|                                    |       |      |           |       |       |       |       |  |
|------------------------------------|-------|------|-----------|-------|-------|-------|-------|--|
| Antimony (aqua regia extractable)  | mg/kg | 1    | ISO 17025 | 1.0   | 1.3   | 1.8   | 1.8   |  |
| Arsenic (aqua regia extractable)   | mg/kg | 1    | MCERTS    | 4.3   | 5.8   | 7.9   | 8.0   |  |
| Barium (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 39    | 58    | 72    | 73    |  |
| Beryllium (aqua regia extractable) | mg/kg | 0.06 | MCERTS    | 0.25  | 0.39  | 0.48  | 0.52  |  |
| Boron (water soluble)              | mg/kg | 0.2  | MCERTS    | 0.4   | 0.8   | 0.7   | 0.7   |  |
| Cadmium (aqua regia extractable)   | mg/kg | 0.2  | MCERTS    | < 0.2 | < 0.2 | < 0.2 | < 0.2 |  |
| Chromium (hexavalent)              | mg/kg | 1.2  | MCERTS    | < 1.2 | < 1.2 | < 1.2 | < 1.2 |  |
| Chromium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 9.3   | 13    | 14    | 17    |  |
| Copper (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 9.0   | 17    | 23    | 31    |  |
| Lead (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 15    | 36    | 49    | 52    |  |
| Mercury (aqua regia extractable)   | mg/kg | 0.3  | MCERTS    | < 0.3 | < 0.3 | < 0.3 | < 0.3 |  |
| Nickel (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 7.0   | 10    | 12    | 14    |  |
| Selenium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| Vanadium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 9.8   | 14    | 17    | 19    |  |
| Zinc (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 25    | 36    | 50    | 51    |  |

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number: 20-93422

Project / Site name: Scotchbarn

Your Order No: P0008267

|                                         |               |                       |                         |               |  |
|-----------------------------------------|---------------|-----------------------|-------------------------|---------------|--|
| Lab Sample Number                       | 1476600       | 1476601               | 1476602                 | 1476603       |  |
| Sample Reference                        | HP105         | HP105 (SS)            | HP107                   | HP107 (SS)    |  |
| Sample Number                           | None Supplied | None Supplied         | None Supplied           | None Supplied |  |
| Depth (m)                               | 0.10          | 0.40                  | 0.20                    | 0.50          |  |
| Date Sampled                            | 16/03/2020    | 16/03/2020            | 16/03/2020              | 16/03/2020    |  |
| Time Taken                              | None Supplied | None Supplied         | None Supplied           | None Supplied |  |
| Analytical Parameter<br>(Soil Analysis) | Units         | Limit of<br>detection | Accreditation<br>Status |               |  |

#### Monoaromatics & Oxygenates

|                                    |       |   |        |       |       |       |       |  |
|------------------------------------|-------|---|--------|-------|-------|-------|-------|--|
| Benzene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| Toluene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| Ethylbenzene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| p & m-xylene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| o-xylene                           | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |

#### Petroleum Hydrocarbons

|                                         |       |       |        |         |         |         |         |  |
|-----------------------------------------|-------|-------|--------|---------|---------|---------|---------|--|
| TPH-CWG - Aliphatic >EC5 - EC6          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aliphatic >EC6 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aliphatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aliphatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   |  |
| TPH-CWG - Aliphatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   | < 2.0   | < 2.0   |  |
| TPH-CWG - Aliphatic >EC16 - EC21        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   |  |
| TPH-CWG - Aliphatic >EC21 - EC35        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | < 8.0   |  |
| TPH-CWG - Aliphatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |  |
| <b>TPH-CWG - Aliphatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | < 10    |  |
| <b>TPH-CWG - Aliphatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | < 10    | < 10    | < 10    |  |

|                                        |       |       |        |         |         |         |         |  |
|----------------------------------------|-------|-------|--------|---------|---------|---------|---------|--|
| TPH-CWG - Aromatic >EC5 - EC7          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aromatic >EC7 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aromatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |  |
| TPH-CWG - Aromatic >EC10 - EC12        | mg/kg | 1     | MCERTS | 3.9     | < 1.0   | 2.0     | < 1.0   |  |
| TPH-CWG - Aromatic >EC12 - EC16        | mg/kg | 2     | MCERTS | 4.6     | < 2.0   | 10      | 2.0     |  |
| TPH-CWG - Aromatic >EC16 - EC21        | mg/kg | 10    | MCERTS | < 10    | < 10    | 25      | < 10    |  |
| TPH-CWG - Aromatic >EC21 - EC35        | mg/kg | 10    | MCERTS | 28      | < 10    | 44      | 15      |  |
| TPH-CWG - Aromatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |  |
| <b>TPH-CWG - Aromatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | 46      | < 10    | 81      | 22      |  |
| <b>TPH-CWG - Aromatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | 46      | < 10    | 81      | 22      |  |



**Analytical Report Number : 20-93422**

**Project / Site name: Scotchbarn**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description *             |
|-------------------|------------------|---------------|-----------|----------------------------------|
| 1476600           | HP105            | None Supplied | 0.10      | Brown loam and clay with gravel. |
| 1476601           | HP105 (SS)       | None Supplied | 0.40      | Brown loam and clay with gravel. |
| 1476602           | HP107            | None Supplied | 0.20      | Brown loam and clay with gravel. |
| 1476603           | HP107 (SS)       | None Supplied | 0.50      | Brown loam and clay with gravel. |

**Analytical Report Number : 20-93422**

**Project / Site name: Scotchbarn**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name                               | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                                                     | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Boron, water soluble, in soil                      | Determination of water soluble boron in soil by hot water extract followed by ICP-OES.                                                                    | In-house method based on Second Site Properties version 3                                                       | L038-PL       | D                  | MCERTS               |
| BTEX and MTBE in soil (Monoaromatics)              | Determination of BTEX in soil by headspace GC-MS.                                                                                                         | In-house method based on USEPA8260                                                                              | L073B-PL      | W                  | MCERTS               |
| Fraction of Organic Carbon in soil                 | Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                 | In house method.                                                                                                | L009-PL       | D                  | MCERTS               |
| Hexavalent chromium in soil (Lower Level)          | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.     | In-house method                                                                                                 | L080-PL       | W                  | MCERTS               |
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                            | L038-PL       | D                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                     | In house method.                                                                                                | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                    | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL       | W                  | MCERTS               |
| Organic matter (Automated) in soil                 | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                             | In house method.                                                                                                | L009-PL       | D                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                         | In house method.                                                                                                | L099-PL       | D                  | MCERTS               |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.    | In-house method based on USEPA 8270                                                                             | L064-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                               | In-house method based on British Standard Methods and MCERTS requirements.                                      | L019-UK/PL    | D                  | NONE                 |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| Total cyanide in soil                              | Determination of total cyanide by distillation followed by colorimetry.                                                                                   | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar) | L080-PL       | W                  | MCERTS               |
| TPH in (Soil)                                      | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                                             | In-house method, TPH with carbon banding and silica gel split/cleanup.                                          | L076-PL       | D                  | NONE                 |
| TPHCWG (Soil)                                      | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.                                                                                 | In-house method with silica gel split/cleanup.                                                                  | L088/76-PL    | W                  | MCERTS               |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**

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

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



## CERTIFICATE OF ANALYSIS

Certificate Number: J108752

|         |                                                                                               |
|---------|-----------------------------------------------------------------------------------------------|
| Client: | Ensafe GEO-Environmental (Manchester), Osprey House, Pacific Quay, Broadway, Salford, M50 2UE |
| Site:   | 103358- Scotchbarn Lane, L35 7JA                                                              |

|                |                                       |               |     |                |               |
|----------------|---------------------------------------|---------------|-----|----------------|---------------|
| Date Received: | 01/04/2020                            | Date Sampled: | N/A | Date Analysed: | 01/04/2020    |
| Sampled By:    | Ensafe GEO-Environmental (Manchester) |               |     | Analysed By:   | Joanna Cannon |

| Certificate Number:<br>J108752 |          |          |             |                                 |
|--------------------------------|----------|----------|-------------|---------------------------------|
| Sample Number                  | Location | Material | Description | Asbestos Fibre Type(s) Detected |
| BS003311                       | Plot 105 | Soil     | 0.10m       | No Asbestos Detected            |
| BS003312                       | Plot 105 | Soil     | 0.40m       | No Asbestos Detected            |
| BS003313                       | Plot 107 | Soil     | 0.20m       | No Asbestos Detected            |
| BS003314                       | Plot 107 | Soil     | 0.50m       | No Asbestos Detected            |

*J. Cannon*

REC Operations Manager  
Issue Date: 01/04/2020

*Sample analysis was conducted at Ensaf Consultants Permanent Laboratory, Cody Court, Unit M3, Kansas Avenue, Salford, Manchester, M50 2GE*

*The methodology is based on procedures within the HSE Document HSG248 'Asbestos: The analysts' guide for sampling, analysis and clearance procedures' and in-house procedures.*

*Where samples have been supplied by the Client (as specified within the Sampled By section), Ensaf Consultants have no responsibility for any sampling carried out and can only make reference to information supplied by the Client. Ensaf Consultants cannot be held responsible for any errors that occurred during sampling or data handling by the Client.*

*The opinions and interpretations indicated on this certificate are outside the scope of UKAS accreditation.*



John Fenlon  
**Bellway Homes Limited (North West)**  
 2 Alderman Road  
 Hunts Cross  
 Liverpool  
 Merseyside  
 L24 9LR

Ref: 24v103358  
 Date: 17<sup>th</sup> June 2020

**By email only: john.fenlon@bellway.co.uk**

Dear John,

### **Garden Validation – Scotchbarn Lane, Knowsley – Plots 103 - 105**

#### **Background and Objectives**

In accordance with the Remediation Strategy ref 103358p2r2, dated November 2017, the following remedial measures are required in all areas of the site:

#### **Depth Requirement for Gardens**

- ▶ A total clean cover system comprising a minimum thickness of 600 mm;
- ▶ A minimum topsoil thickness of 150 mm; and,
- ▶ The remainder of the clean cover system shall be comprised of subsoil.

#### **Validation Requirement**

- ▶ Independent validation of works by Geo-Environmental Consultant;
- ▶ Visual inspection and chemical laboratory validation sampling; and
- ▶ Production of validation letter reports for the clean cover system.

Required sample numbers for chemical validation are summarised in Table 1.

**Table 1: Chemical Validation Testing Requirement**

| Source               | Source of Material      |                          |                          |
|----------------------|-------------------------|--------------------------|--------------------------|
|                      | Greenfield              | Remediated               | Brownfield / Unknown     |
| Gardens              | 1 per 250m <sup>3</sup> | 1 per 100 m <sup>3</sup> | 1 per 50 m <sup>3</sup>  |
| Soft Landscaping     |                         | 1 per 150 m <sup>3</sup> | 1 per 150 m <sup>3</sup> |
| Other Fill Materials |                         | 1 per 250m <sup>3</sup>  | 1 per 250m <sup>3</sup>  |

## Validation Works Completed

Table 2 summarises plots inspected as part of each visit and the corresponding letter.

**Table 2: Summary of Validated Plots**

| Validated Plots<br>[w/ 600mm Cover System]  | Letter Reference |
|---------------------------------------------|------------------|
| 7-10                                        | 01v103358        |
| 1-2, 5                                      | 02v103358        |
| 6, 34-39, 118-119                           | 03v103358        |
| 41-43 & 117                                 | 04v103358        |
| 11 & 40                                     | 05v103358        |
| 12-13                                       | 06v103358        |
| 14-16                                       | 07v103358        |
| 17-19                                       | 08v103358        |
| 120-123                                     | 09v103358        |
| 124-128                                     | 10v103358        |
| 20 – 26                                     | 11v103358        |
| 27, 31-33                                   | 12v103358        |
| 28-30                                       | 13v103358        |
| 50-55                                       | 14v103358        |
| 56-59                                       | 15v103358        |
| 48, 49, 60                                  | 16v103358        |
| 129, 130, 44 – 47, 59                       | 17v103358        |
| 61 - 63                                     | 18v103358        |
| 65-67 (further action required)             | 19v103358        |
| 65-68 (further action required for Plot 66) | 20v103358        |
| 112 - 116                                   | 21v103358        |
| 108 – 111                                   | 22v103358        |
| 104 - 108                                   | 23v103358        |
| 103 - 105                                   | 24v103358        |

### Validation Visit – 29<sup>th</sup> May 2020

Ensafe attended site on 29<sup>th</sup> May 2020 to confirm the correct thickness of topsoil and subsoil has been used in the rear gardens of properties in Plots 103 - 105 and to collect samples for laboratory analysis.

One hand dug pit was completed in gardens 103 – 105 and the depths and descriptions of each strata encountered recorded.

Ensafe's independent inspection shows that the required 600mm of clean cover is present within the rear gardens of Plots 103 - 105.

A visual inspection of the topsoil and subsoil within each pit confirms them to be free of potentially deleterious or unsuitable materials discernible by the naked eye such as ceramic materials, metal objects, plastics, treated wood or textiles.

Topsoil and subsoil samples were collected and analysed for the constituents of concern noted in Table 4 (enclosed to this letter) to the correct frequency as specified in Table 1 above and have been subsequently assessed against their suitability for a residential with gardens and plant uptake end use development.

**Laboratory Testing of Site Won Soil**

Ensafe attended site on 29<sup>th</sup> May 2020 to undertake intrusive ground investigations. Sampling and testing of site won topsoil as part of this work determined it suitable for use within gardens. Laboratory test certificates are attached to this report.

**Laboratory Testing of Placed Topsoil**

Topsoil has been purchased from the R Draper LTD soil merchant. One sample of topsoil and one sample of subsoil were tested at a frequency of 1 per 50m<sup>3</sup> within Plots 103 - 105. Laboratory analysis confirms its suitability for use within the gardens (Table 4). Laboratory test certificates are attached to this report.

**Summary**

Ensafe can confirm that the topsoil and subsoil installed in the rear gardens of Plots 103 – 105 meet the specified requirements as a suitable growing medium and is suitable for its intended use.

Yours Sincerely,

**For and on Ensaf Consultants**



**Catarina Lima  
Consultant**

**Approved and Authorised**



**Philip Thompson  
Associate Director**

Enclosed:

Location Plan of Validated Plots

Plot Inspection Records (including photographs and description)

Table 4: Screening Values for Materials within Residential Soft Landscaping Areas

Chemical Analysis Certificates

**Figure 1: Sketch Plot Validation Pit Location**



## **PLOT INSPECTION RECORDS**

**PLOT NUMBER: 103**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 29/05/2020**  
**Consultant: C. Lima**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 350 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >250 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |



|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**

**PLOT NUMBER: 104**

**Developer: Bellway Homes**

**Date: 29/05/2020**

**Pit Location: Rear Garden**

**Consultant: C. Lima**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |

| Validation Photograph                                                              | Locational Photograph                                                               |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

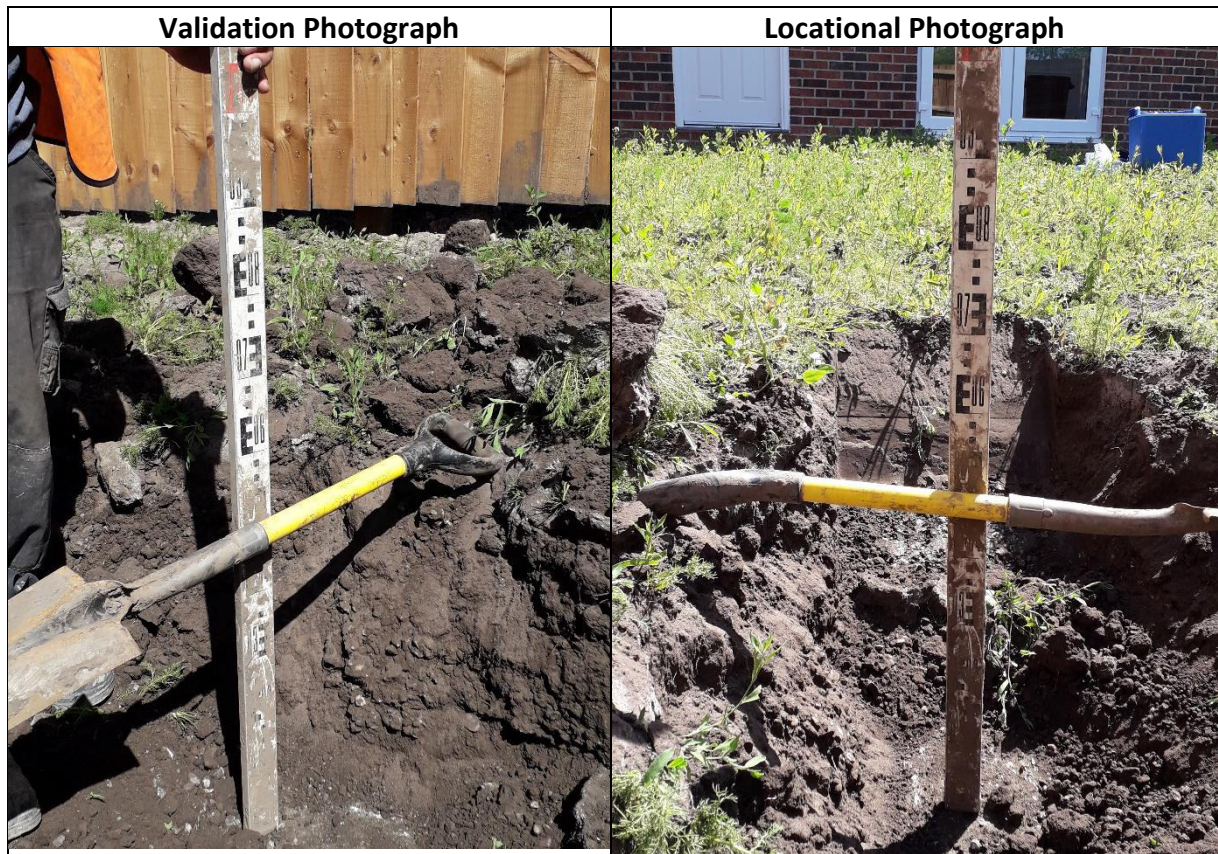
|                                    |
|------------------------------------|
| Additional Comments:               |
| Sampled at 0.10m bgl and 0.60m bgl |
| <b>GARDEN VALIDATION: PASS</b>     |

**PLOT NUMBER: 105**

**Developer: Bellway Homes**  
**Pit Location: Rear Garden**

**Date: 29/05/2020**  
**Consultant: C. Lima**

| Capping Requirements | Total Depth  | Capping Observed | Total Depth |
|----------------------|--------------|------------------|-------------|
| Topsoil              | > 150 mm bgl | Topsoil          | 300 mm bgl  |
| Subsoil              | > 450mm bgl  | Subsoil          | >300 mm bgl |
| Break Layer          | N/A          | Break Layer      | N /A        |
| TOTAL DEPTH          | > 600mm bgl  | TOTAL DEPTH      | 600 mm bgl  |



|                      |
|----------------------|
| Additional Comments: |
| N/A                  |

**GARDEN VALIDATION: PASS**

## **SUITABILITY CRITERIA**

**Table 4: Validation Testing Summary**

| Determinand                                                                | Units | Screening Value for Use within Private Gardens | Maximum Concentration within Topsoil | Maximum Concentration within Subsoil | Screening Value Source |
|----------------------------------------------------------------------------|-------|------------------------------------------------|--------------------------------------|--------------------------------------|------------------------|
| <b>Inorganics – Metals and Asbestos</b>                                    |       |                                                |                                      |                                      |                        |
| Arsenic                                                                    | mg/kg | 37                                             | 19                                   | 15                                   | (i)                    |
| Cadmium                                                                    | mg/kg | 11                                             | 3.1                                  | 3.5                                  | (i)                    |
| Chromium VI                                                                | mg/kg | 6                                              | < 1.2                                | < 1.2                                | (i)                    |
| Lead                                                                       | mg/kg | 200                                            | 160                                  | 26                                   | (iv)                   |
| Inorganic Mercury                                                          | mg/kg | 40                                             | 0.5                                  | 0.5                                  | (i)                    |
| Nickel                                                                     | mg/kg | 130                                            | 32                                   | 25                                   | (i)                    |
| Selenium                                                                   | mg/kg | 250                                            | < 1.0                                | 2.1                                  | (i)                    |
| Copper                                                                     | mg/kg | 2,400                                          | 160                                  | 17                                   | (i)                    |
| Zinc                                                                       | mg/kg | 3,700                                          | 210                                  | 34                                   | (i)                    |
| Cyanide                                                                    | mg/kg | 3.4                                            | < 1                                  | < 1                                  | (v)                    |
| Asbestos                                                                   | %     | Not Detected                                   | Detected                             | Not Detected                         | N/A                    |
|                                                                            |       |                                                |                                      |                                      |                        |
| Phenol                                                                     | mg/kg | 550                                            | < 1.0                                | < 1.0                                | (ii)                   |
| Naphthalene                                                                | mg/kg | 5.6                                            | < 0.05                               | < 0.05                               | (ii)                   |
| Acenaphthylene                                                             | mg/kg | 420                                            | < 0.05                               | < 0.05                               | (ii)                   |
| Acenaphthene                                                               | mg/kg | 510                                            | < 0.05                               | < 0.05                               | (ii)                   |
| Fluorene                                                                   | mg/kg | 400                                            | < 0.05                               | < 0.05                               | (ii)                   |
| Phenanthrene                                                               | mg/kg | 220                                            | 0.90                                 | 0.31                                 | (ii)                   |
| Anthracene                                                                 | mg/kg | 2,400                                          | 0.20                                 | <0.05                                | (ii)                   |
| Fluoranthene                                                               | mg/kg | 280                                            | 2.5                                  | 0.40                                 | (ii)                   |
| Pyrene                                                                     | mg/kg | 1200                                           | 2.3                                  | 0.50                                 | (ii)                   |
| Benzo(a)Anthracene                                                         | mg/kg | 2.7                                            | 1.6                                  | 0.40                                 | (ii)                   |
| Chrysene                                                                   | mg/kg | 22                                             | 1.1                                  | 0.20                                 | (ii)                   |
| Benzo(b)Fluoranthene                                                       | mg/kg | 3.3                                            | 1.2                                  | 0.27                                 | (ii)                   |
| Benzo(k)Fluoranthene                                                       | mg/kg | 93                                             | 0.66                                 | 0.20                                 | (ii)                   |
| Benzo(a)Pyrene                                                             | mg/kg | 2.7                                            | 1.5                                  | 0.26                                 | (ii)                   |
| Indeno(123-cd)Pyrene                                                       | mg/kg | 36                                             | 0.79                                 | < 0.05                               | (ii)                   |
| Dibenzo(a,h)Anthracene                                                     | mg/kg | 0.28                                           | 0.27                                 | < 0.05                               | (ii)                   |
| Benzo(ghi)Perylene                                                         | mg/kg | 340                                            | 0.88                                 | < 0.05                               | (ii)                   |
|                                                                            |       |                                                |                                      |                                      |                        |
| TPH C <sub>5</sub> -C <sub>6</sub>                                         | mg/kg | 78                                             | < 0.001                              | < 0.001                              | (iii)                  |
| TPH C <sub>6</sub> -C <sub>8</sub>                                         | mg/kg | 230                                            | < 0.001                              | < 0.001                              | (iii)                  |
| TPH C <sub>8</sub> -C <sub>10</sub>                                        | mg/kg | 65                                             | < 0.001                              | < 0.001                              | (iii)                  |
| TPH C <sub>10</sub> -C <sub>12</sub>                                       | mg/kg | 180                                            | < 1.0                                | < 1.0                                | (iii)                  |
| TPH C <sub>12</sub> -C <sub>16</sub>                                       | mg/kg | 330                                            | < 2.0                                | < 2.0                                | (iii)                  |
| TPH C <sub>16</sub> -C <sub>21</sub>                                       | mg/kg | 540                                            | < 8.0                                | < 8.0                                | (iii)                  |
| TPH C <sub>21</sub> -C <sub>35</sub>                                       | mg/kg | 1,500                                          | 22                                   | 23                                   | (iii)                  |
| TPH C <sub>35</sub> -C <sub>44</sub>                                       | mg/kg | 1,500                                          | < 8.4                                | < 8.4                                | (iii)                  |
| <b>Screening Value Source</b>                                              |       |                                                |                                      |                                      |                        |
| (i) LQM/CIEH Suitable For Use Level (S4UL) (2015);                         |       |                                                |                                      |                                      |                        |
| (ii) S4UL –Assessment Approach of 2.5% SOM;                                |       |                                                |                                      |                                      |                        |
| (iii) S4UL –2.5% SOM and assumed worst case aliphatic / aromatic compound; |       |                                                |                                      |                                      |                        |
| (iv) Defra Category 4 Screening Level (2014);                              |       |                                                |                                      |                                      |                        |
| (v) CLEA v1.06 Derived Value.                                              |       |                                                |                                      |                                      |                        |

## SOIL CHEMICAL ANALYSIS



**Catarina Lima**  
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## **Analytical Report Number : 20-11791**

|                             |                |                                                    |            |
|-----------------------------|----------------|----------------------------------------------------|------------|
| <b>Project / Site name:</b> | Scotchbarn     | <b>Samples received on:</b>                        | 01/06/2020 |
| <b>Your job number:</b>     | 103358         | <b>Sample instructed/<br/>Analysis started on:</b> | 01/06/2020 |
| <b>Your order number:</b>   | 008332         | <b>Analysis completed by:</b>                      | 15/06/2020 |
| <b>Report Issue Number:</b> | 1              | <b>Report issued on:</b>                           | 15/06/2020 |
| <b>Samples Analysed:</b>    | 4 soil samples |                                                    |            |

**Signed:**

Joanna Wawrzeczko  
Technical Reviewer (Reporting Team)

**For & on behalf of i2 Analytical Ltd.**

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

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

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

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

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

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

Iss No 20-11791-1 Scotchbarn 103358.XLS

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report relate only to the sample(s) submitted for testing.

Page 1 of 5

Analytical Report Number: 20-11791

Project / Site name: Scotchbarn

Your Order No: 008332

| Lab Sample Number                       |       |                       |                         | 1521446       | 1521447       | 1521448       | 1521449       |  |
|-----------------------------------------|-------|-----------------------|-------------------------|---------------|---------------|---------------|---------------|--|
| Sample Reference                        |       |                       |                         | Plot 69       | Plot 69       | Plot 104      | Plot 104      |  |
| Sample Number                           |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied |  |
| Depth (m)                               |       |                       |                         | 0.10          | 0.70          | 0.10          | 0.60          |  |
| Date Sampled                            |       |                       |                         | 29/05/2020    | 29/05/2020    | 29/05/2020    | 29/05/2020    |  |
| Time Taken                              |       |                       |                         | None Supplied | None Supplied | None Supplied | None Supplied |  |
| Analytical Parameter<br>(Soil Analysis) | Units | Limit of<br>detection | Accreditation<br>Status |               |               |               |               |  |
| Stone Content                           | %     | 0.1                   | NONE                    | < 0.1         | < 0.1         | < 0.1         | < 0.1         |  |
| Moisture Content                        | %     | N/A                   | NONE                    | 0.99          | 22            | 9.0           | 6.4           |  |
| Total mass of sample received           | kg    | 0.001                 | NONE                    | 0.40          | 0.40          | 0.40          | 0.50          |  |

#### General Inorganics

|                                                                         |          |         |        |       |       |       |       |  |
|-------------------------------------------------------------------------|----------|---------|--------|-------|-------|-------|-------|--|
| pH - Automated                                                          | pH Units | N/A     | MCERTS | 7.3   | 6.8   | 7.5   | 7.9   |  |
| Total Cyanide                                                           | mg/kg    | 1       | MCERTS | < 1   | < 1   | < 1   | < 1   |  |
| Water Soluble Sulphate as SO <sub>4</sub> 16hr extraction (2:1)         | mg/kg    | 2.5     | MCERTS | 170   | 120   | 270   | 420   |  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | g/l      | 0.00125 | MCERTS | 0.083 | 0.060 | 0.13  | 0.21  |  |
| Water Soluble SO <sub>4</sub> 16hr extraction (2:1 Leachate Equivalent) | mg/l     | 1.25    | MCERTS | 82.7  | 59.9  | 134   | 213   |  |
| Organic Matter                                                          | %        | 0.1     | MCERTS | 4.4   | 5.5   | 4.3   | 3.4   |  |
| Fraction Organic Carbon (FOC)                                           | N/A      | 0.001   | MCERTS | 0.026 | 0.032 | 0.025 | 0.020 |  |

#### Total Phenols

|                            |       |   |        |       |       |       |       |  |
|----------------------------|-------|---|--------|-------|-------|-------|-------|--|
| Total Phenols (monohydric) | mg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |  |
|----------------------------|-------|---|--------|-------|-------|-------|-------|--|

#### Speciated PAHs

|                        |       |      |        |        |        |        |        |  |
|------------------------|-------|------|--------|--------|--------|--------|--------|--|
| Naphthalene            | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |  |
| Acenaphthylene         | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |  |
| Acenaphthene           | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |  |
| Fluorene               | mg/kg | 0.05 | MCERTS | < 0.05 | < 0.05 | < 0.05 | < 0.05 |  |
| Phenanthrene           | mg/kg | 0.05 | MCERTS | 0.90   | 1.7    | < 0.05 | 0.31   |  |
| Anthracene             | mg/kg | 0.05 | MCERTS | 0.20   | 0.47   | < 0.05 | < 0.05 |  |
| Fluoranthene           | mg/kg | 0.05 | MCERTS | 2.5    | 3.7    | 0.40   | 0.49   |  |
| Pyrene                 | mg/kg | 0.05 | MCERTS | 2.3    | 3.0    | 0.39   | 0.50   |  |
| Benzo(a)anthracene     | mg/kg | 0.05 | MCERTS | 1.6    | 2.2    | < 0.05 | 0.40   |  |
| Chrysene               | mg/kg | 0.05 | MCERTS | 1.1    | 1.4    | < 0.05 | 0.20   |  |
| Benzo(b)fluoranthene   | mg/kg | 0.05 | MCERTS | 1.2    | 1.6    | < 0.05 | 0.27   |  |
| Benzo(k)fluoranthene   | mg/kg | 0.05 | MCERTS | 0.66   | 0.62   | < 0.05 | 0.20   |  |
| Benzo(a)pyrene         | mg/kg | 0.05 | MCERTS | 1.5    | 1.6    | < 0.05 | 0.26   |  |
| Indeno(1,2,3-cd)pyrene | mg/kg | 0.05 | MCERTS | 0.79   | 0.67   | < 0.05 | < 0.05 |  |
| Dibenz(a,h)anthracene  | mg/kg | 0.05 | MCERTS | 0.27   | 0.25   | < 0.05 | < 0.05 |  |
| Benzo(ghi)perylene     | mg/kg | 0.05 | MCERTS | 0.88   | 0.79   | < 0.05 | < 0.05 |  |

#### Total PAH

|                             |       |     |        |      |      |        |      |  |
|-----------------------------|-------|-----|--------|------|------|--------|------|--|
| Speciated Total EPA-16 PAHs | mg/kg | 0.8 | MCERTS | 13.9 | 17.9 | < 0.80 | 2.63 |  |
|-----------------------------|-------|-----|--------|------|------|--------|------|--|

#### Heavy Metals / Metalloids

|                                    |       |      |           |       |       |       |       |  |
|------------------------------------|-------|------|-----------|-------|-------|-------|-------|--|
| Antimony (aqua regia extractable)  | mg/kg | 1    | ISO 17025 | 5.6   | 3.1   | < 1.0 | 1.7   |  |
| Arsenic (aqua regia extractable)   | mg/kg | 1    | MCERTS    | 19    | 15    | 5.2   | 6.1   |  |
| Barium (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 190   | 140   | 59    | 72    |  |
| Beryllium (aqua regia extractable) | mg/kg | 0.06 | MCERTS    | 1.4   | 1.2   | 0.33  | 0.43  |  |
| Boron (water soluble)              | mg/kg | 0.2  | MCERTS    | 0.9   | 1.1   | 0.6   | 0.6   |  |
| Cadmium (aqua regia extractable)   | mg/kg | 0.2  | MCERTS    | 3.1   | 3.5   | < 0.2 | 0.8   |  |
| Chromium (hexavalent)              | mg/kg | 1.2  | MCERTS    | < 1.2 | < 1.2 | < 1.2 | < 1.2 |  |
| Chromium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 24    | 25    | 11    | 17    |  |
| Copper (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 160   | 150   | 17    | 44    |  |
| Lead (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 160   | 120   | 26    | 33    |  |
| Mercury (aqua regia extractable)   | mg/kg | 0.3  | MCERTS    | 0.5   | 0.5   | 0.3   | < 0.3 |  |
| Nickel (aqua regia extractable)    | mg/kg | 1    | MCERTS    | 32    | 25    | 8.7   | 13    |  |
| Selenium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | < 1.0 | 2.1   | < 1.0 | 1.3   |  |
| Vanadium (aqua regia extractable)  | mg/kg | 1    | MCERTS    | 35    | 31    | 12    | 16    |  |
| Zinc (aqua regia extractable)      | mg/kg | 1    | MCERTS    | 210   | 140   | 34    | 65    |  |

Analytical Report Number: 20-11791

Project / Site name: Scotchbarn

Your Order No: 008332

|                                         |               |                       |                         |               |
|-----------------------------------------|---------------|-----------------------|-------------------------|---------------|
| Lab Sample Number                       | 1521446       | 1521447               | 1521448                 | 1521449       |
| Sample Reference                        | Plot 69       | Plot 69               | Plot 104                | Plot 104      |
| Sample Number                           | None Supplied | None Supplied         | None Supplied           | None Supplied |
| Depth (m)                               | 0.10          | 0.70                  | 0.10                    | 0.60          |
| Date Sampled                            | 29/05/2020    | 29/05/2020            | 29/05/2020              | 29/05/2020    |
| Time Taken                              | None Supplied | None Supplied         | None Supplied           | None Supplied |
| Analytical Parameter<br>(Soil Analysis) | Units         | Limit of<br>detection | Accreditation<br>Status |               |

#### Monoaromatics & Oxygenates

|                                    |       |   |        |       |       |       |       |
|------------------------------------|-------|---|--------|-------|-------|-------|-------|
| Benzene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Toluene                            | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Ethylbenzene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| p & m-xylene                       | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| o-xylene                           | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| MTBE (Methyl Tertiary Butyl Ether) | µg/kg | 1 | MCERTS | < 1.0 | < 1.0 | < 1.0 | < 1.0 |

#### Petroleum Hydrocarbons

|                                         |       |       |        |         |         |         |         |
|-----------------------------------------|-------|-------|--------|---------|---------|---------|---------|
| TPH-CWG - Aliphatic >EC5 - EC6          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC6 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aliphatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aliphatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   | < 2.0   | < 2.0   |
| TPH-CWG - Aliphatic >EC16 - EC21        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | 8.1     |
| TPH-CWG - Aliphatic >EC21 - EC35        | mg/kg | 8     | MCERTS | < 8.0   | < 8.0   | < 8.0   | 30      |
| TPH-CWG - Aliphatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |
| <b>TPH-CWG - Aliphatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | < 10    | < 10    | < 10    | 38      |
| <b>TPH-CWG - Aliphatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | < 10    | < 10    | < 10    | 38      |

|                                        |       |       |        |         |         |         |         |
|----------------------------------------|-------|-------|--------|---------|---------|---------|---------|
| TPH-CWG - Aromatic >EC5 - EC7          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC7 - EC8          | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC8 - EC10         | mg/kg | 0.001 | MCERTS | < 0.001 | < 0.001 | < 0.001 | < 0.001 |
| TPH-CWG - Aromatic >EC10 - EC12        | mg/kg | 1     | MCERTS | < 1.0   | < 1.0   | < 1.0   | < 1.0   |
| TPH-CWG - Aromatic >EC12 - EC16        | mg/kg | 2     | MCERTS | < 2.0   | < 2.0   | < 2.0   | < 2.0   |
| TPH-CWG - Aromatic >EC16 - EC21        | mg/kg | 10    | MCERTS | < 10    | 10      | < 10    | < 10    |
| TPH-CWG - Aromatic >EC21 - EC35        | mg/kg | 10    | MCERTS | 22      | 27      | < 10    | 23      |
| TPH-CWG - Aromatic > EC35 - EC44       | mg/kg | 8.4   | NONE   | < 8.4   | < 8.4   | < 8.4   | < 8.4   |
| <b>TPH-CWG - Aromatic (EC5 - EC35)</b> | mg/kg | 10    | MCERTS | 32      | 37      | < 10    | 30      |
| <b>TPH-CWG - Aromatic (EC5 - EC44)</b> | mg/kg | 10    | NONE   | 32      | 37      | < 10    | 30      |



**Analytical Report Number : 20-11791**

**Project / Site name: Scotchbarn**

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

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

| Lab Sample Number | Sample Reference | Sample Number | Depth (m) | Sample Description *                 |
|-------------------|------------------|---------------|-----------|--------------------------------------|
| 1521446           | Plot 69          | None Supplied | 0.10      | Brown loam and sand with gravel.     |
| 1521447           | Plot 69          | None Supplied | 0.70      | Brown clay and loam with vegetation. |
| 1521448           | Plot 104         | None Supplied | 0.10      | Brown loam.                          |
| 1521449           | Plot 104         | None Supplied | 0.60      | Brown loam with gravel.              |

**Analytical Report Number : 20-11791**

**Project / Site name: Scotchbarn**

**Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)**

| Analytical Test Name                               | Analytical Method Description                                                                                                                             | Analytical Method Reference                                                                                     | Method number | Wet / Dry Analysis | Accreditation Status |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------|--------------------|----------------------|
| Boron, water soluble, in soil                      | Determination of water soluble boron in soil by hot water extract followed by ICP-OES.                                                                    | In-house method based on Second Site Properties version 3                                                       | L038-PL       | D                  | MCERTS               |
| BTEX and MTBE in soil (Monoaromatics)              | Determination of BTEX in soil by headspace GC-MS.                                                                                                         | In-house method based on USEPA8260                                                                              | L073B-PL      | W                  | MCERTS               |
| Fraction of Organic Carbon in soil                 | Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                 | In house method.                                                                                                | L009-PL       | D                  | MCERTS               |
| Hexavalent chromium in soil (Lower Level)          | Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.     | In-house method                                                                                                 | L080-PL       | W                  | MCERTS               |
| Metals in soil by ICP-OES                          | Determination of metals in soil by aqua-regia digestion followed by ICP-OES.                                                                              | In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.                            | L038-PL       | D                  | MCERTS               |
| Moisture Content                                   | Moisture content, determined gravimetrically. (30 oC)                                                                                                     | In house method.                                                                                                | L019-UK/PL    | W                  | NONE                 |
| Monohydric phenols in soil                         | Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.                                    | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar) | L080-PL       | W                  | MCERTS               |
| Organic matter (Automated) in soil                 | Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.                             | In house method.                                                                                                | L009-PL       | D                  | MCERTS               |
| pH in soil (automated)                             | Determination of pH in soil by addition of water followed by automated electrometric measurement.                                                         | In house method.                                                                                                | L099-PL       | D                  | MCERTS               |
| Speciated EPA-16 PAHs in soil                      | Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.    | In-house method based on USEPA 8270                                                                             | L064-PL       | D                  | MCERTS               |
| Stones content of soil                             | Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.                               | In-house method based on British Standard Methods and MCERTS requirements.                                      | L019-UK/PL    | D                  | NONE                 |
| Sulphate, water soluble, in soil (16hr extraction) | Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent). | In house method.                                                                                                | L038-PL       | D                  | MCERTS               |
| Total cyanide in soil                              | Determination of total cyanide by distillation followed by colorimetry.                                                                                   | In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar) | L080-PL       | W                  | MCERTS               |
| TPH in (Soil)                                      | Determination of TPH bands by HS-GC-MS/GC-FID                                                                                                             | In-house method, TPH with carbon banding and silica gel split/cleanup.                                          | L076-PL       | D                  | NONE                 |
| TPHCWG (Soil)                                      | Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.                                                                                 | In-house method with silica gel split/cleanup.                                                                  | L088/76-PL    | W                  | MCERTS               |

**For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.**

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

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



## CERTIFICATE OF ANALYSIS

Certificate Number: J109443

|         |                                                                                                   |
|---------|---------------------------------------------------------------------------------------------------|
| Client: | Bellway Homes Limited (North West) (Merseyside), 2 Alderman Road, Hunts Cross, Liverpool, L24 9LR |
| Site:   | Scotchbarn, L357jd                                                                                |

|                |            |               |     |                |               |
|----------------|------------|---------------|-----|----------------|---------------|
| Date Received: | 05/06/2020 | Date Sampled: | N/A | Date Analysed: | 05/06/2020    |
| Sampled By:    | External   |               |     | Analysed By:   | Joanna Cannon |

| Certificate Number:<br>J109443 |          |          |             |                                 |
|--------------------------------|----------|----------|-------------|---------------------------------|
| Sample Number                  | Location | Material | Description | Asbestos Fibre Type(s) Detected |
| BS003370                       | Plot 69  | Soil     | 0.10m       | Chrysotile                      |
| BS003371                       | Plot 69  | Soil     | 0.70m       | No Asbestos Detected            |
| BS003372                       | Plot 104 | Soil     | 0.10m       | No Asbestos Detected            |
| BS003373                       | Plot 104 | Soil     | 0.60m       | No Asbestos Detected            |

J. Cannon

Laboratory Manager  
Issue Date: 05/06/2020

Sample analysis was conducted at Ensaf Consultants Permanent Laboratory, Cody Court, Unit M3, Kansas Avenue, Salford, Manchester, M50 2GE

The methodology is based on procedures within the HSE Document HSG248 'Asbestos: The analysts' guide for sampling, analysis and clearance procedures' and in-house procedures.

Where samples have been supplied by the Client (as specified within the Sampled By section), Ensaf Consultants have no responsibility for any sampling carried out and can only make reference to information supplied by the Client. Ensaf Consultants cannot be held responsible for any errors that occurred during sampling or data handling by the Client.

The opinions and interpretations indicated on this certificate are outside the scope of UKAS accreditation.



John Fenlon  
**Bellway Homes Limited (North West)**  
 2 Alderman Road  
 Hunts Cross  
 Liverpool  
 Merseyside  
 L24 9LR

Ref: 24v103358  
 Date: 25<sup>th</sup> June 2020

**By email only: john.fenlon@bellway.co.uk**

Dear John,

### **Garden Validation – Scotchbarn Lane, Knowsley – Plot 69**

#### **Background and Objectives**

In accordance with the Remediation Strategy ref 103358p2r2, dated November 2017, the following remedial measures are required in all areas of the site:

#### **Depth Requirement for Gardens**

- ▶ A total clean cover system comprising a minimum thickness of 600 mm;
- ▶ A minimum topsoil thickness of 150 mm; and,
- ▶ The remainder of the clean cover system shall be comprised of subsoil.

#### **Validation Requirement**

- ▶ Independent validation of works by Geo-Environmental Consultant;
- ▶ Visual inspection and chemical laboratory validation sampling; and
- ▶ Production of validation letter reports for the clean cover system.

Required sample numbers for chemical validation are summarised in Table 1.

**Table 1: Chemical Validation Testing Requirement**

| Source               | Source of Material      |                          |                          |
|----------------------|-------------------------|--------------------------|--------------------------|
|                      | Greenfield              | Remediated               | Brownfield / Unknown     |
| Gardens              | 1 per 250m <sup>3</sup> | 1 per 100 m <sup>3</sup> | 1 per 50 m <sup>3</sup>  |
| Soft Landscaping     |                         | 1 per 150 m <sup>3</sup> | 1 per 150 m <sup>3</sup> |
| Other Fill Materials |                         | 1 per 250m <sup>3</sup>  | 1 per 250m <sup>3</sup>  |

## Validation Works Completed

Table 2 summarises plots inspected as part of each visit and the corresponding letter.

**Table 2: Summary of Validated Plots**

| Validated Plots<br>[w/ 600mm Cover System]  | Letter Reference |
|---------------------------------------------|------------------|
| 7-10                                        | 01v103358        |
| 1-2, 5                                      | 02v103358        |
| 6, 34-39, 118-119                           | 03v103358        |
| 41-43 & 117                                 | 04v103358        |
| 11 & 40                                     | 05v103358        |
| 12-13                                       | 06v103358        |
| 14-16                                       | 07v103358        |
| 17-19                                       | 08v103358        |
| 120-123                                     | 09v103358        |
| 124-128                                     | 10v103358        |
| 20 – 26                                     | 11v103358        |
| 27, 31-33                                   | 12v103358        |
| 28-30                                       | 13v103358        |
| 50-55                                       | 14v103358        |
| 56-59                                       | 15v103358        |
| 48, 49, 60                                  | 16v103358        |
| 129, 130, 44 – 47, 59                       | 17v103358        |
| 61 - 63                                     | 18v103358        |
| 65-67 (further action required)             | 19v103358        |
| 65-68 (further action required for Plot 66) | 20v103358        |
| 112 - 116                                   | 21v103358        |
| 108 – 111                                   | 22v103358        |
| 104 - 108                                   | 23v103358        |
| 69, 103 - 105                               | 24v103358        |
| 69 (re-validation)                          | 25v103358        |

### Initial Validation Visit – 29<sup>th</sup> May 2020

Ensafe attended site on 29<sup>th</sup> May 2020 to confirm the correct thickness of topsoil and subsoil has been used in the rear gardens of properties in Plots 69 and to collect samples for laboratory analysis.

One hand dug pit was completed in the rear garden of Plot 69 and the depths and descriptions of each strata encountered recorded.

Ensafe's independent inspection shows that the required 600mm of clean cover is present within the rear gardens of Plots 69.

A visual inspection of the topsoil and subsoil within each pit confirms them to be free of potentially deleterious or unsuitable materials discernible by the naked eye such as ceramic materials, metal objects, plastics, treated wood or textiles.

Topsoil and subsoil samples were collected and analysed for the constituents of concern noted in Table 3 (enclosed to this letter) to the correct frequency as specified in Table 1 above and have been subsequently assessed against their suitability for a residential with gardens and plant uptake end use development.

### **Laboratory Testing of Site Won Soil**

Ensafe attended site on 29<sup>th</sup> May 2020 to undertake intrusive ground investigations. Sampling and testing of site won topsoil as part of this work determined it suitable for use within gardens. Laboratory test certificates are attached to this report.

### **Laboratory Testing of Placed Topsoil**

Topsoil has been purchased from the R Draper LTD soil merchant. One sample of topsoil and one sample of subsoil were tested at a frequency of 1 per 50m<sup>3</sup> within Plots 69. The presence of loose asbestos fibres with an overall mass percentage of <0.001% was reported in one sample of plot 69 (see report 24v103358).

As such, Ensaf returned to the site on 18th June 2020 to complete further sampling and testing within Plot 69. Three (3no.) additional topsoil samples were taken across Plot 69 at varying locations and depths to determine if the asbestos present was an isolated hotspot or a plot wide contaminant. No asbestos or exceedances of other determinands in comparison with the GAC were identified within the additional samples (Table 3). Given the additional samples did not identify any further asbestos fibres present within the topsoil, and the limited overall mass percentage of asbestos recorded, it is considered that there is no unacceptable risk to human health.

We recommend that going forward excavators and tools are washed down before placing topsoil to avoid any potential cross contamination of contaminants.

### **Summary**

Ensafe can confirm that the topsoil and subsoil installed in the rear garden of Plot 69 meet the specified requirements as a suitable growing medium and is suitable for its intended use.

Yours Sincerely,

**For and on Ensaf Consultants**



**Matthew Dee**  
**Consultant**

**Approved and Authorised**



**Philip Thompson**  
**Associate Director**

Enclosed:

Location Plan of Validated Plots

Plot Inspection Records (including photographs and description)

Table 3: Screening Values for Materials within Residential Soft Landscaping Areas

Chemical Analysis Certificates

**Figure 1: Sketch Plot Validation Pit Location**



## **PLOT INSPECTION RECORDS**