Verification Report for Stonefield Way, South Ruislip, London, HA4 0YH

Report

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Report

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for
Stonefield Way, South
Ruislip, London, HA4 0YH

Prepared for: **Magrock Ltd**
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Reference: **EES 19.251.1**

Date: **1st May 2020**

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Title: **Verification Report**

Stonefield Way (Units 1-7), South Ruislip, London, HA4 0YH

Ecologia Reference: EES 19.251.1

Client:	Magrock Ltd	**Client Ref:**	Stonefield Close

Management Systems Control

Ecologia operates under an integrated management system certified to ISO 9001:2015, ISO 14001:2015 and BS OHSAS 18001:2007.

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1	FINAL	D. Haddock L. Allen	LA. Cammack	LA. Cammack	01/05/2020

EXECUTIVE SUMMARY

Site Location	Stonefield Close (Units 1-7), South Ruislip, London, HA4 0YH. The Site covers an area of approximately 0.71 hectares and is located in South Ruislip approximately 5.5km west of Wembley. The National Grid Reference for the Site is 512139, 185397.
Site Description	Environmental Setting The Site is directly underlain by bedrock geology comprising the London Clay Formation, which is classified as an Unproductive Aquifer. The nearest significant surface water feature is the Roxbourne Brook, which is culverted at its closest extent, approximately 180m north of the Site. Historical Setting The Site was used for agricultural land until around 1950 when it was developed with a depot in the northwest, an aromatics factory in the northeast, a chemical and printing works in the southeast and an electroplating works and vehicle hire depot in the southwest. By 1967, the depot in the east had been extended further east and was labelled as a soft drinks factory. By 2012, the southwest building had been demolished.
Reason for Validation Works and Proposed Re-development	Previous investigation works identified contamination within Made Ground soils including PAHs, heavy metals and asbestos fibres, with ASTs still present onsite. Consequently, risks were identified for human health (construction and service maintenance staff and future site users). Therefore, remediation was required to mitigate potential risks and enable the redevelopment of the Site into a commercial end use. The purpose of this report is to present the necessary information to the Regulatory Authorities to provide confidence that the works have been carried out in accordance with the remedial actions specified in the Remediation Strategy, dated August 2019 (ref 5).
Remediation and Validation Works	Remediation works incorporated the following: • Watching brief during development to identify any significant contamination. • Enabling works, including demolition and site strip. • Asbestos removal in accordance with the Control of Asbestos Regulations. • Removal of 2No. ASTs with associated laboratory testing of underlying soils. • Installation of upgraded water supply. • Materials tracking during development works for both onsite and offsite materials. • Implementation of a clean capping system in landscaped areas – *to be validated in a future subsequent letter report on completion of developer finishes.* • Submission of a Remediation Validation Report to validate the works undertaken to date.
Validation Samples and Analysis	Validation samples taken from beneath the removed ASTs were compared to remediation target criteria (RTC), which revealed no failures for human health or controlled waters. Clean topsoil will be imported for the landscaped areas by Magrock Ltd as part of developer finished. Materials will be tested against the RTC to confirm suitability and will be reported in a subsequent letter report.
Conclusions & Recommendations	Remediation works have comprised removal of asbestos containing materials inside former buildings, removal of ASTs and validation of soils beneath, installation of a 350mm thick sub-base capping layer, materials tracking and installation of an upgraded water supply. Capping in soft landscaping areas is still to be completed (450mm thick topsoil with geomembrane beneath), which will be imported by Magrock Ltd as part of developer finishes. Validation of this material will be issued in a subsequent letter report. Consequently, no residual site sources are deemed to be present that may pose a risk to Human Health / Controlled Waters. The Site is, therefore, considered to be suitable for a commercial development.

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PLANS

APPENDICES

1. INTRODUCTION

1.1. Background

Ecologia was instructed by Magrock Ltd to produce a Verification Report for the remediation works carried out at Stonefield Close (Units 1-7), South Ruislip, London, HA4 0YH.

The planning consent was granted by London Borough of Hillingdon Council (ref: 1660/APP/2019/1018) and relates to the development of seven (7No.) new commercial units with associated carparking and five (5No.) small soft landscaping areas.

The redevelopment plan is included as Figure 1, Appendix I and presented in Plan 1 below.

Plan 1. Redevelopment Plan (*Source: CMP Architects*)

1.2. Objectives

This Verification Report has been completed to provide a summary of previous assessments undertaken onsite and subsequent remediation works undertaken by Magrock Ltd.

The purpose of this report is to present the necessary information to the Regulatory Authorities to provide confidence that the works have been carried out in accordance with the Remediation Strategy (ref 5).

1.3. Previous Assessments

Previous assessments have been carried out at the site, including:

- CBRE 'Stonefield Close, South Ruislip Phase I & II Geo-environmental Assessment and Flood Risk Review.' Dated December 2017 (ref 1).
- MLM Consulting Limited 'Stonefield Close, Ruislip, HA4 0YP – Ground Gas Risk Assessment.' Dated November 2018 (ref 1).

- MLM Consulting Limited 'Stonefield Close, Ruislip, HA4 0YP – Supplementary Groundwater Risk Assessment.' Dated November 2018 (ref 2).
- MLM Consulting Limited 'Stonefield Close, Ruislip, HA4 0YP – Supplementary Groundwater Risk Assessment.' Dated July 2019 (ref 3).
- MLM Consulting Limited 'Remediation Strategy and Verification Plan.' Dated August 2019 (ref 4).

1.4. Verification Report

The Verification Report herein, details the remediation works undertaken at the Site and incorporates a discussion of the following:

- **Site Setting**: a brief summary of the Site environmental setting (Section 2).
- **Previous Assessments**: summarising the previous works undertaken (Section 3).
- **Conceptual Site Model (prior to remediation)**: summary of potential sources, pathways and receptors identified prior to remediation works (Section 4).
- **Remediation Strategy & Methodology:** summary of remediation strategy agreed for the Site and Remediation Target Criteria (RTC) (Section 5).
- **Remediation / Validation Works Completed:** detailing works undertaken onsite to cover previously identified remedial requirements (Section 6).
- **Materials Management Plan (MMP)**: summary of MMP to support the reuse of materials onsite and track material movements onsite / offsite (Section 7).
- **Conceptual Site Model (post remediation)**: summary of potential sources, pathways and receptors identified post remediation works (Section 8).
- **Validation Statement & Conclusions**: overall summary of works completed to satisfy requirements that remediation objectives have been met (Section 9).

2. SITE SETTING

2.1. Site Location

The Site address is: Stonefield Close (Units 1-7),
South Ruislip,
London, HA4 0YH.

The Site covers an area of approximately 0.71 hectares and is located in South Ruislip approximately 5.5km west of Wembley. The National Grid Reference for the Site is 512139, 185397.

2.2. Site History

Historical mapping obtained by CBRE in 2017 (ref 1) showed that the Site was used for agricultural land until around 1950 when it was developed with a depot in the northwest, an aromatics factory in the northeast, a chemical and printing works in the southeast and an electroplating works and vehicle hire depot in the southwest.

By 1967, the depot in the east had been extended further east and was labelled as a soft drinks factory. By 2012, the southwest building had been demolished.

2.3. Site Geology, Hydrogeology and Hydrology

Information regarding the Site's environmental setting has been obtained from previous assessments as well as readily available online sources including the British Geological Survey; MAGIC; and, GOV.UK websites.

The Site is directly underlain by bedrock geology comprising the London Clay Formation. No superficial deposits are present onsite. The London Clay is classified as an Unproductive Aquifer.

According to the BGS 1:50,000 Solid and Drift map of the area (BGS Sheet 256, North London), the London Clay is sequentially underlain by the following solid geology:

- Lambeth Group Deposits (mottled clays, c.10m thick in the vicinity of the site); and
- The Chalk Group (white chalk with flint, to depth) – classified as a Principal Aquifer. The Site is not located in a Source Protection Zone (SPZ).

The nearest significant surface water feature is the Roxbourne Brook, which is culverted at its closest extent, approximately 180m north of the Site.

2.4. Underlying Ground Conditions

Information relating to the underlying ground conditions at the Site was obtained from the Geo-environmental Assessment Report by CBRE (ref 1). Table 2.1 summarises the ground conditions recorded during the investigation.

Table 2.1: Encountered Ground Conditions onsite

Stratigraphic Group	Top Range (m)	Base Range (m)	Thickness (m)	General Description
Concrete	GL	0.21 - 0.35	0.21 - 0.35	Concrete hardstanding
Made Ground	0.21 - 0.35	0.55 – 2.90	0.34 - 2.65	Concrete hardstanding, over light brown slightly clayey gravelly SAND, over orange brown and blueish grey sandy slightly gravelly CLAY
London Clay Formation	0.55 – 2.90	3.00 - 5.45 (base not proven)	1.90 - 4.65 (thickness not proven)	Brownish grey slightly sandy silty CLAY

As confirmed by the intrusive ground investigation, the Site is underlain by unproductive London Clay bedrock, with no superficial deposits and varying depths of Made Ground.

3. PREVIOUS ASSESSMENTS

3.1. CBRE – Phase I & II Geo Environmental Assessment, November 2017

CBRE completed a site investigation in October 2017 to assess the ground conditions and extent of contamination beneath the Site. Site works comprised the drilling and installation of nine (9No.) boreholes to a maximum depth of 5.45 metres below ground level (m bgl).

The laboratory results concluded that contaminant concentrations were typical of brownfield land. Screening of the analytical results against SoBRA generic acceptance criteria (GAC) for a commercial end use revealed Made Ground soils across the north of the Site were impacted by metals and polycyclic aromatic hydrocarbons (PAHs). Trace concentrations of chrysotile asbestos were detected in Made Ground soils in the southeast of the Site (<0.001%).

Groundwater (where encountered) was considered to be perched above the London Clay and revealed generally low concentrations of contaminants. A continuous body of shallow groundwater was not anticipated to be present beneath the Site. Screening of analytical results against Water Quality Standards (WQS) revealed slight exceedances for manganese, PAHs, total petroleum hydrocarbons (TPHs), cyanide (total), trichloroethene (TCE) and vinyl chloride.

Overall, the concentrations of contaminants detected within soil and perched groundwater were considered to be low in relation to the proposed end use of the Site.

One (1No.) round of ground gas monitoring was completed which revealed low concentrations of carbon dioxide and no elevated concentrations of methane or volatile organic compounds (VOCs). However, additional ground gas monitoring was recommended to determine the risk.

Overall, remedial measures recommended the implementation of a clean cover system, incorporating a suitable thickness of imported certified clean soil across landscaped areas and a discovery strategy if unexpected contamination is encountered during the redevelopment.

3.2. MLM – Ground Gas Risk Assessment, November 2018

Additional ground gas monitoring was undertaken by MLM Consulting Ltd in previously installed boreholes (total of 4No. rounds). A maximum carbon dioxide concentration of 0.8% v/v and methane concentration of <0.1% v/v was recorded, with negligible flow rates.

Consequently, a CIRIA Characteristic Situation of CS-1 was assigned to the Site with no ground gas protection measures deemed necessary in new buildings.

3.3. MLM – Supplementary Groundwater Risk Assessment, November 2018

MLM were instructed to complete a supplementary groundwater risk assessment following the discovery of elevated manganese, PAHs, TPHs and solvents during the previous ground investigation undertaken by CBRE in 2017.

Representative groundwater samples (considered to be perched) were recovered from four (2No.) previously installed wells with enough water for sample collection.

Results of the analysis differed from CBRE original findings, whereby Trichloroethene (TCE) was the only exceedance identified above WQS in a single borehole (WS09 – southwest corner of the Site). It was concluded that TCE impaction was not widespread and it was deemed likely to be from an offsite source. However, further groundwater monitoring and testing was recommended to confirm the quality of perched groundwater beneath the Site.

3.4. MLM – Supplementary Groundwater Risk Assessment, July 2019

MLM was instructed to undertake additional groundwater monitoring to determine risks to controlled waters following a request from the Environmental Health Officer at London Borough of Hillingdon.

Three (3No.) additional groundwater monitoring visits were completed at the Site between 13th and 27th June 2019. Groundwater samples could only be retrieved from two (2No.) boreholes onsite (WS06 and WS09) as the others were dry.

The groundwater sampling and testing undertaken by MLM on one occasion in October 2018 and on three occasions during June 2019 did not record concentrations of the inorganic and organic compounds above WQS identified by CBRE in 2017, with the exception of Trichloroethene (TCE.

The assessment concluded that the source of TCE remains unknown; however, the groundwater flow direction towards the northeast and east and the discovery of TCE in only one location (southwest corner), suggests that the source of TCE is offsite. In addition, the presence and concentration of contaminants over time indicates that natural attenuation is taking place.

Overall, due to the low permeability of the bedrock geology beneath the Site (London Clay Formation) as well as the distance and nature of the nearest watercourse (culverted), no further assessment, remediation or mitigation measures for the protection of controlled waters were proposed.

4. CONCEPTUAL SITE MODEL (PRIOR TO REMEDIATION)

The Conceptual Site Model (CSM) prior to remediation was developed in line with CLR 11 (ref 7), and follows the principle of the identification of the:

For a potential risk to be realised all three components above must be identified and a pollutant linkage established.

4.1. Summary of Significant Pollutant Linkages

The summary Conceptual Site Model is presented in Table 4.1 below and is based on the findings and recommendations of the previous assessments discussed in Section 3.

Table 4.1: Summary of Significant Pollutant Linkages

Contamination Source	Pathway	Receptor
PAHs (benzo(a)pyrene, benzo(b)fluoranthene and dibenz(a,h)anthracene) in Made Ground soils in the northeast (CBRE WS05)	Ingestion, dermal contact and inhalation	Construction and services maintenance staff
	Direct contact with plastic water supply pipes	Site end users
Lead in Made Ground soils in the northwest (CBRE WS02)	Ingestion, dermal contact and inhalation	Construction and services maintenance staff
		Site end users
Asbestos fibres in Made Ground soils (<0.001%) in the southeast (CBRE WS06, WS07, and WS08)	Inhalation of respirable fibres	Construction and services maintenance staff

4.2. Areas of Uncertainty & Response

Some areas of uncertainty for which insufficient information was available is set out in Table 4.2 and the proposed course of action to mitigate.

Table 4.2: Summary of Data Uncertainty

Area of Uncertainty	Response and Action
Pipework material selection	Unless it is confirmed in writing by the local water supply company that standard plastic potable water supply pipe is acceptable for this development, upgraded potable water supply pipe resistant to permeation by hydrocarbons will be installed.

5. REMEDIATION STRATEGY & METHODOLOGY

The remediation strategy was produced by MLM and designed to manage pollutant linkages identified to provide a Site that is 'suitable for use' and protective of both Human Health and Controlled Waters.

The remediation strategy was defined in the following report:

- MLM Consulting Limited 'Remediation Strategy and Verification Plan.' Dated August 2019 (ref 4).

5.1. Overall Remediation Strategy

Recommended remediation works incorporated the following:

- Discovery strategy during redevelopment works to identify any unforeseen contamination (not already covered as part of the remediation strategy).
- Enabling works to include demolition of existing buildings and a site strip to create a flat platform for redevelopment works.
- Any works which may disturb asbestos must be undertaken under a Plan of Work in accordance with the Control of Asbestos Regulations (2012).
- Removal of two (2No.) Above Ground Storage Tanks (ASTs) with associated validation testing of underlying soils – AST1 and AST2.
- Installation of upgraded water supply onsite. Note, all services installed below ground in areas where soil contamination is present should be run in 'clean corridors' to enable future maintenance to be in uncontaminated soils.
- Implementation of a clean capping system in landscaped areas (5No. small areas in total), recommended to comprise:
    - 450mm thick layer of imported Topsoil / subsoil materials.
    - Geomembrane at the base.
- Submission of a Verification Report to include:
    - Records of AST removal.
    - Results of testing of topsoil / subsoil / capping imported to Site (note, results to be submitted in a subsequent letter report on completion of developer finishes).
    - Plans showing validation sample locations.
    - Records of the Materials Management Plan (MMP).
    - Documentation of variations and unforeseen contamination (if identified).

5.2. Remedial Target Criteria (RTC)

In order to carry out soil validation testing, the remediation strategy adopted the following criteria for screening purposes:

- S4ULs for commercial use (C4SL for lead) for risks to human health receptors (validation of soils beneath the ASTs and soil for the capping in landscaped areas).
- Drinking Water Standards (DWS) for risks to controlled water receptors and World Health Organisation (WHO) guidelines for hydrocarbons (validation of soils beneath the ASTs).

6. REMEDIATION / VALIDATION WORKS COMPLETED

A summary of remediation / validation works completed are discussed in subsequent sections. A photographic report is included within Appendix II.

6.1. Enabling Works

At the start of the works, Magrock Ltd completed asbestos removal inside the existing buildings and demolition works. The resulting crushed concrete was used to provide a 350mm thick sub-base followed by a DPM 1200 gauge to both internal and external slabs across the entire site area to be covered in hardstanding.

Also, as part of the enabling works, the site soil was stripped (where required) to provide an even platform for redevelopment. The materials tracking information and volumes are included in Section 7.

The redevelopment works were carried out in two phases:

- Phase 1 – construction of Units 1 & 2.
- Phase 2 – construction of Units 3 – 7.
- Note, topsoil import to landscaped areas is due to be completed in May and will be documented in a subsequent letter report.

6.2. Asbestos Removal

During enabling works in Phase 1, an independent asbestos qualified contractor (Innercity Environmental, employed by Downwell) was instructed to remove the identified asbestos from within the existing buildings prior to demolition.

Asbestos controls were implemented during the works, including enclosed working areas and air testing to prevent fibre release. Table 6.1 details the works completed with air testing certificates and photographs included as Appendix III.

Table 6.1: Asbestos Removal (internal)

Area	Type of Asbestos	Size	Date	Air Test Certificate
Area 4 Enclosure	Asbestos Insulation Board (AIB)	$4m^2$ x $16m^2$	17.10.2019	J002382/BC01
Area 2 Enclosure	AIB	NA	17.10.2019	J002382/BC01
Area 2 Enclosure	AIB	$2m^2$ x $4m^2$	18.10.2019	J002382/EE01
Area 2 Enclosure	AIB	$2m^2$ x $4m^2$	18.10.2019	J002382/EE02
Area 5 Enclosure	AIB	$2m^2$ x $4m^2$	21.10.2019	J002382/EE03
Basement	Thermal Insulator Residue	$16m^2$ x $64m^2$	23.10.2019	J002382/BC03
External Window Panels	AIB	$49m^2$ x $392m^2$	01.11.2019	J002463/AA02
Personal & Backgrounds	NA	NA	28.11.2019	J002615/BW01

During enabling works in Phase 2, asbestos cement sheeting was identified on the roof of the existing building (adhered to the underside of the concrete). This materials was subsequently set aside during demolition works and disposed offsite at a licensed waste facility, discussed in Section 7.

Remaining concrete which was not found to be impacted with asbestos was crushed onsite. A total of four (4No.) samples were collected from the stockpile and submitted to a UKAS / MCERTS accredited laboratory for asbestos screening. Results did not detect any asbestos in any of the samples tested – 'Sample 1' to 'Sample 4' on report reference 19-31203. The laboratory certificates are included in Appendix V.

This material was subsequently reused to form the 350mm thick sub-base layer, with the surplus disposed offsite (discussed in Section 7).

6.3. Sampling Frequencies

In line with the remediation strategy, soil validation sampling was carried out in accordance with the sampling frequencies in Table 6.2 below.

Validation testing for landscaped areas will be reported in a subsequent letter report on completion of development finishes.

Table 6.2: Sampling Frequencies

Remediation	Laboratory Testing	Frequency	Remediation Targets
Removal of ASTs	Soil samples will be tested for TPHCWG. One (1No.) soil sample will be tested for TPHCWG soil leachate.	A minimum of five (5No.) samples recovered from beneath each AST.	S4ULs for commercial use for risks to human health receptors. DWS for risks to controlled water receptors.
Capping for Landscaped Areas	Imported natural soils to be tested for CLEA metals, speciated PAH (USEPA16) and organic matter. Reused, recycled or manufactured soils to be tested for CLEA metals, speciated PAH (USEPA16), TPHCWG and organic matter.	Minimum of one (1No.) test per $100m^3$ or one (1No.) test per $150m^2$.	S4ULs for commercial use (C4SL for lead) for human health receptors.

6.4. Removal of Above Ground Storage Tanks (ASTs)

The followings ASTs in Table 6.3 were identified onsite during the initial geo-environmental assessment by CBRE (ref 1) and were subsequently removed by Magrock Ltd as part of the remediation works.

Table 6.3: Above Ground Storage Tanks (ASTs)

Reference	Contents	Capacity	Comments
AST1	Diesel	2,000L	Presumed empty. Bunded and connected to above ground conveyance lines associated with a wet sprinkler system. No evidence of leaks or spills recorded by CBRE during previous geo-environmental assessment (ref 1).
AST2	Heating Oil	16,000L	Understood to have been decommissioned in 2013/14. Bunded, single skinned steel tank filled from an off-set fill point at the northern extent of the building. No evidence of leaks or spills recorded by CBRE during previous geo-environmental assessment (ref 1).

Information obtained from Magrock Ltd confirmed the two tanks to be empty prior to removal in early February 2020. Consequently, each tank was removed and disposed of offsite to allow shallow soil sampling to take place beneath (including any associated bunding and infrastructure).

6.4.1 Validation Sampling – AST1

Ecologia was instructed to attend Site on 11th March 2020 to complete validation soil sampling beneath AST1. At the time of the visit, the AST had already been removed, leaving the shallow soils accessible beneath.

A total of six (6No.) soil samples were taken from the area and submitted to a UKAS / MCERTS accredited laboratory for testing. Sample locations are included on the site plan in Figure 2, Appendix I. Samples were scheduled at the laboratory as follows:

- Six (6No.) soil samples: 'AST1a', 'AST1b', 'AST1c', 'AST1d', 'AST1e' and 'AST1composite' were scheduled for a soil suite, including TPHCWG and BTEX Compounds (Benzene, Toluene, Ethylbenzene and Xylenes).
- One (1No.) soil sample: 'AST1composite' was scheduled for a soil leachate suite, including TPHCWG and BTEX Compounds.

Results were screened against the remediation target criteria, which identified no failures for human health or controlled waters.

A screening table of the results is included in Appendix IV with laboratory certificates included in Appendix V.

6.4.2 Validation Sampling – AST2

Magrock Ltd completed validation soil sampling beneath the former location of AST2 on 22nd April 2020.

A total of six (6No.) soil samples were taken from the area and submitted to a UKAS / MCERTS accredited laboratory for testing. Sample locations are included on the site plan in Figure 3, Appendix I. Samples were scheduled at the laboratory as follows:

- Five (5No.) soil samples: 'A', 'B', 'C', 'D' and 'E' were scheduled for a soil suite, including TPHCWG and BTEX Compounds.
- One (1No.) soil sample: 'F' was scheduled for a soil leachate suite, including TPHCWG and BTEX Compounds.

Results were screened against the remediation target criteria, which identified no failures for human health or controlled waters.

A screening table of the results is included in Appendix IV with laboratory certificates included in Appendix V.

6.5. Upgraded Water Supply

Information obtained from Magrock confirms that an upgraded water supply pipe (Protecta-Line) was installed on site in 'clean corridors' to enable future maintenance to be in uncontaminated soils.

Photographic evidence of the pipework during installation is included in Appendix II with the Protecta-Line datasheet included in Appendix VI.

6.6. Unexpected Contamination

It is understood that no unforeseen contamination was identified during development works, as reported by Magrock Ltd.

7. MATERIALS MANAGEMENT PLAN (MMP)

The MMP was created in line with 'The Definition of Waste: Development Industry Code of Practice', (CoP), Version 2, dated March 2011 (ref 7).

The MMP was required to enable the reuse of soils on the site of origin. The MMP was reviewed by an independent qualified person (QP) before a declaration was submitted to CL:AIRE. The MMP is referenced as follows:

- Ecologia Environmental Solutions Ltd, 'Materials Management Plan (MMP)' (ref: 19.251.1). Dated March 2020 (ref 5).

The main objective of the earthworks was to maximise where possible reuse of materials and minimise the need for offsite disposal. A copy of the MMP and QP declaration form are included in Appendix VII.

7.1. Key Parties Involved

The following parties were involved with the stockpile movements, reuse and disposal of materials throughout the works.

Landowner:

- Wrenbridge Land Ltd, Mill House, Mill Ct, Great Shelford, Cambridge, CB22 5KD. Contact: Mr Jamie Garret, Jamie.Garret@wrenbridge.co.uk.

Principal Contractor:

- Magrock Ltd, 2 Oak Tree Business Park, The Courtyard, Willesborough, Ashford, Kent, TN24 0SY. Contact: Neil Fisher, neil@magrock.co.uk.

Main Earthworks Contractor / Treatment Contractor:

- Oakes Construction Ltd, Rex House, 354 Ballards Lane, London, Greater London, N12 0DD. Contact: Mr Leonard Kaku, leonard@oakesconstruction.co.uk.

Local Authority Contact:

- The London Borough of Hillingdon, Civic Centre, High Street, Uxbridge, Middlesex, UB8 1UW. Contact: Zenab Haji-Ismail, 01895 250230.

Environment Agency Contact:

- Local Environment Agency, 2 Marsham Street, Westminster, London, SW1P 4DF. Contact: 0370 850 6506, enquiries@environment-agency.gov.uk.

Haulier:

- Thames Material Ltd, Salisbury Road, Uxbridge, UB8 2RZ. Waste Carrier Licence: CBDU113446.

Offsite Waste Disposal Facility:

- Thames Materials, Skip Lane, Uxbridge, UB9 6JW. Permit reference: EPR/BB3709TU/A001.

7.2. Certainty of Use

Certainty of use was demonstrated in the form of the submitted MMP, agreed remediation strategy, verification plan and contractual arrangements. Previous site investigation data demonstrated soil to be suitable for reuse on site.

As per the remediation strategy, capping was not required beneath buildings or permanent hard paving (such as roads, parking and footpaths); therefore, no validation testing was carried out on materials used beneath the 350mm sub-base capping layer installed across the entire site area.

Validation testing will, however, be required for soils to be used in the landscaping areas. Ecologia understands that this material will comprise solely of imported topsoil to make up the required 450mm thickness. This material will be validated in a subsequent letter report on completion of the developer finishes.

7.3. Materials Tracking

The main objective of the earthworks was to maximise where possible reuse of materials and minimise the need for offsite disposal.

To achieve the required earthwork formation levels, the cut and fill plan was predicted by Magrock and is included as Figure 4, Appendix I. The breakdown of the material to be cut was predicted as follows:

- Crushed Concrete – 1,600m^3
- Made Ground – 500m^3
- Natural Ground (London Clay) – 200m^3

Approximately 400m^3 of material were estimated to be surplus to requirements and would require offsite disposal under the appropriate duty of care.

During the earthworks on Phases 1 & 2 (November 2019 – April 2020), MMP tracking information was held by Magrock Ltd to detail stockpile movements onsite and offsite.

Information obtained from Magrock Ltd confirms the bulk of the fill operations were in Phase 1 of the earthworks. During this phase, the site levels were raised by approximately 1m (to including backfilling of previous footings) to include the 350mm sub-base. Earthworks on Phase 2 comprised a very minimal site strip to enable the 350mm sub-base to be installed.

Material movements onsite are summarised in Table 7.1 overleaf and are visually depicted on the Site plan in Figure 5, Appendix I. The MMP tracking sheet provided by Magrock Ltd is included in Appendix VIII.

Table 7.1: Material Movements (onsite)

Stockpile Ref.	Origin of Material	Volume (m^3)		Placement Location
		Total	Reused	
NA	Existing Buildings for Demolition (inc. hard surfacing) – Phase 1	1600	1600	Reused onsite for sub-base layer
NA	Existing Buildings for Demolition (inc. hard surfacing) – Phase 2	1400	400	Reused onsite for sub-base layer
1	From OOM 1	350	350	Reused in Units 1 and 2 Cut and Fill
2	From OOM 2 and OOM3	800	800	Reused in Units 1 and 2 Cut and Fill
3	From OOM 3	300	300	Reused in Units 3-7 Cut and Fill
4	From OOM 4 and OOM5	1200	0	NA
5	From OOM 6	250	250	Reused in Units 3-7 Cut and Fill

Where materials were considered unsuitable for reuse or surplus to requirements, materials were disposed offsite at suitably licensed facilities, as per Table 7.2.

Table 7.2: Material Movements (offsite)

SP Ref.	Date	Origin of Material	EWC	Haulier	Disposal Facility	Quantity
NA	01.11.19	AIB (Phase 1)	170601	Windsor Waste Management Ltd (CBDU63545)	Windsor Waste Management, Brentwood, Essex EPR/EB3605TJ	400kg
NA	11.01.20	Cement Asbestos (Phase 2)	170605	Inner City Environmental (CB/DU70395)	Albus Environmental, Bean, Dartford EPR/CB3606SY/A001	460kg
NA	04/12/19 - 10/01/20	Cement Asbestos (Phase 2)	170605	Windsor Waste Management Ltd (CBDU63545)	Biffa Redhill Landfill, Cormongers Lane, Surrey EPR/BU8126IY/V018	33540kg
NA	21/10/19	Cement Asbestos (Phase 2)	170605	Windsor Waste Management Ltd (CBDU63545)	Windsor Waste Management, Brentwood, Essex EPR/EB3605TJ	540kg
NA	17/02/20	Existing Buildings for Demolition (inc. hard surfacing) – Phase 2	170107	Thames Material (CBDU113446)	Thames Material, Skip Lane, Uxbridge EPR/BB3709TU/A001	1000m^3
4	17/03/20	From OOM 004 and 005	170504	Thames Material (CBDU113446)	Thames Material, Skip Lane, Uxbridge EPR/BB3709TU/A001	1200m^3

Prior to soil disposal, a total of three (3No.) soil samples from OOM 4 and OOM5 were submitted to a UKAS / MCERTS accredited laboratory for analysis to confirm soil could be accepted under the disposal facility permit. The laboratory certificate is included in Appendix V (project number: 20030300, with sample references: 25869483, 25869484 and 25869485).

Copies of a selection of waste disposal tickets are included in Appendix IX. All tickets are held by Magrock Ltd and can be made available on request.

8. CONCEPTUAL SITE MODEL (POST REMEDIATION)

Remediation works have been completed in accordance with the below strategy:

- MLM Consulting Limited 'Remediation Strategy and Verification Plan.' Dated August 2019 (ref 4).

Final capping of landscaping areas using imported topsoil is outstanding. Validation testing for landscaped areas will be reported in a subsequent letter report on completion of development finishes.

8.1. Summary of Significant Pollutant Linkages

In summary, the previous source areas requiring remediation are discussed in Table 8.1, along with the remediation completed.

Table 8.1: Summary of Significant Pollutant Linkages (post remediation)

Contamination Source	Pathway	Receptor	Remediation Completed
PAHs (benzo(a)pyrene, benzo(b)fluoranthene and dibenz(a,h)anthracene) in Made Ground soils in the northeast (CBRE WS05)	Ingestion, dermal contact and inhalation	Construction and services maintenance staff	No unforeseen contamination was identified during remediation works. The site area was capped with 350mm sub-base to remove pathway with previously identified Made Ground contamination. Soft landscaping areas will be capped with 450mm topsoil with a geomembrane beneath to remove any ongoing pathways. The ASTs have been removed and soils validated beneath. An upgraded water supply pipe has been installed across the entire site in 'clean corridors'.
	Direct contact with plastic water supply pipes	Site end users	
Lead in Made Ground soils in the northwest (CBRE WS02)	Ingestion, dermal contact and inhalation	Construction and services maintenance staff	
		Site end users	
Asbestos fibres in Made Ground soils (<0.001%) in the southeast (CBRE WS06, WS07, and WS08 – beneath the former chemical works and printers)	Inhalation of respirable fibres	Construction and services maintenance staff	Asbestos was safely removed from existing buildings during the enabling works. Crush concrete was then laid across the site as the 350mm sub-base, which was tested to confirm no asbestos remained. Soft landscaping areas will be capped with 450mm topsoil with a geomembrane beneath to remove any ongoing pathways.

8.2. Discussion of Pollutant Linkages

As part of the enabling works, asbestos containing materials were removed from Site and existing soils were stripped to create a flat platform for development. Previously identified ASTs have been removed from Site and the underlying soils validated against the RTC. Material movements onsite / offsite have been tracked in accordance with the MMP and duty of care. In addition, an upgraded water supply pipe has been installed across the Site.

A capping layer has been installed onsite consisting of 350mm crushed concrete sub-base to remove pathway from previously identified contamination. Soft landscaping areas will be capped with 450mm clean topsoil validated against the RTC with a geomembrane beneath to remove any ongoing human health pathways (to be included in a subsequent letter report).

Consequently, the potential risks to Human Health and Controlled Waters are now deemed to be low / broken.

9. VALIDATION STATEMENT & CONCLUSIONS

9.1. Validation Summary

- Remediation and validation works have been completed across the Site.
- Asbestos has been removed from existing buildings as part of the enabling works.
- Previously identified ASTs have been removed and underlying soils validated against the RTC.
- A 350mm thick sub-base has been laid across the site to remove pathway with previously identified Made Ground contamination.
- Materials management works have been completed with suitable tracking, laboratory testing and placement records.
- An upgraded water supply has been installed onsite and placed in 'clean corridors'.
- No unexpected contamination was identified during the remediation works.

9.2. Conclusions

The Site has been remediated and validated in accordance with the approved strategy (ref 4).

This has comprised removal of asbestos containing materials inside former buildings, removal of ASTs and validation of soils beneath, installation of a 350mm thick sub-base capping layer, materials tracking and installation of an upgraded water supply. Capping in soft landscaping areas is still to be completed (450mm thick topsoil with geomembrane beneath), which will be imported by Magrock Ltd as part of developer finishes. Validation of this material will be issued in a subsequent letter report.

Consequently, no residual site sources are deemed to be present that may pose a risk to Human Health / Controlled Waters. Therefore, no further works are considered necessary.

The Site is, therefore, considered to be suitable for the proposed commercial end use as per the redevelopment plan (Figure 1, Appendix I). However, should the proposed end use change, the conceptual site model would need to be revised accordingly.

10. REFERENCES

10.1. Previous Assessments

ref 1. CBRE ‘Stonefield Close, South Ruislip Phase I & II Geo-environmental Assessment and Flood Risk Review.’ Dated December 2017.

ref 2. MLM Consulting Limited ‘Stonefield Close, Ruislip, HA4 0YP – Ground Gas Risk Assessment.’ Dated November 2018.

ref 3. MLM Consulting Limited ‘Stonefield Close, Ruislip, HA4 0YP – Supplementary Groundwater Risk Assessment.’ Dated November 2018.

ref 4. MLM Consulting Limited ‘Stonefield Close, Ruislip, HA4 0YP – Supplementary Groundwater Risk Assessment.’ Dated July 2019.

ref 5. MLM Consulting Limited ‘Remediation Strategy and Verification Plan.’ Dated August 2019.

ref 6. Ecologia Environmental Solutions Ltd, ‘Materials Management Plan (MMP)’ (ref: 19.251.1). Dated March 2020.

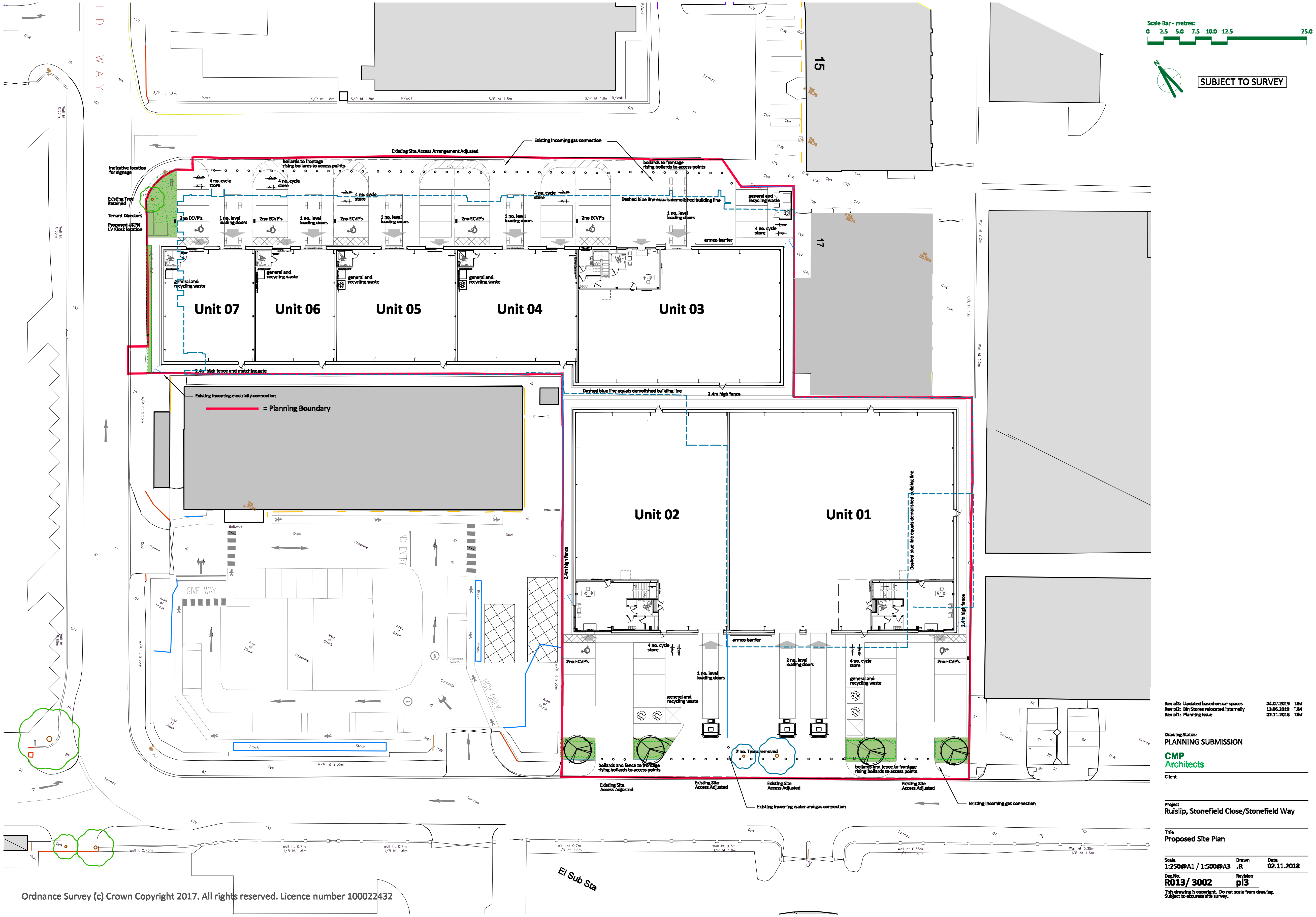
10.2. General

ref 7. DEFRA / EA. (September 2004). The ‘Model Procedures for the Management of Land Contamination’, Contaminated Land Report 11 (CLR 11).

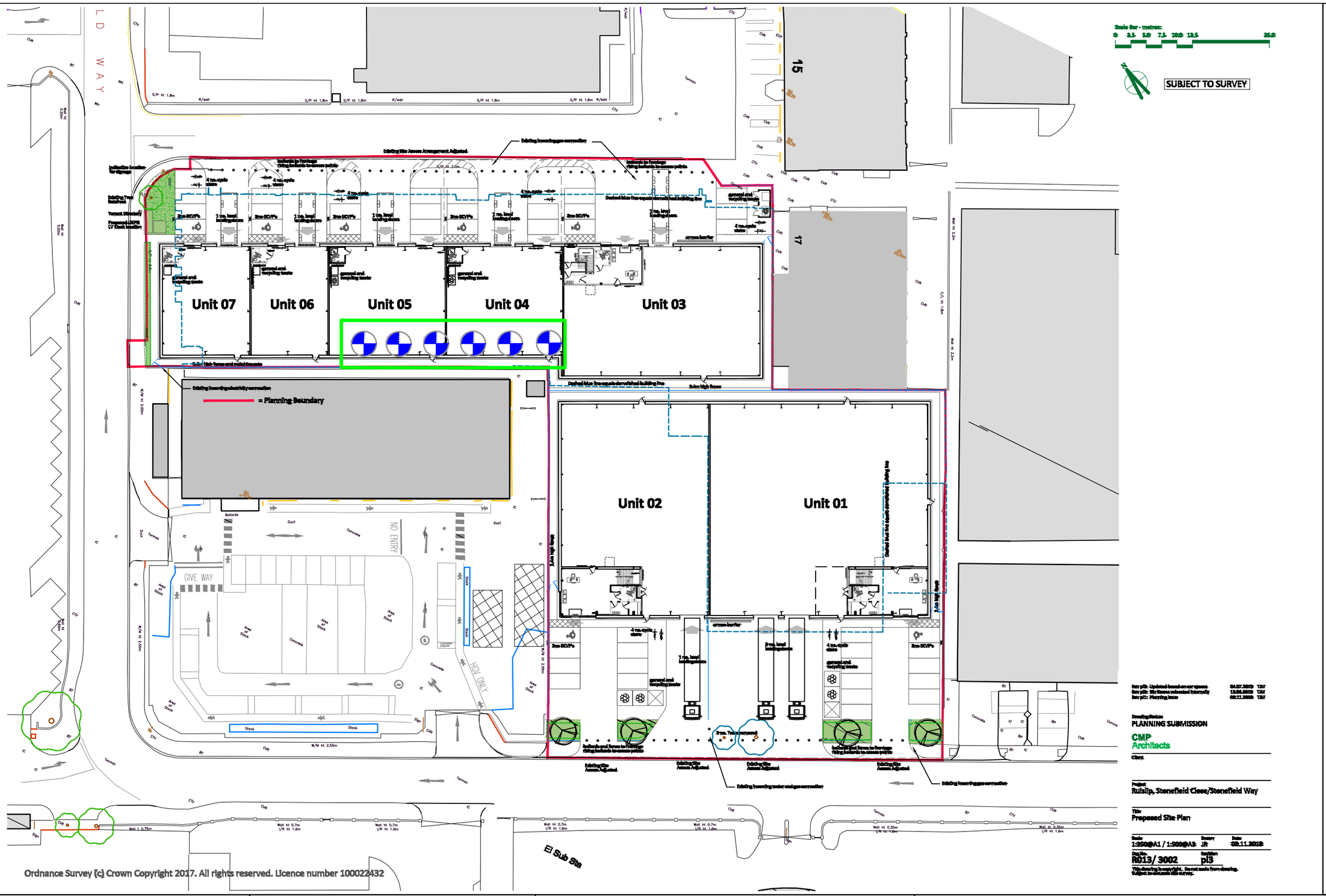
ref 8. CL:AIRE ‘The Definition of Waste: Development Industry Code of Practice’, (CoP), Version 2, dated March 2011.

APPENDIX I

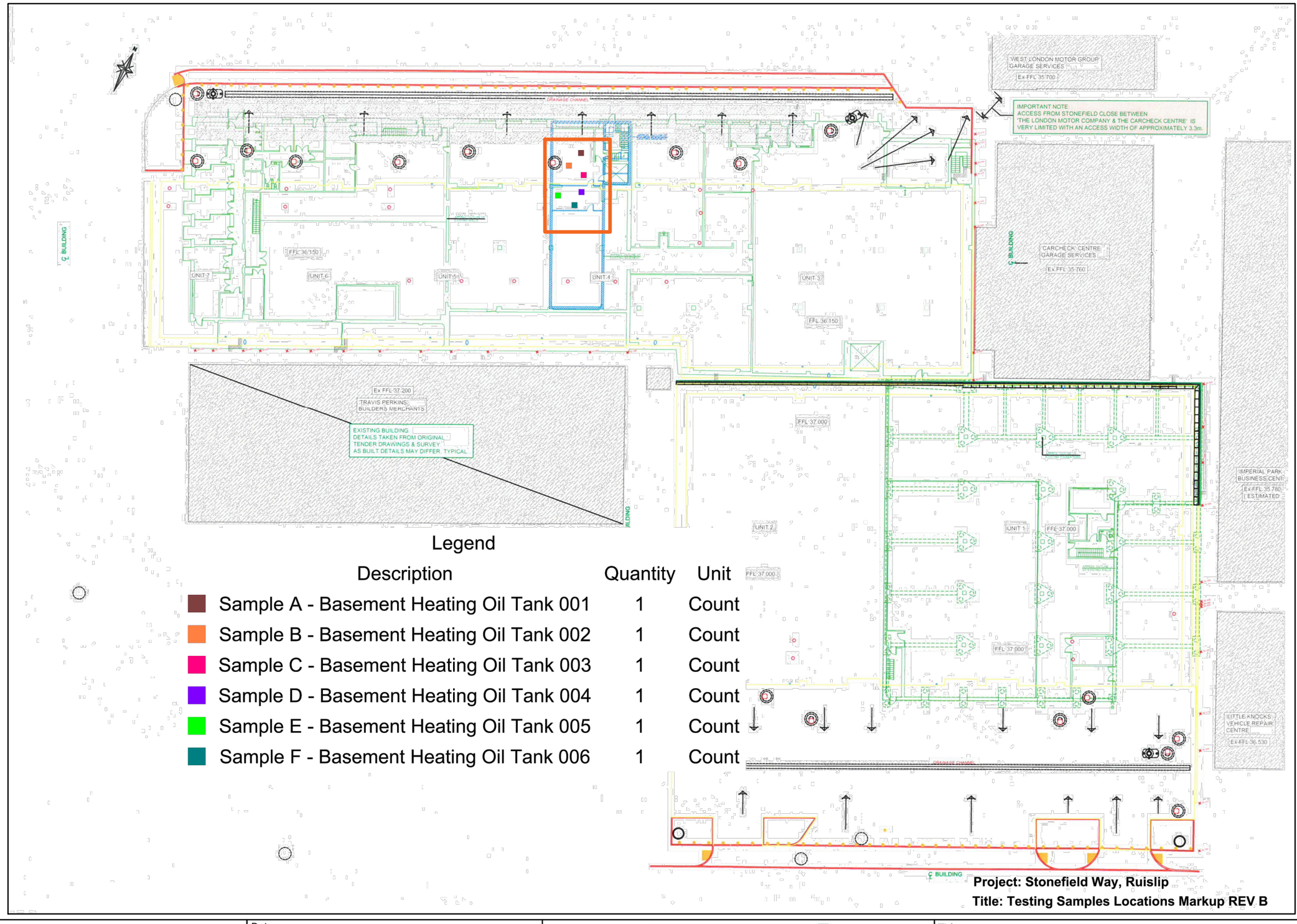
FIGURES



Project: EES 19.251.1	Date: 01/05/2020	Ecologia™ experts on the ground	Title: Redevelopment Plan		Version: 1
Drawn by: CMP Architects	Checked by: N/A		Site: Stonefield Way, Ruislip	Client: Magrock Ltd / Scale \ Paper: N.T.S \ A3	Figure: 1



Project: EES 19.251.1	Date: 01/05/2020	Ecologia experts on the ground	Title: AST1 - Sample Locations		Version: 1
Drawn by: CMP Architects / L. Allen (Ecologia)	Checked by: LA. Cammack		Site: Stonefield Way, Ruislip	Client: Magrock Ltd	Scale \ Paper: N.T.S \ A3	Figure: 2



Legend

Description	Quantity	Unit
Sample A - Basement Heating Oil Tank 001	1	Count
Sample B - Basement Heating Oil Tank 002	1	Count
Sample C - Basement Heating Oil Tank 003	1	Count
Sample D - Basement Heating Oil Tank 004	1	Count
Sample E - Basement Heating Oil Tank 005	1	Count
Sample F - Basement Heating Oil Tank 006	1	Count

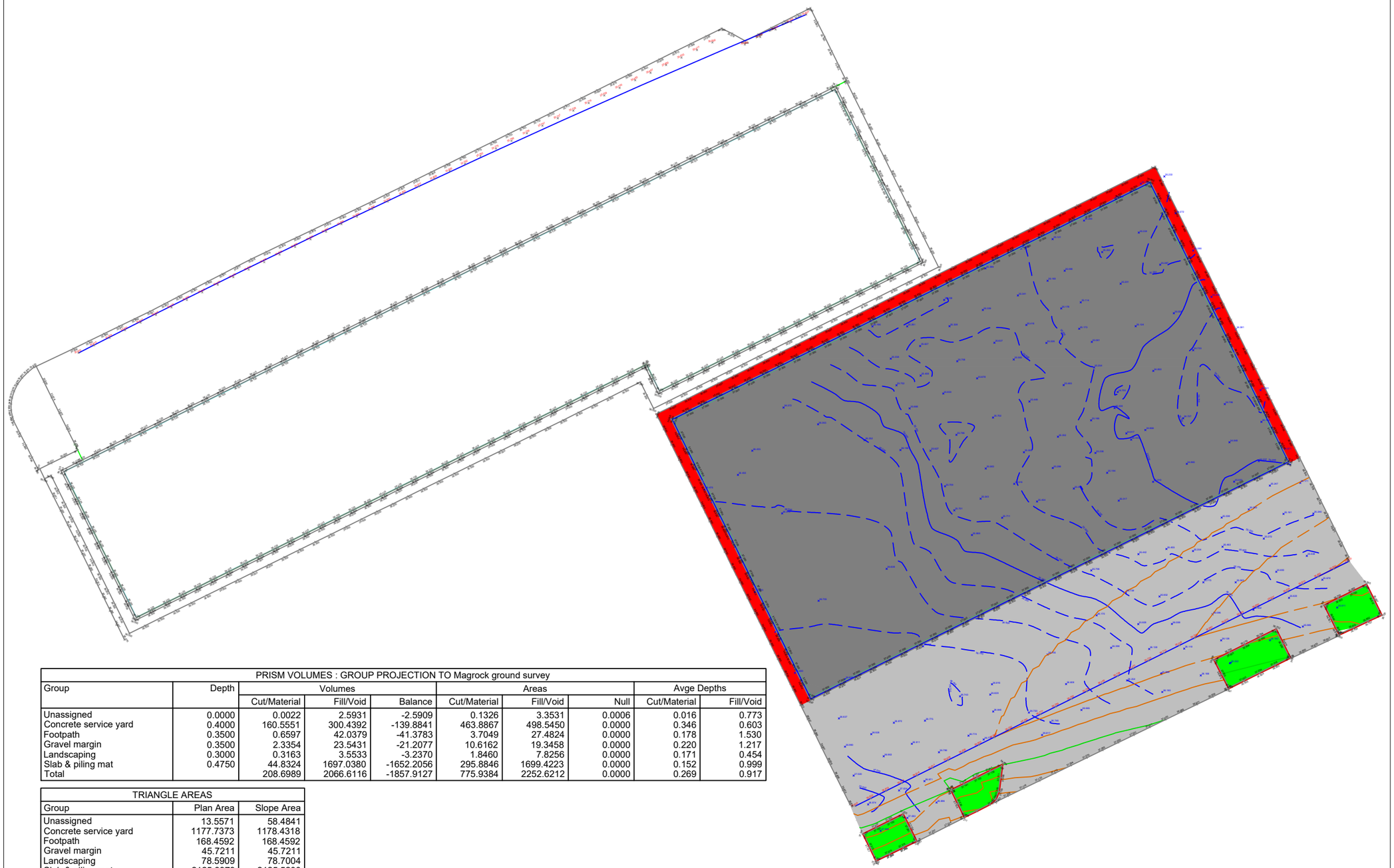
Project: Stonefield Way, Ruislip

Title: Testing Samples Locations Markup REV B

Legend

AST2 Location

Project: EES 19.251.1	Date: 01/05/2020	Ecologia experts on the ground	Title: AST2 - Sample Locations		Version: 1
Drawn by: CMP Architects / Magrock Ltd	Checked by: N/A		Site: Stonefield Way, Ruislip	Client: Magrock Ltd	Scale \ Paper: N.T.S \ A3	Figure: 3



PRISM VOLUMES : GROUP PROJECTION TO Magrock ground survey

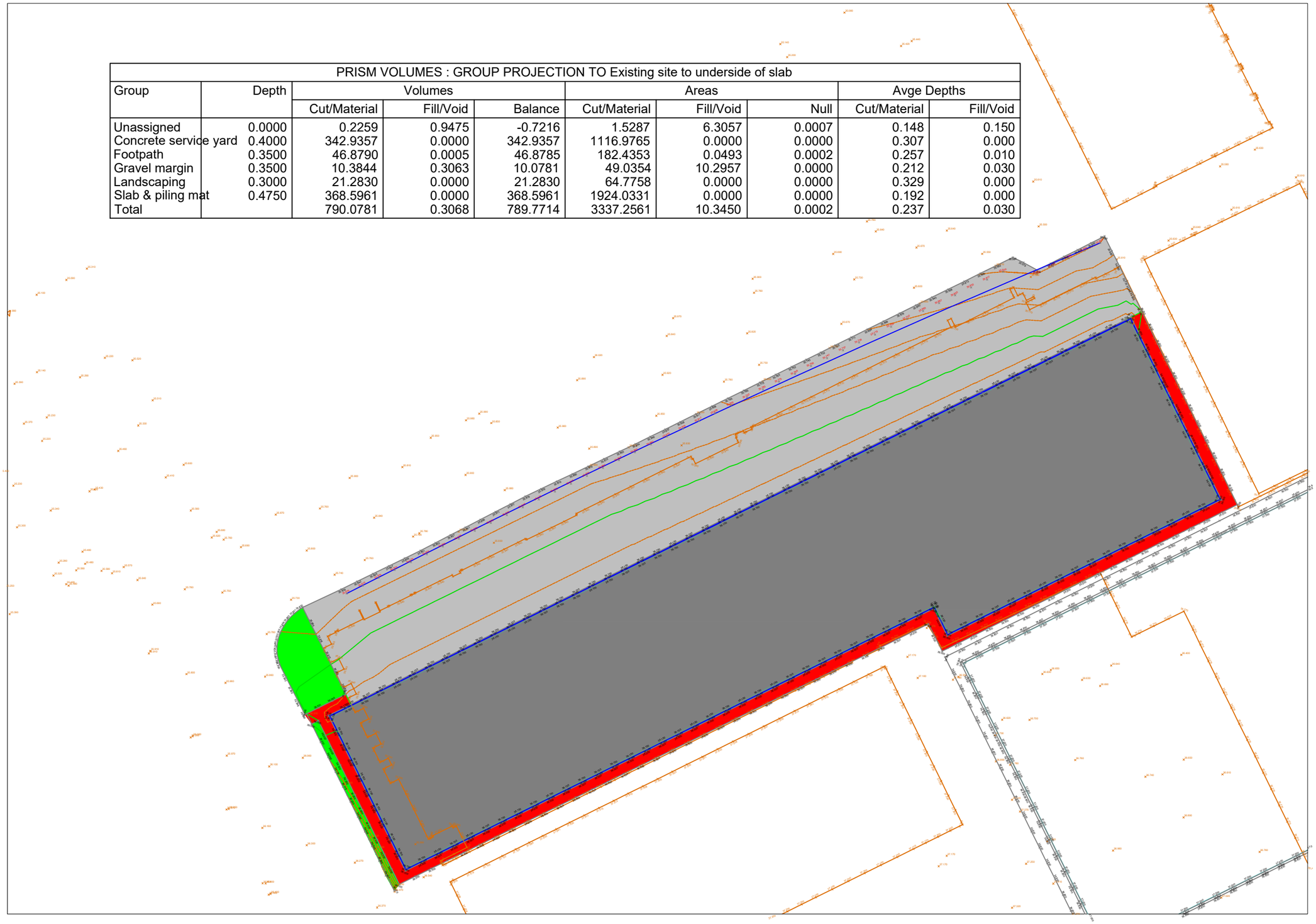
Group	Depth	Volumes			Areas			Avge Depths	
		Cut/Material	Fill/Void	Balance	Cut/Material	Fill/Void	Null	Cut/Material	Fill/Void
Unassigned	0.0000	0.0022	2.5931	-2.5909	0.1326	3.3531	0.0006	0.016	0.773
Concrete service yard	0.4000	160.5551	300.4392	-139.8841	463.8867	498.5450	0.0000	0.346	0.603
Footpath	0.3500	0.6597	42.0379	-41.3783	3.7049	27.4824	0.0000	0.178	1.530
Gravel margin	0.3500	2.3354	23.5431	-21.2077	10.6162	19.3458	0.0000	0.220	1.217
Landscaping	0.3000	0.3163	3.5533	-3.2370	1.8460	7.8256	0.0000	0.171	0.454
Slab & piling mat	0.4750	44.8324	1697.0380	-1652.2056	295.8846	1699.4223	0.0000	0.152	0.999
Total		208.6989	2066.6116	-1857.9127	775.9384	2252.6212	0.0000	0.269	0.917

TRIANGLE AREAS

Group	Plan Area	Slope Area
Unassigned	13.5571	58.4841
Concrete service yard	1177.7373	1178.4318
Footpath	168.4592	168.4592
Gravel margin	45.7211	45.7211
Landscaping	78.5909	78.7004
Slab & piling mat	2125.3979	2125.5200
Total	3609.4634	3655.3166

Project: EES 19.251.1	Date: 01/05/2020	Ecologia™ experts on the ground	Title: Cut & Fill (predicted) - Phase 1		Version: 1
Drawn by: Magrock Ltd	Checked by: N/A		Site: Stonefield Way, Ruislip	Client: Magrock Ltd	Scale \ Paper: N.T.S \ A3	Figure: 4

PRISM VOLUMES : GROUP PROJECTION TO Existing site to underside of slab									
Group	Depth	Volumes			Areas			Avge Depths	
		Cut/Material	Fill/Void	Balance	Cut/Material	Fill/Void	Null	Cut/Material	Fill/Void
Unassigned	0.0000	0.2259	0.9475	-0.7216	1.5287	6.3057	0.0007	0.148	0.150
Concrete servide yard	0.4000	342.9357	0.0000	342.9357	1116.9765	0.0000	0.0000	0.307	0.000
Footpath	0.3500	46.8790	0.0005	46.8785	182.4353	0.0493	0.0002	0.257	0.010
Gravel margin	0.3500	10.3844	0.3063	10.0781	49.0354	10.2957	0.0000	0.212	0.030
Landscaping	0.3000	21.2830	0.0000	21.2830	64.7758	0.0000	0.0000	0.329	0.000
Slab & piling mat	0.4750	368.5961	0.0000	368.5961	1924.0331	0.0000	0.0000	0.192	0.000
Total		790.0781	0.3068	789.7714	3337.2561	10.3450	0.0002	0.237	0.030



Project:	Date:		Title:		Version:
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Drawn by: Magrock Ltd	Checked by: N/A		Site: Stonefield Way, Ruislip	Client: Magrock Ltd	Scale \ Paper: N.T.S \ A3	Figure: 4

C121 STONEFIELD WAY, RUISLIP — MATERIAL MANAGEMENT PLAN

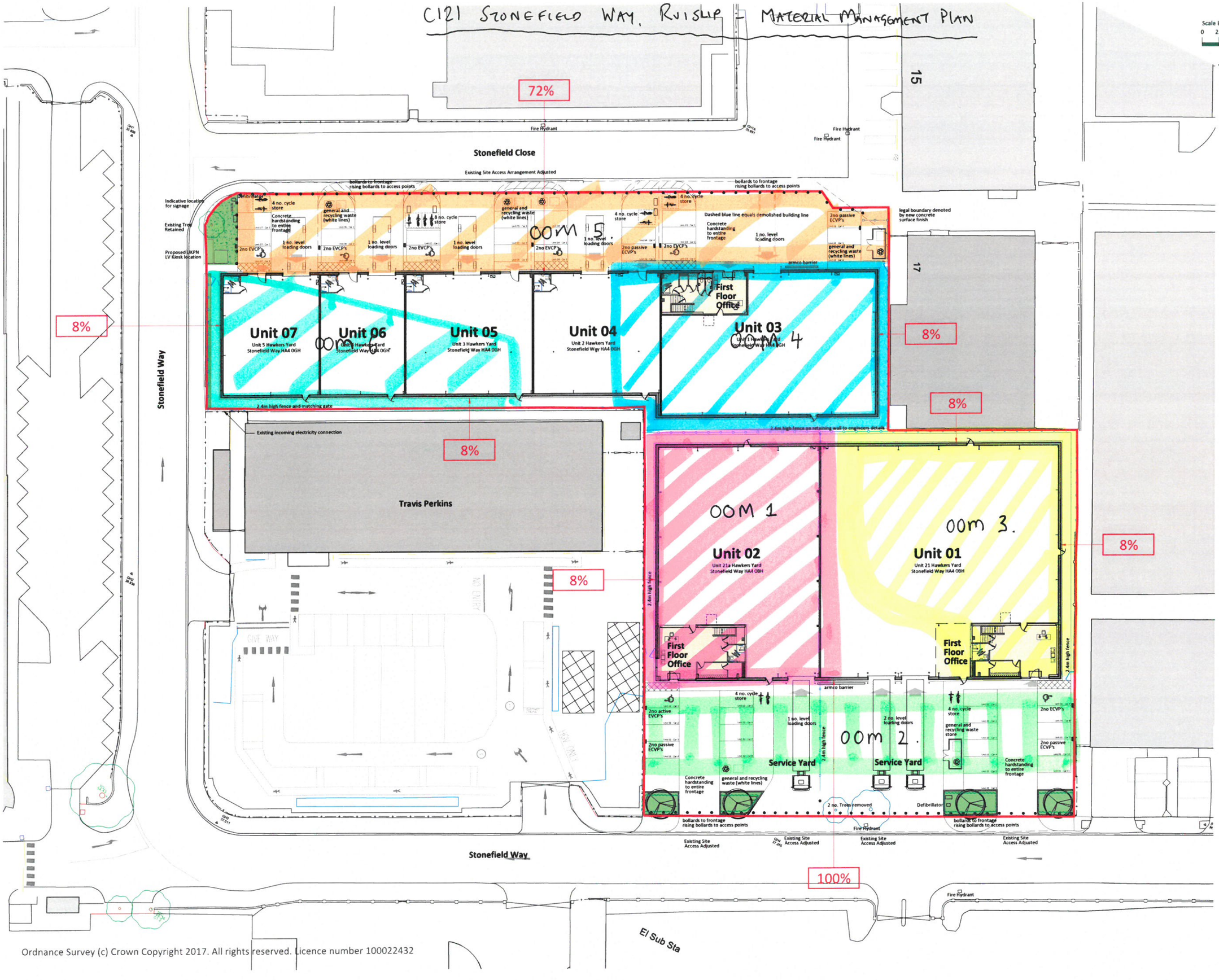
Scale Bar - metres: 0 2.5 5.0 7.5 10.0 12.5 25.0

SUBJECT TO SURVEY

NOTE:
Refer to Landscape Architects drawing and specifications for details of soft landscaping and planting

Key.

OOM = ORIGIN OF MATERIAL.



D. BREWER.
001 REV A.

Rev c9: Unit 3 to 7 moved forward	14.04.2020
Rev c8: Addresses added to Unit Numbers	20.02.2020
Rev c7: Reduced parking spaces to Units 1 and 2	09.01.2020
Rev c6: Bins/bike/fence/bollards adjusted to corner of Unit 03	16.12.2019
Rev c5: Defibrillator locations added	05.12.2019
Rev c4: Bollard positions adjusted to suit engineers	21.11.2019
Rev c3: Fire Hydrant positions shown	13.11.2019
Rev c2: Bin store added to Unit 3	30.10.2019
Rev c1: Issued for Contruction Issue	15.10.2019

Drawing Status:
CONSTRUCTION ISSUE

CMP Architects

Client
WRENBRIDGE

Project
Ruislip, Stonefield Close/Stonefield Way

Title
Proposed Site Plan

Scale	Drawn	Date
1:250@A1 / 1:500@A3	TJM	15.10.2019

Drg.No. R013/ 5006 — Revision c9