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UK

Our Ref: 27621-L09 (01)-cl

17th August 2017

CALA Homes (South Home Counties) Limited
Tilford House,
Farnham Business Park,
Weydon Lane,
Farnham,
Surrey
GU9 8QT

FAO: Mr James Rwodzi

Dear James

RE: Former West End Nursery, Angmering - Validation Plots 33 to 38

1. BACKGROUND

RSK Environment Limited (RSK) was commissioned by CALA Homes (South Home Counties) Limited (CALA) to carry out garden validation testing of Plots 33 to 38 of the former West End Nursery site off Roundstone Lane, Angmering, BN16 4AX. The site was previously occupied by a commercial nursery.

Several phases of site investigation, risk assessments, a remedial strategy and post remediation verification report (Phase 1A) have been completed for the former West End Nursery site by RSK. These are outlined in the following reports:

- RSK, 2015a. Geo-environmental Site Investigation, report ref: 27621 R01 (02), dated May 2016;
- RSK, 2015b. Additional Geo-environmental Site Investigation and Remediation, report ref: 27621 R02 (00), dated June 2015;
- RSK, 2016a. Remedial Strategy, report ref: 27621 R03 (02), dated August 2017;
- RSK, 2016b. Supplementary Geo-environmental Site Assessment, report ref: 27621 R04 (01), dated June 2016;
- RSK 2016c. Tank Validation, report ref: 27621 L01/ad, dated August 2016;
- RSK 2016d. Bund Validation Works, report ref: 27621 L02, dated October 2016;
- RSK 2016e. Asbestos Delineation Works Phase 1A - Plots 1 to 19, report ref: 27621 L04, dated October 2016;
- RSK, 2017. Asbestos Delineation Works Phase 1A - Plots 18 and 20 to 64, report ref: 27621 L05, dated February 2017; and
- RSK, 2017. Post-remediation validation report - Phase 1A, report ref: 27621 R06 (00), dated May 2017.

A number of impacted areas were found previously across the site including elevated concentrations of pesticides (one location), hydrocarbons, asbestos and metals.



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A first phase of remediation was undertaken at the site by Keltbray in accordance with recommendations contained within the approved remedial strategy for the site (RSK report ref: 27621 R03 (01), January 2016). The remedial works undertaken by Keltbray were documented in Completion Report, 6033.CR.LH.08072016V3, dated August 2016.

Throughout the Keltbray remedial works RSK attended site on an ad hoc basis to verify the works carried out. Validation works completed by RSK are detailed within the post remediation verification report produced for Phase 1A.

Based upon the remedial works carried out to date within the Phase 1A, it is considered that the area is suitable for the proposed residential end use, subject to the results of additional validation gas assessment across Phase 1A and garden/soft landscaping validation works.

Since the development works commenced RSK have collected a significant amount of additional data within Phase 1A (Plots 1 to 64). Having reviewed the ground conditions and gas monitoring data from the nearby historic monitoring wells RSK anticipate that additional validation monitoring will demonstrate a sufficiently low risk from ground gases on site. All of the plots in Phase 1A will still have a minimum of a 1200 gauge membrane installed to provide a belt and braces approach. All future plots on the development from CALA Homes will have an Amber 1/CS2 compliant membrane installed. RSK will not inspect every one of the future installed membranes, but will visit to witness approximately 10% of the remaining properties to maintain the confidence in the membranes being installed on site are suitably installed correctly.

Validation of the topsoil and subsoil is ongoing, with RSK inspecting the completed gardens for presence of geo-membrane where applicable and cover layer thickness of subsoil and topsoil.

2. CAPPING LAYER REMEDIAL REQUIREMENTS

On the basis of the impacts previously identified at the site, it was recommended that a capping layer be incorporated into private garden areas to ensure that no residual risk exists to human health from any impacted soils. The specification for the capping layer as agreed with Arun District Council is as follows:

The capping layer in areas of identified impact (remaining bund materials, pesticide hotspot and made ground containing asbestos) and in the central landscaped area should be 600 mm thick to include a minimum of 150 mm clean imported topsoil and 450 mm clean imported/site won subsoil with a geo-marker membrane at the base. In lower risk areas (i.e. no impacts identified during the previous phases of works) the capping layer should be 450 mm to include a minimum of 150 mm clean imported topsoil and 300 mm clean imported/site won subsoil.

Validation of the capping layer should consist of the following:

- In private gardens, testing should be carried out on the basis of one sample for every 50 m³ area of garden; and
- In communal soft landscaping areas, testing should be carried out on the basis of one sample for every 250 m³ of soft landscaping.

Based upon the recommendations above, this letter report represents a verification of the appropriate implementation of capping layer construction at relevant plots within the completed development.

The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work, on the results of laboratory analysis on soil samples and on available information. All works undertaken at the site are in accordance with the RSK Service Constraints presented in **Appendix A**.

3. SITE INSPECTION

RSK attended site on 28th April 2017, and between the 9th and 11th May 2017 to inspect and validate the capping layer (topsoil/subsoil) within the rear and front garden areas of Plots 33 to 38. Photographs from these site inspection visits are presented in **Appendix B**.

One hand-excavated trial pit was completed in each of the garden areas of the Plots (33 to 38) to a depth of at least 600 mm below the existing ground level to allow for inspection and sampling of soils. The trial pit logs are presented in **Appendix C**.

The topsoil was of a uniform composition, generally comprising loose black/ brown slightly gravelly clayey fine to medium SAND. Gravel is subrounded to angular fine to medium flint. The topsoil was followed by the subsoil strata which generally comprised stiff orangey brown/brown slightly sandy gravelly CLAY or light brown slightly clayey gravelly sand.

The depth of the capping layer within the gardens was at least 600 mm across Plots 33, 34, 36 to 38, comprising the full recommended capping layer thickness, underlain by geo-marker membrane at the base. The depth of the capping layer within the gardens was at least 450 mm across Plot 35, which is within the lower risk designated area of the site. It is considered that this demonstrates compliance of the specified capping layer remedial measures.

A site layout plan for Phase 1A is presented as **Figure 1**. The validation certificates for the imported topsoil are presented in **Appendix D**.

4. VERIFICATION TESTING

Soil samples were submitted for chemical laboratory testing comprising a standard suite of potential contaminants. Soil samples were submitted for the following suite of analysis:

- Selected heavy/semi/non-metals;
- pH and sulphate;
- Speciated Total Petroleum Hydrocarbons (TPH)-CWG banding with BTEX (Benzene, Toluene, Ethyl Benzene and Xylene) and MTBE (Methyl Tert Butyl Ether) determination; and
- Speciated Polycyclic Aromatic Hydrocarbons (PAH).
- Asbestos screen

A summary of the capping layer volumes is presented in **Table 1**.

Table 1: Summary of capping layer volumes

Plot Number	Combined topsoil/subsoil volume - front and rear (m ³)	Samples Tested
33	31.8	1
34	35.8	1
35	49.8	1
36	59.74	1
37	72.7	2
38	58.67	1
Total - Plots 33 to 38	308.5	7

A total of 7 validation samples were collected from Plots 33 to 38 (one per back garden and one extra from the front garden of Plots 37/38). Based upon the testing strategy of 1 sample per 50 m³ it is considered that an appropriate number of samples have been obtained.

The results are presented in **Appendix E** and indicate that concentrations of analytes are below the RSK GAC presented in **Appendix F**.

5. CONCLUSIONS

The results of the site inspection and laboratory testing for Plots 33 to 38 have demonstrated that the subsoil is chemically suitable for the proposed residential end-use and the capping layer has been completed to the required specification, comprising at least 450 mm across Plot 35 and 600 mm of clean materials across Plots 33, 34, and 36 to 38. It is therefore considered that no further verification of the private garden areas of Plots 33 to 38 is deemed necessary.

It is considered that the inspection data for the garden areas are sufficient and that this letter report may be submitted to the NHBC, so that the appropriate land quality condition can be reduced to 'Green' based on the information provided.



We trust that the information discussed above is acceptable and recommend this report be submitted to the NHBC and Local Authority accordingly. Should you require RSK to submit this information on your behalf, please do not hesitate to contact us.

Yours sincerely

For RSK Environment Limited



Craig Lewis

Geo-environmental Consultant

Enc.

Cathy Latimer

Principal Geo-environmental Consultant

Figures 1	Phase 1A - Site Location Plan
Appendix A	Service Constraints
Appendix B	Photographic Log
Appendix C	Trial Pit Logs
Appendix D	Topsoil Validation Certificates
Appendix E	Laboratory Certificates
Appendix F	RSK Generic Assessment Criteria

FIGURES



- LEGEND
- Site Boundary (Phase 1A)
 - 600mm Capping Layer Required (total 1749.452m²)
 - 450mm Capping Layer Required (total 3563.123m²)

Rev.	Date	Amendment	Drawn	Chkd.	Appd.



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Client
CALA HOMES (SOUTH HOME COUNTIES) LTD

Project Title
LAND AT WEST END NURSERY, ANGMERING

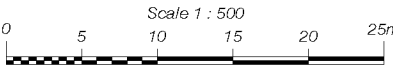
Drawing Title
PHASE 1A - SITE LOCATION PLAN

Drawn	Date	Checked	Date	Approved	Date
AP	10.05.17	CL	10.05.17	CL	10.05.17

Scale	Orig Size	Dimensions
1:500	A2	M

Project No.	Drawing File
27621 - L07	27621 (L07) Fig 1.dwg

Drawing No.	Rev.
FIGURE 1	P1





APPENDIX A

SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for CALA Homes (South Home Counties) Limited (the "client") in accordance with the terms of a contract between RSK and the "client". The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.
2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date hereof, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services that were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walkover survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.
8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.

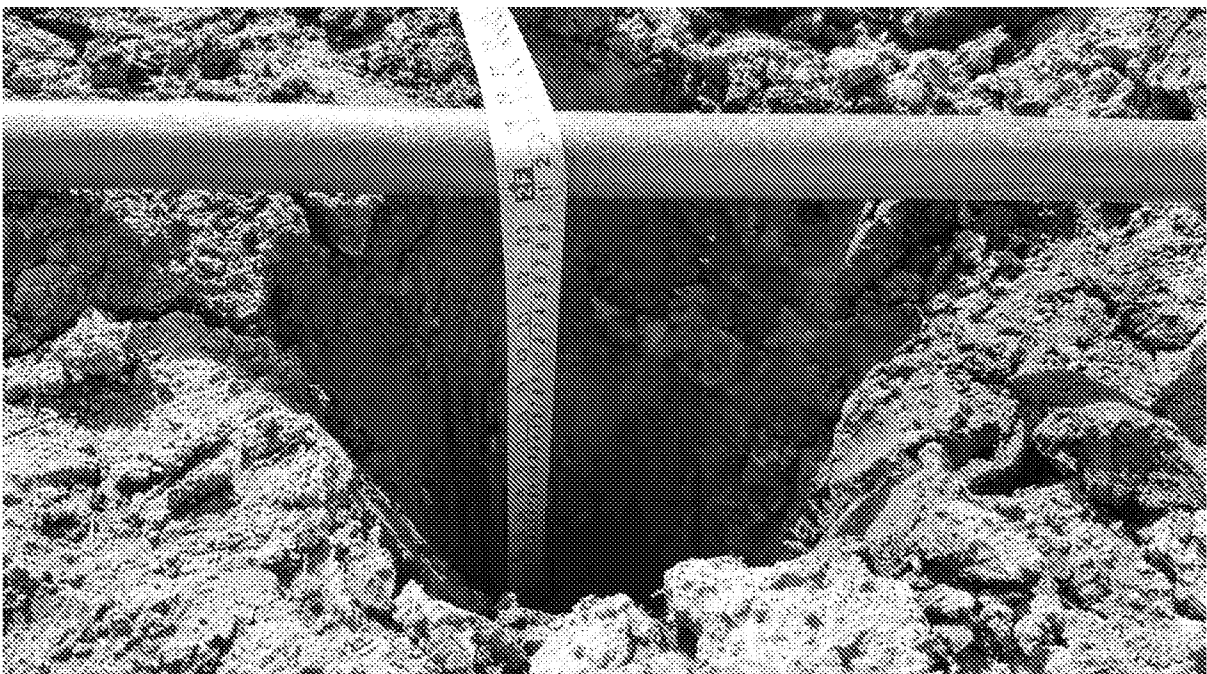


APPENDIX B PHOTOGRAPHIC LOG

PHOTOGRAPHIC LOG

Site Location:

Photo No. 1	
Date: 28/03/2017	
General view of Plot 33	

Photo No. 2	
Date: 28/03/2017	
Capping layer depth of 600mm observed within Plot 33 back garden	

PHOTOGRAPHIC LOG

Site Location:

Photo No.
3

Date:
28/03/2017

View of hand pit Plot 33 back garden, geo-membrane observed at base



Photo No.
4

Date:
11/05/2017

Capping layer depth of 600mm observed within Plot 33-34 front garden



PHOTOGRAPHIC LOG

Site Location:

Photo No.
5

Date:
11/05/2017

View of
hand pit Plot
33-34 front
garden,
geo-
membrane
observed at
base



PHOTOGRAPHIC LOG

Site Location:

Photo No.
6

Date:
28/03/2017

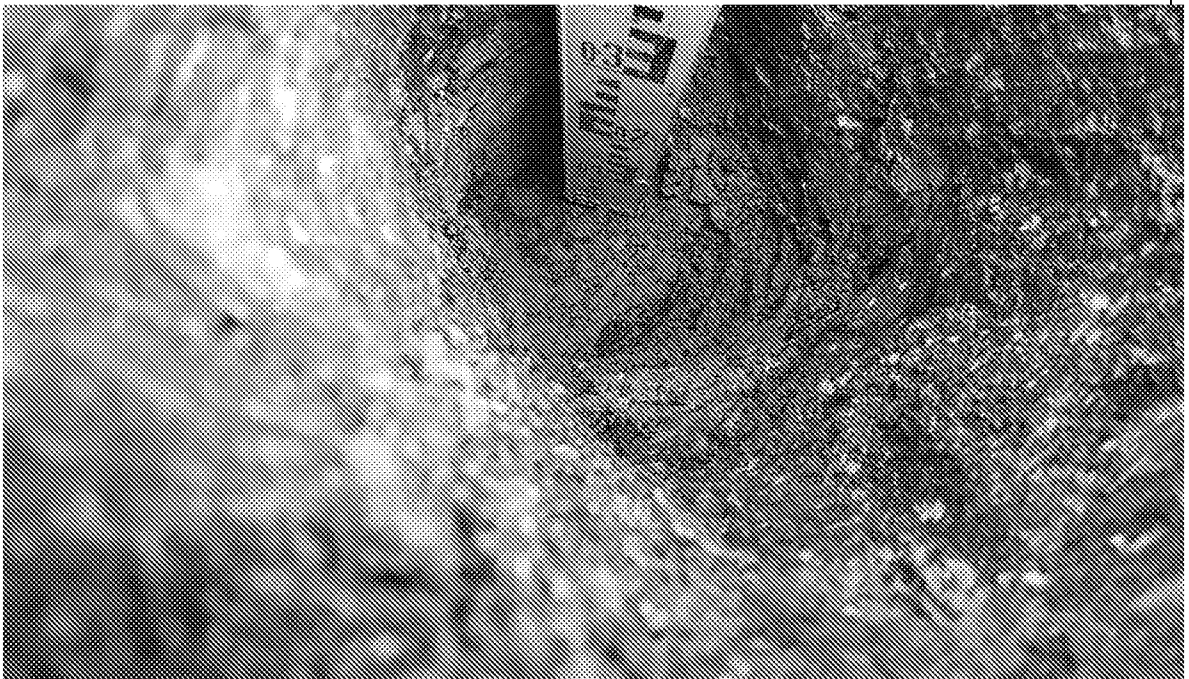
Capping
layer depth
of 600mm
observed
within Plot
34 back
garden



Photo No.
7

Date:
28/03/2017

View of soil
arising Plot
34 back
garden, geo-
membrane
layer
observed at
base



PHOTOGRAPHIC LOG

Site Location:

Photo No.
8

Date:
09/05/2017

Capping layer depth of >450mm observed within Plot 35 back garden

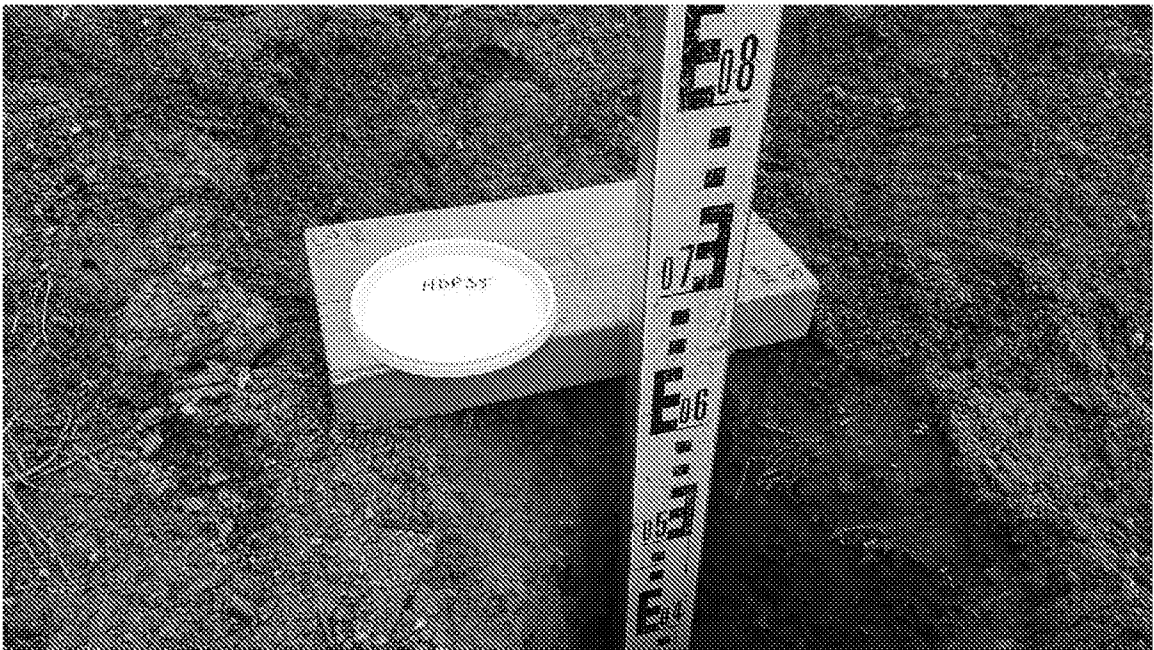


Photo No.
9

Date:
09/05/2017

View of hand pit in front garden of Plot 35



PHOTOGRAPHIC LOG

Site Location:

Photo No.
10

Date:
09/05/2017

View of Plot
36's garden



Photo No.
11

Date:
09/05/2017

Capping
layer depth
of >450mm
observed
within Plot
36 back
garden, geo-
membrane
layer not
shown in
photo but
observed at
750mm



PHOTOGRAPHIC LOG

Site Location:

Photo No. 12	
Date: 11/05/2017	
Capping layer depth of 600mm observed within Plots 36 front garden	

Photo No. 13	
Date: 11/05/2017	
View of hand pit in front garden of Plots 36, geo-membrane observed at base	

PHOTOGRAPHIC LOG

Site Location:

Photo No. 14	
Date: 09/05/2017	
Capping layer depth of >600mm observed within Plot 37 back garden	

Photo No. 15	
Date: 9/05/2017	
View of hand pit in back garden of Plot 37, geo-membrane observed at base	

PHOTOGRAPHIC LOG

Site Location:

Photo No.
16

Date:
09/05/2017

View of Plot
38 garden



Photo No.
17

Date:
9/05/2017

Capping
layer depth
of >600mm
observed
within Plot
38 back
garden



PHOTOGRAPHIC LOG

Site Location:

Photo No.
18

Date:
09/05/2017

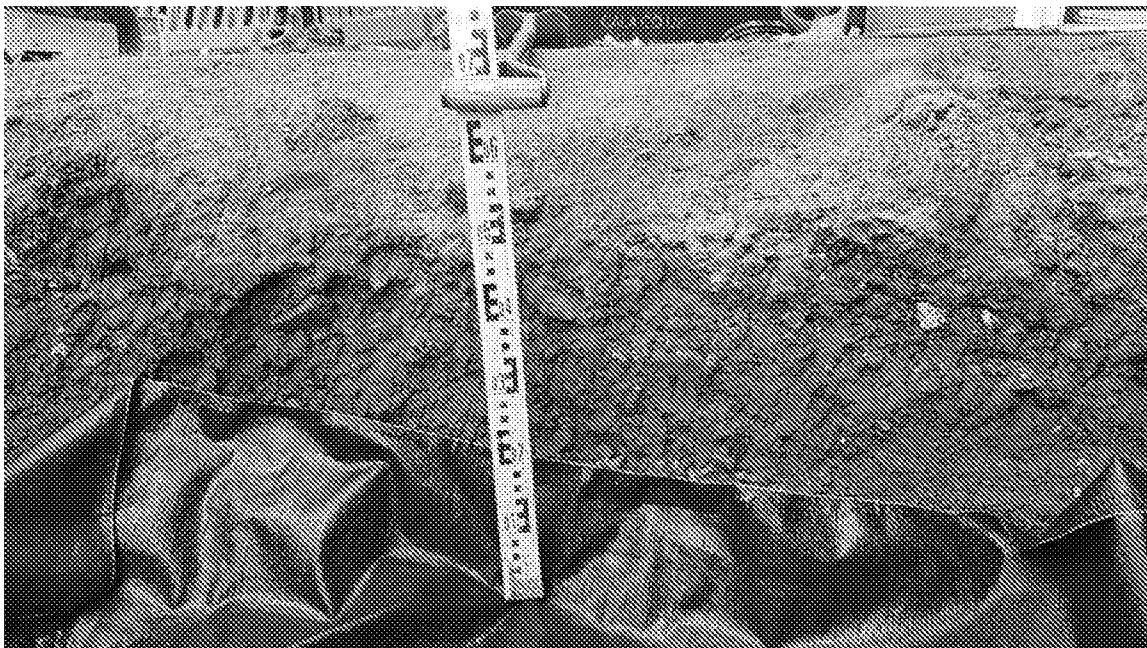
View of hand pit in back garden of Plot 38, geo-membrane observed at base



Photo No.
19

Date:
11/05/2017

Capping layer depth of 600mm observed within Plot 37/38 front garden



PHOTOGRAPHIC LOG

Site Location:

Photo No.
20

Date:
11/05/2017

Subsoil
being
placed in
Plots 37/38



PHOTOGRAPHIC LOG

Site Location:

Photo No.
1

Date:
28/03/2017

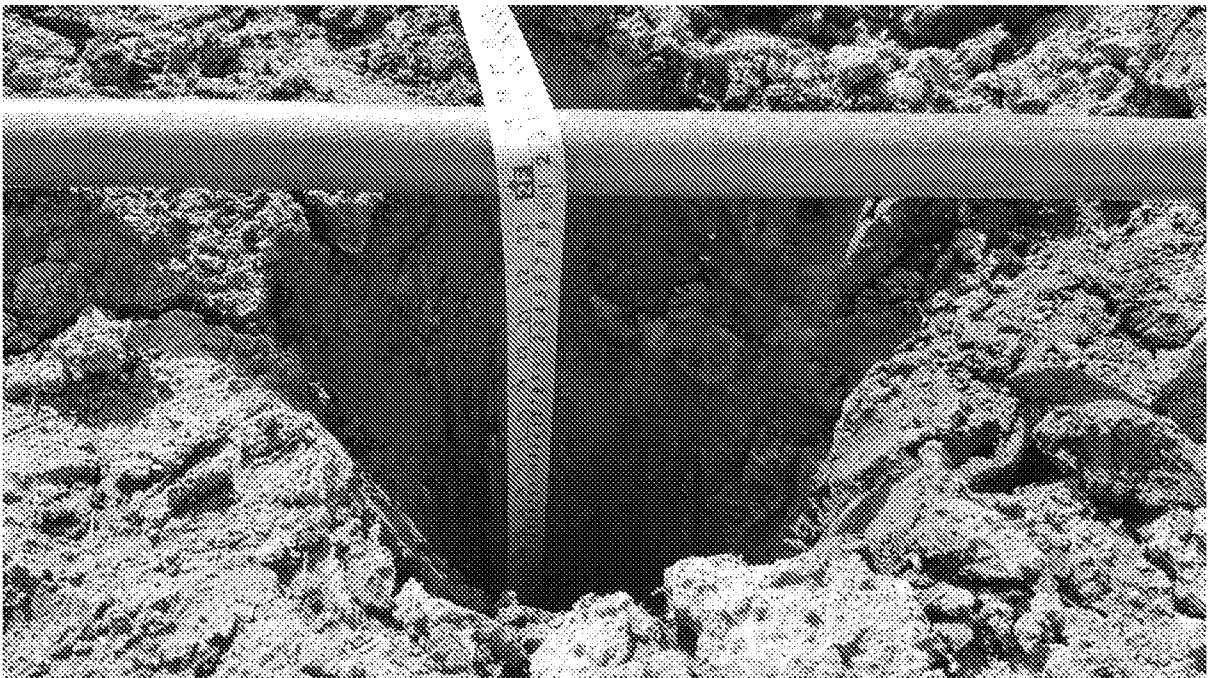
General
view of Plot
33



Photo No.
2

Date:
28/03/2017

Capping
layer depth
of 600mm
observed
within Plot
33 back
garden



PHOTOGRAPHIC LOG

Site Location:

Photo No.
3

Date:
28/03/2017

View of hand pit Plot 33 back garden, geo-membrane observed at base



Photo No.
4

Date:
11/05/2017

Capping layer depth of 600mm observed within Plot 33-34 front garden



PHOTOGRAPHIC LOG

Site Location:

Photo No.
5

Date:
11/05/2017

View of
hand pit Plot
33-34 front
garden,
geo-
membrane
observed at
base



PHOTOGRAPHIC LOG

Site Location:

Photo No.
6

Date:
28/03/2017

Capping
layer depth
of 600mm
observed
within Plot
34 back
garden



Photo No.
7

Date:
28/03/2017

View of soil
arising Plot
34 back
garden, geo-
membrane
layer
observed at
base

