

16 October 2023

Isabel Smith
Environment Agency
Alchemy,
Bessemer Road,
Welwyn Garden City,
Hertfordshire,
AL7 1HE

Our ref: CG/39277A

Please reply to: Kimberley Neville/ Paul Sheehan

BY EMAIL

Dear Isabel

Tottenham Hale, Ferry island - Discharge of Conditions ENVPAC/1/HNL/00410. Full discharge Request B24

Background

CGL issued capping Import Criteria for Plot B, Ferry Island in the Remediation Strategy for the site¹. This was submitted to the Environment Agency (EA) as part of the planning process, and they responded with a series of queries and comments. In response, CGL revised and re-issued the Import Criteria with more justification and lower values for some of the parameters², and after additional EA queries reduced these values further³. The EA subsequently issued further comments⁴ noting that “...*manufactured topsoils even produced in-line with BS 3882:2015 is likely to be a controlled waste EWC 19 12 12*” and advised “...*the use of DoWCoP for direct-transfer of clean naturally occurring topsoils*”. The EA have also raised concerns regarding the concentrations set as the import criteria, saying that “...*it will lead to a deterioration of land quality*”.

CGL has prepared this letter to clarify the proposed works and the materials that will be used and imported to site, with details of relevant guidance and criteria as appropriate for each material.

Imported Materials

Following discussion with the earthworks contractor⁵, the materials that are proposed for use at the site include:

- For the piling mat and backfill: 6F5, 6N and Type 1 MOT
These will be procured via JRL Environmental Ltd and manufactured at their Silvertown Facility in line with SR2010no 12 Treatment of waste to produce soil, soil substitutes and aggregates <75,000tpy, EA permit (EPR WE4202AA/A001) and the WRAP protocol. Testing certificates will be collected for the time periods when materials are brought to site for inclusion in the final Validation Report. The Import Criteria are not applicable to this material, which instead will be produced in-line with the WRAP guidance⁶. Compliance with the WRAP protocol would result in the materials being classified as ‘fully recoverable’ and can be used without the need for waste management controls.

¹ CGL (2022). Plot B, Ferry Island, Tottenham Vale Masterplan Redevelopment. Remediation Strategy (Revision 1).

² CGL (June 2023). Ferry Island Plot B – Revised Capping Import Specification

³ CGL (04/08/23). Email ‘Ferry Island – Statutory consultee response: HGY/2022/0779 – Conditions B19 and B24’.

⁴ Environment Agency (06/09/23). Email ‘Tottenham Hale – Discharge of Conditions ENVPAC/1/HNL/00410.’

⁵ Midgard (29/09/23). Email ‘Tottenham Hale – Discharge of Conditions ENVPAC/1/HNL/00410.’

⁶ WRAP Quality Protocol. Aggregates from Inert Waste.



INVESTORS
IN PEOPLE

Gold

DIRECTORS

Richard Pennock MSc BEng ACSM CEng CMgr AMICE MIMMM MCMI FGS
Mark Creighton CEng FICE
Paul Sheehan MSc BEng (Hons) CSci, SiLC, SQP

Card Geotechnics Limited
Registered in England and Wales No. 2993862
Registered Office at
4 Godalming Business Centre, Woolsack Way
Godalming, Surrey, GU7 1XW

- For landscaping: topsoil and subsoil in-line with BS 3882 and BS8601. This will be a natural material and not a manufactured product. It will be sourced from a reputable supplier, such as Bourne Amenity, and soils will be tested off-site (prior to transportation) and again once on-site and in-situ. The soils will be tested at 1 sample per 250m³ and concentrations compared with CGL's Import Criteria. The soils will be placed as noted in the Remediation Strategy, specifically:
 - 600mm of imported soils with a minimum of 150mm topsoil; or
 - 450mm imported soil with a minimum of 150mm topsoil over a geotextile membrane.

The use of these materials, for the scenarios detailed above, would not require a waste permit or the use of DoWCoP or other waste management controls.

Import Criteria

The topsoils that will be imported to the site will be purchased from a reputable supplier, with certificates of analysis and provenance provided prior to their importation. An example testing suite and report from the proposed supplier (Bourne Amenity) is included as Appendix A which details the likely concentrations of soils brought to the site (all of which are below CGL's Import Criteria).

The topsoil supplier offers a range of topsoils that meet the criteria detailed in BS 3882⁷. The topsoil specification, BS 3882, Note 3 states that *"there is a requirement for topsoil to contain no concentrations of chemical contaminants that would cause a significant risk to human health and the environment"*, and goes on to reference the CLEA model and Soil Guideline Values. The topsoil supplier uses the S4UL residential values to demonstrate that the soils would not cause harm and routinely test their soils to demonstrate that these concentrations are not exceeded. BS 3882 does not stipulate leachate concentrations or limits. However, Bourne Amenity have provided CGL with copies of leachate tests for one of their topsoil products, included as Appendix B2. Leachate concentrations were generally reported at or below the limit of detection (LOD). These leachate samples were analysed by the topsoil provider at the request of a client, for a specific end-use and the 'specified requirements' were specific to that job. The results are only included to give an indication of likely leachable concentrations from the imported topsoils.

The revised CGL Import Criteria are included as Appendix C and are based on a combination of generic assessment criteria, protective of human health, or values listed in BS 3882, and the criteria are generally lower than the human health GAC. Compliance with these numbers would mitigate potential risks to human health.

With respect to potential risks to the environment, the previous reports and conceptual site model (CSM) prepared for the site demonstrated that the risk to controlled waters from the site was low risk and based on the CSM, controlled waters were not identified as a key receptor of concern. The site is not located in a source protection zone; it is not situated over a Principal or Secondary aquifer and there are few surface water receptors near the site. The EA have agreed with this previously, noting that the *"...risk posed to controlled waters is considered very low...⁸"* and this is the reason that the import criteria predominately focus on potential risks to human health. The indicative leachate results (Appendix B2) demonstrate however, that leachate concentrations associated with the proposed topsoils are low.

⁷ British Standard (2015). BS 3882: 2015. Specification for topsoil.

⁸ Environment Agency (January 2023). Charged meeting to discuss the HGY/2022/0779 for the discharge of conditions B19 (monitoring and maintenance plan – contamination – Environment Agency) in relation to plot b (ferry island site) of the Tottenham Hale Centre planning permission (LPA REF: HGY/2018/2223) Dated 27 March 2019. Ref: NE/2022/135208/01-L03.

Land Quality

The EA have also raised concerns that material imported to site, using the proposed importation criteria, would result in a deterioration of land quality. To date, an extensive source of soil contamination has not been identified beneath the site. Soil samples have been collected from surface level to the underlying London Clay and concentrations were generally low, with some isolated exceedances of the residential GAC.

The proposed development plan is included as Appendix D and shows a basement that extends over ~80% of the Plot boundary. When completed, most of the site will be covered in hardstanding/ building footprint, reducing the potential for surface water infiltration and subsequent mobilisation of residual contaminants. The development plans show very limited areas of soft landscaping, with proposed imported topsoils used in small areas of soft landscaping at ground and podium levels.

The proposed Import Criteria are lower than the values the topsoil supplier use to demonstrate compliance with BS 3882. It is considered unlikely that the relatively low volume of imported (natural) topsoils would result in the deterioration of land quality. Although a substantial contaminant source was not identified in Made Ground beneath the site, where concentrations of soluble contaminants were detected above the GAC, often these were reported at concentrations higher than the proposed Import Criteria as shown in the table below. If the validation sampling of the proposed topsoils meet the proposed Import Criteria, it is unlikely to result in a deterioration of land quality.

Table 1: Maximum Site Concentrations Compared to Proposed Import Criteria

Contaminant	Maximum site concentration (mg/kg)	Proposed Import Criteria (mg/kg)	Topsoil criteria (BS 3882:2015) (mg/kg)
Arsenic	30	30	37
Lead	840	310	200
Benzo(b)fluoranthene	5	4.06	3.3
Benzo(a)pyrene	4.4	3.2	2.7
Dibenzo(a,h,)anthracene	0.77	0.34	0.28
Sum of TPH Aliphatic & Aromatic (C5-C35)	4,700	750	Reported as individual fractions based on S4ULs

Conclusions - EA Concerns

From the correspondence received from the EA, we have inferred two primary concerns in regard to the materials to be used on site. These are summarised below.

- 1) *Waste Management Concerns* - The EA have suggested that the proposed imported materials could be classified as wastes and their use should be controlled and documented in accordance with the necessary guidance and permits.

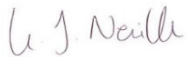
The materials to be imported to site during the construction phase are detailed above and include aggregates and natural topsoil products. For the granular fill materials, these will be procured in-line with the relevant WRAP protocol and guidance. The topsoils will similarly be purchased from a reputable supplier and will be tested before and after placement and will be used as detailed in the Remediation Strategy for the site.

- 2) *Deterioration of Land Quality* – The EA have suggested that import of materials at concentrations listed in the import criteria would result in land quality deterioration.

The proposed import criteria are protective of human health which is considered the primary receptor for the site. The risk to controlled waters was classified as low, nonetheless, indicative soil leachate results for the imported topsoil shows that leachable concentrations are low. The proposed import criteria are lower than the concentrations recommended in BS 3882 to mitigate risk to human health and the environment. They are also lower than inert landfill acceptability criteria and lower than maximum concentrations reported in Made Ground (where reported above the GAC).

We trust the above is satisfactory, please do not hesitate to get in contact should you have any queries.

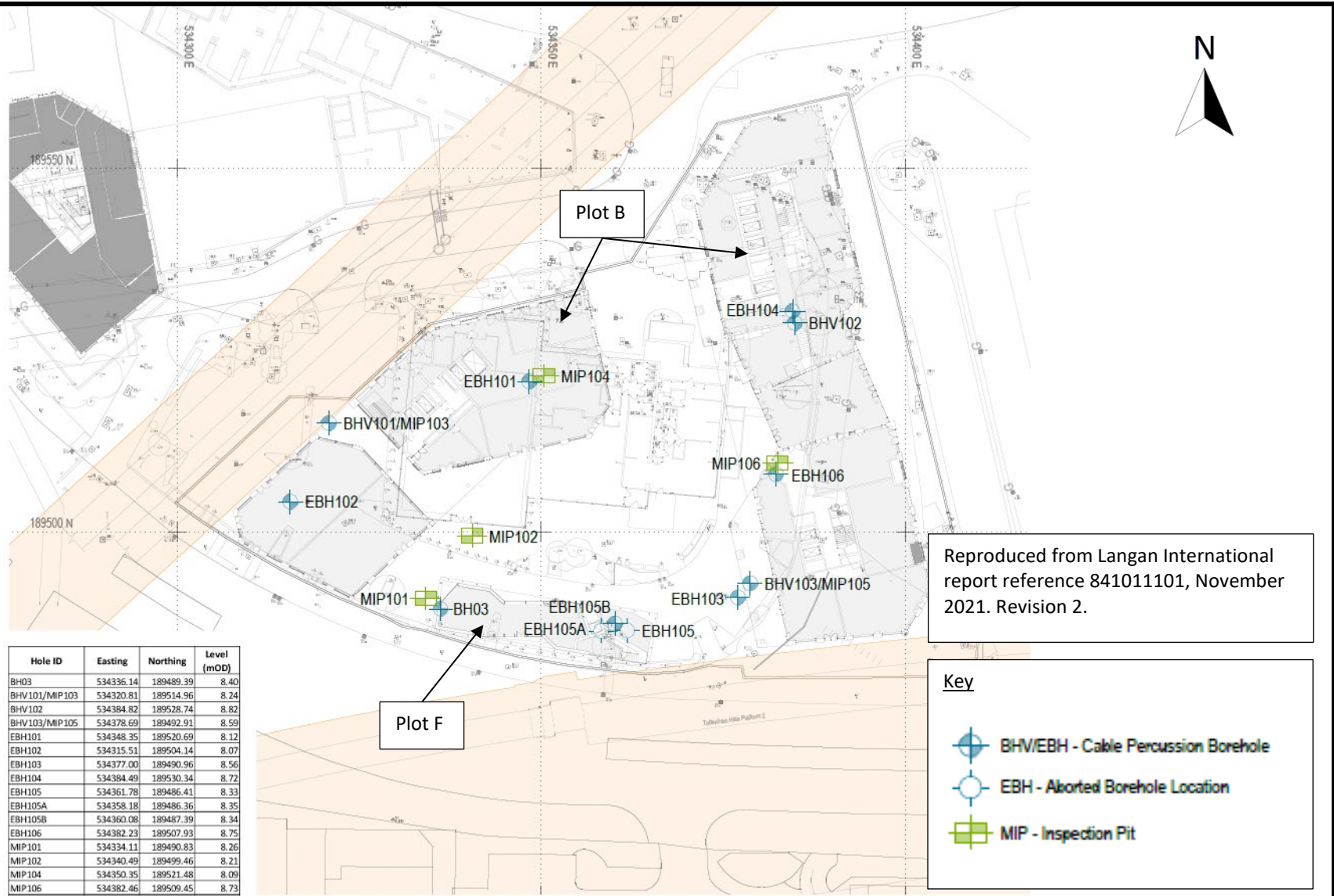
Yours sincerely

A handwritten signature in purple ink that reads 'K. J. Neville'.

Kimberley Neville, Associate
Card Geotechnics Limited

Enc. *Appendix A – Bourne Amenity, Topsoil Analysis Report*
 Appendix B – Bourne Amenity, Indicative Soil Leachate Results
 Appendix C – CGL Import Criteria
 Appendix D – Proposed Development Plan

FIGURES



Client
Whitby Wood Limited

Project
Plot B, Ferry Island, Tottenham Hale Masterplan Redevelopment

Job No
CG/39277A



Title
Exploratory Hole Location Plan

Figure 1

APPENDIX A

Bourne Amenity – Topsoil Analysis Report



TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Drew Wetherell
Bourne Amenity Ltd
The Wharf
Newenden
Cranbrook
Kent TN18 5QG

13th April 2023
Our Ref: TOHA/23/7891/1/SS
Your Ref: PO 114361

Dear Sirs

Topsoil Analysis Report: WH TS6 Topsoil

We have completed the analysis of the soil sample recently received, referenced *WH TS6 Topsoil*, and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

This report presents the results of analysis for the sample received, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing, waste designation purposes or for any project-specific application, especially after the topsoil has left the Bourne Amenity site.

SAMPLE EXAMINATION

The sample was described as a very dark brown (Munsell Colour 10YR 3/3), slightly moist, friable, slightly calcareous SANDY LOAM with a weakly developed, very fine to medium granular and occasionally subangular structure*. The sample was very slightly stony, comprising stones up to 7mm in size, and contained a moderate proportion of organic fines and occasional woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

*This appraisal of soil structure was made from examination of a disturbed sample. Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

Tim O'Hare Associates LLP
Howbery Park Wallingford Oxfordshire OX10 8BA
T:01491 822653 E:info@toha.co.uk
www.toha.co.uk



Plate 1 – WH TS6 Topsoil Sample

ANALYTICAL SCHEDULE

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- detailed particle size analysis (5 sands, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- saturated hydraulic conductivity;
- pH and electrical conductivity values;
- calcium carbonate;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- visible contaminants (>2mm);
- heavy metals (Sb, As, B, Ba, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, V, Zn);
- total cyanide and total (mono) phenols;
- elemental sulphur, acid volatile sulphur and water soluble sulphate;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX);
- asbestos screen.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

RESULTS OF ANALYSIS

Detailed Particle Size Analysis and Stone Content

The sample fell into the *sandy loam* texture class, which is usually considered suitable for general landscape applications provided the soil's physical condition is satisfactory.

Further detailed particle size analysis revealed the grading to comprise predominantly *medium sand* (0.25-0.50mm), with reasonably equal proportions of the remaining mineral fractions. As such, this topsoil could potentially allow reasonable drainage performance, although the proportion of 'fines' (particles <0.15mm: 27%) could interpack the pore spaces between the larger particles and reduce this to an extent. To reduce this risk, it is important not to over-compact this topsoil during placement and we recommend it is not placed thicker than a maximum depth of 300mm, which is in line with *BS3882:2015*, section A.3.

The sample was very slightly stony and, as such, stones should not restrict the use of the soil for general landscape purposes.

Saturated Hydraulic Conductivity

The saturated hydraulic conductivity result (8 mm/hr) recorded for the sample indicates that the material would be considered as slowly permeable for a general landscape topsoil.

pH and Electrical Conductivity Values

The sample was strongly alkaline in reaction (pH 8.4). This pH value would be considered suitable for general landscape purposes provided species with a wide pH tolerance or those known to prefer alkaline soils are selected for planting, turfing and seeding.

The electrical conductivity (salinity) value (water extract) was low, which indicates that soluble salts should not be present at levels that would be harmful to plants.

The electrical conductivity value by CaSO₄ extract (*BS3882* requirement) fell below the maximum specified value (3300 µS/cm) given in *BS3882:2015 – Table 1*.

Organic Matter and Fertility Status

The sample was well supplied with organic matter and all major plant nutrients.

The organic matter level of the sample was found to be high. This may not affect the growth of trees and shrubs; however, it may result in variable settlement across amenity grass areas. As organic matter decomposes, the topsoil volume reduces, leading to an uneven surface which may be undesirable in formal lawn areas.

The C:N ratio of the sample was acceptable for general landscape purposes.

Potential Contaminants

With reference to *BS3882:2015 - Table 1*: Notes 3 and 4, there is a requirement to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with homegrown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels (C4SLs) for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

Phytotoxic Contaminants

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS3882:2015 – Table 1*.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil sample for general landscape purposes. The analysis has also been undertaken to determine the sample's compliance with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

From the soil examination and subsequent laboratory analysis, the sample was described as a strongly alkaline, non-saline, slightly calcareous sandy loam with a weakly developed structure and very low stone content. The sample contained sufficient reserves of organic matter and plant nutrients. Of the potential contaminants determined, none exceeded their respective guideline values.

The organic matter content of the topsoil would be suitable for general planting purposes and probably for lower foot traffic amenity grass areas (e.g. road verges). However, the high organic matter content of the topsoil may lead to variable settlement and a soft, uneven surface in these areas, particularly if used for higher performance amenity grass establishment, e.g. sports pitches or formal lawns.

To conclude, based on our findings, the topsoil represented by this sample would be considered suitable for general landscape purposes (trees, shrubs and low footfall amenity grass), provided species with a wide pH tolerance or those known to prefer alkaline soils are selected for planting, turfing and seeding and the physical condition of the soil is satisfactory.

The topsoil was also fully compliant with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

Soil Handling Recommendations

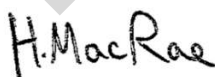
It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, resspreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is sufficiently dry to be non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

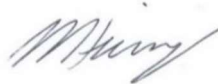
Further details on soil handling are provided in Annex A of *BS3882:2015*.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully



Harriet MacRae
BSc MSc
Graduate Soil Scientist



Matthew Heins
BSc (Hons) MSc
Senior Soil Scientist

For & on behalf of Tim O'Hare Associates LLP

Client:	Bourne Amenty Ltd
Project:	WH TS6 Topsoil
Job:	Topsoil Analysis (BS3882:2015)
Date:	13/04/2023
Job Ref No:	TOHA/23/7891/1/SS

Sample Reference		Accreditation	
Clay (<0.002mm)	%	UKAS	
Silt (0.002-0.05mm)	%	UKAS	
Very Fine Sand (0.05-0.15mm)	%	UKAS	
Fine Sand (0.15-0.25mm)	%	UKAS	
Medium Sand (0.25-0.50mm)	%	UKAS	
Coarse Sand (0.50-1.0mm)	%	UKAS	
Very Coarse Sand (1.0-2.0mm)	%	UKAS	
Total Sand (0.5 - 2.0mm)	%	UKAS	
Texture Class (UK Classification)	—	UKAS	
Stones (2-20mm)	% DW	GLP	
Stones (20-50mm)	% DW	GLP	
Stones (>50mm)	% DW	GLP	

Visible Contaminants: Plastics >2.00mm	%	UKAS
Visible Contaminants: Sharps >2.00mm	%	UKAS

Saturated Hydraulic Conductivity	mm/hr	A2LA
----------------------------------	-------	------

pH Value (1:2.5 water extract)	units	UKAS
Calcium Carbonate	%	UKAS
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS
Electrical Conductivity (1:2 CaSO ₄ extract)	uS/cm	UKAS
Exchangeable Sodium Percentage	%	UKAS
Organic Matter (LOI)	%	UKAS
Total Nitrogen (Dumas)	%	UKAS
C : N Ratio	ratio	UKAS
Extractable Phosphorus	mg/l	UKAS
Extractable Potassium	mg/l	UKAS
Extractable Magnesium	mg/l	UKAS

Total Antimony (Sb)	mg/kg	MCERTS
Total Arsenic (As)	mg/kg	MCERTS
Total Barium (Ba)	mg/kg	MCERTS
Total Beryllium (Be)	mg/kg	MCERTS
Total Cadmium (Cd)	mg/kg	MCERTS
Total Chromium (Cr)	mg/kg	MCERTS
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS
Total Copper (Cu)	mg/kg	MCERTS
Total Lead (Pb)	mg/kg	MCERTS
Total Mercury (Hg)	mg/kg	MCERTS
Total Nickel (Ni)	mg/kg	MCERTS
Total Selenium (Se)	mg/kg	MCERTS
Total Vanadium (V)	mg/kg	MCERTS
Total Zinc (Zn)	mg/kg	MCERTS
Water Soluble Boron (B)	mg/kg	MCERTS
Total Cyanide (CN)	mg/kg	MCERTS
Total (mono) Phenols	mg/kg	MCERTS
Elemental Sulphur	mg/kg	MCERTS
Water Soluble Sulphate (SO ₄)	g/l	MCERTS

Naphthalene	mg/kg	MCERTS
Acenaphthylene	mg/kg	MCERTS
Acenaphthene	mg/kg	MCERTS
Fluorene	mg/kg	MCERTS
Phenanthrene	mg/kg	MCERTS
Anthracene	mg/kg	MCERTS
Fluoranthene	mg/kg	MCERTS
Pyrene	mg/kg	MCERTS
Benzo(a)anthracene	mg/kg	MCERTS
Chrysene	mg/kg	MCERTS
Benzo(b)fluoranthene	mg/kg	MCERTS
Benzo(k)fluoranthene	mg/kg	MCERTS
Benzo(a)pyrene	mg/kg	MCERTS
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS
Dibenzo(a,h)anthracene	mg/kg	MCERTS
Benzo(g,h,i)perylene	mg/kg	MCERTS
Total PAHs (sum USEPA16)	mg/kg	MCERTS

Aliphatic TPH >C5 - C6	mg/kg	MCERTS
Aliphatic TPH >C6 - C8	mg/kg	MCERTS
Aliphatic TPH >C8 - C10	mg/kg	MCERTS
Aliphatic TPH >C10 - C12	mg/kg	MCERTS
Aliphatic TPH >C12 - C16	mg/kg	MCERTS
Aliphatic TPH >C16 - C21	mg/kg	MCERTS
Aliphatic TPH >C21 - C35	mg/kg	MCERTS
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS
Aromatic TPH >C5 - C7	mg/kg	MCERTS
Aromatic TPH >C7 - C8	mg/kg	MCERTS
Aromatic TPH >C8 - C10	mg/kg	MCERTS
Aromatic TPH >C10 - C12	mg/kg	MCERTS
Aromatic TPH >C12 - C16	mg/kg	MCERTS
Aromatic TPH >C16 - C21	mg/kg	MCERTS
Aromatic TPH >C21 - C35	mg/kg	MCERTS
Aromatic TPH (C5 - C35)	mg/kg	MCERTS

Benzene	mg/kg	MCERTS
Toluene	mg/kg	MCERTS
Ethylbenzene	mg/kg	MCERTS
p & m-xylene	mg/kg	MCERTS
o-xylene	mg/kg	MCERTS
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	MCERTS

Asbestos Screen	ND/D	ISO 17025
-----------------	------	-----------

SL = SANDY LOAM

Visual Examination

The sample was described as a very dark brown (Munsell Colour 10YR 3/3), slightly moist, friable, slightly calcareous SANDY LOAM with a weakly developed, very fine to medium granular and occasionally subangular structure. The sample was very slightly stony, comprising stones up to 7mm in size, and contained a moderate proportion of organic fines and occasional woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

Results of analysis should be read in conjunction with the report they were issued with

The contents of this certificate shall not be reproduced without the express written permission of Tim O'Hare Associates LLP.



TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

WH TS6 Topsoil

13
4
10
14
44
11
4
83
SL
1
0
0

0
0

8

8.4
1.0
830
2846
3.5
11.8
0.35
20
47
1202
170

< 1.0
21
29
0.69
< 0.2
43
< 1.8
13
25
< 0.3
21
< 1.0
77
50
1.3
< 1.0
< 1.0
< 5.0
1.4

< 0.05
< 0.05
< 0.05
< 0.05
0.05
< 0.05
0.13
0.10
0.06
0.05
0.12
< 0.05
0.07
< 0.05
< 0.05
< 0.05
< 0.80

< 0.001
< 0.001
< 0.001
< 1.0
< 2.0
< 8.0
< 8.0
< 10
< 0.001
< 0.001
< 0.001
< 1.0
< 2.0
< 10
< 10
< 10

< 0.005
< 0.005
< 0.005
< 0.005
< 0.005
< 0.005

Not-detected

H. MacRae

Harriet MacRae
BSc MSc
Graduate Soil Scientist

APPENDIX B

Bourne Amenity – Indicative Topsoil Leachate Results

Sample Reference			Specified Requirements	Westerham TS6 Topsoil Sample 1	Westerham TS6 Topsoil Sample 2	Westerham TS6 Topsoil Sample 3
		Accreditation				
Total Aluminium (Al)	mg/kg	MCERTS	150000	1100 ✓	1200 ✓	1200 ✓
Total Antimony (Sb)	mg/kg	MCERTS	550	3 ✓	3 ✓	3 ✓
Total Arsenic (As)	mg/kg	MCERTS	35	8 ✓	9 ✓	9 ✓
Total Barium (Ba)	mg/kg	MCERTS	1300	19 ✓	20 ✓	21 ✓
Total Beryllium (Be)	mg/kg	MCERTS	51	0.33 ✓	0.35 ✓	0.36 ✓
Total Cadmium (Cd)	mg/kg	MCERTS	84	< 0.2 ✓	< 0.2 ✓	< 0.2 ✓
Chromium III (Cr)	mg/kg	MCERTS	3000	4.4 ✓	12 ✓	11 ✓
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS	4.3	6.6 X	< 1.8 ✓	< 1.8 ✓
Total Copper (Cu)	mg/kg	MCERTS	6200	15 ✓	14 ✓	18 ✓
Total Lead (Pb)	mg/kg	MCERTS	420	12 ✓	13 ✓	14 ✓
Total Mercury (Hg)	mg/kg	MCERTS	238	< 0.3 ✓	< 0.3 ✓	< 0.3 ✓
Total Molybdenum (Mo)	mg/kg	MCERTS	670	0.56 ✓	0.53 ✓	0.55 ✓
Total Nickel (Ni)	mg/kg	MCERTS	130	9.5 ✓	11 ✓	10 ✓
Total Selenium (Se)	mg/kg	MCERTS	595	< 1.0 ✓	< 1.0 ✓	< 1.0 ✓
Total Vanadium (V)	mg/kg	MCERTS	190	23 ✓	25 ✓	25 ✓
Total Zinc (Zn)	mg/kg	MCERTS	40000	34 ✓	37 ✓	36 ✓
Boron (Water Soluble)	mg/kg	MCERTS	--	2.2 --	2.2 --	1.9 --
Naphthalene	mg/kg	MCERTS	8	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Acenaphthylene	mg/kg	MCERTS	150	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Acenaphthene	mg/kg	MCERTS	150	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Fluorene	mg/kg	MCERTS	150	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Phenanthrene	mg/kg	MCERTS	150	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Anthracene	mg/kg	MCERTS	150	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Fluoranthene	mg/kg	MCERTS	150	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Pyrene	mg/kg	MCERTS	150	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Benz(a)anthracene	mg/kg	MCERTS	10	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Chrysene	mg/kg	MCERTS	15	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Benzo(b)fluoranthene	mg/kg	MCERTS	12	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Benzo(k)fluoranthene	mg/kg	MCERTS	15	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Benzo(a)pyrene	mg/kg	MCERTS	5	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS	7	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Dibenzo(a,h)anthracene	mg/kg	MCERTS	2	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Benzo(g,h,i)perylene	mg/kg	MCERTS	70	< 0.05 ✓	< 0.05 ✓	< 0.05 ✓
Total PAHs (sum USEPA16)	mg/kg	MCERTS	--	< 0.80 --	< 0.80 --	< 0.80 --
TPH (C6-C40)	mg/kg	MCERTS	1000	<10 ✓	<10 ✓	<10 ✓
TPH Aromatic C5-C7 (Benzene)	mg/kg	MCERTS	1	< 0.001 ✓	< 0.001 ✓	< 0.001 ✓
TPH Aromatic C7-C8 (Toluene)	mg/kg	MCERTS	1	< 0.001 ✓	< 0.001 ✓	< 0.001 ✓
Benzene, Toluene, Ethylbenzene, Xylene	mg/kg	MCERTS	1	< 0.001 ✓	< 0.001 ✓	< 0.001 ✓
1,2,3-Trimethylbenzene	mg/kg	MCERTS	10	Not-detected ✓	Not-detected ✓	Not-detected ✓
1,2,4-Trimethylbenzene	mg/kg	MCERTS	10	<1.0 ✓	<0.001 ✓	<0.001 ✓
1,3,5-Trimethylbenzene	mg/kg	MCERTS	5	<0.001 ✓	<0.001 ✓	<0.001 ✓
Methyl tert-butyl ether (MTBE)	mg/kg	MCERTS	100	<0.001 ✓	<0.001 ✓	<0.001 ✓
Tributyl Tin (Chloride)*	mg/kg	MCERTS	--	<0.01 *	<0.01 *	<0.01 *
1,2-Dichloroethane (1,2-DCA)	mg/kg	MCERTS	0.02	<0.001 ✓	<0.001 ✓	<0.001 ✓
1,1,1-Trichloroethane	mg/kg	MCERTS	28	<0.001 ✓	<0.001 ✓	<0.001 ✓
1,1,2,2-Tetrachloroethane	mg/kg	MCERTS	12	<0.001 ✓	<0.001 ✓	<0.001 ✓
1,1,1,2-Tetrachloroethane	mg/kg	MCERTS	6	<0.001 ✓	<0.001 ✓	<0.001 ✓
Tetrachloroethene (PCE)	mg/kg	MCERTS	5	<0.001 ✓	<0.001 ✓	<0.001 ✓
Tetrachloromethane (carbon tetrachloride)	mg/kg	MCERTS	0.1	<0.001 --	<0.001 --	<0.001 --
Trichloroethene (TCE)	mg/kg	MCERTS	0.5	<0.001 --	<0.001 --	<0.001 --
Trichloromethane (chloroform)	mg/kg	MCERTS	3	<0.001 ✓	<0.001 ✓	<0.001 ✓
Chloroethene (vinyl chloride)	mg/kg	MCERTS	0.0001	<0.001 --	<0.001 --	<0.001 --
1,1,2-Trichloroethane	mg/kg	MCERTS	4	<0.001 ✓	<0.001 ✓	<0.001 ✓
1,1-Dichloroethane	mg/kg	MCERTS	8	<0.001 ✓	<0.001 ✓	<0.001 ✓
1,1-Dichloroethene	mg/kg	MCERTS	0.02	<0.001 --	<0.001 --	<0.001 --
Chlorobenzene	mg/kg	MCERTS	2	<0.001 ✓	<0.001 ✓	<0.001 ✓
1,3-Dichlorobenzene	mg/kg	MCERTS	2	<0.2 ✓	<0.2 ✓	<0.2 ✓
1,2,3-Trichlorobenzene	mg/kg	MCERTS	6	<0.001 ✓	<0.001 ✓	<0.001 ✓
1,2,4-Trichlorobenzene	mg/kg	MCERTS	11	<0.3 ✓	<0.3 ✓	<0.3 ✓
1,3,5-Trichlorobenzene	mg/kg	MCERTS	2	<0.001 ✓	<0.001 ✓	<0.001 ✓
1,2,3,5-Tetrachlorobenzene	mg/kg	MCERTS	3	<0.001 ✓	<0.001 ✓	<0.001 ✓
Phenol	mg/kg	MCERTS	520	<0.2 ✓	<0.2 ✓	<0.2 ✓
2-Chlorophenol	mg/kg	MCERTS	150	<0.1 ✓	<0.1 ✓	<0.1 ✓
2,4-Dichlorophenol	mg/kg	MCERTS	100	<0.3 ✓	<0.3 ✓	<0.3 ✓
Pentachlorophenol	mg/kg	MCERTS	35	<0.10 ✓	<0.10 ✓	<0.10 ✓
Hexachloro-1,2-butadiene	mg/kg	MCERTS	35	<0.1 ✓	<0.1 ✓	<0.1 ✓
Chloroethane	mg/kg	MCERTS	18	<0.001 ✓	<0.001 ✓	<0.001 ✓
Chloromethane	mg/kg	MCERTS	0.013	<0.001 ✓	<0.001 ✓	<0.001 ✓
Asbestos Screen	ND/D	ISO 17025	Absent / Present	Absent ✓	Absent ✓	Absent ✓

Sample Reference			Specified Requirements	Westerham TS6 Topsoil Sample 1		Westerham TS6 Topsoil Sample 2		Westerham TS6 Topsoil Sample 3	
		Accreditation							
Arsenic (As) (dissolved)	µg/l	MCERTS	25	14	✓	16	✓	15	✓
Cadmium (Cd) (dissolved)	µg/l	MCERTS	0.2	< 0.08	✓	0.08	✓	< 0.08	✓
Chromium (Cr) (dissolved)	µg/l	MCERTS	4.7	U/S*	--	U/S*	--	U/S*	--
Hexavalent Chromium (Cr VI) (dissolved)	µg/l	MCERTS	0.6	U/S*	--	U/S*	--	U/S*	--
Copper (Cu) (dissolved)	µg/l	MCERTS	5	27	X	30	X	31	X
Lead (Pb) (dissolved)	µg/l	MCERTS	7.2	5.9	✓	7.8	X	7.1	✓
Mercury (Hg) (dissolved)	µg/l	MCERTS	0.05	< 0.0070	✓	< 0.0070	✓	< 0.0070	✓
Nickel (Ni) (dissolved)	µg/l	MCERTS	20	13	✓	12	✓	29	X
Selenium (Se) (dissolved)	µg/l	MCERTS	10	< 4.0	✓	< 4.0	✓	< 4.0	✓
Zinc (Zn) (dissolved)	µg/l	MCERTS	40	34	✓	27	✓	27	✓
Cyanide (CN)	µg/l	MCERTS	1	2.7	X	2.7	X	2.9	X
Total Phenols (monohydric)	µg/l	MCERTS	7.7	1.4	✓	< 1.0	✓	< 1.0	✓
Naphthalene	µg/l	MCERTS	1.2	< 0.01	✓	< 0.01	✓	< 0.01	✓
Fluoranthene	µg/l	MCERTS	0.1	< 0.01	✓	< 0.01	✓	< 0.01	✓
Benzo(b)fluoranthene	µg/l	MCERTS	0.03	< 0.01	✓	< 0.01	✓	< 0.01	✓
Benzo(k)fluoranthene	µg/l	MCERTS		< 0.01	✓	< 0.01	✓	< 0.01	✓
Benzo(a)pyrene	µg/l	MCERTS	0.05	< 0.01	✓	< 0.01	✓	< 0.01	✓
Indeno(1,2,3-cd)pyrene	µg/l	MCERTS	0.002	< 0.01	--	< 0.01	--	< 0.01	--
Benzo(g,h,i)perylene	µg/l	MCERTS		< 0.01	--	< 0.01	--	< 0.01	--
TPH (C8-C40)	µg/l	MCERTS	10	< 10	✓	< 10	✓	< 10	✓
Benzene	µg/l	MCERTS	8	< 1.0	✓	< 1.0	✓	< 1.0	✓
Ethylbenzene	µg/l	MCERTS	20	< 1.0	✓	< 1.0	✓	< 1.0	✓
Toluene	µg/l	MCERTS	40	< 1.0	✓	< 1.0	✓	< 1.0	✓
Xylene	µg/l	MCERTS	30	< 1.0	✓	< 1.0	✓	< 1.0	✓
Tributyl Tin	µg/l	MCERTS	0.0002	< 0.01	--	< 0.01	--	< 0.01	--
Chloride	µg/l	MCERTS	250000	76000	✓	77000	✓	84000	✓
Pentachlorophenol	µg/l	MCERTS	0.4	< 0.1	✓	< 0.1	✓	< 0.1	✓

*Unsuitable Sample due to colouration of sample voiding the chromatography method

Matthew Heins
 BSc (Hons) MScSoilSci
 Senior Soil Scientist

APPENDIX C

CGL – Import Criteria

Note: The removal of the Made Ground during excavation of the basement, dewatering and treatment will aid the betterment of the groundwater at the site. The risk to Controlled Waters is considered to be low, therefore the capping import specification is protective of human health only.

Appendix C. Maximum Permissible Concentrations for Imported Capping Layer Soils

Determinant		Residential without Plant Uptake Human Health Generic Assessment Criteria (mg/kg)	Suggested Capping Import Maximum permissible concentration ¹ (mg/kg) ²	Selection of Import Criteria ¹¹
		6% SOM	6% SOM	
Arsenic		30	30 ⁴	GAC ⁴ to be used
Beryllium		1.7	1.7 ⁴	GAC ⁴ to be used
Boron (water soluble)		10,800	5 ⁵	More stringent lower limit for potential phytotoxic effect to be used
Cadmium		85.3	85.3 ⁴	GAC ⁴ to be used
Chromium (III)		887	887 ⁴	GAC ⁴ to be used
Chromium (VI)		5.75	5.75 ⁴	GAC ⁴ to be used
Lead		310	310 ⁴	C4SL ¹⁰ to be used
Mercury		75.3	75.3 ⁴	GAC ⁴ to be used
Selenium		596	596 ⁴	GAC ⁴ to be used
Copper		7,130	135 ³	More stringent specification for Topsoil value to be used
Nickel		182	75 ³	More stringent specification for Topsoil value to be used
Zinc		40,400	200 ³	More stringent specification for Topsoil value to be used
Vanadium		651	651 ⁴	GAC ⁴ to be used
Benzo(a)pyrene		3.2	3.2 ⁴	GAC ⁴ to be used
Benzo(a)anthracene		15	15 ⁴	GAC ⁴ to be used
Benzo(b)fluoranthene		4.06	4.06 ⁴	GAC ⁴ to be used
Benzo(k)fluoranthene		107	107 ⁴	GAC ⁴ to be used
Chrysene		31.9	31.9 ⁴	GAC ⁴ to be used
Dibenzo(a,h)anthracene		0.34	0.34 ⁴	GAC ⁴ to be used
Indeno(1,2,3-cd)pyrene		46.2	46.2 ⁴	GAC ⁴ to be used
Naphthalene		12.4	12.4 ⁴	GAC ⁴ to be used
TPH aliphatic ⁶	EC5-6	107	107 ⁴	GAC ⁴ to be used
	EC>6-8	328	328 ⁴	GAC ⁴ to be used
	EC>8-10	87.7	87.7 ⁴	GAC ⁴ to be used
	EC>10-12	453	453 ⁴	GAC ⁴ to be used
	EC>12-16	2,970	750 ⁷	More stringent assessment criteria ⁷ to be used
TPH aromatic ⁶	EC>16-35	12,900	750 ⁷	More stringent assessment criteria ⁷ to be used
	EC5-7	1.42	1.42 ⁴	GAC ⁴ to be used
	EC>7-8	3,860	750 ⁷	More stringent assessment criteria ⁷ to be used
	EC>8-10	144	144 ⁴	GAC ⁴ to be used
	EC>10-12	720	720 ⁴	GAC ⁴ to be used
	EC>12-16	2,060	750 ⁷	More stringent assessment criteria ⁷ to be used
	EC>16-21	1,940	750 ⁷	More stringent assessment criteria ⁷ to be used
	EC>21-35	1,940	750 ⁷	More stringent assessment criteria ⁷ to be used
Sum of TPH aliphatic & aromatic C5-C10		4,528	< 750 ⁷	More stringent assessment criteria ⁷ to be used
Sum of TPH aliphatic & aromatic C10+		22,983	< 750 ⁷	
pH		5-10	5-10	
Monohydric Phenols		2,310 ⁴	750 ⁷	GAC ⁴ to be used
Free Cyanide		34 ⁴	34 ⁴	GAC ¹⁰ to be used
Asbestos			No detectable fibres ⁸	

Notes:

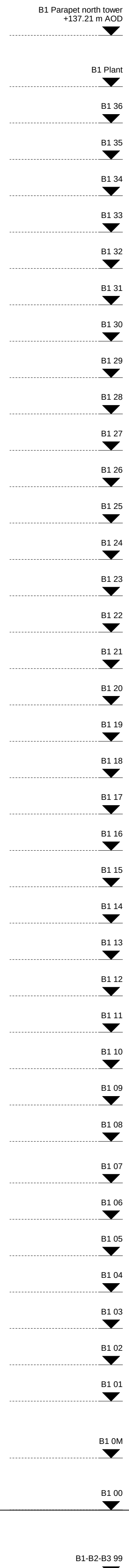
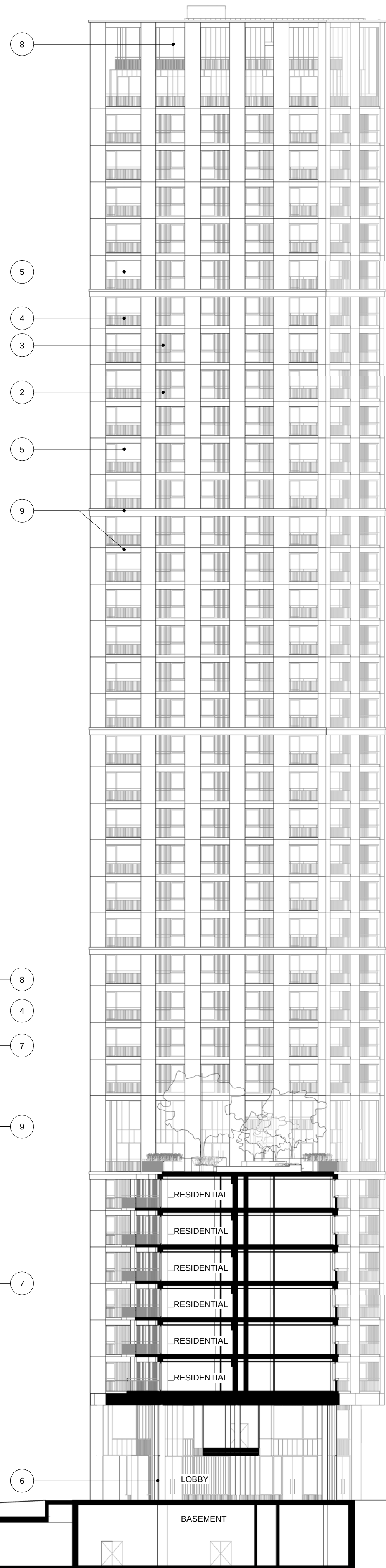
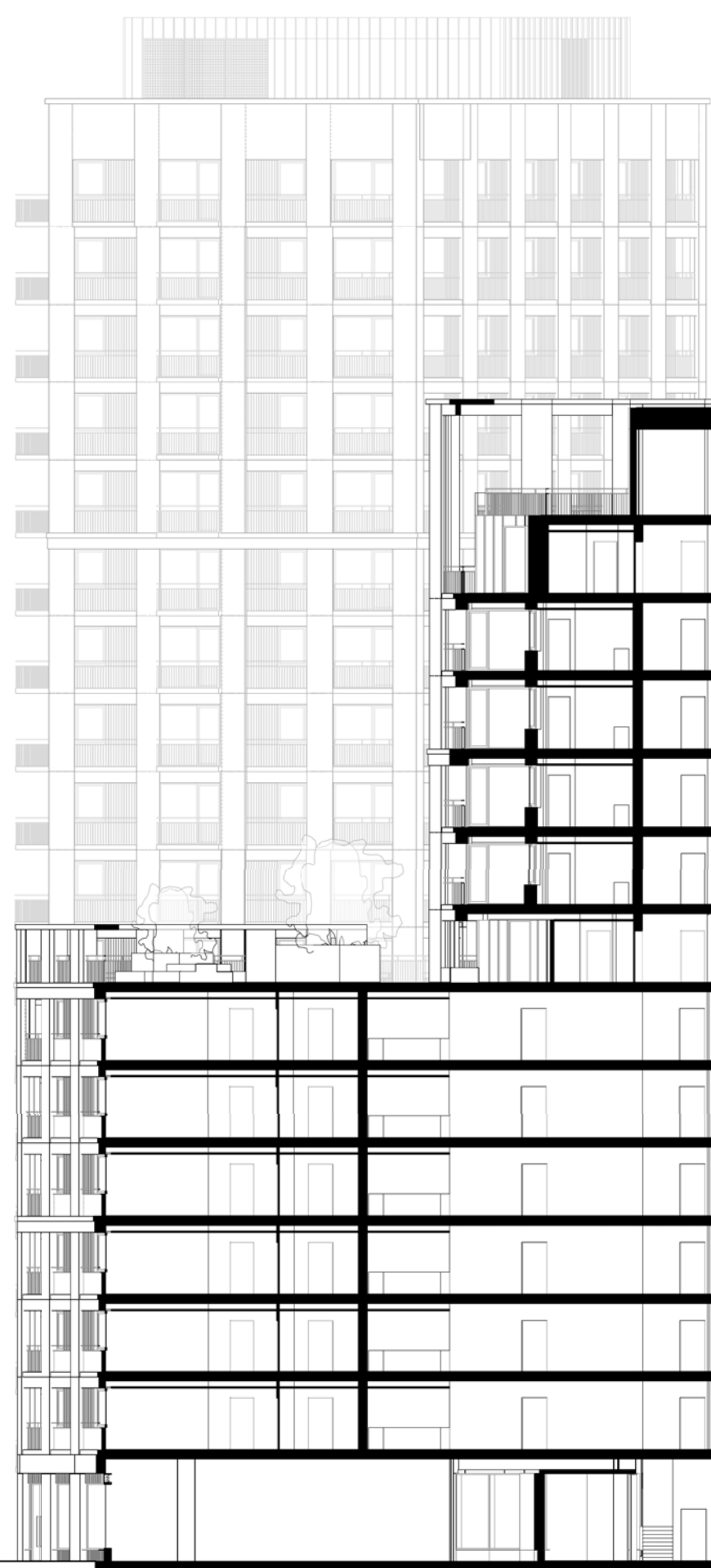
1. These maximum permissible concentrations (MPCs) are import criteria only and are not necessarily appropriate for human health risk assessment.
2. In mg/kg dry soil except pH and asbestos.
3. British Standard BS3882:2015 Specification for Topsoil and requirements for use. Table 1. Values taken for pH 6-7.

CGL – Capping Layer Soil Import Specification

4. Generic Assessment Criteria generated 'in-house' based on CLEA model Version 1.071.
5. Nable, Banuelos and Paul. (1997). *Boron Toxicity*. Plant and Soil, **Vol. 193**, pp1 81-198. Lower limit for potential phytotoxic effect
6. Speciated TPH values must not exceed individual GAC. The listed GAC consider risks to human health, but it is possible that some of the values for heavy-end TPH could pose a risk to controlled waters. As such, a lower import criterion for these fractions is recommended.
7. Assessment criteria of 750mg/kg is noted to be more stringent than Site Specific Assessment Criteria/GAC using CLEA and should the material be excavated in the future, should prevent it being classified as hazardous waste.
8. Laboratory screen by microscopy may be required subject to source of material.
9. Published C4SL for lead (DEFRA, 2014)
10. GAC for free cyanide derived by Atkins based on acute exposure for a 0-6 year old child
11. Requirement for British Standard for Topsoil and Subsoil, or landscaping specification to be met. All other material to be imported as a product.

APPENDIX D

Proposed Development Plan



KEY	
1.	Smooth concrete pier
2.	Profiled concrete infill panel
3.	Profiled metal cladding
4.	Metal balustrades to match cladding
5.	Window system to match cladding colour
6.	Curtain walling to shopfronts and entrances
7.	Brickwork panels
8.	Metal plant screens
9.	Textured concrete lintel
AOD: Above Ordnance Datum	

REV	DATE	DESCRIPTION
P00	July '18	ISSUED FOR PLANNING
P01	Oct. 18	PLANNING ADDENDUM

ARCHITECTS Ashley Road East ALISON BROOKS ARCHITECTS	Alison Brooks Architects Unit 610, Highgate Studios 53-79 Highgate Road London NW9 1TL www.alisonbrooksarchitects.com info@alisonbrooksarchitects.com +44 (0)20 7267 9777
Ferry Island North Island ALLFORD HALL MONAGHAN MORRIS	AHMM ARCHITECTS Ltd Morelands 5-23 Old Street London EC1Y 9HL www.ahmm.co.uk info@ahmm.co.uk +44 (0)20 7251 5261
Ashley Road West Welbourne Pollard Thomas Edwards	Pollard Thomas Edwards Diespeker Wharf 38 Graham Street London N1 8JX www.pollardthomasedwards.co.uk mail@ptea.co.uk +44 (0)20 7336 7777
Ferry Square Pavilion RUFFARCHITECTS	RUFFARCHITECTS 205 Wardenour Street, London W1R 8ZJ www.ruffarchitects.co.uk info@ruffarchitects.co.uk +44 (0)20 3614 8992

NOTE
Residential layouts, terrace layouts, planting and materials are shown for illustrative purposes only.

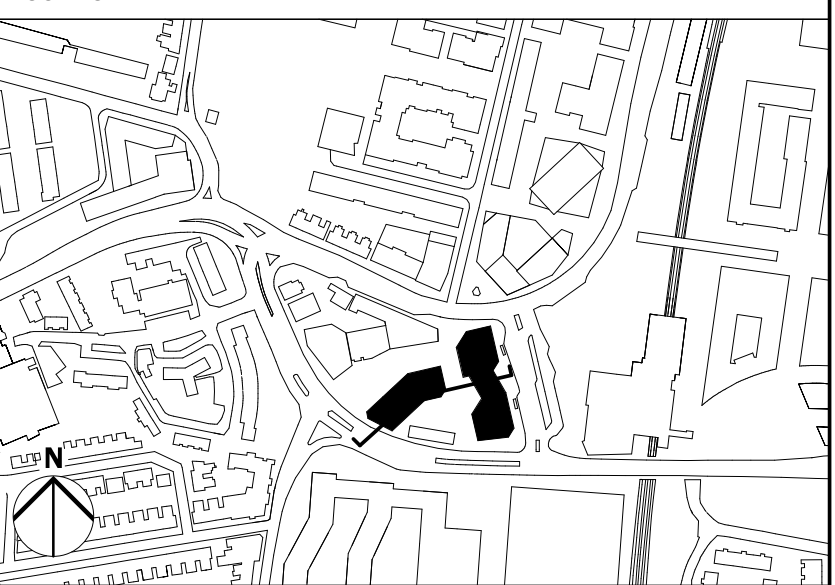
When this drawing is issued in uncontrolled CAD format it will be accompanied by a PDF version and is issued to enable the recipient to prepare their own documents / models / drawings for which they are solely responsible. The recipient should report all drawing errors, omissions and discrepancies to the architect. All dimensions should be checked on site by the contractor and such dimensions shall be the contractor's responsibility.

The "Architects", as listed, accepts no responsibility or liability for any use of this drawing by parties other than the party for whom it was prepared or for purposes other than those for which it was prepared

- any alterations or additions to or discrepancies arising out of changes to the background information on which the drawings are based that was current at the time of the issue, and which occur to that information after it has been issued by the "Architects"
- any loss or degradation of the information held in this drawing resulting from the translation from the original file format to any other file format or from the recipients use of the drawing in any form or any version of the programme other than that which was used to prepare it
- the accuracy of survey information provided by others or for any costs, claims, proceedings and expenses arising out of reliance on such information

Any scaling from the drawing to the actual work shall be the responsibility of the user of the drawing and the planning authority solely for the purposes of the planning application to which it relates

LOCATION



job title	TOTTENHAM HALE CENTRE ISLAND SITES
drawing title / location	PROPOSED SECTION AA

drawn by	checked	scale	status
MG	AM	1 : 250@A1, 1 : 500@A3	INFORMATION
drawing number			revision
TH-IS_ZZ_001_A_16092_(P00)_P300			P 01