

Appendix G

MATERIALS MANAGEMENT PLAN





keltbray Remediation

Materials Management Plan (MMP) Initial Submission

**Bermondsey Project,
Drummond Road,
Bermondsey,
London, SE16 4DG**



	Print Name	Position	Signature
Author(s)	Dafni Varthali	Remediation Scientist	
Checked by	Tom Simpson	Technical Manager	
Approved by	Tom Simpson	Technical Manager	

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1. Introduction

Keltbray (KR) have been contracted by Grosvenor to undertake enabling and remedial works for the proposed development of Bermondsey Project, Drummond Road, Bermondsey, London, SE16 4DG (the 'Site').

Proposed works at the Site will include of a reduce excavation dig with subsequent re-instatement to form a working platform to facilitate the on-going development of the Site. Suitable Made Ground soils will be processed for geotechnical improvement and where required treated to remove visible fragments of asbestos prior to placement. Recovered oversized material (brick and concrete) will be crushed on site to generate suitable granular material for reuse on site as part of the capping fill.

Selected excavations (where contamination has been identified as indicated by the available site investigation data) will be carried out in a methodical and sustainable manner, to segregate and manage materials in such a way to maximise reuse and minimise waste for off-site disposal or recovery. Materials under the proposed marker layer of clean cover can be placed once validated on a risk based approach confirming that any residual contamination does not pose a risk to human health and controlled waters and that appropriate remedial actions have been completed with the provision of a pathway break. Where required KR will be providing a sufficient 150-200mm interim cover with the final 600mm clean cover system to be placed and verified at a later stage by follow-on contractors.

If unexpected contamination is encountered, a discovery strategy will be deployed, where material will be segregated and assessed for reuse, treatment or disposal.

To enable the site KR will be re-instating the ground level, between +1.050 mAOD to +1.900 mAOD and providing a 750-1000 mm thick pile mat and 350 mm thick capping layer in remaining areas. The proposed levels are detailed in BER-WSP-BFXXX-00-DR-S-00003_P02 and BER-WSP-BFXXX-00-DR-S-00002_P02 for the Biscuit Factory and BER-WSP-BCXXX-00-DR-S-00031 for the Campus Site, **Appendix A**. It should be noted these levels could be subject to change but are an indication of the typical levels required for the development and construction phase of the works.

This Materials Management Plan covers the re-use of suitable site- won materials as engineered fill material.

2. CL:AIRE Materials Management Plan (MMP) Form

This section presents the lines of evidence required to demonstrate the suitability, certainty and quantity required for the on-site reuse of excavated materials.

The chapter format follows CL:AIRE's October 2014 Material Management Plan form available at:

www.claire.co.uk/projects-and-initiatives/dow-cop/29-executing-dowcop-projects/116-materials-management-plan-mmp

2.1. Introduction

The person / organisation agreeing to pay the Declaration Fee - Name, organisation and contact details inc. email address -

Tom Simpson
Technical Manager,
Keltbray Remediation,
St Andrew's House,
Portsmouth Road,
Esher,
KT10 9TA

Email: tom.simpson@kelbray.com

Mobile: 07801 576432

Office: 0207 643 1000

I confirm I have read and understood the Terms & Conditions.

Question 1

Specify the scenario to which this MMP relates, as described in the Definition of Waste: Development Industry Code of Practice (DoW CoP) (1, 2, 3 or 4):

- 1. Reuse on the Site of Origin
- 2. Direct Transfer of clean naturally occurring soil / mineral materials
- 3. Cluster Project
- 4. Combination of any of the above

Question 2.

Organisation and name of person preparing this MMP

Dafni Varthali
 Remediation Scientist,
 Keltbray Remediation,
 St Andrew's House,
 Portsmouth Road,
 Esher,
 KT10 9TA

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Mobile: 07525 277299

Office: 0207 643 1000

2.2. Document Control

Date issued	28/4/2021
Revision date	
Summary of revision 1	
Summary of revision 2	
Summary of revision 3	
Summary of revision 4	
Summary of revision 5	

2.3. Site Details

Question 3. Site / Project name(s)	
Reuse / receiving site name :	Bermondsey Project, Drummond Road, Bermondsey, London, SE16 4DG
Donor site name (if Direct Transfer)	N/A

2.4. Landowners

Question 4a. Name of Landowner(s) (full address and contact details) – where excavated materials are to be reused
<p>Grosvenor Group 70 Grosvenor Street London W1K 3JP United Kingdom</p> <p>Britainandireland@grosvenor.com Office: 020 7408 0988</p>
Question 4b. Name of Landowner(s) (full address and contact details) – where excavated materials are arising from
<p>Grosvenor Group 70 Grosvenor Street London W1K 3JP United Kingdom</p> <p>Britainandireland@grosvenor.com Office: 020 7408 0988</p>

2.5. Summary and Objections

Question 5a. Provide a brief description of the planned project and how excavated materials are to be reused.

KR have been contracted to re-instate the site to the required levels through the controlled and phased excavation of identified contamination hotspots and the removal of hardstanding and below ground structures. KR will also provide a development platform, predominantly a pile mat platform, of suitable crush material.

Excavated materials will be carefully segregated and screened / treated accordingly and validated for reuse against the agreed criteria in the approved Remediation Strategies. Oversize material arising from screening and demolition activities (brick and concrete) will be crushed on site to generate material for reuse on site as part of the development platform (pile mat or capping layer).

This MMP covers the re-use of suitable site-won materials as engineered fill material.

Note: Oversized material will be crushed under a WRAP Protocol to produce a suitable aggregate product.

2.6. General Plans and Schematics

Question 6. Attach a location plan for the site(s) and a plan of the site(s) which identifies where different materials are to be excavated from, stockpile locations (if applicable), where materials are to be treated (if applicable) and where materials are to be reused.



Figure 2: Site Location Plan

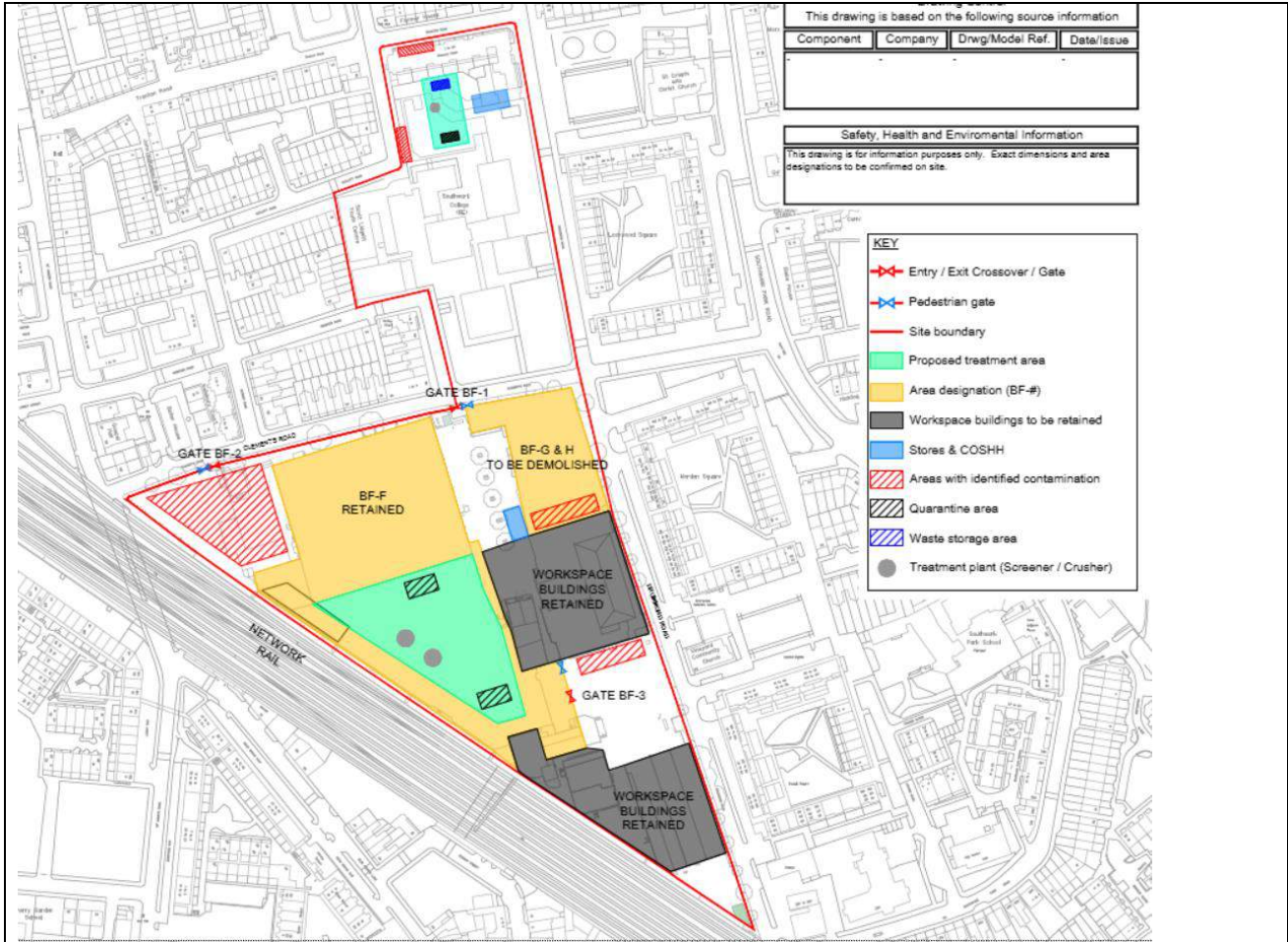


Figure 3: Site Boundary and Site Layout



Figure 4: Indicative Formation Levels Contour, Campus Site



Figure 5: Indicative Formation Levels Contours, Biscuit Factory

Key design drawings included within **Appendix A**:

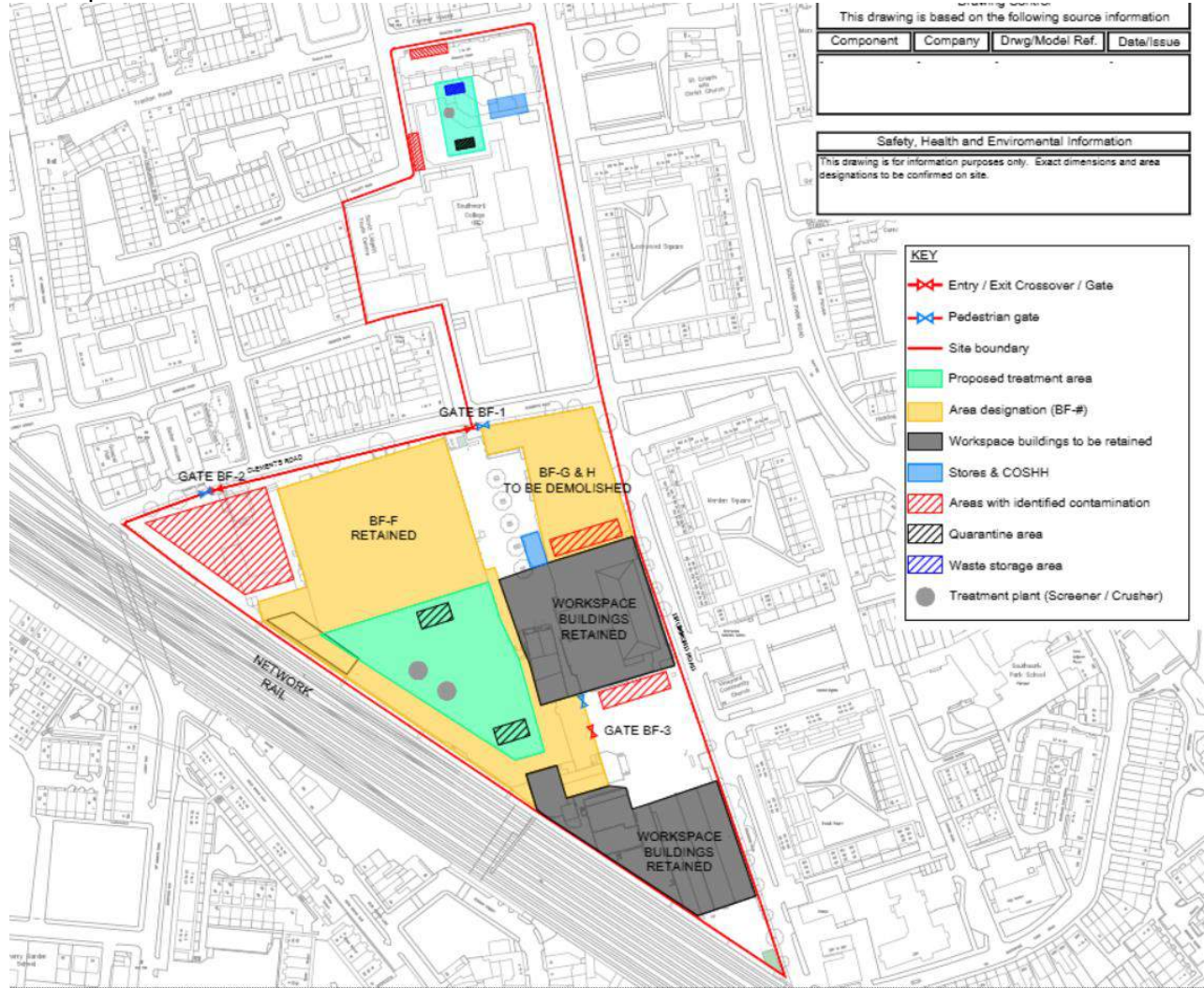
Areas of excavation are detailed in External Areas Earthworks Indicative Formation Levels Contours BER-ARP-BFXXX-XX-SK-D-82003 for the Biscuit Factory and BER-ARP-BC03A-XX-SK-D-82002 for the Campus Site. Capping layer and pile mat design and levels are detailed in BER-WSP-BFXXX-00-DR-S-00003_P02 and BER-WSP-BFXXX-00-DR-S-00002_P02 for the Biscuit Factory and BER-WSP-BCXXX-00-DR-S-00031 for the Campus Site.

Material excavated to achieve finish levels will be treated under KR mobile treatment deployment CB3902KF/W0035 to recover material suitable for reuse and separate out deleterious material for disposal off site.

A copy of the deployment application and issue letter is included in **Appendix B**.

Question 7. Attach a schematic of proposed materials movement. Where there is only one source area and one placement area briefly describe it. For all other projects a schematic is required.

Description & Schematic Document Reference:



Areas of excavation are detailed in External Areas Earthworks Indicative Formation Levels Contours BER-ARP-BFXXX-XX-SK-D-82003 for the Biscuit Factory and BER-ARP-BC03A-XX-SK-D-82002 for the Campus Site. Capping layer and pile mat design and levels are detailed in BER-WSP-BFXXX-00-DR-S-00003_P02 and BER-WSP-BFXXX-00-DR-S-00002_P02 for the Biscuit Factory and BER-WSP-BCXXX-00-DR-S-00031 for the Campus Site, included in **Appendix A**.

2.7. Parties Involved and Consultation

Question 8a. Main earthworks contractor(s) (full address and contact details) – Where excavated materials are to be reused

Keltbray Remediation
St Andrew's House,
Esher,
Surrey
KT10 9TA

Office: 0207 643 1000

Question 8b. Main earthworks contractor(s) (full address and contact details) - Where excavated materials are arising from

Bermondsey Project (Site of origin)

Keltbray Remediation
St Andrew's House,
Esher,
Surrey
KT10 9TA

Office: 0207 643 1000

Question 9. Treatment contractor(s) (full address and contact details) – for treatment on site of origin, or at a Hub site within a fixed STF / Cluster Project

Bermondsey Project (Site of origin)

Keltbray Remediation
St Andrew's House,
Esher,
Surrey
KT10 9TA

Office: 0207 643 1000

SR 2008 No.27: mobile plant for treatment of soils and contaminated material, substances or products. Standard rules to operate a mobile plant for the treatment of soils and contaminated material, substances or products

Environment Agency Reference: CB3902KF/W0035

Treatment for re-use at site of origin

NOTE: Stabilisation of site won material for geotechnical purposes maybe undertaken to reduce the requirement for importing (quality protocol) recycled or quarried aggregate. If undertaken this treatment is not considered part of the SR 2008 No. 27 treatment activities, as the treatment is only required to improve geotechnical characteristics of the material.

Question 10. Where wastes and materials are to be transported between sites, provide details of the transport contractor(s) (full address, contact details and waste carriers registration details (if applicable))

N/A

Question 11. Provide Local Authority contact details (full address and named contacts) where excavated materials are to be reused

Victoria Lewis

London Borough of Southwark
Planning & Regeneration
PO Box 64529
London
SE1P 5LX

Victoria.lewis@southwark.gov.uk

Office:020 7973 3765

Richard Earis

London Borough of Southwark
Planning & Regeneration
PO Box 64529
London
SE1P 5LX

Richard.Earis@southwark.gov.uk

Office:020 75252469

Question 12a. For the site where materials are to be reused and for Hub Site locations provide Environment Agency contact details (full address and named contacts):

Planning

Morgan Haringman
Planning Advisor,
Environment Agency,
Iceni House,

Cobham Road,
Ipswich, Suffolk
IP3 9JD

KSLPlanning@environment-agency.gov.uk

Office: 0208 4748011

Treatment Permit

David Powell

Permitting Officer - Mobile Plant Team,
Environment Agency National Permitting Service,

Quadrant 2,
99 Parkway Ave
Sheffield
S9 4WF

david.powell01@environment-agency.gov.uk

Office: 02030253742

Mobile: 07880005343

Question 12b.

For all Cluster Projects:

Attach any relevant documentation from the EA relating to the excavation and reuse of the materials to demonstrate no objection to the proposals (see 3.37 of DoW CoP)

If the EA has not been consulted please explain why (see paragraph 3.39 of the DoW CoP).

N/A

2.8. Suitable for Use Criteria

Question 13. Please describe or provide copies of the required specification(s) for the materials to be reused on each site.

Document Reference:

- WSP, Bermondsey Biscuit Factory – Main Site, Outline Remediation Strategy, Rev 04, Ref: 70075582-001, October 2020;
- WSP, Bermondsey Biscuit Factory – Campus Site, Outline Remediation Strategy, Rev 04, Ref: 70075882-001, October 2020

A copy of the document can be found in **Appendix C**.

Any material intended for re-use on site as general fill below the proposed marker layer for the clean cover will be tested at a frequency of 1 sample per 500m³. The chemical suite of analysis includes; asbestos, metals, PAHs and TPH-CWG. There are no specific set criteria and testing will be for information purposes only as this material will be placed on a risk based approach.

Any material intended for re-use as part of the clean cover system will be assessed against the Generic Assessment Criteria for end use adopted in the Remediation Strategy, Table 6-2 and Table 6-3, **Appendix C**. The testing frequency is specified as 1 sample per 250m³.

Table 6-2 - GACs for Residential End Use with No Plant Uptake

Analyte	GAC	Units	Analyte	GAC	Units
Asbestos	None Detected	%	TPH Aliphatic C16-C35	800*	mg/kg
Arsenic	35	mg/kg	TPH Aliphatic C35-C44	800*	mg/kg
Cadmium	87	mg/kg	TPH Aromatic C7-C8	853	mg/kg
Chromium III	1,590	mg/kg	TPH Aromatic C8-C10	47	mg/kg
Copper	1000**	mg/kg	TPH Aromatic C10-C12	248	mg/kg
Lead	188	mg/kg	TPH Aromatic C12-C16	800*	mg/kg
Mercury	56	mg/kg	TPH Aromatic C16-C21	800*	mg/kg
Nickel	181	mg/kg	TPH Aromatic C21-C35	800*	mg/kg
Selenium	430	mg/kg	TPH Aromatic C35-C44	800*	mg/kg
Zinc	1000**	mg/kg	Benzo(a)pyrene	1.7	mg/kg
TPH Aliphatics C5-C6	42	mg/kg	Naphthalene	2.3	mg/kg

Analyte	GAC	Units	Analyte	GAC	Units
TPH Aliphatics C6-C8	104	mg/kg	Benzene	0.38	mg/kg
TPH Aliphatics C8-C10	27	mg/kg	Ethylbenzene	83	mg/kg
TPH Aliphatics C10-C12	132	mg/kg	Toluene	868	mg/kg
TPH Aliphatics C12-C16	800*	mg/kg	Xylene M & O	79	mg/kg

* - NOTE: Values with an * have been reduced to 800 mg/kg as a proxy value. This is a professional judgement value as the actual values for hydrocarbons within a residential without plant end use are considered to be too high for the betterment of Controlled Waters.

Values with an ** have been reduced to 1,000 mg/kg as a proxy value. This is a professional judgement value as the actual values for Copper and Zinc within a residential without plant end use are considered to be too high for the betterment of Controlled Waters.

Table 6-3 - GACs for Residential Public Open Space End Use

Analyte	GAC	Units	Analyte	GAC	Units
Asbestos	None Detected	%	TPH Aliphatic C16-C35	800*	mg/kg
Arsenic	79	mg/kg	TPH Aliphatic C35-C44	800*	mg/kg
Cadmium	120	mg/kg	TPH Aromatic C7-C8	800*	mg/kg
Chromium III	2,140	mg/kg	TPH Aromatic C8-C10	800*	mg/kg
Copper	1,000**	mg/kg	TPH Aromatic C10-C12	800*	mg/kg
Lead	375	mg/kg	TPH Aromatic C12-C16	800*	mg/kg
Mercury	124	mg/kg	TPH Aromatic C16-C21	3,790	mg/kg
Nickel	305	mg/kg	TPH Aromatic C21-C35	3,790	mg/kg
Selenium	1,140	mg/kg	TPH Aromatic C35-C44	3,790	mg/kg
Zinc	1,000**	mg/kg	Benzo (a) pyrene	5.2	mg/kg
TPH Aliphatics C5-C6	800*	mg/kg	Naphthalene	4,890	mg/kg
TPH Aliphatics C6-C8	800*	mg/kg	Benzene	72	mg/kg
TPH Aliphatics C8-C10	800*	mg/kg	Ethylbenzene	800*	mg/kg
TPH Aliphatics C10-C12	800*	mg/kg	Toluene	800*	mg/kg
TPH Aliphatics C12-C16	800*	mg/kg	Xylene M & O	800*	mg/kg

* - NOTE: Values with an * have been reduced to 800 mg/kg as a proxy value. This is a professional judgement value as the actual values for hydrocarbons within a residential without plant end use are considered to be too high for the betterment of Controlled Waters.

Values with an ** have been reduced to 1,000 mg/kg as a proxy value. This is a professional judgement value as the actual values for Copper and Zinc within a residential without plant end use are considered to be too high for the betterment of Controlled Waters.

Where contamination is suspected or known to be present

Question 14a. Please provide copies of or relevant extracts from the risk assessment(s) that has been used to determine the specification for use on the site. This must relate to the place where materials are to be used. This must be in terms of (i) human health (ii) controlled waters and (iii) any other relevant receptors. If a risk assessment is not relevant for a particular receptor given the site setting please explain why below:

Document Reference:

- WSP, Bermondsey Biscuit Factory – Main Site, Outline Remediation Strategy, Rev 04, Ref: 70075582-001, October 2020;
- WSP, Bermondsey Biscuit Factory – Campus Site, Outline Remediation Strategy, Rev 04, Ref: 70075882-001, October 2020

Relevant sections of this document states

Section 5.5.1.1: Human Health (Metals)

Residual risks to human health associated contaminated soils within the upper 600mm of the final finished formation levels will be mitigated for lead contamination, through the removal of Made Ground to achieve the formation levels and the covering of most of the site with buildings and hardstanding where Made Ground may still be present following earthworks. In small areas of proposed soft landscaping residual human health risks will be mitigated for lead contaminated soil, through the import or re-use of a 600 mm clean cover system which is chemically compliant with the end-use of the Site. This element of the proposed remediation works that will require verification by subsequent contractors following the completion of Keltbray works.

Section 5.5.1.2: Human Health (Unidentified Hydrocarbons and PCBs)

Localised areas of hydrocarbon contamination may be present within the area of the petrol tanks and PCBs within the area of the substation in the north-western part of the Site. A watching brief by a suitable qualified person is recommended during the enabling works and if any visual evidence of contamination is noted, a discovery strategy and further investigation and assessment of the potential risk to the proposed end-use is recommended. Any mitigation measures will be agreed with the regulators, if required. This approach would be recommended for all areas of potential unidentified contamination on the Site during the enabling works.

Section 5.5.1.3: Human Health (Asbestos) (par.2)

Risks to human health will be mitigated across the majority of the Site through the covering of

the Site with buildings and hardstanding. Within the small areas of soft landscaping, a 600 mm clean cover will be imported (or site re-won) and placed as part of the proposed development. Where development is to be undertaken in stages, sufficient interim cover (minimum 150 mm) should be placed across the site to protect construction workers and other site users.

Section 5.5.2: Controlled Waters

Based on the proposed excavation and removal of the majority of the Made ground across the Site any potential sources of contamination are considered likely to be removed. There may be potential areas of unidentified contamination present at formation level following the earthworks which could pose a risk to Controlled Waters.

A watching brief by a suitably qualified person is also recommended during earthworks in order to identify any potential areas of concern at formation level which may require further assessment during the works in order to ensure that there is a low risk to Controlled Waters.

On achievement of formation level, a watching brief and discovery strategy is recommended within the area of the former laundry in the north-western part of the Site. If potential contaminants of concern are noted, further assessment is recommended and any mitigation measures required will be agreed with the regulators, if required.

Question 14b. Please attach any relevant documentation from the LA relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 of the CoP)

LA Document references:

20_AP_3173-DECISION_NOTICE_-_GRANT-1064133, included in **Appendix D**.

See **Appendix D** for issue of Decision Notice Letter of planning application 17/AP/4088 confirming the discharge of condition 9(a) and partial condition of 9(b).

- WSP, Bermondsey Biscuit Factory – Main Site, Outline Remediation Strategy, Rev 04, Ref: 70075582-001, October 2020;
- WSP, Bermondsey Biscuit Factory – Campus Site, Outline Remediation Strategy, Rev 04, Ref: 70075882-001, October 2020

Question 14c. Please attach any relevant documentation from the EA relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 and Table 2 of the CoP)

EA Document reference:

20_AP_3173-ENVIRONMENT_AGENCY-1041760

See **Appendix D** of Consultee Comment letter (ref: SL/2020/120672/01-L01) recommending the discharge of condition 9(a) and (b)

See **Appendix B** for issue letter for Keltbray's mobile plant deployment by the Permitting Officer. Document reference: Issue Letter – CB3902KF/W0035.

Question 14d. Please attach any relevant documentation from any other regulators (if relevant) relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 of the CoP)

Document Reference:
20_AP_3173-OFFICER_ASSESSMENT-1064137

See **Appendix D**, for Planning Officer Report recommending the discharge of condition 9(a) and (b)

Where contamination is not suspected

Question 15a. Please attach copies or relevant extracts from the Desk Top Study that demonstrates that there is no suspicion of contamination.

N/A

Question 15b. Please attach copies of or relevant extracts from the site investigation/testing reports that adequately characterise the clean materials to be used (if appropriate)

N/A

Question 15c. Please attach copies of any other relevant information (if available) confirming that land contamination is not an issue.

N/A

2.9. Certainty of Use

Question 16a. Planning Permission(s) relating to the site where materials are to be reused

Please provide a copy of the relevant planning permission

Document Reference:
20_AP_3173-DECISION_NOTICE_-_GRANT-1064133

Planning permission 17/AP/4088

Question 16b. Explain how the reuse of the excavated materials fits within the planning permission(s) for each site.

Planning permission was granted on the condition that the remediation of the site is undertaken in accordance with the remediation strategy. The remediation strategy sets out specific criteria for placement of materials/clean cover systems and proposes DoWCoP as an appropriate re-use mechanism. The remediation strategy has been approved by the local authority and the Environment Agency.

The use of material is to re-engineer the ground and bring the site to the proposed levels and facilitate the on-going development of the site.

Question 16c. If planning permission is not required for any one site please explain why below e.g. permitted development, clean up of a chemical spill, surrender of an Environmental Permit, re-contouring within the existing permission.

N/A

Where contamination is suspected or is known to be present

Question 17. Please provide a copy of any Remediation Strategy(ies) that have been agreed with relevant regulators.

Document Reference(s):

- WSP, Bermondsey Biscuit Factory – Main Site, Outline Remediation Strategy, Rev 04, Ref: 70075582-001, October 2020;
- WSP, Bermondsey Biscuit Factory – Campus Site, Outline Remediation Strategy, Rev 04, Ref: 70075882-001, October 2020

Where contamination is not suspected

Question 18. Please provide a copy of any Design Statement(s) that have been agreed (e.g. with the planning authority or in the case of permitted developments the client).

N/A

2.10. Quantity of Use

Question 19. Please provide a breakdown of the excavated materials for each site and how much will be placed at each site or sub area of each site.

Where this is not specific to a single readily identifiable source refer to an annotated plan, schematic or attach a tabulated summary.

Document Reference(s):

All numbers are rounded to the nearest 50m³ and 10 per cent added to all final volumes to provide a contingency for estimated volumes; which have been calculated on all available information provided to date.

Extend of excavation and backfill requirement are as per BER-ARP-BFXXX-XX-SK-D-82002, BER-ARP-BC03A-XX-SK-D-82001 and BER-WSP-BFXXX-00-DR-S-00002, BER-WSP-BCXXX-00-DR-S-0031 the anticipated volumes are:

Cut volume = 55,000m³

General fill volume = 38,000m³

It is estimated that of the total cut volume, 40,000m³ of made ground soils will be screened and 8,550 m³ of oversized recovered. Oversize material will be crushed under a WRAP Protocol and re-used on site. Of the made ground materials processed there will be 38,000m³ recovered for reuse and. Excess material will be removed off-site

NOTE: 'General Fill' might be stabilised for geotechnical improvement to reduce the requirement for importing (quality protocol) recycled or quarried aggregate. Additionally it is considered more sustainable to stabilise the available 'General Fill' than to import quarried / primary aggregates.

Question 20a. How has consolidation/compaction being considered in the above mass balance calculations?

Volumes have been calculated as ground volumes, and therefore compaction of reinstated material is anticipated to be of similar volumes.

Question 20b. How has loss due to treatment being considered in the above mass balance calculations (if applicable)?

A proportion of deleterious material and oversized material has been estimated to be produced as part of the screening process of excavated Made Ground. As there is an excess of this material to be disposed of even a reduction in the volume will provide the necessary

volumes required.

Question 20c. How has the addition of treatment materials being considered in the above mass balance calculations (if applicable)?

Note - An exact figure is not required but one that is reasonable in the circumstances and can be justified if challenged.

N/A

2.11. Contingency Arrangements

Question 21a. What is to happen to, and who is to pay for out of specification materials?

Reference:

A copy of Keltbray's Discovery Strategy for Unexpected Contamination can be found in **Appendix E**.

Materials defined as not suitable for reuse on site will be disposed or recovered at an appropriately permitted / licensed facility.

Keltbray retain responsibility for all material movement and for any financial implications associated with potential 'out of spec' materials under the contract.

Question 21b. What is to happen to, and who is to pay for any excess materials?

Reference:

Excess materials produced on site will be disposed or recovered at an appropriately permitted / licensed facility.

Keltbray retain responsibility for all material movement and for any excess materials under the contract.

Question 21c. What happens if the project programme slips in relation to excavated materials or materials under-going treatment?

Reference:

Keltbray is responsible for this activity as part of the contract, should material treatment fail material will be disposed of offsite untreated at Keltbray's cost.

Question 21d. Other identified risk scenarios for the project (relating to excavated materials)?

Reference:

- WSP, Bermondsey Biscuit Factory – Main Site, Outline Remediation Strategy, Rev 04, Ref: 70075582-001, October 2020;
- WSP, Bermondsey Biscuit Factory – Campus Site, Outline Remediation Strategy, Rev 04, Ref: 70075882-001, October 2020

A copy of Keltbray's Discovery Strategy for Unexpected Contamination can be found in **Appendix E**.

There is potential for unexpected contamination to be encountered relating to former uses of the site. As per the agreed Remediation Strategy all excavation works will be supported by a watching brief and a discovery strategy. Procedures as set out in the Discovery Strategy will be followed, with any unforeseen contamination being reported, with remedial actions reviewed.

Should unexpected contamination be encountered, further assessment is required and any mitigation measures will be agreed with the regulators.

Keltbray retain responsible for the costs associated to unexpected contamination / materials.

2.12. The Tracking System

Question 22a. For all sites please describe the tracking system to be employed to monitor materials movements.

A stockpile tracker, import log and export log will be used and updated frequently to ensure materials are tracked from excavation to placement (see **Appendix F** for site records templates).

The stockpile tracker details the movement of materials on site and ensures clear lines of evidence can be drawn to show all materials movements across the site from start to finish, allowing a 'cradle to grave' approach.

Each stockpile is given a number, which will be referenced in stockpile tracker, as well as a visual sign being put up on site to avoid any possible confusion. The stockpiles tracker will record the material type, its origin, what testing has been/needs to be undertaken and the classification of the stockpile. Treatment needs will also be recorded as well as what treatment has taken place and whether the stockpile is ready for reuse on site or removal from site.

Weekly survey will be conducted of site works, including of stockpiles to assess volumes and track progress.

The export log tracks all materials leaving site. This log corresponds with the stockpile tracker and which stockpiles leave site is recorded on both logs. Every load leaving site is recorded with its unique waste transfer note / hazardous waste consignment note number, receiving facility, waste carrier and permit numbers.

The import log details all materials coming into site along with where they are from, what the material is, when it is imported and its intended end use.

Where contamination is suspected or known to be present, state the procedures put in place to:

Question 22b. Prevent contaminants not suitable for the treatment process being accepted

All material testing (including SI data) will be assessed prior to excavating material on site.

All materials and testing will be tracked using the stockpile register and surveys.

A suitably trained operative will be on site full time and will ensure materials on site and in the stockpile register are appropriately handled and placed / exported. Visual assessments will be conducted on site to segregate material based on chemical and physical characteristics and further assessment to segregate treatable material from unsuitable for treatment and re-use.

Where contamination is suspected or known to be present, state the procedures put in place to:

Question 22c. Prevent cross contamination of materials not in need of treatment, wastes awaiting treatment and treated materials

Any material designated for off-site disposal will be stockpiled separately.

All material leaving site will be recorded on the export log.

As part of the Discovery Strategy, any potentially contaminated materials of an unknown or unclassified nature, will be transferred to a quarantine area, separated from other site materials, in the same manner as untreatable contaminated materials.

Each stockpile will have appropriate signage so all ground workers know where to direct material, all materials will be on the stockpile register and will be tracked throughout their life including placement location.

Where contamination is suspected or known to be present, state the procedures put in place to:

Question 22d. Demonstrate that materials that do not require treatment and

successfully treated materials reach their specific destination

Please refer to the details in Question 22b above for material acceptance procedure.

All materials will be stockpiled separately at all times. The stockpile register ensure the correct materials are treated (or not) and where they are placed. In addition to this surveys will be undertaken a minimum of once a week of placed materials to ensure a suitable record is maintained. The stockpile register will also record details of sampling requirements (rate as specified in the Remediation Strategy) and links to chemical analysis confirming suitability of re-use Only when the material is validated against remedial criteria can it be deemed suitable for placement as general fill on site.

The mobile treatment permit deployment (**Appendix B**) details all treatment of material on site, volumes, methodologies, testing, validation and responsibilities.

There will also be a suitably trained operative on site full time, this person will ensure that the records are kept up to date and that the correct stockpiles are used in the correct destinations.

Where contamination is suspected or known to be present, state the procedures put in place to:

Question 22e. Ensure that waste for off-site disposal or treatment is properly characterised and goes to the correct facility

As part of the Discovery Strategy, any potentially contaminated materials of an unknown or unclassified nature, will be transferred to a quarantine area, separated from other site materials, in the same manner as untreatable contaminated materials.

All materials will be tracked using the stockpile register and surveys. A suitably trained technician will be on site full time and will ensure materials on site and in the stockpile register are appropriately handled and placed / exported.

All permits and licences of facilities and carriers will be obtained and audited prior to disposal.

Question 23. Please attach a copy of the tracking forms / control sheets that are to be used to monitor materials movements.

To include transfer of loads on site into stockpiles prior to treatment (if applicable), stockpiled after treatment (if applicable), stockpiled awaiting use (as appropriate) and final placement.

Document reference(s)

Surveys will be produced to record movement of material along with completion of the following included forms:

Stockpile register
Import Log
Export log

Example of soil audit to be used to track materials onsite is included in **Appendix F**.

For Hub Sites within Cluster Projects & where materials need treatment before reuse

Question 24. Please attach a copy of the Environmental Permit covering the treatment process.

Alternatively if the treatment is covered by a Mobile Plant Permit and associated Deployment Form, attach a copy of the EA agreement to the Deployment Form.

N/A

2.13. Records

Question 25. Where, and in what form, are records to be kept?

Note – records e.g. transfer notes, delivery tickets, Desk Top Study, Site Investigation, Risk Assessment(s), Verification Report(s) need to be kept for at least 2 years after the completion of the works and production of the Verification Report

All records relating to the works (e.g. transfer notes, delivery tickets, Desk Top Study, Site Investigation, Risk Assessment(s)) will be maintained onsite throughout the works for inspection at any time. All other records relating to the works (e.g. transfer notes, delivery tickets, Desk Top Study, Site Investigation, Risk Assessment(s), Verification Report) will be maintained at Keltbray Remediation head office in Esher (Section 2.7) for at least 6 years after the completion of the works

All Health surveillance records will be maintained onsite throughout the works for inspection at any time. Following completion of the works, records will be held at Keltbray Remediation head office (Section 2.7) in Esher for a minimum of 40 years.

2.14. Verification Plan

Question 26. Provide or explain the Verification Plan which sets out how you will record the placement of materials and prove that excavated materials have been reused in the correct location and in the correct quantities within the development works (see 3.4 of the DoW CoP).

Document Reference

Verification is provided through the robust soil audit and tracking process described in section 2.12. This will include reference to reports for chemical analysis where necessary and for any geotechnical testing that takes place.

All of this information will be reported in the Verification Report which will be issued upon conclusion of the project..

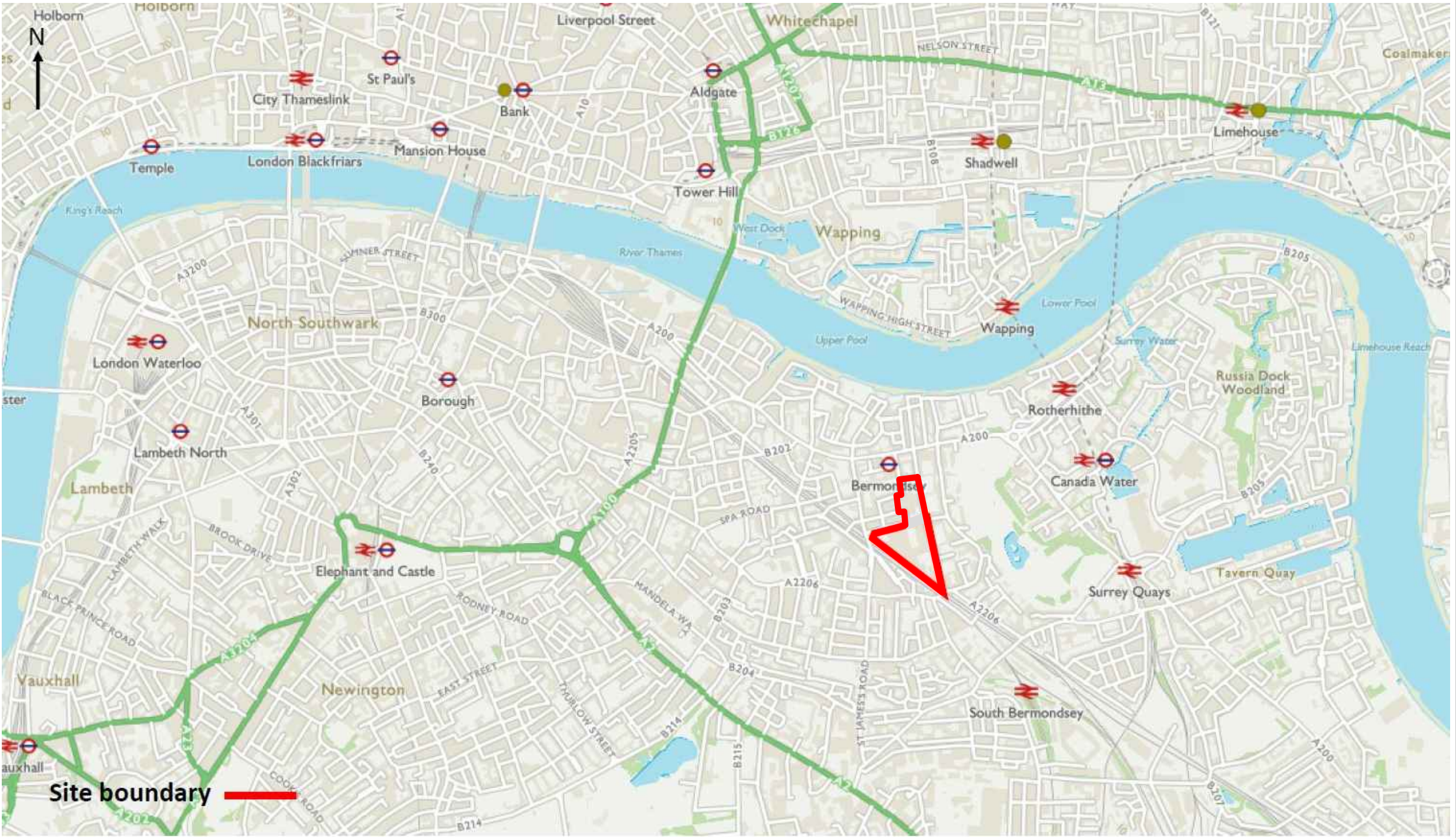
Appendix A Site Plans

Drawing Control			
This drawing is based on the following source information			
Component	Company	Drwg/Model Ref.	Date/Issue

Safety, Health and Environmental Information

This drawing is for information purposes only. Exact dimensions and area designations to be confirmed on site.

- NOTES:**
1. This drawing is to be read in conjunction with all relevant engineer's drawings, architect's drawings and specifications.
 2. For setting out information, refer to the relevant architect's drawing. All elevations and levels are in metres and are related to Ordnance Datum (O.D.).
 3. All dimensions are in metres unless noted otherwise.
 4. Drawings should not be scaled either by hand or from the computer digital data, only figured dimensions are to be used.
 5. The contractor shall be responsible for the design, build and temporary works. They shall provide all temporary works during construction.
 6. Specific temporary works constraints arising from the permanent works design, if and where applicable, are noted on the Keltbray Remediation drawings to which they relate.
 7. Any discrepancies in the information provided should be immediately reported to the Engineer prior to the commencement of work.



P01	29.03.2021	MP	29.03.2021	DV
FIRST FOR REVIEW				
Rev	Date	By	Chkd	Appd

keltbray

St. Andrew's House
 Portsmouth Road
 Esher KT10 9TA
 T: +44 (0)20 7643 1000 F: +44 (0)20 7643 1001 E: enquires@keltbray.com
 www.keltbray.com
 Client

Project Title
BERMONDSEY BISCUIT FACTORY

Key Plan

Drawing Title
SITE LOCATION PLAN

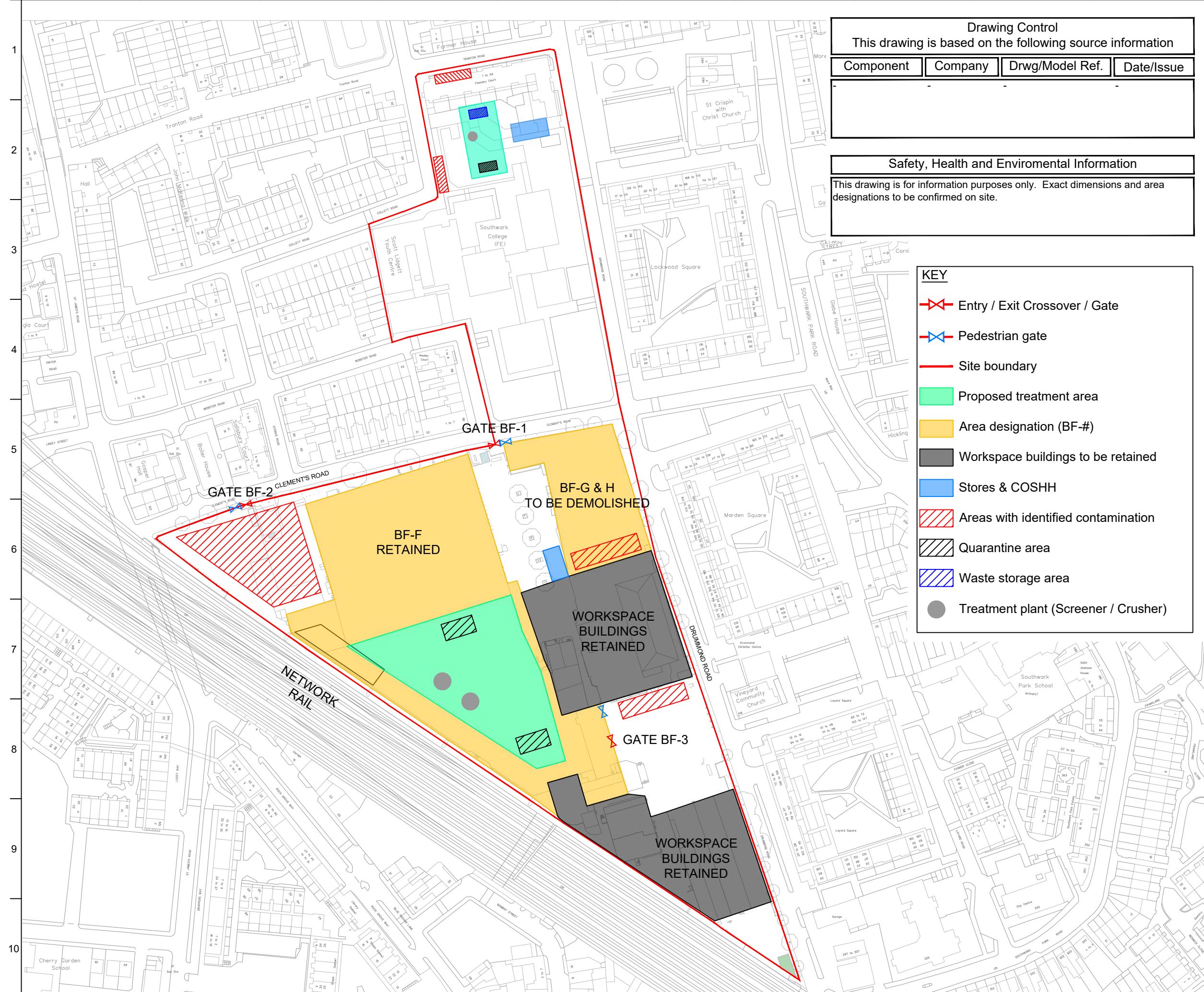
Scale at A3
1:2000

Role
X - SUBCONTRACTOR

Suitability
S2 - FOR INFORMATION

Keltbray Remediation Job No	Rev
T6347	P01

Name
BFX-KRE-X-000-XX-DR-CE-0008
Phase - Originator - Role - Zone - Level - Type - Element - Number



Drawing Control
This drawing is based on the following source information

Component	Company	Drwg/Model Ref.	Date/Issue

Safety, Health and Environmental Information

This drawing is for information purposes only. Exact dimensions and area designations to be confirmed on site.

KEY

- Entry / Exit Crossover / Gate
- Pedestrian gate
- Site boundary
- Proposed treatment area
- Area designation (BF-#)
- Workspace buildings to be retained
- Stores & COSHH
- Areas with identified contamination
- Quarantine area
- Waste storage area
- Treatment plant (Screener / Crusher)

- NOTES:**
- This drawing is to be read in conjunction with all relevant engineer's drawings, architect's drawings and specifications.
 - For setting out information, refer to the relevant architect's drawing. All elevations and levels are in metres and are related to Ordnance Datum (O.D.).
 - All dimensions are in metres unless noted otherwise.
 - Drawings should not be scaled either by hand or from the computer digital data, only figured dimensions are to be used.
 - The contractor shall be responsible for the design, build and temporary works. They shall provide all temporary works during construction.
 - Specific temporary works constraints arising from the permanent works design, if and where applicable, are noted on the Keltbray Remediation drawings to which they relate.
 - Any discrepancies in the information provided should be immediately reported to the Engineer prior to the commencement of work.

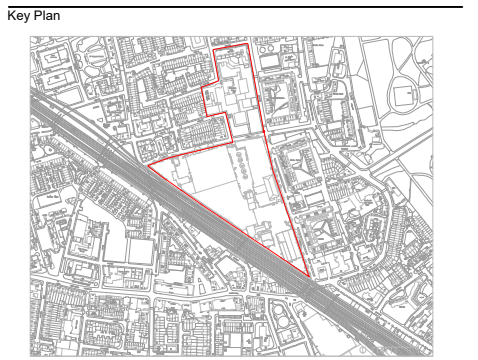
P01	22.04.2021	WH	22.04.2021	DV
FIRST FOR ISSUE				
Rev	Date	By	Chkd	Appd

keltbray

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www.keltbray.com



Project Title
BERMONDSEY BISCUIT FACTORY



Drawing Title
SITE LAYOUT PLAN

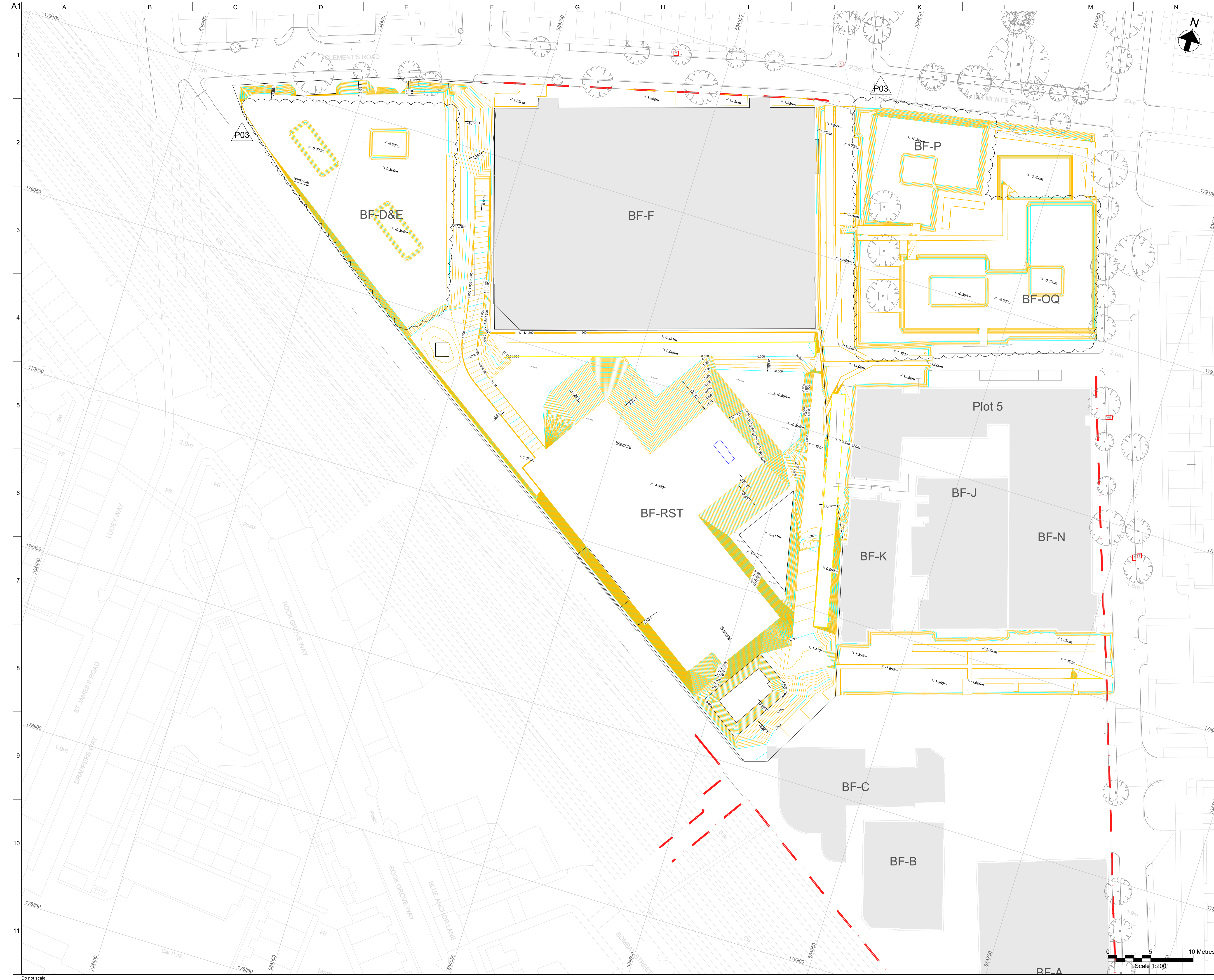
Scale at A3
NOT TO SCALE

Role
X - SUBCONTRACTOR

Suitability
S2 - FOR INFORMATION

Keltbray Remediation Job No	Rev
T6347	P01

Name
BFX-KRE-X-000-XX-DR-CE-0010
Phase - Originator - Role - Zone - Level - Type - Element - Number



- Notes**
1. This drawing is for information purposes only and is subject to design development in future design stages.
 2. This drawing compares proposed formation levels with estimated existing to give an indication of earthworks required to achieve proposed scheme.
 3. Bulk excavation levels do not allow for localised pit excavation. It is assumed this will be undertaken under a different contract.
 4. Please refer to sketch BER-ARP-BFXXX-XX-SK-D-82003 for proposed excavation contours.
 5. The volumes provided on this drawing are for indicative and are information only. The volumes have been produced from assumptions on existing and proposed levels. It is expected that the Contractor confirm and validate all excavation volumes.
 6. For all excavations in close proximity to Building BF-F, please refer to AKTII design information for proposed excavation methodology.

P03	29/10/20	TB	CM	RR
Tender Addendum				
P02	05/06/20	MA	CM	RR
Tender Addendum				
P01	18/03/19	BK	CM	RR
Controlled Issue - Aconex				
Issue	Date	By	Chkd	Appd

ARUP
 13 Fitzroy Street
 London W1T 4BQ
 Tel +44(0)20 7638 1531 Fax +44(0)20 7580 3924
 www.arup.com

Client
Grosvenor Group

Job Title
**The Bermondsey Project
 Biscuit Factory - Phase 1
 Enabling and Demolition Works**

Key Plan

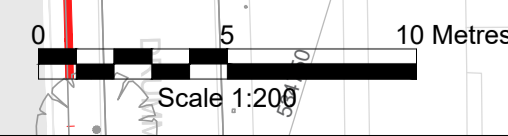
Drawing Title
**Biscuit Factory
 External Areas Earthworks
 Indicative Formation Levels
 Contours**

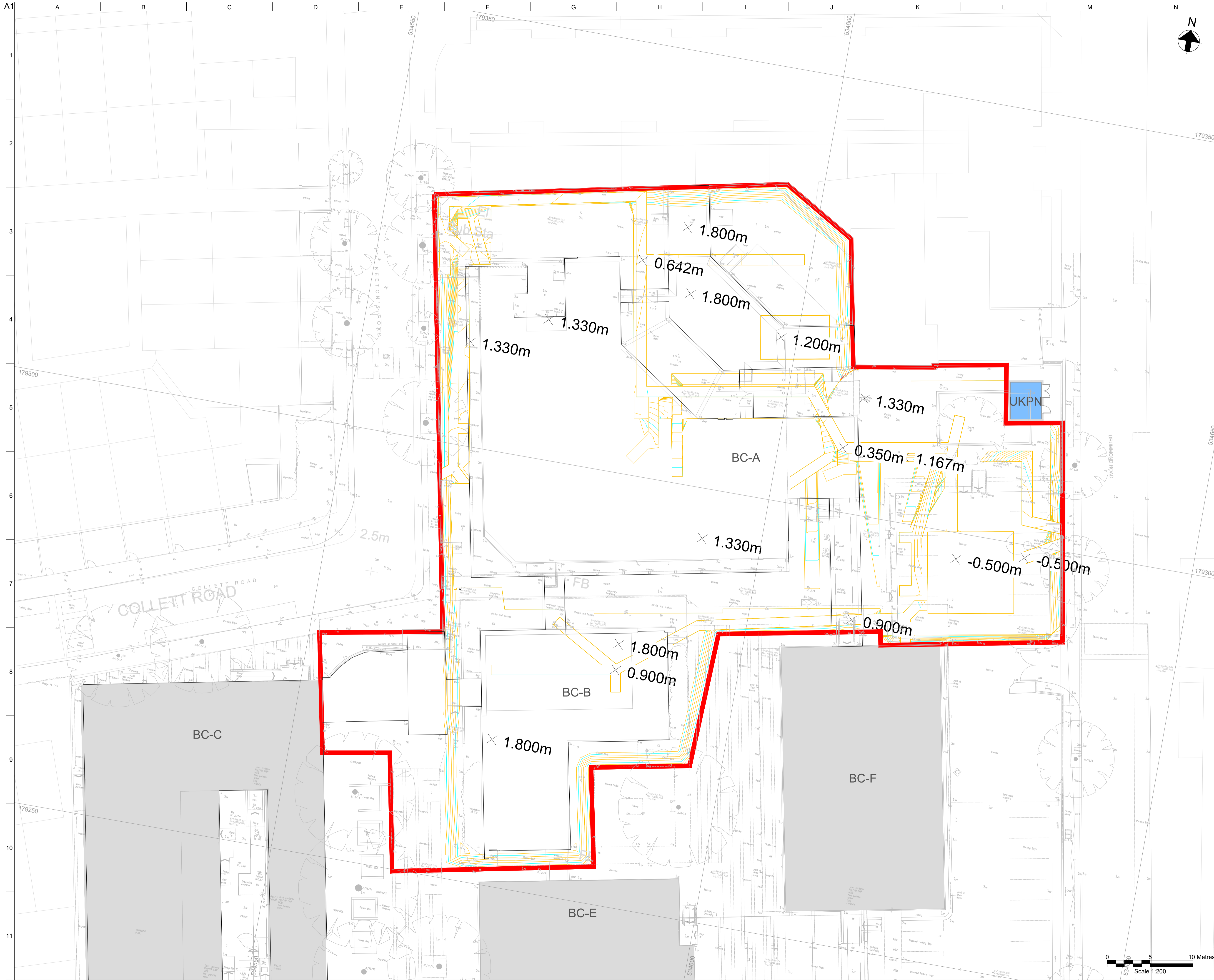
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Discipline Civil

Job No
237092-00

Drawing No
**For Information
 BER-ARP-BFXXX-XX-SK-D-82003**





- Notes**
1. This drawing is for information purposes only and is subject to design development in future design stages.
 2. This drawing compares proposed formation levels with estimated existing to give an indication of earthworks required to achieve proposed scheme.
 3. Bulk excavation levels do not allow for localised pit excavation. It is assumed this will be undertaken under a different contract.
 4. Please refer to WSP drawing BER-WSP-BCXXX-00-DR-S-00030 for indicative pile mat levels
 5. The volumes provided on this drawing are for information only. The volumes have been produced from assumptions on existing and proposed levels. It is expected that the Contractor confirm and validate all excavation volumes.

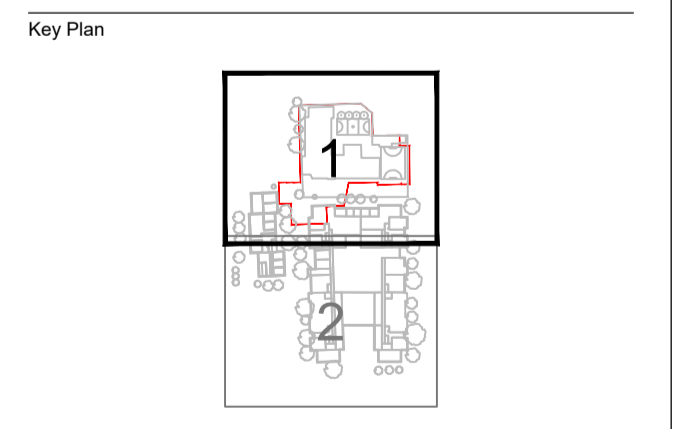
P01	18/11/19	CM	CM	RR
For Information				
Issue	Date	By	Chkd	Appd

ARUP

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 London W1T 4BQ
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 www.arup.com

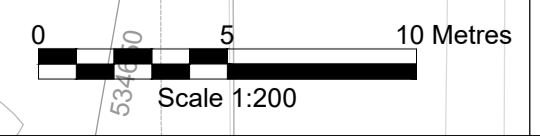
Client
Grosvenor Group

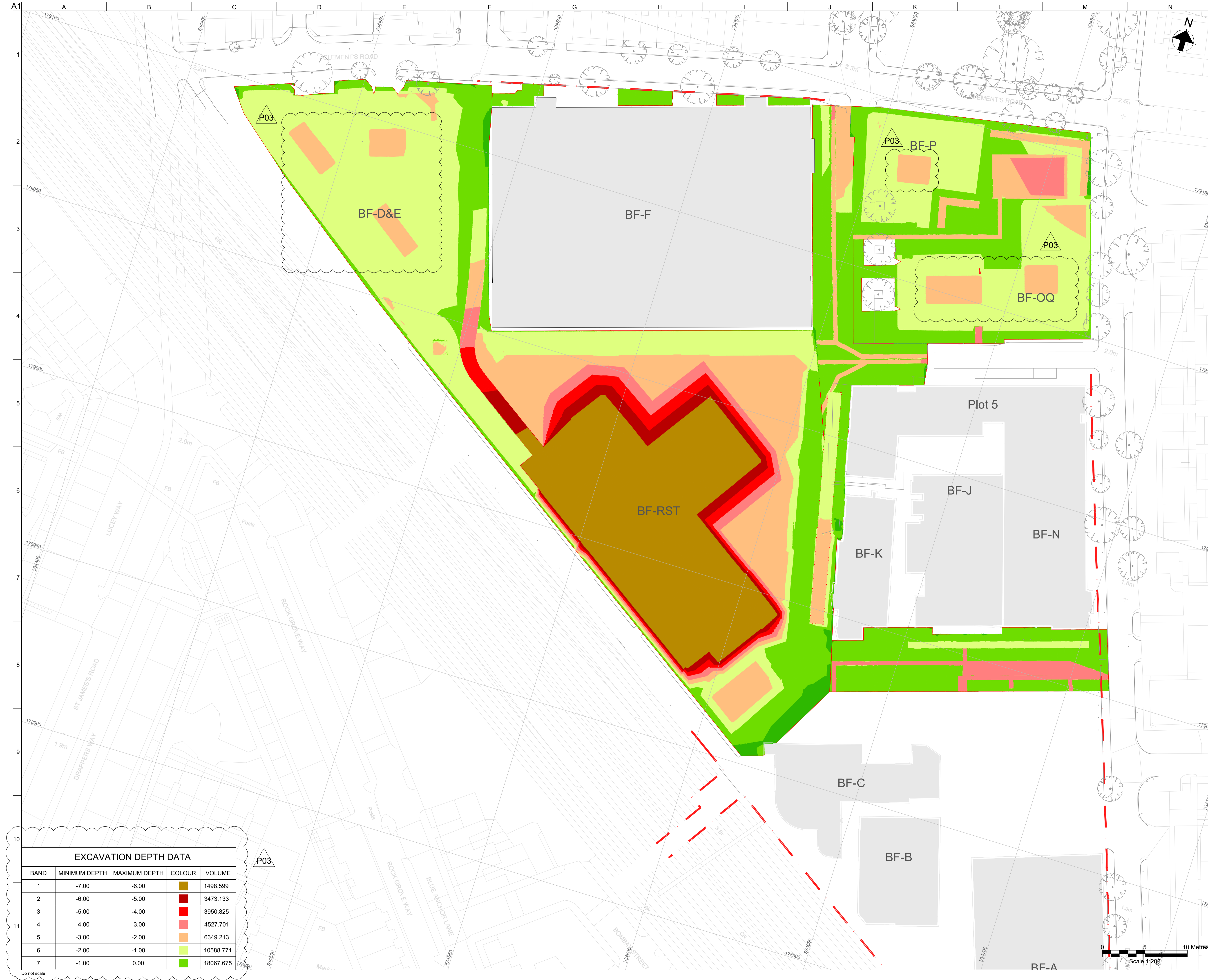
Job Title
**The Bermondsey Project
 Campus - Phase 1
 Enabling and Demolition Works**



Drawing Title
**Campus School
 External Areas Earthworks
 Indicative Formation Levels
 Contours**

Scale at A1 1:200
 Discipline Civil
 Job No **237092-00** Drawing Status **For Information**
 Drawing No **BER-ARP-BC03A-XX-SK-D-82002**





- Notes**
1. This drawing is for information purposes only and is subject to design development in future design stages.
 2. This drawing compares proposed formation levels with estimated existing to give an indication of earthworks required to achieve proposed scheme.
 3. Bulk excavation levels do not allow for localised pit excavation. It is assumed this will be undertaken under a different contract.
 4. Please refer to sketch BER-ARP-BFXXX-XX-SK-D-82003 for proposed excavation contours.
 5. The volumes provided on this drawing are for indicative and are information only. The volumes have been produced from assumptions on existing and proposed levels. It is expected that the Contractor confirm and validate all excavation volumes.
 6. For all excavations in close proximity to Building BF-F, please refer to AKTII design information for proposed excavation methodology.
 7. BF-D&E excavation volumes have been modelled in relation to the RIBA 2 structural design.

P03	29/10/20	TB	CM	RR
Tender Addendum				
P02	05/06/20	MA	CM	RR
Tender Addendum				
P01	18/03/19	AM	CM	RR
Controlled Issue - Aconex				
Issue	Date	By	Chkd	Appd

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Client
Grosvenor Group

Job Title
**The Bermondsey Project
 Biscuit Factory - Phase 1
 Enabling and Demolition Works**

Key Plan

Drawing Title
**Biscuit Factory
 External Areas Earthworks
 Indicative Formation Levels
 Isopac**

Scale at A1 1:1000

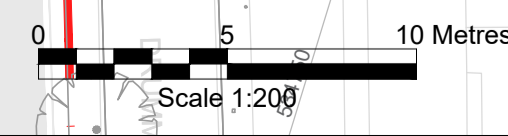
Discipline Civil

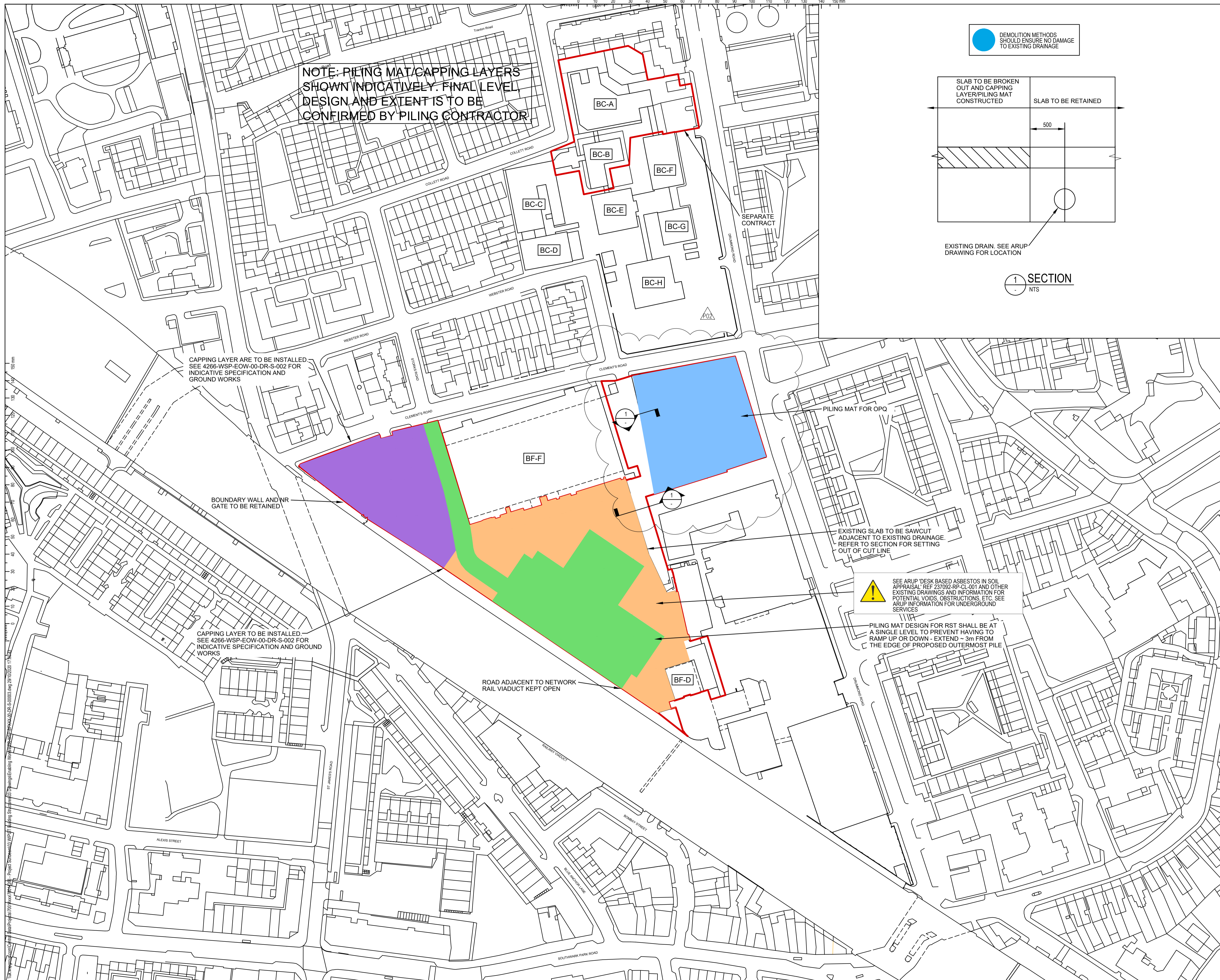
Job No **237092-00** Drawing Status **For Information**

Drawing No **BER-ARP-BFXXX-XX-SK-D-82002**

EXCAVATION DEPTH DATA

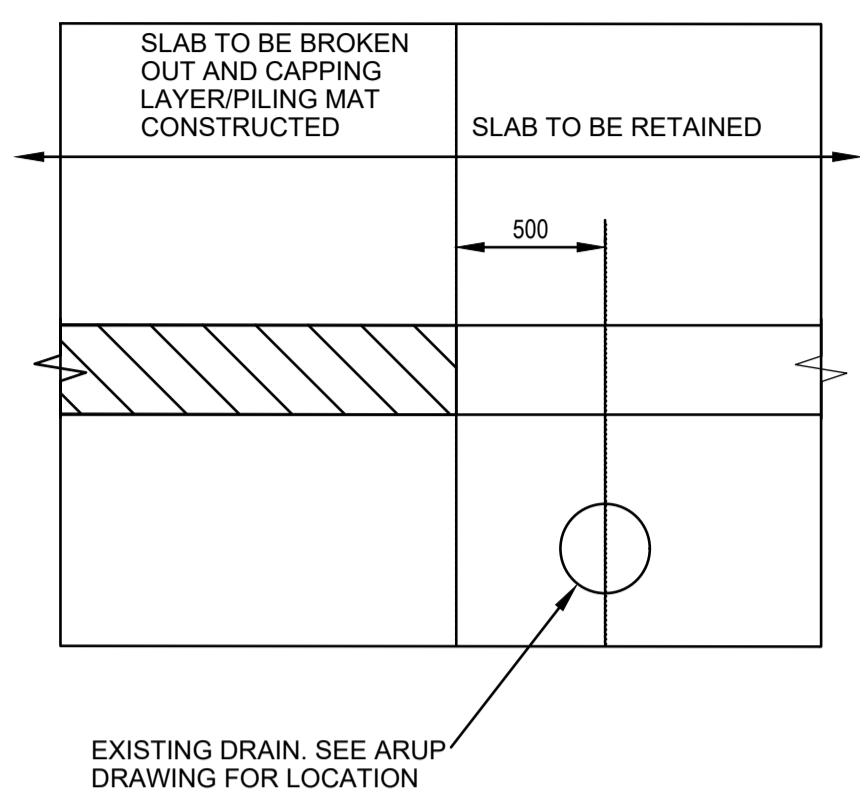
BAND	MINIMUM DEPTH	MAXIMUM DEPTH	COLOUR	VOLUME
1	-7.00	-6.00	Dark Brown	1498.599
2	-6.00	-5.00	Red	3473.133
3	-5.00	-4.00	Light Red	3950.825
4	-4.00	-3.00	Orange	4527.701
5	-3.00	-2.00	Light Orange	6349.213
6	-2.00	-1.00	Light Green	10588.771
7	-1.00	0.00	Green	18067.675





NOTE: PILING MAT/CAPPING LAYERS SHOWN INDICATIVELY. FINAL LEVEL DESIGN AND EXTENT IS TO BE CONFIRMED BY PILING CONTRACTOR

DEMOLITION METHODS SHOULD ENSURE NO DAMAGE TO EXISTING DRAINAGE



DO NOT SCALE

KEY TO HEALTH AND SAFETY SYMBOLS

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION.
- INDICATES A RESIDUAL RISK FOR INFORMATION.
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION.
- INDICATES A RESIDUAL RISK AS A WARNING.

BUILDINGS TO BE DEMOLISHED PRIOR TO EXTERNAL DRAINAGE INFRASTRUCTURE BEING ABANDONED OR REMOVED

LEGEND
REFER TO SECTIONS ON DRAWING 4266-WSP-EOW-00-DR-S-002

- PRELIMINARY EXTENT OF CAPPING LAYER - TBC FOLLOWING SITE INVESTIGATIONS. LEVEL +1.700 AOD TBC BY ARUP FOLLOWING SI.
- PILING MAT LEVEL +1.650 AOD
- PILING MAT LEVEL +1.900 AOD
- CAPPING LAYER BUILDINGS D&E SITE LEVEL +1.050 AOD

CAPPING LAYER ARE TO BE INSTALLED. SEE 4266-WSP-EOW-00-DR-S-002 FOR INDICATIVE SPECIFICATION AND GROUND WORKS

BOUNDARY WALL AND NR GATE TO BE RETAINED

CAPPING LAYER TO BE INSTALLED. SEE 4266-WSP-EOW-00-DR-S-002 FOR INDICATIVE SPECIFICATION AND GROUND WORKS

ROAD ADJACENT TO NETWORK RAIL VIADUCT KEPT OPEN

PILING MAT FOR OPQ

EXISTING SLAB TO BE SAWCUT ADJACENT TO EXISTING DRAINAGE. REFER TO SECTION FOR SETTING OUT OF CUT LINE

SEE ARUP 'DESK BASED ASBESTOS IN SOIL APPRAISAL' REF 237092-RP-CL-001 AND OTHER EXISTING DRAWINGS AND INFORMATION FOR POTENTIAL VOIDS, OBSTRUCTIONS, ETC. SEE ARUP INFORMATION FOR UNDERGROUND SERVICES

PILING MAT DESIGN FOR RST SHALL BE AT A SINGLE LEVEL TO PREVENT HAVING TO RAMP UP OR DOWN - EXTEND - 3m FROM THE EDGE OF PROPOSED OUTERMOST PILE

P02	29/10/2020	RP	PILING MAT BUILDING OPQ UPDATED	LR	PW
P01	24/04/2020	RW	ENABLING WORKS CONCEPT ISSUE	JL	CP
D		BS	UPDATED AS SHOWN	CP	CP
C		WIP	UPDATED AS SHOWN	CP	CP
B	09/03/2018	BS	UPDATED AS SHOWN	NA	CP
A	02/03/2018	BS	FIRST ISSUE	NA	CP
REV	DATE	BY	DESCRIPTION	CHK	APD

DRAWING STATUS: **D2 - ISSUED FOR TENDER**

wsp
 WSP House, 70 Chancery Lane, LONDON WC2A 1AF
 Tel: +44 (0)20 7314 5000 Fax: +44 (0)20 7314 5001
<http://www.wspgroup.com>

CLIENT: GROSVENOR

ARCHITECT: KPF

PROJECT: THE BERMONDSEY PROJECT

TITLE: PILING MAT / CAPPING LAYER SITE PLAN

SCALE @ A1: 1:1000





PROJECT No: 70014266

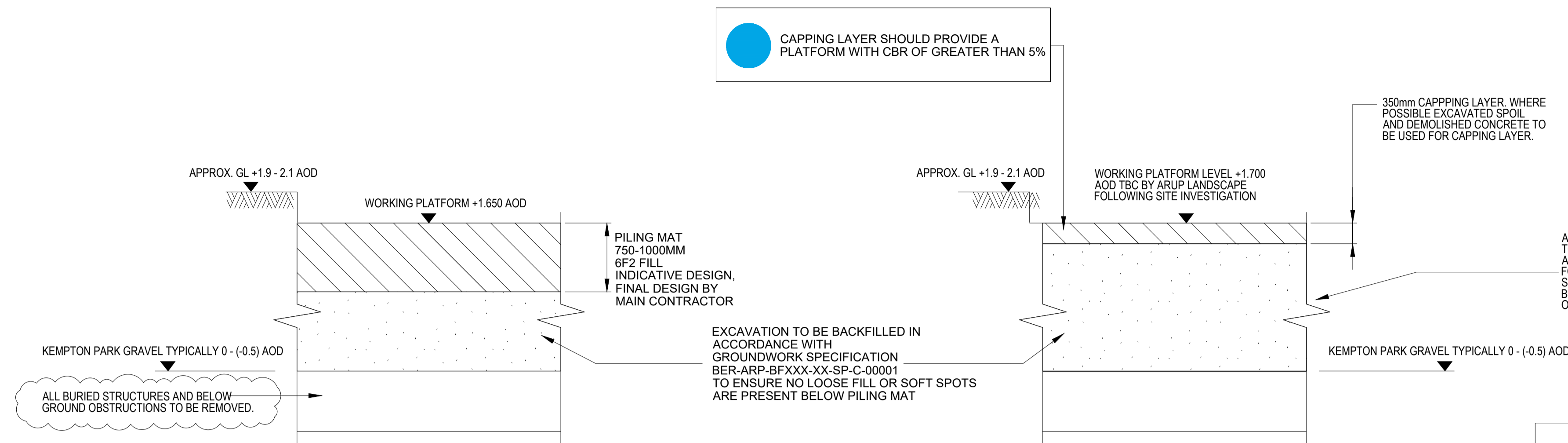
DRAWING No: BER-WSP-BFXXX-00-DR-S-00003


REV: P02

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KEY TO HEALTH AND SAFETY SYMBOLS

-  INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION.
-  INDICATES A RESIDUAL RISK FOR INFORMATION.
-  INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION.
-  INDICATES A RESIDUAL RISK AS A WARNING.



 SEE DESK STUDIES AND ENVIRONMENTAL INFORMATION BY ARUP FOR DETAILS OF ASBESTOS AND OTHER CONTAMINANTS IN GROUND

ALL BURIED STRUCTURES FOUND BELOW THE CAPPING LAYER TO BE REMOVED. FINAL DEPTH TBC ON SITE. FOR EXTENT OF ASBESTOS REMEDIATION REFER TO ARUP TECHNICAL NOTES. FOUNDATIONS, BASEMENT AND HISTORICAL BURIED STRUCTURES FOUND WITHIN THE FOOTPRINT OF THE PROPOSED BUILDING BF-U THAT CAN POSE OBSTRUCTION TO FUTURE PILING OPERATION TO BE REMOVED.

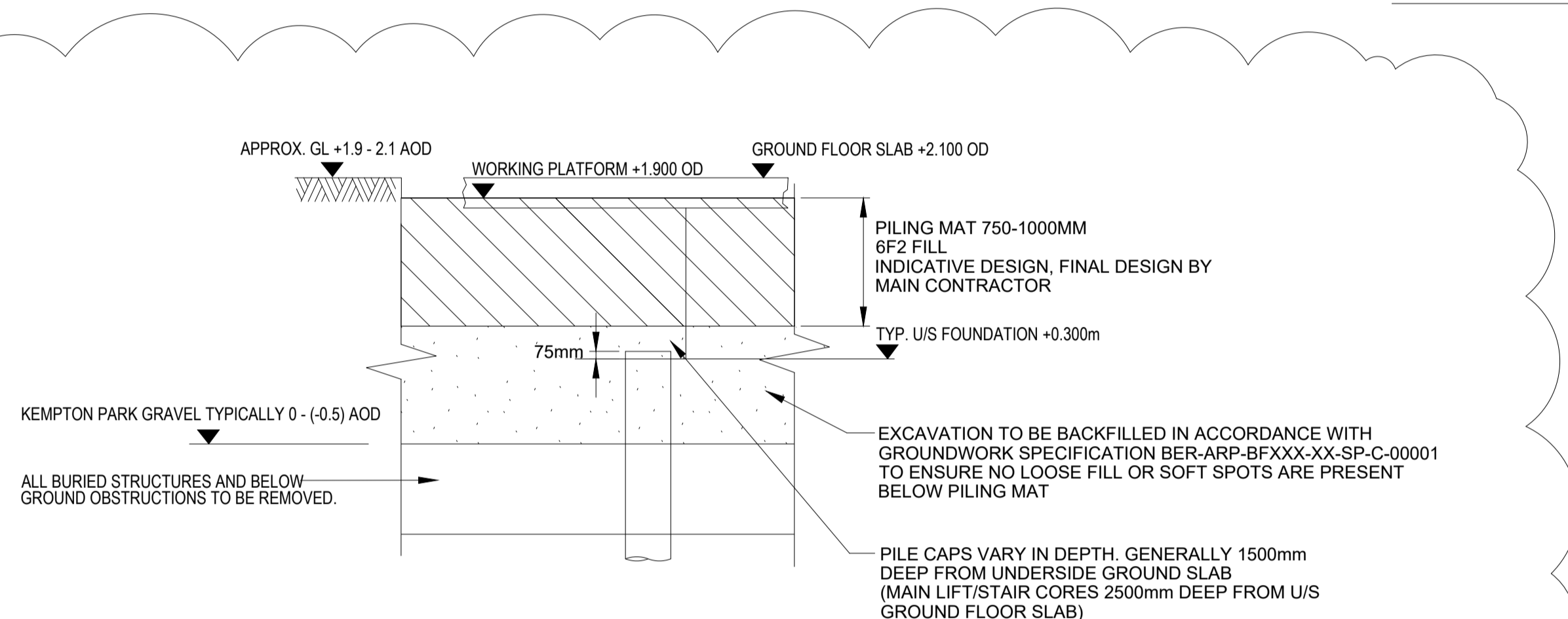
FOR DETAILS OF LIKELY BELOW GROUND STRUCTURES REFER TO:

- ARUP DESK STUDIES
- RECORD DRAWINGS ISSUED BY WSPON 23/02/2018 FOR BF-C AND BF-D.
- FOR BF-E ASSUME EXISTING FOUNDATIONS ARE 1.5m x 1.5m x 1.0m DEEP PAD FOUNDATIONS TBC ON SITE.

NOTE OTHER FOUNDATIONS MAY EXIST FROM EARLIER BUILDINGS. FOR LOCATION OF COLUMNS SEE EXISTING DRAWINGS IN BER-WSP-BFXXX-XX-RP-S-00001.

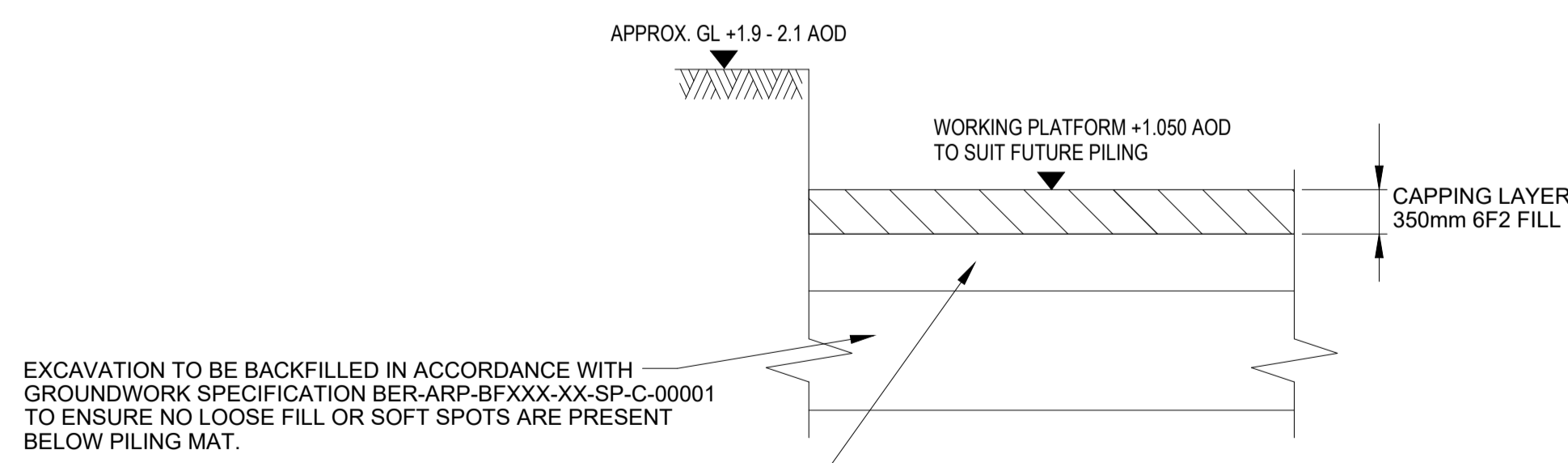
PILING MAT DESIGN - RST (INDICATIVE)

CAPPING LAYER DESIGN FOR AREAS OUTSIDE FUTURE BUILDING FOOTPRINT (INDICATIVE)



PILING MAT DESIGN - OPQ (INDICATIVE)

FINAL PILING PLATFORM LEVEL TO BE DETERMINED BY CONTRACTOR. LEVELS SHOWN REPRESENT BEST ESTIMATES. LEVELS MAY INCREASE OR DECREASE. DEMOLITION CONTRACTOR TO PRICE BASED ON THIS DRAWING. THE LEVELS WILL BE REVIEWED FOLLOWING APPOINTMENT OF THE MAIN CONTRACTOR AND ANY CHANGES TO THIS DRAWING IMPLEMENTED AS A CHANGE UNDER THE DEMOLITION CONTRACT.



CAPPING LAYER DESIGN BUILDINGS D&E SITE

REV	DATE	BY	DESCRIPTION	CHK	APP
P02	28/10/2020	RP	ENABLING WORKS CONCEPT ISSUE	LR	PW
P01	24/04/2020	RW	ENABLING WORKS CONCEPT ISSUE	JL	CP
B	09/03/2018	BS	UPDATED AS SHOWN	NA	CP
A	02/03/2018	BS	FIRST ISSUE	NA	CP

DRAWING STATUS: **D2 - ISSUED FOR TENDER**



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http://www.wspgroup.com

CLIENT: GROSVENOR

ARCHITECT: KPF





PROJECT: THE BERMONDSEY PROJECT

TITLE: INDICATIVE GROUND WORKS DESIGN

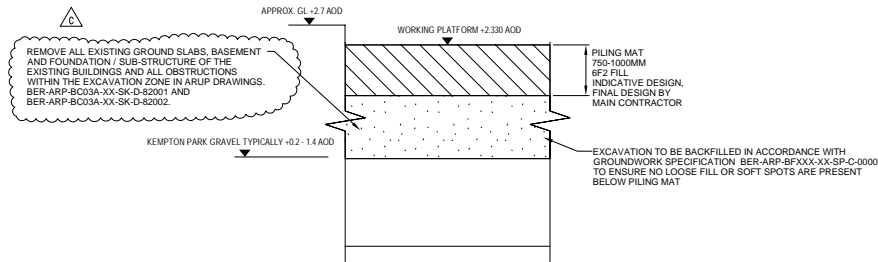
SCALE @ A1:	CHECKED:	APPROVED:	
1:50	NA	CP	
PROJECT No:	DESIGNED:	DRAWN:	DATE:
70014266	NA	BS	02/03/2018
DRAWING No:	REV:		
BER-WSP-BFXXX-00-DR-S-00002	P02		

SEE DESK STUDIES AND ENVIRONMENTAL INFORMATION BY ARUP FOR DETAILS OF ASBESTOS AND OTHER CONTAMINANTS IN GROUND

KEY TO HEALTH AND SAFETY SYMBOLS

-  INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION.
-  INDICATES A RESIDUAL RISK FOR INFORMATION.
-  INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION.
-  INDICATES A RESIDUAL RISK AS A WARNING.

THE USE OF A PILING MAT IS TO BE REVIEWED FOLLOWING THE APPOINTMENT OF THE MAIN CONTRACTOR. THE DEMOLITION/ENABLING WORKS CONTRACTOR MUST OBTAIN APPROVAL FROM THE EMPLOYER'S AGENT BEFORE PROCEEDING WITH THIS WORK.



PILE MAT DESIGN - SCHOOL (INDICATIVE)

REV	DATE	BY	DESCRIPTION	CHK	APP
C	14/02/2020	BS	UPDATED AS SHOWN	JL	CF
B	09/02/2018	BS	UPDATED AS SHOWN	JL	CF
A	05/03/2018	BS	FIRST ISSUE	JL	CF

ENABLING WORKS TENDER



WSP House, 70 Chancery Lane, LONDON WC2A 1AF
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<http://www.wspgroup.com>

CLIENT: GROSVENOR

ARCHITECT: KPF

PROJECT: THE BERMONDSEY PROJECT

TITLE: INDICATIVE GROUND WORKS DESIGN

SCALE @ A1:	1:50	DRAWN:	JL	APPROVED:	CP
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PROJECT No:	70014208	DRAWN:	JL	CHECKED:	BS	DATE:	05/03/2018
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DRAWING No: BER-WSP-BCXXX-00-DR-S-00031 | REV: C

C:\Users\j.lambert\OneDrive\Documents\Projects\Bermondsey\Bermondsey - Main\Concept\04 - 14/02/2020\04-00031.dwg (12/02/2020 14:28:08)

Appendix B

Regulatory Correspondence

Victoria Lewis
London Borough of Southwark
Planning & Regeneration
PO Box 64529
LONDON
SE1P 5LX

Our ref: SL/2020/120672/01-L01
Your ref: 20/AP/3173
Date: 30 November 2020

Dear Victoria Lewis

Discharge of parts a) and b) of condition 9 (contamination) of planning permission 17/AP/4088 (full planning permission for demolition, alterations and extension of existing buildings and erection of new buildings comprising a mixed use scheme providing up to 1,418 residential units, up to 3,436 sqm GEA of flexible class A1/A3/A4 floorspace, up to 14,666 SQM GEA of flexible class B1 floorspace, up to 869 SQM GEA of flexible class D1/D2 and up to 3,311 SQM GEA of multi use floorspace (A1/A3/A4/D1) within building BF-F, A new secondary school, in buildings ranging from 6 to 36 storeys in height as well as the creation of a single storey basement. The development also includes communal amenity space, landscaping, childrens' playspace, car and cycle parking, installation of plant, new pedestrian, vehicular and servicing routes, the creation of two new pedestrian routes through the railway arches and other associated works; and Outline planning permission (with all matters reserved) for the part demolition and part retention of existing buildings and erection of two new buildings comprising a mixed use scheme providing up to 130 residential units and up to 780 SQM GEA of flexible A1/A3/A4/D1/SUI generis uses and other associated works)

Tower Bridge Business Complex Clements Road London Southwark SE16 4DG

Thank you for consulting the Environment Agency on the above planning application.

We have reviewed the submitted information and respond as follows:

Environment Agency position

We **can recommend the discharge** of parts (a) and (b) of condition 9.

The application considers two adjacent sites - Main Site and Campus Site. Each of the sites is accompanied by an 'Outline Remediation Strategy' document by WSP under the Project reference 70075582 dated October 2020. The documents summarize previous investigations and the current contamination status. On the

basis of the data obtained, the preferred remedial options are a mixture of excavation and dispose / removal to soil treatment facility and materials management and cover systems / barriers, supported by a watching brief and discovery strategy. We find this acceptable and consequently we recommend that Condition 9 Parts (a) and (b) may be discharged.

We hope you find our response helpful. Please contact us if you have any questions.

Yours sincerely

Mr Morgan Haringman
Planning Advisor

Direct e-mail KSLPlanning@environment-agency.gov.uk

Recommendation

1. That the approval of the submitted details is GRANTED.

Background Information

Parent planning application

2. The detailed background information relating to this development is set out in the report on the original planning application, the development description for which reads as:

Full planning permission for demolition, alterations and extension of existing buildings and erection of new buildings comprising a mixed-use scheme providing up to 1,418 residential units, up to 3,436 sq.m. (GEA) of flexible Class A1/A3/A4 floorspace, up to 14,666 sq.m. (GEA) of flexible Class B1 floorspace, up to 869 sq.m. (GEA) of flexible Class D1/D2 floorspace and up to 3,311 sq.m. (GEA) of flexible multi-use Class A1/A3/A4/D1 floorspace within retained Block BF-F, a new secondary school, in buildings ranging from 5 to 35 storeys in height as well as the creation of a single storey basement. The development also includes communal amenity space, landscaping, children's playspace, car and cycle parking, installation of plant, new pedestrian, vehicular and servicing routes, the creation of two new pedestrian routes through the Railway Arches and associated works; and,

Outline planning permission (with all matters reserved) for the part demolition and part retention of existing buildings and erection of two new buildings comprising a mixed-use scheme, providing up to 130 residential units and up to 780 sq.m. (GEA) of flexible multi-use floorspace (Class A1/A3/A4/D1/Sui Generis), and other associated works.

Planning permission was granted by the Greater London Authority (GLA) on 20th June 2020 following the completion of a s106 agreement.

Details required by the parent planning application

3. The condition which this 'Approval of Details' application seeks to discharge reads as follows:

Condition 9 - Land Contamination, Verification Report

(a) Prior to the commencement of any development (excluding above-ground demolition) for a Phase or Building, a site investigation and risk assessment shall be completed in accordance with a scheme to assess the nature and extent of any contamination on the site, whether or not it originates on the site, and be submitted to the Local Planning Authority for approval.

i. The Phase 1 report (desk study, site categorisation, sampling strategy etc) shall be submitted to the Local Planning Authority for approval before the commencement of any investigations.

ii. Any subsequent Phase 2 activities (site investigation and risk assessment) shall be conducted in accordance with any approved scheme and submitted to the Local Planning Authority for approval prior to the commencement of any remediation that might be required.

(b) In the event that contamination is present, a detailed remediation strategy to bring the site to a condition suitable for the intended use by removing unacceptable risks to human health, buildings and other property and the natural and historical environment shall be prepared and submitted to the Local Planning Authority for approval in writing. The scheme shall ensure that the site will not qualify as contaminated land under Part 2A of the Environmental Protection Act 1990 in relation to the intended use of the land after remediation. The approved remediation scheme (if one is required) shall be carried out in accordance with its terms as part of the development. The Local Planning Authority shall be given two weeks written notification of commencement of the remediation scheme works.

(c) Following the completion of the works and measures identified in the approved remediation strategy, a verification report providing evidence that all works required by the remediation strategy have been completed shall be submitted to and approved in writing by the Local

Planning Authority.

(d) In the event that potential contamination is found at any time when carrying out the approved development that was not previously identified, it shall be reported in writing immediately to the Local Planning Authority, and a scheme of investigation and risk assessment, a remediation strategy and verification report (if required) shall be submitted to the Local Planning Authority for approval in writing, in accordance with a-c above.

Reason - To ensure that risks from land contamination to the future users of the land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other off-site receptors in accordance with saved policy 3.2 'Protection of amenity' of the Southwark Plan (2007), strategic policy 13' High environmental standards' of the Core Strategy (2011), policy 5.21 of the London Plan and the National Planning Policy Framework 2019.

The application seeks to discharge part a) of the condition for the entire site, and part b) of the condition as follows:

Main site: buildings BF-D&E, BF-F, BF-O, BF-P, BF-Q, and BF-RST only.
Campus site: building BC-6 (school) only.

Details submitted in support of this 'Approval of Details' application

4. The following documents have been submitted in support of this 'Approval of Details' application:
 - Cover letter from WSP dated 2nd October 2020 (Main site);
 - Cover letter from WSP dated 2nd October 2020 (Campus site);
 - Bermondsey Biscuit Factory campus site outline remediation strategy by WSP dated October 2020;
 - Cover letter from GeraldEve dated 27th October 2020;
 - Bermondsey Biscuit Factory Main site outline remediation strategy by WSP dated October 2020

Planning history

5. See Appendix 1 for any relevant planning history of the application site and/or adjoining sites.

Key Issues for Consideration

6. The main issues to be considered in respect of this application are:
 - Whether the submitted details are acceptable in terms of policy;
 - Consultee responses, and how the application addresses the concerns raised;
 - Whether the submitted details are sufficient to discharge the terms of the condition and reason for the imposition of the condition;
 - Any other matters;
 - Community impact and equalities assessment, and;
 - Human rights implications
7. These matters are discussed in detail in the 'Assessment' section of this report.

Assessment

Planning policy

8. The revised National Planning Policy Framework ('NPPF') was published in February 2019 which sets out the national planning policy and how this needs to be applied. The NPPF focuses on sustainable development with three key objectives: economic, social and environmental.
9. Paragraph 212 states that the policies in the Framework are material considerations which should be taken into account in dealing with applications.

10. The detailed planning policy relating to this development is set out in the report on the original planning application. Any specific policy considerations relating to the submitted details are detailed below.

11. **Consultation responses, and how the application addresses the concerns raised**

Consultation responses from external, internal and divisional consultees

12. Summarised below are the material planning considerations raised by external, internal and divisional consultees. Where the matter is not addressed in the relevant subsequent parts of this 'Assessment' section, the officer has provided a response to issue(s) raised by the consultee.

13. Environmental Protection Team

The remediation strategies for the campus and main sites are acceptable to discharge the condition parts a.) and b.).

However I note that there are some gaps in the characterisation of both sites. Whilst removal of made ground is likely to mitigate these, the remediation strategy includes a necessary discovery strategy and further sampling.

For example in respect of VOCs where it is stated that:

Insufficient data has been provided of volatile organic compounds recorded by the Photo Ionisation Detector for soils. As such the risk from the ingress of volatile organic compounds within existing soils cannot be ruled out at this time. However, based on the proposed removal of the majority of the Made Ground on the Site, the potential source of contamination would be removed. It should be noted that this element of the proposed remediation works will be completed by subsequent contractors following the completion of the Keltbray works.

There is also uncertainty over areas of the site covered by existing buildings and over the exact ground gas protection measures, which cannot be specified until detailed building design is known. Further piling risk assessment is necessary once piling design is known.

The proposed approach is accepted however I would draw the applicant's attention to the statement:

If a significant pollutant linkage that requires supplementary remediation works is identified then notification will be made to the local planning authority along with the mitigation approach for managing the identified contamination risk.

It will be necessary for the applicant to ensure that:

- Gaps in site characterisation are covered by the discovery strategy in accordance with the detail approved in this remediation strategy
- We approve the mitigation measures for any new risks that may be identified
- That there is suitably detailed verification which includes reporting on the outcome of the discovery strategy

Officer Comment: The comments above have been forwarded to the applicant so that they can be taken into account in the next stage of the remediation work for this site.

14. Environment Agency

15. Can recommend the discharge of parts a) and b) of condition 9.

16. Officer comment: N/A.

Do the submitted details sufficiently meet the terms of the condition?

17. Yes; both the Environment Agency and the Council's Environmental Protection Team have confirmed that parts a) and b) of the condition can be discharged. An informative is recommended reminding the applicant that part b) has only been discharged for certain buildings and that further details will be required in due course.

Community impact and equalities assessment

18. The Council must not act in a way which is incompatible with rights contained within the European Convention of Human Rights.
19. The Council has given due regard to the above needs and rights where relevant or engaged throughout the course of determining this application.
20. The Public Sector Equality Duty (PSED) contained in Section 149 (1) of the Equality Act 2010 imposes a duty on public authorities to have, in the exercise of their functions, due regard to three "needs" which are central to the aims of the Act:
1. The need to eliminate discrimination, harassment, victimisation and any other conduct prohibited by the Act
 2. The need to advance equality of opportunity between persons sharing a relevant protected characteristic and persons who do not share it. This involves having due regard to the need to:
 - Remove or minimise disadvantages suffered by persons who share a relevant protected characteristic that are connected to that characteristic;
 - Take steps to meet the needs of persons who share a relevant protected characteristic that are different from the needs of persons who do not share it, and;
 - Encourage persons who share a relevant protected characteristic to participate in public life or in any other activity in which participation by such persons is disproportionately low.
 3. The need to foster good relations between persons who share a relevant protected characteristic and those who do not share it. This involves having due regard, in particular, to the need to tackle prejudice and promote understanding.
21. The protected characteristics are: race, age, gender reassignment, pregnancy and maternity, disability, sexual orientation, religion or belief, sex, marriage and civil partnership.

Human rights implications

22. This planning application engages certain human rights under the Human Rights Act 2008 (the HRA). The HRA prohibits unlawful interference by public bodies with conventions rights. The term 'engage' simply means that human rights may be affected or relevant.
23. This application has the legitimate aim of providing the details required by a grant of planning permission. The rights potentially engaged by this application, including the right to a fair trial and the right to respect for private and family life are not considered to be unlawfully interfered with by this proposal.

24. Positive and proactive statement

25. The Council has published its development plan and Core Strategy on its website together with advice about how applications are considered and the information that needs to be submitted to ensure timely consideration of an application. Applicants are advised that planning law requires applications to be determined in accordance with the development plan unless material considerations indicate otherwise.
26. The Council provides a pre-application advice service that is available to all applicants in order to assist applicants in formulating proposals that are in accordance with the development plan and core strategy and submissions that are in accordance with the application requirements.

27. Positive and proactive engagement: summary table

Was the pre-application service used for this application?	No
If the pre-application service was used for this application, was the advice given followed?	N/A
Was the application validated promptly?	Yes
If necessary/appropriate, did the case officer seek amendments to the scheme to improve its prospects of achieving approval?	N/A
To help secure a timely decision, did the case officer submit their recommendation in advance of the statutory determination date?	Yes

Conclusion

28. For the reasons given above, it is recommended that this 'Approval of Details' application be granted.

SOUTHWARK COUNCIL

Town and Country Planning Act 1990 (as amended)

Town and Country Planning (Development Management Procedure) (England) Order 2015 (as amended)



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DECISION NOTICE

LBS Reg. No.: 20/AP/3173

Date of Issue of Decision: 18/12/2020

Applicant See company name
 Southwark GP Nominee 1 Limited and Southwark GP Nominee 2...

Approval has been GIVEN for the following details:

Discharge of part a) of condition 9 (contamination) for the entire site and part b) (Main site buildings BF-D&E, BF-F, BF-O, BF-P, BF-Q, and BF-RST only and the campus site building BC-6 (school) only) of planning permission 17/AP/4088 (Full planning permission for demolition, alterations and extension of existing buildings and erection of new buildings comprising a mixed use scheme providing up to 1,418 residential units, up to 3,436 sqm GEA of flexible Class A1/A3/A4 floorspace, up to 14,666 sqm GEA of flexible Class B1 floorspace, up to 869 sqm GEA of flexible Class D1/D2 and up to 3,311 sqm GEA of multi use floorspace (A1/A3/A4/D1) within Building BF-F, a new secondary school, in buildings ranging from 6 to 36 storeys in height as well as the creation of a single storey basement. The development also includes communal amenity space, landscaping, childrens' playspace, car and cycle parking, installation of plant, new pedestrian, vehicular and servicing routes, the creation of two new pedestrian routes through the Railway Arches and other associated works; and Outline planning permission (with all matters reserved) for the part demolition and part retention of existing buildings and erection of two new buildings comprising a mixed use scheme providing up to 130 residential units and up to 780 sqm GEA of flexible A1/A3/A4/D1/Sui Generis Uses and other associated works).

At Tower Bridge Business Complex Clements Road London Southwark

In accordance with the valid application received on 3 November 2020 and supporting documents:

Reference no./Plan or document name	Received on
Cover letter from WSP dated 2nd October 2020 (Main	02/11/2020

Approval of Details Reserved by Condition

LBS Registered Number: 20/AP/3173

Date of issue of this decision: 18/12/2020



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site);Application: covering letter	
Bermondsey Biscuit Factory campus site outline remediation strategy by WSP dated October 2020;Land contamination assessment	02/11/2020
Cover letter from WSP dated 2nd October 2020 (Campus site);Application: covering letter	02/11/2020
Cover letter from GeraldEve dated 27th October 2020;Application: covering letter	02/11/2020
Bermondsey Biscuit Factory Main site outline remediation strategy by WSP dated October 2020Land contamination assessment	02/11/2020

Signed:

Simon Bevan

Director of Planning

DECISION NOTICE

LBS Registered Number: 20/AP/3173

Date of issue of this decision: 18/12/2020



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Informative Notes to Applicant Relating To The Proposed Development

1. Part b) of the condition has been discharged in part only in accordance with the application details. Details for the remaining building will be required in due course in order to discharge part b) in full.

DECISION NOTICE

LBS Registered Number: 20/AP/3173

Date of issue of this decision: 18/12/2020



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IMPORTANT NOTES RELATING TO THE COUNCIL'S DECISION

1. APPEALS TO THE SECRETARY OF STATE.

- If you are aggrieved by the decision of your local planning authority to refuse permission for the proposed development or to grant it subject to conditions, then you can appeal to the Secretary of State under section 78 of the Town and Country Planning Act 1990.

Appeals can be made online at: <https://www.gov.uk/planning-inspectorate>.

If an enforcement notice is or has been served relating to the same or substantially the same land and development as in your application and if you want to appeal against your local planning authority's decision on your application, then you must do so within: 28 days of the date of service of the enforcement notice, OR within 6 months (12 weeks in the case of a householder or minor commercial appeal) of the date of this notice, whichever period expires earlier.

- The Secretary of State can allow a longer period for giving notice of an appeal, but he will not normally be prepared to use this power unless there are special circumstances which excuse the delay in giving notice of appeal.
- The Secretary of State need not consider an appeal if it seems to the Secretary of State that the local planning authority could not have granted planning permission for the proposed development or could not have granted it without the conditions they imposed, having regard to the statutory requirements, to the provisions of any development order and to any directions given under a development order.
- If you intend to submit an appeal that you would like examined by inquiry then you must notify the Local Planning Authority and Planning Inspectorate (inquiryappeals@planninginspectorate.gov.uk) at least 10 days before submitting the appeal.
- Further details are on GOV.UK (<https://www.gov.uk/government/collections/casework-dealt-with-by-inquiries>).

2. PROVISIONS FOR THE BENEFIT OF THE DISABLED

- Applicants are reminded that account needs to be taken of the statutory

DECISION NOTICE

LBS Registered Number: 20/AP/3173

Date of issue of this decision: 18/12/2020



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requirements of the Disability Discrimination Act 1995 to provide access and facilities for disabled people where planning permission is granted for any development which provides:

- i. Buildings or premises to which the public are to be admitted whether on payment or otherwise. [Part III of the Act].
 - ii. Premises in which people are employed to work as covered by the Health and Safety etc At Work Act 1974 and the Management of Health and Safety at Work Regulations as amended 1999. [Part II of the Act].
 - iii. Premises to be used as a university, university college or college, school or hall of a university, or intended as an institution under the terms of the Further and Higher Education Act 1992. [Part IV of the Act].
- Attention is also drawn to British Standard 8300:2001 Disability Access, Access for disabled people to schools buildings – a management and design guide. Building Bulletin 91 (DfEE 99) and Approved Document M (Access to and use of buildings) of the Building Regulations 2000 or any such prescribed replacement.

3. OTHER APPROVALS REQUIRED PRIOR TO THE IMPLEMENTATION OF THIS PERMISSION.

- The granting of approval of a reserved matter or outstanding matter does not relieve developers of the necessity for complying with any Local Acts, regulations, building by-laws and general statutory provisions in force in the area, or allow them to modify or affect any personal or restrictive covenants, easements, etc., applying to or affecting either the land to which the permission relates or any other land or the rights of any persons or authorities (including the London Borough of Southwark) entitled to the benefits thereof or holding an interest in the property concerned in the development permitted or in any adjoining property. In this connection applicants are advised to consult the council's Highway Maintenance section [tel. 020-7525-2000] about any proposed works to, above or under any road, footway or forecourt.

4. BUILDING REGULATIONS.

- You are advised to consult Southwark Building Control at the earliest possible moment to ascertain whether your proposal will require consent under the Building Act 1984 [as amended], Building Regulations 2000 [as amended], the London Building Acts or other statutes. A Building Control

DECISION NOTICE

LBS Registered Number: 20/AP/3173

Date of issue of this decision: 18/12/2020



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officer will advise as to the submission of any necessary applications, [tel. call centre number 0845 600 1285].

Site address: Tower Bridge Business Complex Clements Road London

Reference: 20/AP/3173

Planning Division
Southwark Council
Chief Executive Department
PO Box 64529 London SE1 5LX

Planning.applications@southwark.gov.uk ;

Appendix C

Remediation Strategy



Keltbray Remediation

BERMONDSEY BISCUIT FACTORY - MAIN SITE

Outline Remediation Strategy





Keltbray Remediation

BERMONDSEY BISCUIT FACTORY - MAIN SITE

Outline Remediation Strategy

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

PROJECT NO. 70075582

OUR REF. NO. 70075582-001

DATE: OCTOBER 2020

WSP

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3	Revision 4
Remarks	Draft for comments	Client Comment Updates	Client Comment Updates	Client Comment Updates	Client Comment Updates
Date	July 2020	September 2020	October 2020	October 2020	October 2020
Prepared by	Zoe Norris	R. Gohel	R. Gohel	R. Gohel	R. Gohel
Signature					
Checked by	Reena Gohel	R. Gohel	R. Gohel	R. Gohel	R. Gohel
Signature					
Authorised by	Dr R. Hares	Dr R. Hares	Dr R. Hares	Dr R. Hares	Dr R. Hares
Signature					
Project number	70075582	70075882	70075882	70075882	70075882
Report number	70075582-001	70075882-001	70075882-001	70075882-001	70075882-001
File reference	70075882-Rem Strat Main.docx	\\uk.wspgroup.com\central data\Projects\70075xxx\70075582 - Bermondsey Biscuit Factory - Remediation Strategies\03 WIP\Main Site	\\uk.wspgroup.com\central data\Projects\70075xxx\70075582 - Bermondsey Biscuit Factory - Remediation Strategies\03 WIP\Main Site	\\uk.wspgroup.com\central data\Projects\70075xxx\70075582 - Bermondsey Biscuit Factory - Remediation Strategies\03 WIP\Main Site	\\uk.wspgroup.com\central data\Projects\70075xxx\70075582 - Bermondsey Biscuit Factory - Remediation Strategies\03 WIP\Main Site



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2020 WSP RISK ASSESSMENT METHODOLOGY
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SCREENING TABLES

1 INTRODUCTION

1.1 AUTHORISATION

WSP was commissioned by Keltbray Remediation (the Client) to prepare an Outline Remediation Strategy for the proposed development at the Bermondsey Biscuit Factory, 100 Drummond Road, Bermondsey, London, SE16 4DG (the Site). The Main part of the Site is located at The Biscuit Factory, Clements Road, Bermondsey, London, SE16 4DG as shown on **Figure 1** and **Figure 2** included within **Appendix A**.

The following report is only for the 'Main Site' section of the wider development area. A separate Outline Remediation Strategy has been prepared for the Campus part of the Site (Ref: 70075882 002, dated July 2020).

The Kelbray scope of works include remediation works in line with this strategy, enabling works and basement excavation. This will be verified and reported as one phase. Any ground gas protection measures, topsoil verification works or piling risk assessment will be undertaken by follow on contractors, therefore, will be verified separately at a later stage.

This work has been conducted in line with current good practice, including that detailed in the Environment Agency (EA) document CLR 11, Model Procedures for the Management of Land Contamination.

This assessment has been undertaken to discharge Contaminated Land Planning Condition 9b within Planning Application No. 17/AP/4088. Planning Condition 9b states the following:

In the event that contamination is present, a detailed remediation strategy to bring the site to a condition suitable for the intended use by removing unacceptable risks to human health, buildings and other property and the natural and historical environment shall be prepared and submitted to the Local Planning Authority for approval in writing. The scheme shall ensure that the site will not qualify as contaminated land under Part 2A of the Environmental Protection Act 1990 in relation to the intended use of the land after remediation. The approved remediation scheme (if one is required) shall be carried out in accordance with its terms as part of the development. The Local Planning Authority shall be given two weeks written notification of commencement of the remediation scheme works.

This report provides a review and a summary of the historical ground investigation works undertaken on the Site. There is an updated risk assessment included within this document but reference should be made to the historical reports for further information.

1.2 PROPOSED DEVELOPMENT

It is understood that the proposed development on the Site generally comprises of a residential end use. A copy of the emerging Masterplan is presented in **Appendix A** as **The Bermondsey Project – Design & Access Statement – Part C Masterplan**.

Copies of the proposed Enabling & Demolition Works including proposed formation levels are included in **Appendix A** as Drawings **BER-ARP-BFXXX-XX-SK-D-82001**, **BER-ARP-BFXXX-XX-SK-D-82002** and **BER-ARP-BFXXX-XX-SK-D-82003**. The proposed remediation works will be undertaken down to formation level by Keltbray Remediation details of which are shown within the above drawings.



Indicative plans provided at this stage show that there are a number of basements proposed across most of the west and north-eastern parts of the Site which extend to 6 m and up to 2 m respectively. The proposed formation levels for the remainder of the Site will be reduced on average between 0 m and 2 m as indicated on Drawing No. **BER-ARP-BFXXX-XX-SK-D-82002 (Appendix A)**.

The proposed development will be phased as Phases 1, 2 and 3 (Plots BF-D&E, BF-F, BF-O, BF-P, BF-Q, BF-R, BF-S and BF-T) as shown on Drawing No's. 2607-KPF-MPLN-XX-DR-PLN A-0015, 2607-KPF-MPLN-XX-DR-PLN A-0016, 2607-KPF-MPLN-XX-DR-PLN A-0017 and 2607-KPF-MPLN-XX-DR-PLN A-0018 (Appendix A). The Phases of works being captured within the Keltbray scope of works are as listed above. It is presently uncertain whether Plots BF-U and BF-V will be included within this scope of works or whether they will be completed in subsequent works.

It should be noted that this report has been prepared based on the masterplan provided at the time of writing the report (included within **Appendix A**). Any changes to the plans provided would require a re-assessment of the required remediation measures for the proposed development.

1.3 OBJECTIVES

Based on the findings of the historical ground investigation reports, the following objectives have been identified:

- Prepare a Remediation Strategy in accordance with CLR 11 to address the pollutant linkages identified across the Site and provide a site suitable for use under Part 2A of the Environmental Protection Act 1990. The Remediation Strategy will include:
 - Review of background information;
 - Summary of relevant pollutant linkages as identified through development of a Conceptual Site Model (CSM) and the GQRA;
 - Remediation Objectives and Requirements;
 - Remedial Strategy; and,
 - Remediation Validation Requirements

The objective of the remediation is to provide a site that is suitable for use under Part 2A of the Environmental Protection Act 1990 for re-development for residential end use.

1.4 SOURCES OF INFORMATION

The following contamination assessment reports have been referred to in the design and the preparation of the Remediation Strategy:

- WSP | Parsons Brinckerhoff (2015) *Plot 1, Biscuit Factory, Bermondsey, London – Contaminated Land Generic Quantitative Risk Assessment*. 7000940 November 2015;
- Hydrock (2018) *The Bermondsey Project – Phase 1 Stage 1 Asbestos in Soil Ground Investigation, Southwark Nominee 1 Limited and Southwark Nominee 2 Limited*. TBP-HYD-S1-GI-RP-GE-1001 July 2018;
- Arup (2017) *Project Bermondsey Desk Based Asbestos in Soils Appraisal*. 237092-RP-CP-001.
- Arup (2018) *The Bermondsey Project – Phase 1 Stage 1 Asbestos in soil investigation Interim Investigation Report, Grosvenor Britain & Ireland*. 237092-CL-RP-001, August 2018;



- Socotec (2018) *The Bermondsey Project, London – Factual Report on Site Investigation, Southwark GP Nominee 1 Limited and Southwark GP Nominee 2 Limited*. D8004-18, September 2018; and,
- Ramboll (2018) *Technical Note - Assessment of Results Obtained to Date from the First Stage of the Phase II Environmental Site Investigation at Bermondsey Biscuit Factory - Gardiner & Theobald LLP on behalf of Southwark GP Nominee 1 Ltd. and Southwark GP Nominee 2 Ltd*. TNUK11-24348_Stage 1; and
- Ramboll (2019) *Bermondsey Biscuit Factory – Phase II Environmental Site Assessment: Investigation Stage 1*. UK11-24348, February 2019.

1.5 CONFIDENTIALITY & LIMITATIONS

This report is addressed to and may be relied upon by Keltbray Remediation.

This assessment has been prepared for the sole use and reliance of the above-named parties. This report has been prepared in line with the WSP proposal and associated notes. This report shall not be relied upon or transferred to any other parties without the express written authorisation of WSP. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

This report needs to be read and used in full. General limitations of the assessment are included in **Appendix B**.

2 SUMMARY OF SITE INFORMATION

2.1 SITE LOCATION & SITE DESCRIPTION

The Site Location Plan and Site Layout Plans are provided as **Appendix A**.

Table 2-1 provides details of the site obtained from a review of Ordnance Survey (OS) mapping, online aerial photography and key observations made during historical ground investigation works.

Table 2-1 – Summary of Site Details

Details	Description
Name and Address of Site	The Biscuit Factory, Clements Road, Bermondsey, London, SE16 4DG.
Location and Grid Reference	The Site is located in the northern part of the London Borough of Bermondsey at approximately NGR 534470; 179070.
Site Description and Current Use	<p>The Site is triangular in shape and approximately 5.5 hectares (ha) in size.</p> <p>The Site currently comprises commercial businesses (part of Tower Bridge Business Complex) which are housed within the former Biscuit Factory buildings. A small portion of the Site is also being used for car parking, presumed to be associated with these commercial businesses.</p> <p>The Site is located south of Clements Road and approximately 400 m south of Bermondsey tube station.</p> <p>The Site is bordered on the south-western side by the London and Greenwich South Eastern Railway Line, with residential housing beyond. The remainder of the Biscuit Factory is located to the east of the Site.</p> <p>An electrical substation was located at the northeast of the Site adjacent to the security hut.</p>
Surrounding Site Area and Topography	<p>The Site is surrounded by a mix of residential properties and commercial properties.</p> <ul style="list-style-type: none"> • The Site is bound to the north by Clements Road with Residential Properties beyond. The campus part of the wider development area is located to the north-east of Clements Road. • The Site is bound to the east by Drummond Road with residential properties and a church beyond. • The Site is bound to the west and south by railway arches for the London and Greenwich South Eastern Railway line. <p>The Site is slightly variable with site levels varying between 1.71 metres Ordnance Datum (m OD) in the south-east and 2.45m OD in the north-west.</p>
Site History	Historically the Site comprised terraced residential housing. In 1903 an Iron Store and Varnish Shop are shown in the north-eastern part of the Site. Mapping from the 1950s indicate that some residential properties had been demolished (possibly related to bomb damage from World War 2). By 1958 the Iron Store and Varnish Shop have been replaced by a Timber Store and Coal Store. From 1960 a Laundry was present towards the north eastern part of the Site and was replaced by a factory in 1970. The Biscuit Factory was occupying the majority of the Site from 1950s. The Site currently comprises Tower Bridge Business Complex.

Details	Description
	Historical information indicates that there was a substation and petrol tanks also present in the north-western corner of the Site

2.2 GROUND INVESTIGATION

A historical exploratory hole location plan of the ground investigations completed on the Biscuit Factory Main Site completed to date is included as **Figure 3** within **Appendix A** of this report.

An outline of the historical reports provided is summarised below and discussed in detail within **Section 2.3** onwards/

2.2.1 WSP | PARSONS BRINCKERHOFF 2015

Intrusive ground investigations were undertaken between 5 and 7 October 2015. The investigation covered Plot 1 of the Biscuit Factory Main Site (north-west of the Site) and comprised five hand dug pits (HP101 – HP105) and two rotary boreholes (BH101 – BH102).

Post site investigation monitoring works included six ground gas monitoring rounds and groundwater measurements. Two groundwater sampling events of all 2015 installed monitoring wells and sampling of one monitoring well installed in WSP | PB 2013 investigation.

The findings of the ground investigation works were reported within WSP report and are summarised in the sections below.

2.2.2 ARUP 2017

A desk based asbestos in soil appraisal was undertaken by Arup in 2017. A review of archive sources identified areas of the Site where there is a potential for buried asbestos and asbestos containing soils present associated the historical development.

Asbestos insulation board and lagging were noted on Plot 5.

The report recommended an asbestos focussed ground investigation the scope for which was included within the Hydrock 2018 works below.

2.2.3 HYDROCK 2018

Intrusive ground investigations were undertaken between 10 April and 22 June 2018. The investigation (Biscuit Factory Main Site) comprised 62 mechanically excavated trial pits and twelve hand excavated trial pits.

The findings of the ground investigation works were reported within the Hydrock report and are summarised in the sections below.

2.2.4 ARUP 2018

The 2018 Arup report provided an assessment of the results provided in the Hydrock 2018 report. The main purpose of the report was to assess the asbestos fibres present on the Main Biscuit Factory wider and Campus Site.

Suspected Asbestos Containing Materials (ACMs) were identified during the GI in 21 of the 74 trial pits across the Main Biscuit Factory Site. ACM identified ranged from occasional intact cement to very frequent degraded loose fibrous debris. Loose fibres within the soil matrix was frequently identified.

Asbestos fibres identified bound to and within concrete was identified within six trial pits. In addition, other ACMs identified include sporadic intact or weathered floor tile, cement or insulation board, loose fibrous debris and degraded insulation board.

Four samples of the suspected asbestos containing concrete in were sent for laboratory analysis. Amosite and Crocidolite were detected in all four samples.

The Site was split into five areas for the purpose of the assessment and asbestos was detected in 51 of 55 samples taken from Area 1 which is located in the south-eastern part of the Site. High concentrations ($>0.1\%w/w$) was identified within eight soil samples with a maximum concentration of $0.585\% w/w$ recorded at TP118 (2.50 m bgl). The average asbestos concentration in soil for Area 1 was $0.059\% w/w$, at moderate quantities, however the report notes that the concentration of asbestos within the ACM itself will be much higher.

Across the remainder of the Site asbestos was detected within 27 of 144 samples taken at very low concentrations (<0.001 to $0.01\% w/w$). One high concentration of asbestos was detected in TP420 (0.40 m bgl) where a chrysotile concentration of $0.31\% w/w$ was recorded. However, the report notes that a soil sample obtained from the same depth has no asbestos detected.

Olfactory evidence of contamination was limited to a strong organic odour within TP406 and a slight organic odour within TP506; both occurring in the Made Ground. There was no visual evidence of contamination identified in the trial pits excavated.

2.2.5 RAMBOLL 2018

The 2018 Ramboll Technical Note assessed the results as presented within the Socotec 2018 Report. The main purpose of the report was to assess the environmental findings present on the Biscuit Factory Site and the Campus Site.

The Ramboll Technical Note assess the soil results against the Ramboll GACs for residential land use criteria (without plant uptake).

The Ramboll report highlighted the following exceedances, however the results are not fully differentiated within the report as to which exploratory hole the exceedances are from or whether the exceedances were from the Biscuit Factory Site or the Campus part of the Site. The findings show the following:

- Lead was found to exceed Generic Assessment Criteria (GAC) in 14 samples with concentrations ranging from 350 to 1,362 mg/kg (GAC 310 mg/kg);
- Petroleum Hydrocarbons (Aliphatic C8-10) was found to exceed GAC in BH6 (3.5 m bgl) with a concentration of 15 mg/kg (GAC 13 mg/kg); and,
- Aromatic C8-10 was found to exceed GAC in WS13 (0.8 m bgl) with a concentration of 22.1 mg/kg (GAC 22 mg/kg).

2.2.6 RAMBOLL / SOCOTEC 2018

In 2018 Socotec was commissioned by Ramboll to undertake an intrusive ground investigation between 30 April and 13 July 2018. The investigation (Biscuit Factory Main Site) comprised seven cable percussion boreholes (BH3, BH4A, BH5, BH6, BH7A, BH11 and BH13) and six window(less) sample boreholes (WS5, WS6, WS8, WS12, WS13 and WS14).

Ramboll completed a Phase II Environmental Site Assessment following the ground investigation. The report highlighted the following exceedances in the Main Site:

- Arsenic was found to exceed GAC in WS8 (0.8 m bgl) with a concentration of 42.9 mg/kg (GAC 40 mg/kg);
- Lead was found to exceed GAC (310 mg/kg) in fourteen samples, exceedances in the magnitude of 315 mg/kg to 1,280 mg/kg;
- Asbestos (chrysotile) was detected at WS6 (0.4 m bgl), quantified at 0.312%;
- BH6 (3.5 m bgl) exceeded GAC of Aliphatic C08-10 (13 mg/kg), with a concentration of 15 mg/kg;
- Groundwater exceedances for lead (0.05 mg/l) in BH6 (0.251mg/l) and BH4A (0.092 mg/l) were noted during a single groundwater sampling round; and,
- A groundwater sample from BH6, slightly exceeded assessment criteria for Aliphatic C08-C10.
- Slight hydrocarbon odours were noted at WS8, WS12 and WS13. Strong hydrocarbon odour and black staining was observed at BH6.

2.2.7 OTHER GROUND INVESTIGATIONS

The following reports have been completed for the Biscuit factory Main Site and are listed within the historical reports but have not been made available to WSP at the time of writing this report:

- Arup (December 201) The Bermondsey Project, Phase 1 Asbestos in soils ground investigation specification, reference 23709232-SPEC-001 Issue 1;
- Albury SI (2000) Report of geotechnical investigation;
- Concept (2015) Biscuit Factory Plot 5 Ground Investigation, site investigation report; and,
- Soiltechnics (2017) Biscuit Factory, Building F, Foundation investigation and assessment report.

2.3 GEOLOGY

The information in the table below has been compiled from the British Geological Survey (BGS) and exploratory hole logs from the ground investigation works undertaken across the Site. A summary of the encountered ground conditions is presented in **Table 2-2**.

Table 2-2 - Geological Ground Model

Strata	General Description	Min Depth to Top (m)	Maximum Depth to Top (m)	Maximum Thickness (m)
Made Ground – Cohesive / Granular	Sandy gravelly silt / sandy gravelly clay / clayey sandy gravel, locally with low cobble content. Gravel fractions are comprised of brick, concrete, clinker, flint, wooden debris and ceramic fragments. Locally with thin layers of concrete.	Ground level	0.10	2.05
*Alluvium	Soft and firm brown, greyish / orangish brown and yellow brown slightly sandy slightly	0.85	2.00	1.20

Strata	General Description	Min Depth to Top (m)	Maximum Depth to Top (m)	Maximum Thickness (m)
	gravelly clay / clayey sand. Gravel is comprised of flint.			
Kempton Park Gravels	Medium dense brown and yellow very gravelly sand / Gravel. Gravel is comprised of flint.	1.60	3.50	10.00
**London Clay	Stiff grey mottled brown Clay.	6.70	7.80	3.20
Lambeth Group	Stiff and very stiff / very dense dark grey mottled brown, greyish brown and bluish brown, greenish grey, multicoloured silty clay / very sandy clay / sandy gravel / gravelly clayey sand. Locally with frequent shell fragments.	6.70	12.20	17.30
Thanet Formation	Very dense dark grey silty sand.	16.40	22.50	14.10
Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated)	Very weak medium density white Chalk recovered as gravelly silt. Gravel is subangular to subrounded fine to coarse with occasional very angular cobbles of flint.	30.50	32.80	4.95 NP

NP = Not proven

* BGS Maps indicate Alluvium is present locally but not present on Site. Alluvium not encountered in all exploratory hole locations.

** Possible London Clay was encountered during the investigation works completed by Socotec in 2018, however it is likely that these deposits are only encountered locally

2.4 HYDROGEOLOGICAL MODEL

The Superficial deposits of the Kempton Park Gravels and the bedrock of the Lambeth Group and the Thanet Sands are all listed as Secondary A Aquifers respectively. The Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated) are classified as a Principal Aquifer.

The site is not located within an Environment Agency (EA) designated Source Protection Zone (SPZ).

Groundwater strikes were encountered in the Made Ground at depths between 0.50 and 1.50 m bgl, at depths between 4.00 and 5.50 m bgl in the Kempton Park Gravels and at depth between 9.80 and 15.90m bgl in the Lambeth Group. It should be noted that groundwater strikes were encountered in the London Clay Formation at depth of 7.90 m bgl.

Monitored standing ground water levels were measured between 0.72 and 1.23 m bgl in the monitoring wells installed in the Made Ground, 0.72 and 3.86 m bgl in the wells installed in the Kempton Park Gravels, 6.28 and 7.00 m bgl in the wells installed in the Lambeth Group and 6.06 m and 6.40 m bgl in the wells installed in the Thanet Formation.

It should be noted a number of the monitoring wells were cross installed (BH4A, BH6 (S) and (D), BH7A (S) and BH11 (S)).



2.5 HYDROLOGY

The closest named surface water feature to the Site is the River Thames located approximately 500 m north of the Site. The nearest surface water feature is an unnamed lake located 350 m east of the Site in Southwark Park. It is possible this is a manmade surface water feature. The Site is located within Flood Zone 3.

2.6 RISK ASSESSMENTS

WSP has not been provided with a compiled generic quantitative risk assessment (GQRA) for the Site. The majority of the recent reports are focused around the risks posed by asbestos fibres.

As such in order to develop an outline re-mediation strategy, WSP has re-screened the historical chemical data available within this section and outlined proposed mitigation measures associated with the risks identified within subsequent sections of this report.

2.6.1 HUMAN HEALTH RISK ASSESSMENT FROM SOILS

In the United Kingdom, the presence of contamination on a Site is generally only of concern if an actual or potentially unacceptable risk exists. Legislation and guidance on the assessment of contaminated Sites, consistent with the European Union best practice, acknowledges the need for a tiered risk based approach. This report represents a Generic Quantitative Risk Assessment (GQRA) being a comparison of Site contaminant levels against highly conservative standards and compliance criteria including an assessment of risk using the source-pathway-receptor model.

WSP has derived a set of Generic Assessment Criteria (GAC) for the CLEA generic land use scenarios using the CLEA Workbook v1.071 Excel modelling tool. The CLEA workbook does not currently have the capacity to derive criteria to assess risks from the inhalation of vapours resulting from contaminants dissolved in groundwater. Therefore, a set of groundwater GACs has also been derived using the Johnson & Ettinger (J&E) approach.

Where appropriate, exceedances of GACs are compared against published Category 4 Screening Levels (C4SLs) (Ref. 29). These are only applicable for six compounds, namely arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead. C4SL represent a level of acceptable risk in the context of Part IIA of the 1990 Environmental Protection Act i.e. soil concentration below C4SL limit are considered to be 'definitely not contaminated' and pose at most a 'low level of toxicological concern'.

Further details on the assumptions and methodologies adopted by WSP are provided in **Appendix C**.

Twenty-one samples from the Socotec investigation, 218 samples (189 for asbestos only, 29 for all analytes) from the Hydrock investigation, eighteen samples from the WSP | PB investigation and thirty five samples from the Ramboll investigation were assessed based on a residential end use with no plant uptake (1.0 % SOM) for the Site.

Tables 2-3 and 2-4 summarise the findings of this assessment and the full screening tables are included within **Appendix D**:



Table 2-3 - Summary of Soil Contamination Exceedances (GACs)

Analyte	GAC (mg/kg)	No. of exceedances	Maximum Concentration (mg/kg)	Location and Depth of Elevated Concentrations (Report)
Lead	188	42	1,270	TP411 at 0.8 m bgl (Socotec)
			1,360	WS13 at 0.4 m bgl (Socotec)
			517.6	WS13 at 0.8 m bgl (Socotec)
			352.0	WS5 at 0.9 m bgl (Socotec)
			397.1	BH13 at 0.8 m bgl (Socotec)
			242.7	BH11 at 0.4 m bgl (Socotec)
			840	TP505 at 0.5 m bgl (Hydrock)
			630	TP505 at 0.8 m bgl (Hydrock)
			270	TP509 at 0.4 m bgl (Hydrock)
			370	TP507 at 0.9 m bgl (Hydrock)
			590	TP418 at 0.5 – 1 m bgl (Hydrock)
			410	TP403 at 0.3 m bgl (Hydrock)
			890	TP416 at 0.5 m bgl (Hydrock)
			370	TP109 at 0.50 – 1 m bgl (Hydrock)
			220	TP105 at 0.30 – 0.50 m bgl (Hydrock)
			1,900	TP209 at 0.30 – 0.50 m bgl (Hydrock)
			630	TP209 at 0.70 – 1.20 m bgl (Hydrock)
			290	TP421 at 0.30 – 0.50 m bgl (Hydrock)
			790	TP41 at 1.2 m bgl (Hydrock)
			1,400	TP421 at 0.50 – 0.80 m bgl (Hydrock)
469	BH102 at 1.2 m bgl (WSP PB)			
656	HP103 at 0.4m bgl (WSP PB)			

Analyte	GAC (mg/kg)	No. of exceedances	Maximum Concentration (mg/kg)	Location and Depth of Elevated Concentrations (Report)
			475	HP103 at 1.1m bgl (WSP PB)
			482	HP104 at 0.3m bgl (WSP PB)
			505	HP104 at 0.7m bgl (WSP PB)
			500	HP105 at 0.3m bgl (WSP PB)
			386	HP105 at 0.8m bgl (WSP PB)
			880	BH5A at 0.7 m bgl (Ramboll)
			890	WS12 at 0.5 m bgl (Ramboll)
			350	WS12 at 1.0 m bgl (Ramboll)
			590	BH4A at 0.5 m bgl (Ramboll)
			790	BH6 at 1.2 m bgl (Ramboll)
			271	BH3 at 0.8 m bgl (Ramboll)
			207.1	BH11 at 0.4 m bgl (Ramboll)
			1280	BH13 at 0.8 m bgl (Ramboll)
			540.5	WS2 at 0.9 m bgl (Ramboll)
			617.3	WS4 at 1.8 m bgl (Ramboll)
			391	WS5 at 0.4 m bgl (Ramboll)
			363	WS5 at 0.9 m bgl (Ramboll)
			651.3	WS8 at 0.8 m bgl (Ramboll)
			316	WS13 at 0.4 m bgl (Ramboll)
			698.1	WS13 at 0.8 m bgl (Ramboll)
Benzo(a)pyrene	1.7	4	2.4	TP507 at 0.9 m bgl (Hydrock)
			5.1	TP108 at 0.5 – 1 m bgl (Hydrock)
			3.68	HP103 at 0.4 m bgl (WSP PB)
			2.97	WS2 at 0.9 m bgl (Ramboll)

When assessed against the current GACs, elevated concentrations of lead and benzo(a)pyrene were reported.



The results for lead and benzo(a)pyrene have been compared against C4SL values for a more pragmatic yet precautionary approach the findings of which are outlined within **Table 2-4**.

Table 2-4 - Summary of Soil Contamination Exceedances (C4SLs)

Analyte	C4SL (mg/kg)	No. of exceedances	Maximum Concentration (mg/kg)	Location and Depth of Elevated Concentrations (Report)
Lead	310	35	1,270	TP411 at 0.8 m bgl (Socotec)
			1,360	WS13 at 0.4 m bgl (Socotec)
			517.6	WS13 at 0.8 m bgl (Socotec)
			352.0	WS5 at 0.9 m bgl (Socotec)
			397.1	BH13 at 0.8 m bgl (Socotec)
			840	TP505 at 0.5 m bgl (Hydrock)
			630	TP505 at 0.8 m bgl (Hydrock)
			370	TP507 at 0.9 m bgl (Hydrock)
			590	TP418 at 0.5 – 1 m bgl (Hydrock)
			410	TP403 at 0.3 m bgl (Hydrock)
			890	TP416 at 0.5 m bgl (Hydrock)
			370	TP109 at 0.50 – 1m bgl (Hydrock)
			1,900	TP209 at 0.30 – 0.50 m bgl (Hydrock)
			630	TP209 at 0.70 – 1.20 m bgl (Hydrock)
			790	TP41 at 1.2 m bgl (Hydrock)
			1,400	TP421 at 0.50 – 0.80 m bgl (Hydrock)
			469	BH102 at 1.2 m bgl (WSP PB)
			656	HP103 at 0.4m bgl (WSP PB)
			475	HP103 at 1.1m bgl (WSP PB)
			482	HP104 at 0.3m bgl (WSP PB)
505	HP104 at 0.7m bgl (WSP PB)			
500	HP105 at 0.3m bgl (WSP PB)			

Analyte	C4SL (mg/kg)	No. of exceedances	Maximum Concentration (mg/kg)	Location and Depth of Elevated Concentrations (Report)
			386	HP105 at 0.8m bgl (WSP PB)
			880	BH5A at 0.7m bgl (Ramboll)
			890	WS12 at 0.5 m bgl (Ramboll)
			350	WS12 at 1.0 m bgl (Ramboll)
			590	BH4A at 0.5 m bgl (Ramboll)
			790	BH6 at 1.2 m bgl (Ramboll)
			540.5	BH13 at 0.8 m bgl (Ramboll)
			617.3	WS2 at 0.9 m bgl (Ramboll)
			391	WS4 at 1.8 m bgl (Ramboll)
			363	WS5 at 0.4 m bgl (Ramboll)
			651.3	WS5 at 0.9 m bgl (Ramboll)
			316	WS8 at 0.8 m bgl (Ramboll)
			698.1	WS13 at 0.4 m bgl (Ramboll)

Elevated concentrations of lead are still found to be present at twenty-three sample locations when compared against the C4SL target value of 310 mg/kg, however no samples exceeded the C4SL concentration for benzo(a)pyrene.

Chrysotile, amosite and crocidolite asbestos were detected in eighty of the samples screened during the Hydrock ground investigation and within two samples screened during WSP | PB GI. Asbestos fibres were not identified in the twenty-one samples screened from the Socotec GI. Chrysotile was identified in one sample during the Ramboll GI. Asbestos quantification was undertaken on each set of samples, the findings of which are presented in **Table 2.5** below.

Table 2-5 - Summary of Positive Asbestos Identifications

Location	Sample Depth (m bgl)	Presence	Quantification (%)	Comment
TP405	0	Chrysotile	<0.001	Sheeting / board debris
TP420	0.40	Chrysotile	0.312	Hard / cement type material
TP503	0.40	Chrysotile	<0.001	Loose fibres
TP505	0.50	Amosite	<0.001	Loose fibres

Location	Sample Depth (m bgl)	Presence	Quantification (%)	Comment
TP510	0.90	Amosite	<0.001	Loose fibres
TP509	0.40	Chrysotile	<0.001	Loose fibres
TP508	0.40	Chrysotile, Amosite and Crocidolite	0.004	Loose fibres and hard cement type material
TP508	1.0	Chrysotile and Amosite	0.009	Loose fibres
TP508	1.60	Chrysotile	<0.001	Loose fibres
TP507	0.30	Amosite and Crocidolite	0.0200	Loose fibres and loose fibrous debris
TP418	0.30	Chrysotile	0.0003	Loose fibres
TP404	0.40	Amosite	0.0002	Loose fibres
TP404	0.30	Chrysotile	0.0005	Loose fibres
TP404	1.0	Chrysotile	0.0001	Loose fibres
TP502	0.50	Amosite	0.0001	Loose fibres
TP111	0.30	Chrysotile and Amosite	0.0207	Loose fibres and loose fibrous debris
TP111	0.50	Chrysotile and Amosite	0.0180	Loose fibrous debris
TP111	1.50	Chrysotile and Crocidolite	0.0004	Loose fibres
TP110	0.30	Chrysotile	0.0003	Loose fibres
TP110	0.50	Chrysotile and Crocidolite	0.0019	Loose fibres and loose fibrous debris
TP110	1.20	Chrysotile and Crocidolite	0.0009	Loose fibres
TP110	2.20	Chrysotile Crocidolite and Amosite	0.0304	Loose fibres and hard / cement type material and sheeting / board debris
TP112	0.30	Chrysotile and Crocidolite	0.0040	Loose fibres and sheeting /board debris
TP113	0.30	Chrysotile	0.0001	Loose fibres
TP113	1.60	Chrysotile	0.0013	Loose fibres and sheeting / board debris
TP114	0.30	Chrysotile	0.0002	Loose fibres

Location	Sample Depth (m bgl)	Presence	Quantification (%)	Comment
TP114	0.50	Chrysotile	0.0001	Sheeting board debris
TP109	0.30	Amosite and Chrysotile	0.1183	Loose fibres and loose fibrous debris
TP109	0.50	Amosite and Chrysotile	0.0246	Sheeting board debris
TP109	2.00	Amosite Chrysotile and Crocidolite	0.0115	Bitumen and loose fibres
TP106	0.30	Amosite Chrysotile and Crocidolite	0.906	Loose fibres and loose fibrous debris and sheeting / board debris
TP106	0.50	Amosite Chrysotile and Crocidolite	0.0880	Loose fibres and loose fibrous debris
TP107	0.40	Amosite Chrysotile and Crocidolite	0.0140	Loose fibres and loose fibrous debris
TP107	0.50	Amosite Chrysotile and Crocidolite	0.2879	Loose fibres and loose fibrous debris and sheeting / board debris
TP107	1.50	Amosite Chrysotile Crocidolite and Anthophyllite	0.2647	Loose fibres and loose fibrous debris
TP108	0.30	Amosite Chrysotile and Crocidolite	0.0027	Loose fibres and loose fibrous debris
TP108	0.50	Amosite Chrysotile and Crocidolite	0.1465	Loose fibres and loose fibrous debris
TP108	1.40	Amosite and Chrysotile	0.0144	Loose fibres and loose fibrous debris
TP116	0.60	Amosite Chrysotile and Crocidolite	0.0499	Loose fibres and loose fibrous debris
TP116	2.0	Amosite Chrysotile and Crocidolite	0.0710	Loose fibres and loose fibrous debris
TP101	0.80	Amosite Chrysotile and Crocidolite	0.0108	Loose fibres and hard / cement type material
TP101	0.90	Amosite Chrysotile and Crocidolite	0.1000	Loose fibres and loose fibrous debris
TP108	0.30	Chrysotile	0.0157	Loose fibrous debris

Location	Sample Depth (m bgl)	Presence	Quantification (%)	Comment
TP102	0.50	Amosite and Chrysotile	0.0041	Loose fibres
TP102	1.30	Amosite Chrysotile and Crocidolite	0.0035	Loose fibres
TP102	2.40	Amosite Chrysotile and Crocidolite	0.0015	Loose fibrous debris and hard / cement type material and loose fibres
TP103	0.80	Amosite Chrysotile and Crocidolite	0.0592	Loose fibres and loose fibrous debris
TP103	1.20	Amosite and Chrysotile	0.0789	Loose fibrous debris
TP117	0.70	Amosite Chrysotile and Crocidolite	0.0216	Loose fibrous debris
TP117	1.50	Amosite Chrysotile and Crocidolite	0.0077	Loose fibres and loose fibrous debris
TP117	2.40	Amosite Chrysotile and Crocidolite	0.0882	Loose fibrous debris
TP118	0.70	Amosite and Chrysotile	0.0119	Loose fibres and loose fibrous debris
TP118	1.60	Amosite Chrysotile and Crocidolite	0.3620	Loose fibres and loose fibrous debris
TP118	2.50	Amosite Chrysotile and Crocidolite	0.5853	Loose fibres and loose fibrous debris
TP119	0.50	Amosite Chrysotile and Crocidolite	0.1665	Insulation board / tile and loose fibrous debris and hard / cement type material and loose fibres and bitumen
TP119	1.0	Amosite Chrysotile and Crocidolite	0.0063	Loose fibres and loose fibrous debris
TP119	2.0	Amosite Chrysotile and Crocidolite	0.1144	Loose fibres and loose fibrous debris
TP104	0.30	Amosite Chrysotile and Crocidolite	0.0077	Loose fibres and loose fibrous debris
TP104	0.30	Amosite Chrysotile and Crocidolite	0.0077	Loose fibres and loose fibrous debris

Location	Sample Depth (m bgl)	Presence	Quantification (%)	Comment
TP104	0.70	Amosite and Chrysotile	0.0422	Loose fibres and loose fibrous debris
TP105	0.30	Amosite Chrysotile and Crocidolite	0.0180	Loose fibres and loose fibrous debris
TP105	0.70	Amosite Chrysotile and Crocidolite	0.0255	Loose fibres and loose fibrous debris
TP104	1.0	Amosite and Chrysotile	0.0016	Loose fibrous debris
TP802	0.10	Amosite and Chrysotile	0.0109	Loose fibres and loose fibrous debris and hard / cement type material
TP208	0.30	Chrysotile	0.0004	Loose fibres
TP115	0.50	Amosite and Chrysotile	0.0008	Loose fibres
TP115	1.50	Amosite Chrysotile and Crocidolite	0.0062	Loose fibres
TP115	2.20	Amosite and Chrysotile	0.0140	Loose fibres and loose fibrous debris
TP211	0.40	Chrysotile	0.0031	Hard / cement type material and loose fibres and bitumen
TP212	0.50	Amosite	0.0009	Loose fibres and sheeting / board debris
TP406	0.50	Amosite	0.0004	Loose fibres
TP205	0.30	Chrysotile	0.0005	Loose fibrous debris
TP410	0.30	Chrysotile	<0.0001	Loose fibres and loose fibrous debris
TP421	0.50	Amosite	0.0006	Loose fibres
TP301	0.30	Amosite and Chrysotile	0.0186	Sheeting / board debris and loose fibres
TP301	0.90	Chrysotile	0.0001	Loose fibres
TP302	0.30	Amosite and Chrysotile	0.0003	Loose fibres
TP303	0.30	Amosite and Chrysotile	0.0024	Bitumen and sheeting / board debris

Location	Sample Depth (m bgl)	Presence	Quantification (%)	Comment
TP304	0.70	Amosite	0.0001	Loose fibres
HP101 (WSP PB)	0.30	Chrysotile	<0.001	Loose fibres
HP103 (WSP PB)	0.4	Chrysotile	<0.001	Loose fibres
WS6	0.4	Chrysotile	0.312	N/A

Despite the low percentage of asbestos fibres, based on the variable nature of the Made Ground and the non-threshold nature of this contaminant (i.e. there is no identified safe minimum threshold of exposure), the material could pose a potential risk to human health.

With respect to the potential risk of exposure to asbestos containing materials (ACMs) to construction workers, risk should be mitigated through the use of appropriate PPE and RPE. WSP's approach to this assessment encompasses current industry guidance including CIRIA C733 – "Asbestos in Soil and Made Ground – A guide for understanding and managing Risks" and the Joint Industry Working Group (JIWG) "Industry Guidance on Managing and Working with Asbestos in Soils in Construction and Demolition Materials". The JIWG Industry Guidance is specifically used in the consideration of consequence and probability in the exposure model as these documents provide practical advice in relation to the issues associated with asbestos within a soil matrix (as opposed to "original form" asbestos containing materials such as asbestos sheets, insulation boards and pipework lagging).

2.6.2 CONTROLLED WATERS RISK ASSESSMENT

The Site is underlain by three Secondary A Aquifers and one Principal Aquifer.

To facilitate the assessment of risk posed by the ground to controlled waters, leachate analysis was undertaken on three samples and groundwater analysis was undertaken on six samples during the historical WSP | PB investigation in the north-west of the Site.

A total of four samples groundwater samples were submitted for chemical analysis during the Ramboll ground investigation.

As such in order to develop an outline remediation strategy, WSP has re-screened the historical chemical data available within this section and outlined proposed mitigation measures associated with the risks identified within subsequent sections of this report.

As such a controlled waters risk assessment against Drinking Water Standards (DWS) or against Environmental Quality Standards (EQS) is not possible for the majority of the Site.

2.6.2.1 Controlled Waters Assessment

The Controlled Waters risk assessment was conducted in accordance with the principles of EA 'Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination' 2006 (EA 2006) and the 'prevent and limit' approach of the Water Framework Directive (2000/60.EC). Generic

Controlled Waters risk assessments compare directly measured concentrations with standard assessment criteria.

Appropriate Water Quality Standards (WQS) are selected based on both a hierarchy of relevance to the receptor. In this case, the Controlled Water receptors identified in the CSM were the underlying Secondary A Aquifers and Principal Aquifers.

Therefore, based on this the following WQS is considered to be appropriate:

- Environmental Quality Standards (EQS) from The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2017; and,
- UK Drinking Water Standards.

Further details on the assumptions and methodologies adopted by WSP are provided in **Appendix C**.

The chemical testing results for the soil leachate analysis has been screened against the relevant WQS the findings of which are presented within **Table 2-6**

Table 2-6 – Exceedances of UK DWS / WHO and EQS Guidelines in Soil Leachate Samples – WSP / PB

Contaminant	No Samples Tested	No Samples Exceeding >WQS	Max Result (ug/l)	EQS (ug/l)	DWS (ug/l)	Exceedance
Ammoniacal Nitrogen	3	1	1,440	-	500	BH101
Arsenic	3	1	10.8	-	10	BH101
Fluoranthene	3	3	0.625	0.0063	-	BH101, BH102 and HP101
Anthracene	3	1	0.204	0.1	-	BH102
Mercury	3	1	2.0	0.07	1	BH101
pH	3	1	11.1	6 - 9	6.5 – 10	BH102
Tetrachloroethene	3	1	16.2	10	-	HP101

Six groundwater samples were taken over two monitoring rounds in the north-western corner of the Site during WSP | PB investigation. The chemical testing results for the groundwater has been screened against the relevant WQS the findings of which are presented within **Table 2-7**.

Table 2-7 - Summary of EQS and DWS Exceedances in Groundwater Samples - Ramboll

Contaminant	No Samples Tested	No Samples Exceeding >WQS	Max Result (ug/l)	EQS (ug/l)	DWS (ug/l)	Exceedance
Ammoniacal Nitrogen as NH4	6	6	34,600	-	500	BH101 (Round 1 and 2) BH102 (Round 1 and 2) WBH01B (Round 1 and 2)
Nitrite as NO2	3	1	4,470	-	500	BH101 (Round 1)
Nitrate as NO3	3	1	159,000	-	5,000	BH101 (Round 1)
Chloroform	6	2	3.59	2.5	-	WBH01B (Round 1 and 2)
Arsenic	6	1	14.3	-	10	BH101 (Round 2)

Four groundwater samples were taken over a single monitoring round during the Ramboll ground investigation. The chemical testing results from the groundwater has been screened against the relevant WQS, the findings of which are present within **Table 2-8**.

Table 2-8 – Summary of EQS and DWS exceedances in Groundwater samples

Contaminant	No Samples Tested	No Samples Exceeding >WQS	Max Result (ug/l)	EQS (ug/l)	DWS (ug/l)	Exceedance
Chloroform	3	2	5	2.5	-	BH5, BH13
Aromatic EC21-EC35	3	1	0.029	0.00017	-	BH6

The results indicate that a number of contaminants have the potential to leach from soils, albeit at low concentrations. Typically, contaminants recorded at elevated concentrations are not prevalent in groundwater samples.



BH101 recorded an arsenic concentration of 14.2 ug/l within the groundwater which marginally exceeded the assessment criteria and a soil leachate exceedance was also recorded at BH101, which indicates possible leaching from the Made Ground to the Kempton Park Gravels.

A single TPH exceedance was recorded in BH6. This exceedance may be associated with a number of the historical site uses, especially the petrol tank in the north west. Despite a single, and marginal concentration further investigation may be required in order to fully understand the extent of the contaminant of concern.

TCE was recorded at leachable concentrations at HP101. TCE was not recorded above the assessment criteria for soils or within the groundwater samples however, chloroform form was noted as exceeding the WQS at the location of WBH01B, BH5 and BH13. It is understood that there was a laundry historically present on the Site and the TCE and chloroform concentrations may be associated with this former use. A watching brief is recommended within this area to confirm potential visual / olfactory evidence of contamination.

Elevated concentrations of ammoniacal nitrogen, nitrite and nitrate have been noted at the location of BH101. Based on the limited groundwater testing data available for the Site, the potential source of these is currently unknown. Ammonia is a ubiquitous contaminant of surface waters, entering watercourses from a variety of point and diffuse sources. It comprises two principal forms: the ionised ammonium ion (NH₄⁺) and un-ionised ammonia (NH₃). The toxicity of ammonia to fish is attributable mainly to the un-ionised NH₃ molecule. The proportion of un-ionised ammonia increases with increasing temperature and pH. Ammonia is lost from water by volatilisation and, under aerobic conditions, it is oxidised by nitrifying bacteria to nitrite and then to nitrate. It is considered likely that these elevated concentrations are related to the underlying Alluvium deposits. However, any earthworks and excavations on the Site may also mobilise contaminants of concern and this should be considered as a part of any future development works.

Further assessment of the area of the former laundry on the Site should also be undertaken in order to ensure that there are no potential contaminants of concern remaining at formation level.

2.7 GROUND GAS RISK ASSESSMENT

The 2018 Socotec ground investigation included a total of six return visits undertaken from 27 July to 5 September 2018, with the exception of WS5 where two monitoring visits were completed on 27 July and 09 September 2018 and WS8 where one monitoring visit was completed on 24 August 2018.

The maximum recorded positive flow rate was 0.1 l/hr over the six monitoring visits.

BH11 (S) and BH4A were cross installed in the possible Alluvium, Kempton Park Gravels and Lambeth Formation. BH3 was cross installed within the possible Alluvium, Kempton Park Gravels and possible London Clay. BH7A was cross installed within the Kempton Park Gravels and Lambeth Formation. BH6 (S) was cross installed within the Made Ground, possible Alluvium and Kempton Park Gravels.

BH5 (S) and BH13 (S) were installed within the Kempton Park Gravels and WS5, WS8, WS12 and WS15 were installed within the Made Ground.

WSP | PB ground investigation included a total of six return visits undertaken from 12 October 2015 to 20 November 2015, with the expectation of BH101 and WBH01B where five monitoring visits were completed.

The maximum recorded positive flow was 1/hr over the six monitoring visits.



HP101 to HP105 were installed in the Made Ground with BH101, BH102 and WBH01B installed in the Kempton Park Gravels.

Table 2-9 below presents a summary of the ground gas monitoring results.

Table 2-9 - Summary of Ground Gas Monitoring Results

Exploratory Hole	Max Flow Rate (l/hr)	Max Methane (% v/v)	Max Carbon Dioxide (% v/v)	Min Oxygen (% v/v)	Frequency of Flooding
BH3 (S) (Socotec)	0.1	<0.1	4.5	16.2	0 of 6
BH4A (Socotec)	0.1	<0.1	4.7	6.5	6 of 6
BH5 (S) (Socotec)	0.1	<0.1	5	15.9	6 of 6
BH6 (S) (Socotec)	0.1	<0.1	3.5	11.2	6 of 6
BH7A (S) (Socotec)	0.1	<0.1	4.7	11.2	6 of 6
BH11 (S) (Socotec)	0.1	<1	1.4	9.9	0 of 6
BH13 (S) (Socotec)	0.1	0.4	0.3	18.2	0 of 6
WS5 (Socotec)	<0.1	<0.1	8.1	8.1	0 of 2
WS8 (Socotec)	<0.1	<0.1	<0.1	20.2	1 of 1
WS12 (Socotec)	0.1	<0.1	1.9	16.2	3 of 6
WS13 (Socotec)	<0.1	<0.1	9.9	9.1	0 of 6
HP101 (WSP PB)	0.3	0.0	6.3	8.2	0 of 6
HP102 (WSP PB)	0.1	0.0	0.6	15.1	0 of 6
HP103 (WSP PB)	0.2	0.0	3.1	18.1	0 of 6
HP104 (WSP PB)	1.0	0.0	1.0	17.6	0 of 6
HP105 (WSP PB)	0.1	0.0	0.6	17.0	0 of 6
BH101 (WSP PB)	0.1	0.0	6.4	8.5	5 of 5

Exploratory Hole	Max Flow Rate (l/hr)	Max Methane (% v/v)	Max Carbon Dioxide (% v/v)	Min Oxygen (% v/v)	Frequency of Flooding
BH102 (WSP PB)	0.3	0.0	8.9	4.6	6 of 6
WBH01B (WSP PB)	0.1	0.0	4.6	13.2	5 of 5

For the Socotec ground investigation, based on the maximum methane and carbon dioxide concentrations and flow rate of 0.1l/hr the calculated GSV resulted in a Characteristic Situation 1 (Very Low Risk) site setting. However, a number of exceedances of 5% v/v of carbon dioxide (CO₂) were recorded on a number of occasions when the wells were not flooded. Due to the higher carbon dioxide concentrations Gas Characterisation Situation 2 (Low Risk) is considered the most suitable to describe the Site's current gas regime.

For the WSP | PB ground investigation, based on the maximum methane and carbon dioxide concentrations and flow of 1/hr the calculated GSV resulted in a Characteristic Situation 2 (Low Risk). Characteristic Situation 2 sites require the following consideration of the following mitigation measures:

- Reinforced concrete cast in situ floor slab (suspended or raft) with a gas resistant membrane* and underfloor venting; or
- Beam and block or precast concrete slab and reinforced gas membrane and underfloor venting;
- Under floor venting or pressurisation in combination with one of the above.
- During the installation of gas proof membrane all joints, penetrations of the gas proof membrane should be sealed, with service entries protected as appropriate. It is recommended that visual assessment of the workmanship is undertaken post laying and installation of the membrane.

* Gas resistant membrane must meet the following requirements in order to achieve a score of 2: sufficiently impervious to the gases with a methane gas transmission rate <40.0 ml/day/m²/atm (average) for sheet and joints (tested in accordance with BS ISO 15105-1 manometric method), sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions, sufficiently strong to withstand in-service stresses (e.g. settlement if placed below a floor slab), sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc), capable, after installation, of providing a complete barrier to the entry of the relevant gas and verified in accordance with CIRIA C735 [N1].

The recommendation of any mitigation is beyond the scope of this document and risk assessment based on specific building and development design will be required.

Low-level readings of carbon monoxide (CO) and hydrogen sulphide (H₂S) typically in the range of <1 ppm, were recorded during the ground gas monitoring. The proposed development is therefore not considered at risk from the ingress of these gases within existing soils.

Five readings between 5.2ppm and 0.2ppm of volatile organic compounds (VOCs) were recorded in five locations (BH11 (S), BH3 (S), BH4A, WS12 and WS13) across the six monitoring rounds in the Socotec GI and six readings between 2ppm and 5ppm recorded in one location (BH102) across the six monitoring rounds in the WSP | PB GI. These are not considered to be significant however, the data is considered to be insufficient to give a representative view of the VOC concentrations.

3 CONCEPTUAL SITE MODEL

3.1 INTRODUCTION

This section summarises the findings of the GQRA and the key receptors identified in the CSM and provides the plausible linkages identified at the generic assessment level.

3.2 POTENTIAL CONTAMINATION SOURCES

Based on the site conditions and potential contaminant linkages, potential sources of contamination that may affect the development have been identified as follows:

- Made Ground;
- Former laundry;
- Former Biscuit Factory;
- Former timber store;
- Former iron store;
- Former varnish shop;
- Former coal store;
- Former petrol tanks; and,
- Substation.

3.3 POTENTIAL RECEPTORS

Relevant potential receptors are considered to include the following in the context of the proposed development:

Human Health

- Construction workers
- Future site users
- Adjacent site users / adjacent residents

Controlled Waters

- Secondary A Aquifers – Kempton Park Gravels, Lambeth Group, Thanet Formation
- Principal Aquifer - Chalk Aquifer

Future development

- Buildings and services
- Neighbouring properties

The risk assessment by WSP identified a limited risk to surface waters (River Thames) based on the distance from the Site. However, groundwater will need to be managed during any earthworks if encountered.

3.4 PLAUSIBLE CONTAMINANT LINKAGES

Table 3-1 presents the Relevant Pollutant Linkages (RPL's) that were considered to be plausible following the site investigation, based on an evaluation of the potential sources and future receptors.

Table 3-1 – Relevant Pollutant Linkages that require Remedial Action

Relevant Pollutant Linkage	Source	Potential Pathways	Potential Receptors	Comments
RPL1	Asbestos	Inhalation of fibres on-site	Construction workers, Future site users Adjacent site users / residents	Asbestos fibres and Asbestos Containing Materials (ACM) were noted at several locations across the site. Consideration of further risk assessment and appropriate control measures must be undertaken if this material is to be re-used on site or disposed of off-site to a suitably licenced facility.
RPL2	Metals within the Made Ground	Direct contact / soil ingestion in unsealed areas	Construction workers, Future site users	Made Ground soil was found to pose a potential risk of harm to human health in unsealed areas. The risks posed by lead in Made Ground soil will require further assessment and mitigation through either further characterisation of soils (Discovery Strategy) and/or remedial measures based on the proposed development plans.
RPL3		Direct contact	Buildings and services	Contaminants within the Made Ground may impact proposed buildings and services. An assessment of concrete in aggressive ground may be required. Any pipe design should be subject to the appropriate soil testing in service trenches and agreed with the relevant statutory authority.
RPL4		Vertical migration to underlying Secondary A Aquifers and Principal Aquifer	Controlled Waters - Secondary A and Principal Aquifers	Future redevelopment will include a reduction in site levels and removal of a majority of the Made Ground on the Site. There is a potential risk of unidentified contamination being present within the soils below the cut level which may impact Controlled Waters underlying the Site. It is considered likely that the proposed development will be piling through the Made Ground on Site. Piled foundations may provide a preferential pathway for shallow contamination to reach the deeper groundwater bodies. A Piling Risk Assessment should be completed to prevent contamination of the Principal aquifer.

Relevant Pollutant Linkage	Source	Potential Pathways	Potential Receptors	Comments
RPL5	Petrol Tank in the north-west of the Site	Direct contact / soil ingestion in unsealed areas	Construction workers, Future site users	<p>A historical petrol tank is noted in the north-western corner of the Site. The status of the tank is currently unknown. There may be localised hydrocarbons present within this area based on the former use which are considered to pose a potential risk of harm to human health.</p> <p>The risks posed by potential hydrocarbons will require further assessment and mitigation through further characterisation of soils during the works (a Discovery Strategy).</p>
RPL6		Direct contact	Buildings and services	<p>Contaminants within the area of the former tank may impact proposed buildings and services.</p> <p>An assessment of concrete in aggressive ground may be required. Any pipe design should be subject to the appropriate soil testing in service trenches and agreed with the relevant statutory authority.</p>
RPL7		Vertical migration to underlying Secondary A Aquifers and Principal Aquifer	Controlled Waters - Secondary A and Principal Aquifers	<p>Future redevelopment will include a reduction in site levels and removal of a majority of the Made Ground on the Site. There is a potential risk of unidentified contamination being present within the soils below the cut level which may impact Controlled Waters underlying the Site.</p> <p>It is considered likely that the proposed development will be piling through the Made Ground on Site. Piled foundations may provide a preferential pathway for shallow contamination to reach the deeper groundwater bodies. A Piling Risk Assessment should be completed to prevent contamination of the Principal aquifer.</p>
RPL8	Electricity Substation in the North-west	Direct contact / soil ingestion in unsealed areas	Construction workers, Future site users	<p>An electricity substation is noted in the north-western corner of the Site. Historical ground investigation works in this area has not tested for mineral oils or PCBs. There may be localised PCBs present at this location which are considered to pose a potential risk of harm to human health.</p> <p>The risks posed by potential PCBs will require further assessment and mitigation through further characterisation of soils during the works (a Discovery Strategy).</p>

Relevant Pollutant Linkage	Source	Potential Pathways	Potential Receptors	Comments
RPL9	Electricity Substation in the North-west	Vertical migration to underlying Secondary A Aquifers and Principal Aquifer	Controlled Waters - Secondary A and Principal Aquifers	<p>Future redevelopment will include a reduction in site levels and removal of a majority of the Made Ground on the Site. There is a potential risk of unidentified contamination being present within the soils below the cut level which may impact Controlled Waters underlying the Site.</p> <p>It is considered likely that the proposed development will be piling through the Made Ground on Site. Piled foundations may provide a preferential pathway for shallow contamination to reach the deeper groundwater bodies. A Piling Risk Assessment should be completed to prevent contamination of the Principal aquifer.</p>
RPL10	Former Laundry in the north-west	Vertical migration to underlying Secondary A Aquifers and Principal Aquifer	Controlled Waters - Secondary A and Principal Aquifers	<p>Some elevated concentrations of TCE and chloroform were noted within the leachates and groundwater in the north-west in the location of a former laundry. There is a potential risk of unidentified contamination being present within the soils below the cut level which may impact Controlled Waters underlying the Site.</p> <p>The risks posed by potential TCE and chloroform will require further assessment and mitigation through further characterisation of soils during the works (a Discovery Strategy).</p> <p>It is considered likely that the proposed development will be piling through the Made Ground on Site. Piled foundations may provide a preferential pathway for shallow contamination to reach the deeper groundwater bodies. A Piling Risk Assessment should be completed to prevent contamination of the Principal aquifer.</p>
RPL11	Made Ground: Active generation of ground gas (carbon dioxide, methane, low oxygen concentrations)	Vertical migration and accumulation in confined spaces in proposed development	Future site users Adjacent site users / residents	<p>Ground gas measures will be required for new buildings in accordance with C665 for a low risk Characteristic Situation 2 site.</p> <p>Further GI may be considered to reduce the Gas Characterisation Situation.</p>



3.5 GAPS WITHIN THE EXISTING DATA

Based on the limited coverage across the Biscuit Factory Main Site, there are considered to be gaps within the existing data, however, based on the proposed development comprising a reduction in site levels by up to 2 m and between 2 m and 6 m within areas of proposed, it is considered likely that most of the Made Ground soils present on the Site will be excavated and taken off site. It is recommended that a watching brief by a suitably qualified person is maintained for the duration of these works in order to ensure that unidentified contamination is suitably identified and managed, if encountered.

A discovery strategy and assessment during the enabling works is considered likely to be required within the areas of the former petrol tank, substation and former laundry in the north-western part of the Site.

It should be noted that an assessment of the available geotechnical data from historical ground investigations has not been included within this report.

4 REMEDIATION OBJECTIVES, CONSTRAINTS AND OPTIONS APPRAISAL

This section defines the remediation objectives and constraints and sets out the basis for selecting the most appropriate overall remediation option for the Site.

4.1 REMEDIATION OBJECTIVES

The objectives of the proposed remediation are as follows:

- Protection of human health and the environment;
- To provide a site suitable for the proposed end-use;
- Contributing to a sustainable development;
- Minimising adverse environmental impact on off-site locations; and,
- Best practical remediation measure.

The protection of human health from soil contamination will need to address:

- Unacceptable risks to human health, and,
- Potential risk to Controlled Waters

A summary of the remediation objectives per RPL is provided in **Table 4.1**, below. As outlined earlier within the strategy, the remediation works will be verified in two stages. The actions highlighted in **red** make reference to elements of the proposed remediation works that will require verification by subsequent contractors following the completion of the Keltbray works.

Table 4-1- Summary of Remediation Objectives per RPL

RPL	Source	Aim / Requirements	Action
RPL1	Asbestos Fibres	Protection of construction workers, future site users and adjacent site users / residents	Control measures during earthworks and controlled removal of arisings generated. During groundworks appropriate PPE/RPE and mitigation methods as outlined within an Asbestos Management Plan are recommended to mitigate the risk against the release of airborne asbestos fibres (including air monitoring) are recommended. Provision of a pathway break in soft landscaped areas (pathway break to be completed and verified at a later stage by subsequent contractors).
RPL2	Metals within the Made Ground soils	Protection of construction workers and future site users	Control measures in line with CDM Regulations during earthworks and any other excavation works associated with basements and infrastructure. A watching brief by a suitably qualified person during bulk excavations is

RPL	Source	Aim / Requirements	Action
			<p>recommended to observe potential unidentified contamination.</p> <p>Provision of a pathway break in soft landscaped areas (pathway break to be completed and verified at a later stage by subsequent contractors).</p>
RPL3	Metals within the Made Ground soils	Protection of Buildings and services	Assessment of concrete in aggressive ground and potential requirement for barrier pipes (subject to agreement with relevant statutory authority).
RPL4	Metals within the Made Ground soils	Protection of Controlled Waters - Secondary A and Principal Aquifers	<p>A watching brief by a suitably qualified person during bulk excavation works to observe potential unidentified contamination during the works.</p> <p>Further assessment of risk to Controlled Waters if potential contaminants of concern are identified at formation level.</p> <p>A Piling Risk Assessment to be completed at a later stage by others when piling design known.</p>
RPL5	Petrol Tank in the north-west of the Site	Construction workers, Future site users	A watching brief by a suitably qualified person during bulk excavation works and a discovery strategy and further investigation and assessment if previously unidentified contamination is encountered during the works.
RPL6	Petrol Tank in the north-west of the Site	Buildings and services	Assessment of concrete in aggressive ground and potential requirement for barrier pipes (subject to agreement with relevant statutory authority).
RPL7	Petrol Tank in the north-west of the Site	Controlled Waters - Secondary A and Principal Aquifers	<p>A watching brief by a suitably qualified person during bulk excavation works and a discovery strategy and further investigation and assessment if previously unidentified contamination is encountered during the works.</p> <p>Further assessment of risk to Controlled Waters if potential contaminants of concern are identified at formation level.</p> <p>A Piling Risk Assessment to be completed at a later stage by others when piling design known.</p>
RPL8	Electricity Substation in the North-west	Construction workers, Future site users	A watching brief by a suitably qualified person during bulk excavation works and a discovery strategy and further investigation

RPL	Source	Aim / Requirements	Action
			and assessment if previously unidentified contamination is encountered during the works.
RPL9	Electricity Substation in the North-west	Controlled Waters - Secondary A and Principal Aquifers	<p>A watching brief by a suitably qualified person during bulk excavation works and a discovery strategy and further investigation and assessment if previously unidentified contamination is encountered during the works.</p> <p>Further assessment of risk to Controlled Waters if potential contaminants of concern are identified at formation level.</p> <p>A Piling Risk Assessment to be completed at a later stage by others when piling design known.</p>
RPL10	Former Laundry in the North-west	Controlled Waters - Secondary A and Principal Aquifers	<p>A watching brief by a suitably qualified person during bulk excavation works and a discovery strategy and further investigation and assessment if previously unidentified contamination is encountered during the works.</p> <p>Further assessment of risk to Controlled Waters if potential contaminants of concern are identified at formation level.</p> <p>A Piling Risk Assessment to be completed at a later stage by others when piling design known.</p>
RPL11	Ground Gas	Protection of future site users	<p>Control measures during excavation works and prevention of gas migration through the use of suitable gas protection measures as a part of the proposed development. Alternatively, further sampling and re-assessment of risk (gas protection measures to be completed and verified at a later stage by subsequent contractors).</p>

5 REMEDIATION OPTIONS APPRAISAL

An appraisal has been undertaken taking into consideration technical, logistical and financial aspects of the remediation technology/options and incorporates the staged approach as defined in CLR 11 (2004).

The remedial options available to manage unacceptable risks will either:

- Manage (remove, destroy, modify or immobilise) the source,
- Interrupt the pathway; or,
- Modify the receptor or the behaviour of the receptor.

The most appropriate approach is considered to be a combination of source treatment and removal / modification of the migration pathway.

The assessment of chemical data indicates that there are areas of asbestos, lead and hydrocarbon contamination.

The proposed options are designed to manage the source of contamination or interrupt the pathway. Modifying receptor or receptor behaviour has not been considered in this instance. Source management may involve the removal, destruction, stabilisation, or transformation of the source. Pathway interruption may involve either the blocking of the pathway or the destruction or removal of contaminants moving along a pathway.

Feasible remedial techniques for the Site include in-situ and ex-situ civil engineering based, process based solutions and planning based solutions.

5.1 EXCAVATE AND DISPOSE (CIVIL ENGINEERING BASED SOLUTION)

This technique simply involves excavating the source of contaminated material. It has the advantage that it is an observational technique and contaminated material identified by visual and olfactory means may be removed with some confidence. The disposal option is an expensive and environmentally unsustainable solution, requiring disposal of the contaminated material to a suitable disposal facility, a source of chemically suitable material to backfill the excavation and transport of the waste and fill materials. Any excavation and disposal works should be undertaken in line with materials management of the soils in accordance with waste management guidance as outlined within Section 6.8.

5.2 EXCAVATE AND REMOVAL TO SOIL TREATMENT FACILITY (CIVIL ENGINEERING BASED SOLUTION)

This technique involves excavating the source of contaminated material. This is an observational technique based on visual / olfactory evidence of contamination which will be confirmed by validation testing. This material will then be disposed of off-site to a registered Soil Treatment Facility (STF) for treatment and re-use off-site. Based upon the volume of contaminated material, this may prove to be a more cost-effective approach than treatment on site, however, segregation should be undertaken to ensure that this is cost effective.

5.3 MATERIALS MANAGEMENT AND COVER SYSTEMS / BARRIERS (CIVIL ENGINEERING BASED SOLUTION)

This technique introduces an appropriate barrier, removing the pathway to the receptor. Import of clean materials or onsite management of appropriate materials is required for construction of the barrier. Systems range from simple cover layers to provide a reduction of the hazard to human health and to provide a suitable medium for plant growth; through to engineered systems designed to provide a complete separation of the receptor from the hazard and to perform a number of functions including limiting upward migration of contaminants due to capillary rise and controlling the downward infiltration of water.

5.4 SELECTIVE DEVELOPMENT ZONING (PLANNING BASED SOLUTION)

This method divides the site into different development zones whereby the exceedances of contaminants will be compared against different land-use scenarios and the masterplan for the site will be developed accordingly. This method may not be appropriate as a Master Plan has already been developed.

5.5 PREFERRED REMEDIATION OPTIONS

Based upon the proposed formation levels, literature review, consultation with a number of specialist contractors, and from direct experience on sites of similar complexity, it is considered that an appropriate and cost-effective approach can be adopted is a mixture of excavation and dispose / removal to soil treatment facility and materials management and cover systems / barriers.

It should be noted that the Piling Risk Assessment, gas protection measures and clean cover elements of this strategy will be undertaken by other contractors so the Remediation works will require verification in two stages. This is discussed in more detail within Section 6.

Based on the available data the preferred remedial option comprises the following:

5.5.1 HUMAN HEALTH

5.5.1.1 Metals – Lead

Residual risks to human health associated with contaminated soils within the upper 600 mm of the final finished formation levels will be mitigated for lead contamination, through the removal of Made Ground to achieve the formation levels and the covering of most of the site with buildings and hardstanding where Made ground may still be present following earthworks. In small areas of proposed soft landscaping residual human health risks will be mitigated for lead contaminated soil, through the import or re-use of a 600 mm clean cover system which is chemically compliant with the end-use of the Site. This element of the proposed remediation works that will require verification by subsequent contractors following the completion of the Keltbray works.

5.5.1.2 Unidentified Hydrocarbons and PCBs

Localised areas of hydrocarbons contamination may be present within the area of the petrol tanks and PCBs within the area of the substation in the north-western part of the Site. A watching brief by a suitably qualified person is recommended during the enabling works and if any visual olfactory evidence of contamination is noted, a discovery strategy and further investigation and assessment of the potential risk to the proposed end-use is recommended. Any mitigation measures will be agreed with the regulators, if required.



This approach would be recommended for all areas of potential unidentified contamination on the Site during the enabling works.

5.5.1.3 Asbestos

For asbestos contaminants, this should be managed as a part of the construction works under an Asbestos Management Plan. The Asbestos Management Plan will be produced by Keltbray one month prior to commencing works for their package of works. This document should be updated by subsequent contractors who will be continuing construction. As general Site Management good practice, earthworks operatives should be given a toolbox talk on potential contaminated land risks in particular the possibility of encountering Asbestos Containing Material (ACM) prior to excavation. If suspected ACM is identified then the following is required:

- I. Stop works in the vicinity of the suspected location;
- II. Inform Site Manager;
- III. Inform the environmental consultant;
- IV. Operatives to be provided with appropriate PPE;
- V. Damp and cover the location to prevent release of asbestos fibres;
- VI. Fence off the area to prevent tracking of fibres across the Site by vehicle / people movements;
- VII. Collection of soil sample for asbestos quantification testing;
- VIII. If the sample is negative for asbestos (i.e. non-detect or <0.001%) no further works are required;
- IX. If the sample records asbestos at >0.001% or is in an area of soft landscaping then the material must be excavated in accordance with the procedure described below (for the remediation of identified contamination RPL1); and,
- X. If the sample records asbestos at <0.1% and is below an area of hardstanding or within the building footprint then the material can remain, provided that a woven geotextile membrane (terram hi viz) and 200 mm of clean validated material is placed over the soil to minimise the spread / release of asbestos fibres during construction phase; or excavated to a temporary covered stockpile for placement below a hardstand area at a later time. If ACMs are identified and the Contractor opts to allow the material to remain in place (after providing cover layer) the extent must be surveyed and recorded on an as built drawing and retained in the Health and Safety File.

Risks to human health will be mitigated across the majority of the Site through the covering of the Site with buildings and hardstanding. Within the small areas of soft landscaping, a 600 mm clean cover will be imported (or site re-won) and placed as a part of the proposed development. Where development is to be undertaken in stages, sufficient interim cover (minimum 150 mm) should be placed across the site to protect construction workers and other site users.

5.5.2 CONTROLLED WATERS

Based on the proposed excavation and removal of the majority of the Made Ground across the Site, any potential sources of contamination are considered likely to be removed. There may be potential areas of unidentified contamination present at formation level following the earthworks which could pose a risk to Controlled Waters.

A watching brief by a suitably qualified person is also recommended during earthworks in order to identify any potential areas of concern at formation level which may require further assessment during the works in order to ensure that there is a low risk to Controlled Waters.

On achievement of formation level, a watching brief and discovery strategy is recommended within the area of the former laundry in the north-western part of the Site. If potential contaminants of concern are noted, further assessment is recommended and any mitigation measures required will be agreed with the regulators, if required.

5.5.3 BUILDINGS

GROUND GASES

The potential presence of elevated ground borne gas (indicating a CS2 classification - Low Risk) should be reconsidered upon completion of the remedial works.

It is understood that the Site levels will be reduced across the Site. It is recommended that the proposed gas protection measures outlined above are confirmed based on the final formation levels on the Site and the proposed locations of the buildings.

Insufficient data has been provided of volatile organic compounds recorded by the Photo Ionisation Detector for soils. As such the risk from the ingress of volatile organic compounds within existing soils cannot be ruled out at this time. However, based on the proposed removal of the majority of the Made Ground on the Site, the potential source of contamination would be removed.

It should be noted that this element of the proposed remediation works will be completed by subsequent contractors following the completion of the Keltbray works.

5.5.3.1 Foundations

If elevated concentrations of sulphate are noted, the concrete foundations for the buildings will require appropriate design of concrete classification.

5.5.3.2 Services

Based on UK Water Industry Research 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' and the available data, an indicative assessment has been undertaken on the type of water supply pipes that may be suitable for the Site. The assessment suggests that barrier pipes may be required. Once the proposed locations of the potable water supply pipes have been confirmed; appropriate soil testing should be agreed with the relevant statutory authority.

It should be noted that the water supply company's bespoke threshold concentrations take precedence over the UKWIR guidance, therefore, this should be confirmed prior to construction.

6 REMEDIATION STRATEGY

6.1 PROPOSED DEVELOPMENT

The Site is being assessed for residential development with no plant uptake with some landscaping areas.

It is currently proposed that the indicative formation levels for the Site are likely to be between 1.35m and -4.20 m AOD with a proposed cut of between 0 to 2 m across the majority of the Site and up to 6m in south east the for a proposed basement.

Ground levels may be subject to change to provide alternative development platforms. Based on the above it is anticipated that some of the Made Ground will likely be excavated from the Site and some of the underlying natural soils may also be excavated in some areas.

It is anticipated that the re-use of on-site soils and import / transfer of materials will be carried out under the CL:AIRE Code of Practice to facilitate the re-use and treatment of on-site material that might otherwise be classified as waste.

6.2 CONSTRAINTS AND CONSIDERATIONS

The following are a number of Site specific factors that are likely to affect the choice of remediation solution. These are summarised below:

- The assessment undertaken is based on the outline masterplan available at the time of writing this report. It is understood that this may be subject to change as the development progresses in which case this assessment and strategy should be re-assessed.
- The piling risk assessment, ground gas protection measures and clean cover verification elements of the remediation works will be undertaken by subsequent contractors following the completion of the Keltbray works. The Keltbray works will be verified as one stage and the outstanding elements will require verification by subsequent contractors at a later stage.
- The proposed buildings are likely to be piled through the Alluvium and the Kempton Park Gravels thus potentially creating vertical pathways into the underlying aquifer. Consideration of the environmental impacts associated with the piling works should be considered in a piling risk assessment that should be conducted in accordance with NC/99/73 Piling and penetrative ground improvement methods on land affected by contamination: guidance on pollution prevention dated 2001. The piling design is currently unknown and the piling element of the proposed construction will be completed by subsequent contractors and will be verified following the completion of the Keltbray works. When confirmed, the Piling Risk Assessment will be completed by the Piling contractor and submitted one month prior to commencing piling works.
- It is understood that the site is relatively flat, however, the levels on the Site will be reduced from 0 m to 2 m. It is anticipated at this stage that all materials excavated will be removed from Site, however, some of the material generated could potentially be re-used on the Site subject to chemical and geotechnical suitability. Any material re-use should be undertaken under a Materials Management Plan in line with the CLAIRE Code of Practice.
- At this stage, design plans for locations of potable water supply have not been finalised. Some soils may pose a risk to below ground potable water pipes constructed from copper within areas of Made Ground on the Site.
- It is understood that groundwater was recorded at between 0.72 and 6.54 m bgl. Based on the maximum cut of 6 m bgl groundwater is considered likely to be encountered. If dewatering is

required during the construction process it will be undertaken by a Design and Build Contractor. It is understood that they would be responsible for specific discharge consents, abstraction licence (if required), and ensure the works are in line with appropriate legislative frameworks (the Water Act 2003, for example) and guidance. It is considered possible that the water within excavations may require treatment prior to discharge. This should be considered as a part of the proposed development. If visual / olfactory evidence of contamination is identified during the works, the environmental consultant shall be informed and a sample will be obtained for testing in order to assess the risks associated with contamination within the groundwater.

6.3 SITE CLEARANCE

Various existing buildings will need to be demolished and cleared prior to the start of the construction phase on Site.

6.4 REMOVAL OF GRASS / TOPSOIL / SUBSOIL

When removing the grass / topsoil / subsoil from the Site, these materials should be segregated from the Made Ground deposits.

It is understood that there may be some areas of landscaping proposed on the Site. If topsoil / subsoil materials are required for the proposed landscaping areas, these materials will require testing for chemical suitability in line with the requirements of **Table 6.4**.

Geotechnical suitability will also need to be assessed in line with BS3882 for Topsoil.

If the material is found to be chemically / geotechnically unsuitable, these materials would need to be taken off site for disposal.

6.5 REDUCTION IN GROUND LEVEL

The Site is likely to be cut on average by between 0 and 2 m below existing ground levels and up to 6 m within areas of proposed basements. The proposed remediation works will be undertaken down to formation level by Keltbray Remediation, details of which are shown on Drawing numbers **BER-ARP-BFXXX-XX-SK-D-82002** and **BER-ARP-BFXXX-XX-SK-D-82003 (Appendix A)**.

6.5.1 SEGREGATION AND TREATMENT OF SOILS

Based on the historical use of the Site and the variable nature of the soils underlying the Site, segregation and potential re-use of soils is possible. Segregation and further classification and assessment of soils would inform the most cost effective and sustainable option for disposal and re-use of soils.

All material re-use should be in line with the CL:AIRE Code of Practice and the chemical and geotechnical suitability should be assessed in line with the requirements of this Remediation Strategy and any subsequent Remediation Implementation Plan provided by the contractor.

6.6 EXCAVATIONS FOR DEVELOPMENT AND SERVICES

Based upon the works undertaken on the site, excavations for foundations and services should be possible in the Made Ground using normal hydraulic plant.

Based upon the findings of the ground investigation, shallow seepages of perched water are likely to occur locally. Sump pumping should be sufficient to remove water from excavations. Appropriate consents will be required to pump the perched water to sewer or, where chemically suitable, to be

discharged off-site via one of the interceptors. If not suitable, the perched water may require collection for treatment with a suitable Mobile Treatment Permit or be tankered off-site to a treatment facility.

Excavations may not remain stable in the short term within some parts of the site, even to shallow depth, and may require support or battering back. The base of all excavations should be blinded in order to prevent the deterioration of the cohesive materials.

Elevated concentrations of carbon dioxide and depleted levels of oxygen were recorded within isolated areas of the site; this should be considered when risk assessments are undertaken for work in excavations and other confined spaces.

6.7 VISUAL INSPECTION AND ANALYSIS

It is proposed that a system of appropriate inspection and assessment is implemented during the excavation of all Made Ground as part of the planned works. This role will be performed by a suitably experienced Engineer who is able to provide an appropriate level of specialist technical advice in relation to the presence of contamination or otherwise.

The Engineer shall ensure that all material is correctly inspected, stockpiled, tested and classified. The Engineer will have primary responsibility for the inspection of arisings and excavation of any suspected contaminated material.

The Engineer will direct the contractor as to how arisings are to be managed, including the requirements for the segregation, stockpiling and subsequent testing.

In addition, during the excavation works and disposal of the asbestos impacted soils the chosen contractor should retain the services of an asbestos consultant to provide guidance on works, to include methodologies for mitigating fibre release, providing toolbox talks to staff and undertaking personnel and verification monitoring.

In order to maximise the quantity of material that can be retained on site for re-use, the segregation of different material types should be completed.

6.8 DISCOVERY STRATEGY

A discovery strategy is recommended within areas of concern noted within the north-western part of the Site. This includes the substation, petrol tank and former laundry.

The size of the potentially impacted areas is considered likely to vary therefore a testing frequency has not been stipulated within this Outline Remediation Strategy. On identification of potential contamination, subject to the extent of the area of concern, a bespoke sampling and validation strategy will be compiled. This will then be submitted to the Local Authority Contaminated Land Officer and the sampling and validation works will commence following 5 working days if no comments are received.

This role will be performed by a suitably qualified person who is able to observe any visual / olfactory evidence of contamination during the enabling works and undertake further investigation, sampling, testing (as per the bespoke strategy submitted to the regulators) and subsequent assessment on receipt of the results.

The findings may indicate the requirement for further mitigation measures required as a part of the proposed development. This will require regulatory approval prior to implementation (if required).

6.9 WASTE MANAGEMENT

It is understood that significant volumes of materials will be generated during the reduced dig across the Site. Any crushed concrete or brick could be temporarily used as a piling mat or re-used as a sub-base under pavements and roads. If re-used on site however, a materials management plan (MMP) should be considered if the backfill materials are being generated from the site or if the materials generated from the works are considered to be suitable for re-use on the Site under the CL:AIRE Code of Practice, or alternatively a waste recovery permit.

A 'Qualified Person' as defined under the CoP will review the development of the Materials Management Plan, Risk Assessments and Remediation Strategy/Design Statement together with documentation relating to Planning and Regulatory issues will sign a Declaration which is forwarded to the Environment Agency and which confirms compliance with the CoP. Any need for the disposal of material off site will require appropriate pre-classification and pre-treatment to minimise the waste volume. It is the strategy of the site however to maximise re-use of materials where possible.

The Contractor should provide a works materials management statement that sets out the circumstances and criteria for which materials are to be classified as waste or non-wastes.

The Contractor is required to provide method statements illustrating how compliance with waste management legislation is to be achieved for those materials classified as waste, to include but not limited to:

- Use of imported material;
- Criteria for assessing of the suitability of imported materials;
- Management of material that arises during the works and is classified as waste;
- Waste streams are appropriately classified prior to offsite disposal;
- Audit process for the selection of waste management contractors to include the collection and assessment of licences, permits and registrations; and,
- Audit process and record keeping.

In addition, all documents required if a waste recovery permit is required.

Where imported material is from a virgin source or the material has been demonstrated to have been produced in accordance with the WRAP Quality Protocol and is used Below the 600 mm Capping Layer the sampling and testing of the material would not be required. A visual / olfactory assessment of the material once imported onto Site would however be required.

6.10 SAMPLING AND TESTING FOR SUITABILITY OF USE

Sampling and testing of any backfill materials will be required in order to demonstrate suitability of use.

Materials under the proposed marker layer for the clean cover can be remain in-situ without testing on the basis that the potential residual contamination has been assessed as suitable to remain in place at depth.

Sampling frequency and strategy is detailed below:



Table 6-1- Sampling Frequency

Activity	Testing Frequency	Testing Suite
Stockpiled materials for disposal	Testing frequency as required by the receiver of the waste	Waste acceptable criteria (WAC) analysis if being taken to a landfill or a full testing suite for metals, inorganics and organics if being taken to another site or a Soil Treatment Facility (subject to the requirements of the receiver site).
Validation of clean cover materials for soft landscaped areas	One sample every 250 m ³ . This should be tested and verified in-situ	Suite including TPH-CWG, asbestos, metals and PAHs.
Material used for backfilling of excavations	One sample every 500 m ³ .	Suite including TPH-CWG, asbestos, metals and PAHs. Testing results will be for information purposes and re-use of materials will be on a risk based approach in line with the Definition of Waste: Code of Practice.
Validation of Unexpected Contamination	TBC and submitted to regulators if identified.	TBC and submitted to regulators if identified.

The materials being used for the validation of clean cover would be assessed for suitability by comparison to the Generic Screening Criteria (GACs) for residential end-use with no plant uptake and Residential Public Open Space for 1.0% soil organic matter (SOM) are presented within the tables below.

Table 6-2 - GACs for Residential End Use with No Plant Uptake

Analyte	GAC	Units	Analyte	GAC	Units
Asbestos	None Detected	%	TPH Aliphatic C16-C35	800*	mg/kg
Arsenic	35	mg/kg	TPH Aliphatic C35-C44	800*	mg/kg
Cadmium	87	mg/kg	TPH Aromatic C7-C8	853	mg/kg
Chromium III	1,590	mg/kg	TPH Aromatic C8-C10	47	mg/kg
Copper	1000**	mg/kg	TPH Aromatic C10-C12	248	mg/kg
Lead	188	mg/kg	TPH Aromatic C12-C16	800*	mg/kg
Mercury	56	mg/kg	TPH Aromatic C16-C21	800*	mg/kg
Nickel	181	mg/kg	TPH Aromatic C21-C35	800*	mg/kg
Selenium	430	mg/kg	TPH Aromatic C35-C44	800*	mg/kg
Zinc	1000**	mg/kg	Benzo(a)pyrene	1.7	mg/kg
TPH Aliphatics C5-C6	42	mg/kg	Naphthalene	2.3	mg/kg



Analyte	GAC	Units	Analyte	GAC	Units
TPH Aliphatics C6-C8	104	mg/kg	Benzene	0.38	mg/kg
TPH Aliphatics C8-C10	27	mg/kg	Ethylbenzene	83	mg/kg
TPH Aliphatics C10-C12	132	mg/kg	Toluene	868	mg/kg
TPH Aliphatics C12-C16	800*	mg/kg	Xylene M & O	79	mg/kg

* - NOTE: Values with an * have been reduced to 800 mg/kg as a proxy value. This is a professional judgement value as the actual values for hydrocarbons within a residential without plant end use are considered to be too high for the betterment of Controlled Waters.

Values with an ** have been reduced to 1,000 mg/kg as a proxy value. This is a professional judgement value as the actual values for Copper and Zinc within a residential without plant end use are considered to be too high for the betterment of Controlled Waters.

Table 6-3 - GACs for Residential Public Open Space End Use

Analyte	GAC	Units	Analyte	GAC	Units
Asbestos	None Detected	%	TPH Aliphatic C16-C35	800*	mg/kg
Arsenic	79	mg/kg	TPH Aliphatic C35-C44	800*	mg/kg
Cadmium	120	mg/kg	TPH Aromatic C7-C8	800*	mg/kg
Chromium III	2,140	mg/kg	TPH Aromatic C8-C10	800*	mg/kg
Copper	1,000**	mg/kg	TPH Aromatic C10-C12	800*	mg/kg
Lead	375	mg/kg	TPH Aromatic C12-C16	800*	mg/kg
Mercury	124	mg/kg	TPH Aromatic C16-C21	3,790	mg/kg
Nickel	305	mg/kg	TPH Aromatic C21-C35	3,790	mg/kg
Selenium	1,140	mg/kg	TPH Aromatic C35-C44	3,790	mg/kg
Zinc	1,000**	mg/kg	Benzo (a) pyrene	5.2	mg/kg
TPH Aliphatics C5-C6	800*	mg/kg	Naphthalene	4,890	mg/kg
TPH Aliphatics C6-C8	800*	mg/kg	Benzene	72	mg/kg
TPH Aliphatics C8-C10	800*	mg/kg	Ethylbenzene	800*	mg/kg
TPH Aliphatics C10-C12	800*	mg/kg	Toluene	800*	mg/kg
TPH Aliphatics C12-C16	800*	mg/kg	Xylene M & O	800*	mg/kg

* - NOTE: Values with an * have been reduced to 800 mg/kg as a proxy value. This is a professional judgement value as the actual values for hydrocarbons within a residential without plant end use are considered to be too high for the betterment of Controlled Waters.



Values with an ** have been reduced to 1,000 mg/kg as a proxy value. This is a professional judgement value as the actual values for Copper and Zinc within a residential without plant end use are considered to be too high for the betterment of Controlled Waters.

6.11 CLEAN COVER SYSTEMS

The placement of clean cover systems will be undertaken following the completion of the Keltbray element of the construction works. These works will be completed by subsequent contractors appointed by the developer. It will be the responsibility of the developer who should appoint a suitably qualified environmental consultant to independently verify that imported cover materials meet the required standard and the cover systems are constructed in accordance with the requirements set out below.

In areas of proposed soft landscaping and public open space, where Made Ground remains in place, there is the potential for residual contamination to be present which, although has been assessed as suitable to remain in place, may pose an increased risk to sensitive human receptors if it is brought to the surface due to maintenance work, or other activities such as gardening. As such it is recommended that a minimum cover is designed to mitigate residual risks and a marker layer such as orange terram or similar is required. In addition, soft landscaping will require suitable growing medium for cultivation.

The capping thicknesses are shown below to be a required minimum across public open space. The clean cover layer will be placed in the sequence as shown below by the developer during the construction phase. It is considered that areas of public open space will be managed by companies who can take appropriate mitigation measures to limit exposure to their workforce.

Such a cover barrier would need to be agreed with the Contaminated Land officer at the Local authority and will be dependent on the final development layout and levels.

It is noted that the proposed capping of certain failures across the site will in a majority of cases exceed that set out below in **Table 6-4**.

Table 6-4- Capping Thickness

AREA ON-SITE	GEOTEXTILE MARKER LAYER	SUB-SOIL (mm)	TOPSOIL (mm)	TOTAL THICKNESS (mm)
Public Open Space / landscaping areas	Yes	400	200	600

The chemical requirements for the landscaping areas are outlined within **Tables 6.2 and 6.3** and geotechnical requirements of subsoil and topsoil are as outlined within BS 8601:2013 and BS 3882:2015, respectively.

The capping layer should be verified in-situ by a suitably qualified person following placement.

6.12 MANAGEMENT OF ASBESTOS

6.12.1 REVIEWING ASSESSMENTS

Further assessment of risks associated with the presence of asbestos containing materials within the Made Ground would need to be considered as a part of the proposed development when assessing risks to construction workers and future site users. Based on the uncontrolled filling the presence of asbestos within the ground cannot be dismissed and should be considered as a part of the proposed

development and an Asbestos Management Plan should be compiled in line with CIRIA C733 – “Asbestos in Soil and Made Ground – A guide for understanding and managing Risks” and the Joint Industry Working Group (JIWG) “Industry Guidance on Managing and Working with Asbestos in Soils in Construction and Demolition Materials” and, implemented as a part of the development works. The Asbestos Management Plan will be produced by Keltbray one month prior to commencing works for their package of works. This document should be updated by subsequent contractors who will be continuing construction.

If asbestos is identified during the excavations on the site, this material will require careful management in accordance with Control of Asbestos Regulations 2012. Asbestos exposure risk assessment, mitigation such as dust suppression and air monitoring would be required.

The Principal Contractor should review risk assessments as part of the ongoing management of their health and safety systems to make sure they are still relevant and reflect any lessons learned site from activities. A competent person should conduct the review. A specific review should take place if:

- methods used to control fibre release change;
- there is doubt about the efficiency of control measures;
- there is a significant change in the type of work, amount of asbestos or method of work; and,
- the results of air monitoring indicate the exposure levels to be higher than previously assessed.

Where monitoring of exposure levels, or other information gathered during the course of work indicates that the initial assessment requires revision with regards to either the duration of the task or nature of the materials, the following tasks should be undertaken:

- immediately review the assessment and control measures and whether the nature;/extent of the exposure means that the work should be done using different methods and equipment;
- review whether the work needs to be done by a licensed contractor; and,
- record any changes made to the risk assessment (the revised assessment must be available on site at all times).

6.12.2 PLANS OF WORK (METHOD STATEMENT) - COMPLIANCE WITH REGULATION 7 OF CAR 2012

The Plan is the record of how senior managers/directors require the job to be undertaken. The main purpose of the Plan is to guide site work. An up-to-date copy of the Plan must always be on site. It also demonstrates that the contractor has considered the significant risks and how these will be addressed.

Work must not take place unless a copy of the Plan of Work is readily available on site. Employees must be informed of the contents of the Plan and be instructed on the work methods and controls to use. A copy should also be kept at the head office, so management can effectively monitor performance. Access to general procedures should also be available at site, either as paper copies or electronically. The plan should be kept updated to reflect any subsequent changes to the work.

The Plan of Work must also be shown to anyone who needs to see it, including those carrying out inspections of the works and/or air monitoring. It should also be available on request to employees, safety representatives and other elected representatives of employee health and safety, as well as others who may be affected by the work.

In order for a Plan of Work to be deemed suitable and sufficient it must include, as a minimum:

- the nature and probable duration of the work;
- the number of people involved in the work;
- the address and location where the work is to be carried out;
- the methods to be used to prevent or reduce exposure to asbestos, e.g. prevention and control measures and arrangements for the handling and disposal of asbestos waste;
- the type of equipment, including PPE and RPE, used for:
 - protecting and decontaminating those carrying out the work;
 - protecting other people present at or near the worksite.
- the nature and probable duration of works;
- the method(s) to be used to prevent or reduce exposure to asbestos, permit to dig etc;
- the supervision & monitoring of the works;
- type of equipment used for protection and decontamination of those employees carrying out works and the equipment used;
- detailed excavation/soil disturbance techniques;
- detailed site layout showing location of ACMs, location of welfare and any areas of restricted access and/or respirator zones, site access/egress controls, and traffic routes; and,
- a full list of organisations, contacts and telephone numbers.

The Principal Contractor shall ensure, so far as is reasonably practicable, that the work to which the plan of work relates is carried out in accordance with that plan of work and any subsequent written changes to it.

6.12.3 LICENSING OF WORK WITH ASBESTOS - COMPLIANCE WITH REGULATION 8 OF CAR

Before any work on Licensed ACMs commences an employer must hold a HSE licence for working with asbestos. This must be in line with the application and notification requirements.

It may be judged at the outset that the site works will fall under the Notifiable Non-Licensed Works category and therefore a Licence to work with asbestos is not required. However, a Licensed asbestos removal contractor may be engaged during specific phases of the works to provide additional competence.

A Licensed Contractor must be engaged at the site should a review of existing risk assessments and working methods indicate a change of work category from NNLW to Licensable work, triggers for this may include the following:

- Higher than expected airborne fibre levels generated when making proper use of control measures, i.e. the Control Limit or STEL is likely to be breached;
- When bulk ACM in the form of Coatings are encountered; and,
- When bulk ACM are discovered that include, Insulation or Insulating Board in anything other than very small quantities.

6.12.4 NOTIFICATION OF WORK WITH ASBESTOS – COMPLIANCE WITH REGULATION 9 OF CAR

Prior to undertaking licensed work, the appropriate enforcing authority must be notified with details of the proposed work at least 14 days before work starts. This enables the enforcing authority to assess the proposals for carrying out work with asbestos and, if appropriate, to inspect the site either before or during the work.

Although the requirement is to notify the relevant enforcing authority office in writing at least 14 days before any licensed work begins, the enforcing authority may allow a shorter period, e.g. in an emergency where there is a serious risk to the health and safety of any person. This shorter period is known as a 'waiver' or 'dispensation'.

It is highly unlikely, however, that waivers would be granted for most types of activities on soil and C&D materials contaminated with asbestos covered by this guidance. Such activities are usually longer-term, well-planned activities. Waivers would probably only be considered by the enforcing authority in exceptional circumstances, e.g. or emergency clear up after a flood, clear up of unintended releases of ACMs.

Since most, if not all, of the types of activities on soil and C&D materials contaminated with asbestos covered by this guidance would be classed under the category 'construction' which includes remediation, the relevant enforcing authority will be the Health and Safety Executive.

The Licensed Asbestos Removal Contractor must inform the enforcing authority in writing if there are changes to the work that might affect the particulars of the notification.

Normally each individual licensed job should be notified to the enforcing authority. However, a single notification of licensed asbestos work may be submitted to the enforcing authority for work likely to be regularly repeated on the same site. If there are several distinct sites, a separate notification is required for each of them. Any other subsequent work not covered in the original notification will need to be separately notified.

For Notifiable Non-Licensed Work - Employers who plan to carry out NNLW must notify the work using the online notification form for notifying HSE. Notification must be made before the work begins.

Notifications must only be made using the online notification form ASB NNLW1 at:

<https://extranet.hse.gov.uk/lfserver/external/asbnnlw1>

NOTES

- there is no stipulated minimum prior notice period, but they should notify before work starts;
- work may proceed once notification has been submitted, no permission for work to proceed is required;
- an acknowledgment PDF copy of your notification will be provided electronically and should be kept with other documentation (such as the Plan of Work) relating to the activity;
- for a long-term project of work involving multiple jobs in one localised area the whole project should be notified once;
- Licensed asbestos contractors are required to notify both licensed and NNLW work; and,
- there is further guidance on the online notification form itself.

6.13 OTHER CONSIDERATIONS

6.13.1 MANAGING UNEXPECTED CONTAMINATION / WATCHING BRIEF / DISCOVERY STRATEGY

Excavations should be undertaken with an appropriately skilled banksman overseeing excavation works. The banksman should be aware of the different types of material 'expected' and 'not expected' on this Site. In the event that unexpected contamination is encountered then the following action is proposed.

Immediately stop excavations to assess the immediate risks to the environment to include:

- Inhalation of hazardous dust such as asbestos;
- Inhalation of vapour or gas; and,
- Spread of liquid contamination such as liquids / oils leaking from pipes or tanks.

If there is an immediate risk to human health and construction workers then evacuate to a safe distance and follow site emergency procedures.

If no immediate risk to human health then undertake an assessment to determine:

- The source of contamination; and,
- Appropriate method of containment.


A specialist Environmental consultant must be appointed to further assess the risks, undertake potential additional investigation, sampling and testing. With assistance from the specialist consultant, a risk based assessment and strategy will be developed to assess the potential source / pathway / receptor pollutant linkages. If a significant pollutant linkage that requires supplementary remediation works is identified then notification will be made to the local planning authority along with the mitigation approach for managing the identified contamination risk.

In addition to the above, it is recommended that a watching brief by a suitably qualified person be carried out during all major earth works including basement excavation, slab removal. All site personnel will be briefed on the potential areas of concern, contamination risks and observations to be made during the works. The engineer shall ensure:

- Observations of all excavations during the works and any potential contamination is noted and addressed in accordance with **Table 6-5**;
- A photographic record is kept during the key stages of the development and key occurrences of the works;
- All contamination observations are addressed in accordance with this Remediation Strategy; and,
- All of the findings will be reported within the Verification Report.

The procedure for assessing unexpected contamination will be a risk based assessment and will follow the following the procedure outlined in **Table 6-5**. The level of risk assessment will dependant on the identified pollutant linkage and the severity of the unexpected contamination.

Table 6-5- Flow Chart Showing Procedures for Assessing and Managing Unexpected Contamination



Step	Actions
Identify Pollutant Linkage	Review the Conceptual Site Model to identify any relevant Pollutant Linkages
Discovery strategy (if required)	Undertake further ground investigation, sampling, testing and assessment if required
Conduct Risk Assessment	Undertake a Quantitative Risk Assessment to determine if the level of risk is acceptable
Remediation Options Appraisal	If the level of risk is not acceptable then review the options to select the most cost effective option to either break or remove the pollutant linkage
Determine Remediation Strategy	Finalise and present the Strategy for regulatory approval
Submit to Regulator for approval	In the event that regulatory approval is not obtained then revisit the Remediation Options Appraisal and Remediation Strategy to meet regulatory requirements
Implement Strategy	Implement Remediation in accordance with the agreed strategy
Verification	Undertake verification works and report in a final Validation Report

6.13.2 WATER SUPPLY PIPES

Prior to commencement of the construction works, the statutory water authority should be consulted to determine the most suitable form of water supply pipes. Residual organic contamination is expected within site soils and on this basis ductile iron water supply pipes are likely to be required.

6.13.3 DRAINAGE

Drainage design relying on infiltration drainage will not be suitable without further detailed risk assessment to define risks to controlled waters. The Environment Agency should be consulted prior to finalisation of the proposed drainage strategy for the development.

6.13.4 GAS AND VAPOUR PROTECTION

Ground gas risks should be confirmed by subsequent contractors based on the final formation levels.

The vapour / gas protection measures should be confirmed with the regulators and this should include details and specification of the specifications, how they will be fitted and the locations in relation to the foundations.

Verification of the vapour / gas protection measures should be undertaken and provided to the regulators prior to the foundation works.

7 ENVIRONMENTAL MONITORING AND CONTROL MEASURES

As part of construction works at the Site there will be a requirement for environmental controls and monitoring.

Typical considerations will focus on perched groundwater, air, noise and vibration and odour. The requirement for detailed information on the methodologies and controls will be detailed in a Construction Environmental Management Plan or Construction Code of Practice document.

7.1 DUST AND PARTICULATES

Dust and particulates can potentially be generated during excavation and haulage activities. The haulage requirements should be minimised, and haulage routes kept free from mud where possible and sufficiently dampened down to minimise dust generation.

It is recommended that dust generation should be monitored on a visual basis and potential dust and asbestos fibres should also be monitored via frisbee gauges on the boundary of the Site at agreed locations. Damping down is recommended to be undertaken where any excessive dust was observed or where monitored dust levels exceed a value of 200 mg/m³.

7.2 VAPOURS AND ODOURS

Vapours and odours are expected to be released during the excavation, transport and treatment of hydrocarbon impacted soil. The works should be monitored constantly by the Environmental Specialist with the aid of a portable photo-ionisation detector (PID). It is anticipated that vapours will rapidly disperse and that measurable concentrations will not extend beyond the dig boundary and treatment area. Should measurable concentrations (>1 ppm total VOC's) be found outside the dig area limits or the treatment area it is recommended that works should cease pending assessment.

Within the excavation area respiratory protection for organic vapours that conforms to the European Product Directive (CE) should be available for personnel exposed to odours/vapours.

This should be worn should 'ambient' vapours be detected (and specific site risk assessment shall be undertaken to define trigger vapour concentrations warranting cessation and reassessment of this procedure). The type of respiratory protection required may be determined based on observed site conditions. Whilst the Site is not currently operational or occupied by other users, on-going monitoring within and at the Site boundary on the basis of proximate commercial properties, together with along on-site transport routes shall be undertaken, both of recordable vapours and odour. Should excessive vapours or odours be generated the works shall be temporarily suspended and reassessed. The findings of all monitoring will be clearly communicated to other site users.

7.3 WATER INGRESS AND CONTROL

It is anticipated that some of the excavations will encounter groundwater (perched or otherwise). Water ingress has the potential to be contaminated and will require management through either dewatering and/or disposal under Duty of Care or discharge via consent to foul sewer. Similarly, buried pipelines or underground structures may contain contaminated liquids. Measures should be taken to ensure that when emptying and/or excavating such structures, contaminated liquids do not contaminate the surrounding soil or other materials or enter groundwater or any surface water feature.

8 HEALTH, SAFETY AND ENVIRONMENTAL CONSIDERATIONS

The health and safety management scheme operated during remediation, earthworks and validation operations should take into account all relevant health and safety documentation, policy and methodology applicable to such works. The works should also comply with the Construction Design Management Regulations (CDM) 2015.

8.1 CONTAMINATION

Construction workers or maintenance staff involved in excavations at the Site will be exposed to concentrations of contamination in soils that are likely to present a low to moderate risk to human health. It will be necessary to ensure that construction workers are adequately protected and that a suitable health and safety management scheme is operated during construction and remediation activities.

As a minimum the health and safety plan should address the following potential health and safety issues:

- Potential for vapours in excavations;
- Dermal contact;
- Ingestion; and,
- Dust and (asbestos) fibre inhalation.

Earthworks and construction contractors should be aware of the potential for asbestos containing materials in soils and be vigilant to its presence. If potential asbestos containing materials are identified during redevelopment professional advice should be sought.

8.2 ENVIRONMENTAL CONTROLS

The Contractor should be responsible for the provision of all necessary environmental controls during the remediation works. These measures will include:

- Protection of surface water drains and catchments of surface run-off to reduce the risk of contaminated run-off and high-suspended solids moving off-site;
- Management of stockpiles of recycled (crushed) construction aggregates and contaminated soils awaiting off-site disposal and/or on-site treatment to minimise the potential for generation of contaminated run-off and dust;
- Use of dust and odour suppression techniques during development to minimise off-site impacts; and,
- Storage of all fuels, oils and chemicals will be stored in appropriate containers within bunded compounds.

Guidelines presented within the Environment Agency document, “Pollution Prevention Guidance 6 – Working at Construction and Demolition Sites” should be adhered to and all relevant licences obtained.

9 VERIFICATION REPORTING

All relevant information shall be collected during the remediation works and a verification report compiled by suitably qualified persons at Keltbray Remediation (or other suitably qualified persons, identified by Keltbray, on completion. The report shall take account of the recommendations in CLR11 and comprise as a minimum:

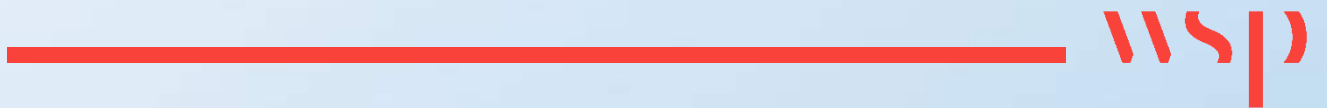
- A summary of the information contained in the risk assessment reports along with the agreed redevelopment strategy and objectives;
- Details of all parties involved in the works;
- Laboratory validation test certificates if unexpected contamination encountered;
- Details and quantities of excavated soils and soils re-used on site or disposed of off Site;
- Records of all earthworks, excavations and sorting including as built drawings, photographs, quantities of materials exported and imported;
- An annotated photographic record showing sides and base of the excavation during the drainage infrastructure works. Photographs should include details of the location and date and as built survey showing the base of excavation;
- Inclusion of information from an asbestos specialist providing a summary of the asbestos removal works completed which as minimum should include Consignment Notes, Air Monitoring Records and an account of the works completed;
- Verification of backfill materials on completion of the enabling works in order to confirm suitability of re-use;
- As built drawings; and,
- Waste classification and management documentation (including consignment note, waste carrier licenses and waste management licence).

It is envisaged that the site Health and Safety File will include all information pertaining to the areas affected by ground contamination.

It should be noted that the piling risk assessment, ground gas protection measures and clean cover verification works will be verified by subsequent contractors therefore these elements of the works will require verification reporting on completion.

Appendix A

FIGURES





Key
 Site Boundary

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community



TITLE:
 Bermondsey Bisuit Factory - Site Location Plan - Main Site

FIGURE No:
 70075582 - Figure 1



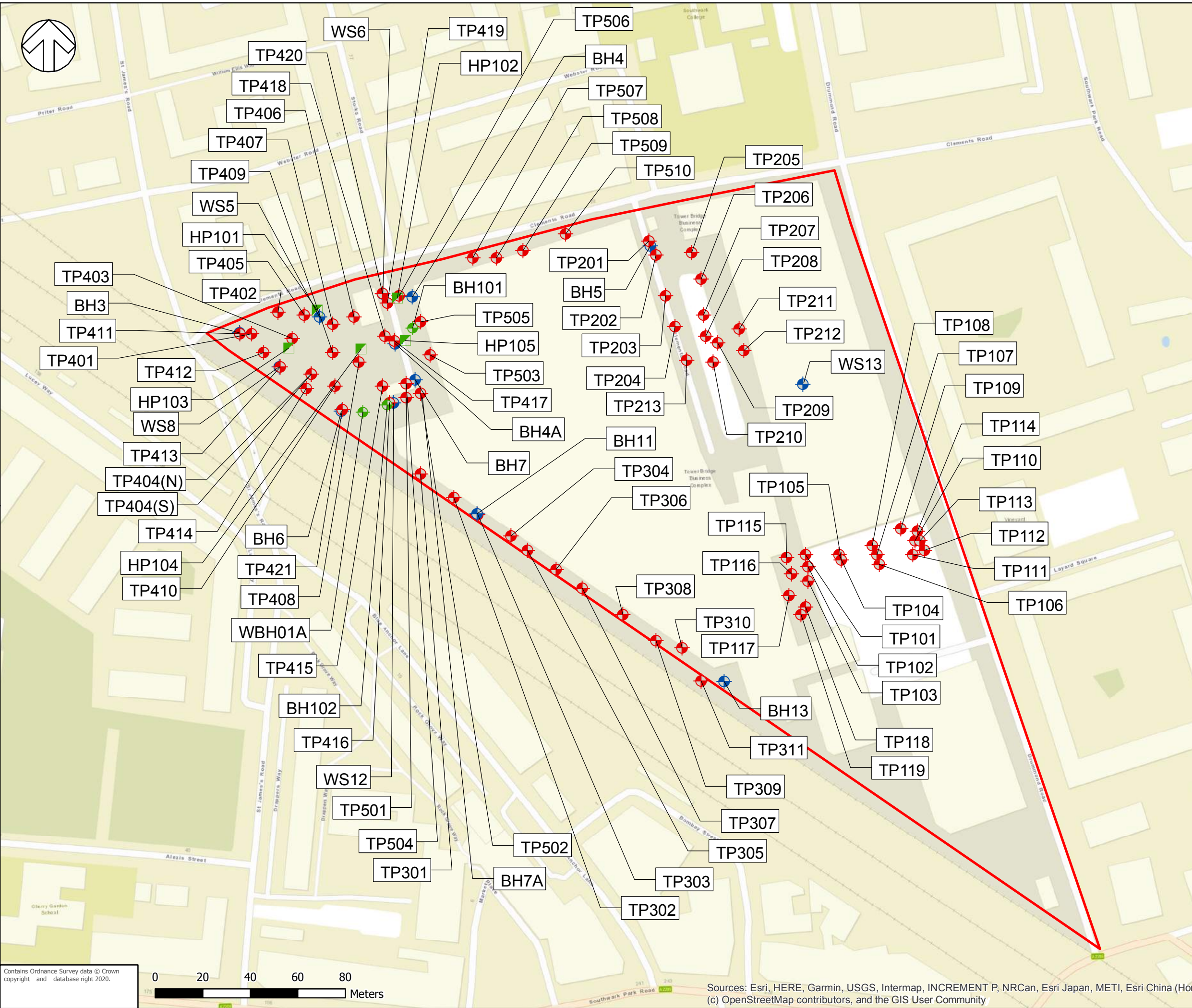
Key

 Site Boundary



TITLE:
 Bermondsey Biscuit Factory -
 SiteLayout Plan - Main Site

FIGURE No:
 70075582 - Figure 2



Legend

- Site Boundary
- Borehole Locations**
- ◆ Hydrock
- ◆ Ramboll Socotec
- WSP | PB Boreholes**
- ◆ Boreholes
- Hand Pits

TITLE:

**Bermondsey Biscuit Factory
Exploratory Hole Plan (Main)**

FIGURE No:

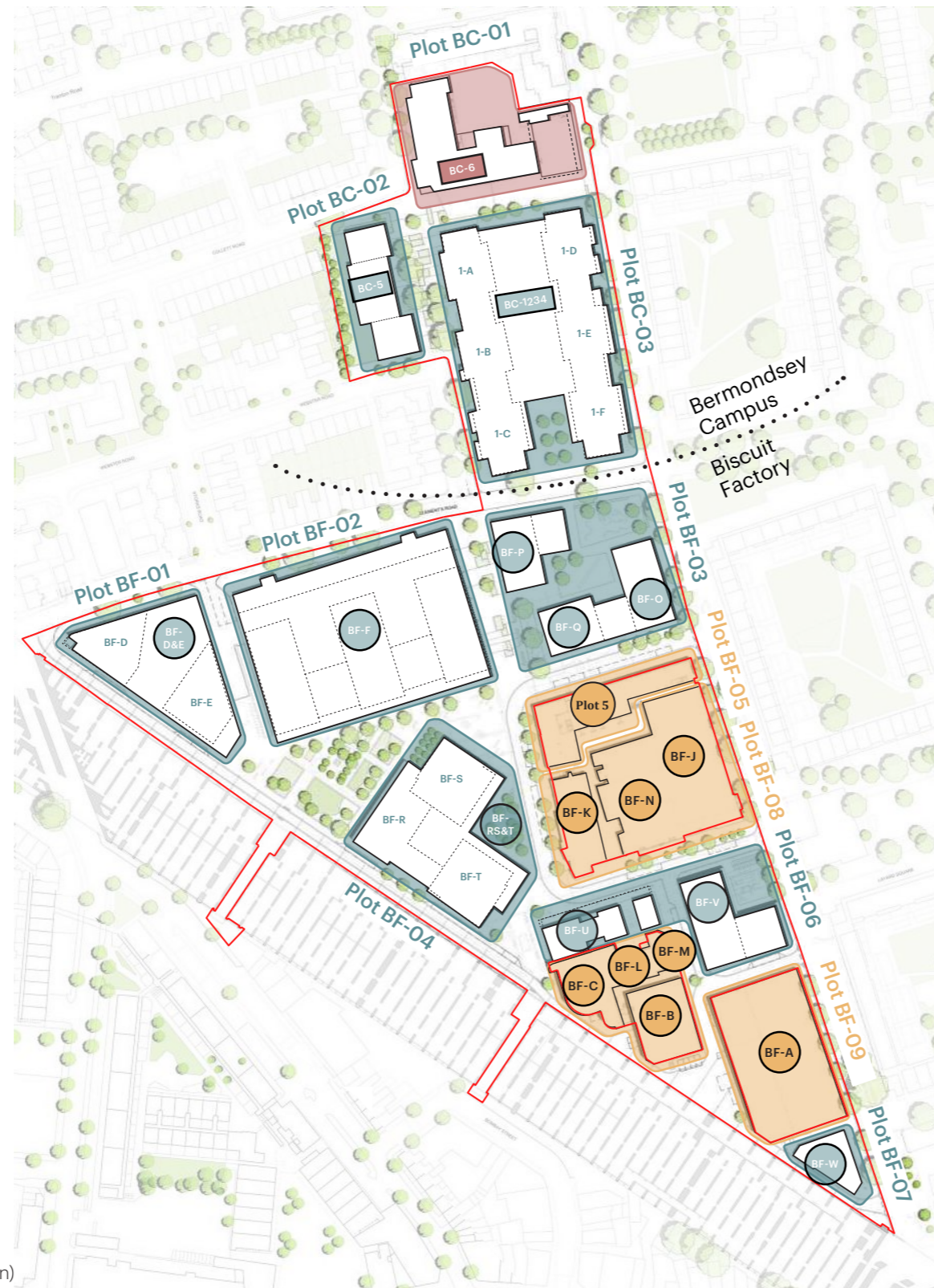
70075582 - Figure 2

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Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Swisstopo, Mapbox, and the GIS User Community

Design & Access Statement

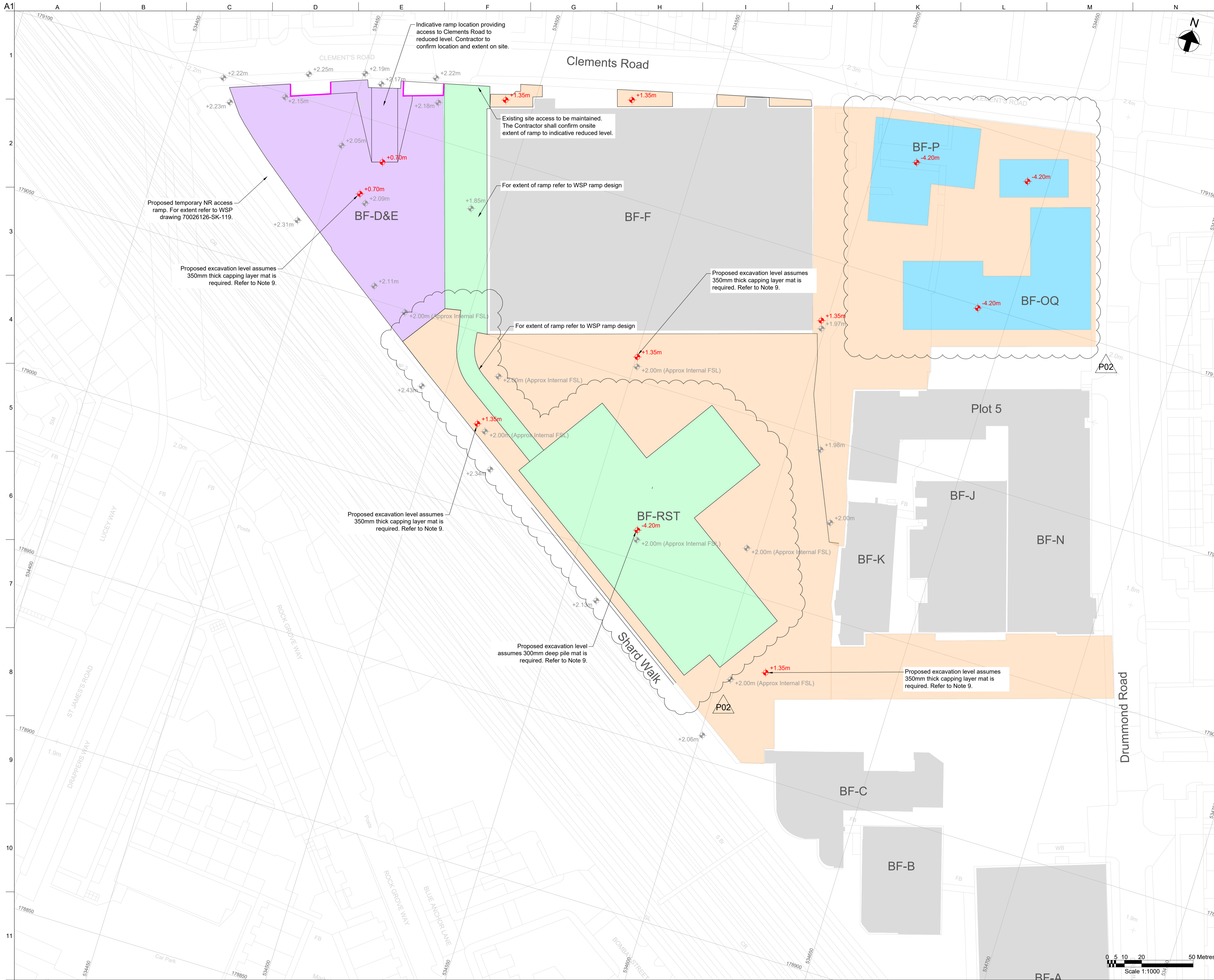
Part C: Masterplan



- Masterplan application boundary
- School Plot
- Grosvenor building plots
- Workspace plots (do not form part of the application)

C Masterplan

- 3.0 Description of the Masterplan proposal
- 3.1 Design Concept
- 3.2 Design evolution
- 3.3 Massing / density / scale
- 3.4 Masterplan layout
- 3.5 Character of place
- 3.6 Architecture
- 3.7 Land use and Amount of Development
- 3.8 Non-Residential Use
- 3.9 Residential and Amenity
- 3.10 Access
- 3.11 Servicing
- 3.12 Sustainability



- Notes**
- All dimensions, are in metres unless otherwise noted.
 - All levels are in metres above OS datum (Newlyn) (mAOD) unless otherwise noted.
 - All coordinates are in the Ordnance Survey (OS) grid.
 - This drawing is not to be scaled.
 - These drawings are for costing purposes only.
 - Temporary barriers are indicative and assumed to be a minimum 1 in 3 to provide slope stability.
 - Where required, all temporary works are to be designed by the Contractor.
 - Levels provided are indicative excavation levels which are subject to change following receipt of further site investigations, confirmation of CBR and Contractor pile mat design.
 - For indicative pile mat and capping layer design refer to WSP enabling works drawings:
- BER-WSP-BFXXX-00-DR-S-00002
- BER-WSP-BFXXX-00-DR-S-00003
 - Any obstructions found below proposed excavation levels are to be broken out to Kempton Park Gravel layer and backfilled appropriately, see WSP drawing BER-WSP-BFXXX-00-DR-S-00002 for further information.
 - For complete list of assumptions for the indicative levels, refer to WSP and Arup Enabling Works design documentation.
 - The enabling works should take account of the asbestos in soils outline remediation and risk management strategy (Arup (August 2018) Report ref. 237092-CL-RP-001). The remediation and risk management strategy will be updated for Phase 1 following future investigation beneath existing buildings (date TBC). Localised deeper excavation may be required subject to the outcome of the future investigation.
 - Building names relate to existing buildings. For proposed building names refer to KPF drawings.

Legend

Surface Levels

- +2.33m Existing Level
- +2.33m Proposed Excavation Level

Excavation Zone

- Future Public Realm (Underside of Capping)
- Proposed BF-D and BF-E Plot (Underside of Capping Layer)
- Proposed BF-RST Basement, Ramp & Building Envelope (Underside of Pile Mat)
- Proposed BF-OPQ Plot (Underside of Pile Mat)
- Existing and Retained Buildings

P02	05/06/20	MA	CM	RR
Tender Addendum				
P01	18/03/19	AM	CM	RR
Controlled Issue - Aconex				
Issue	Date	By	Chkd	Appd

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Client
Grosvenor Group

Job Title
**The Bermondsey Project
Biscuit Factory - Phase 1
Enabling and Demolition Works**

Key Plan

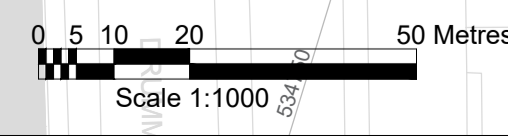
Drawing Title
**Biscuit Factory
External Areas Earthworks
Indicative Build-up
Layout**

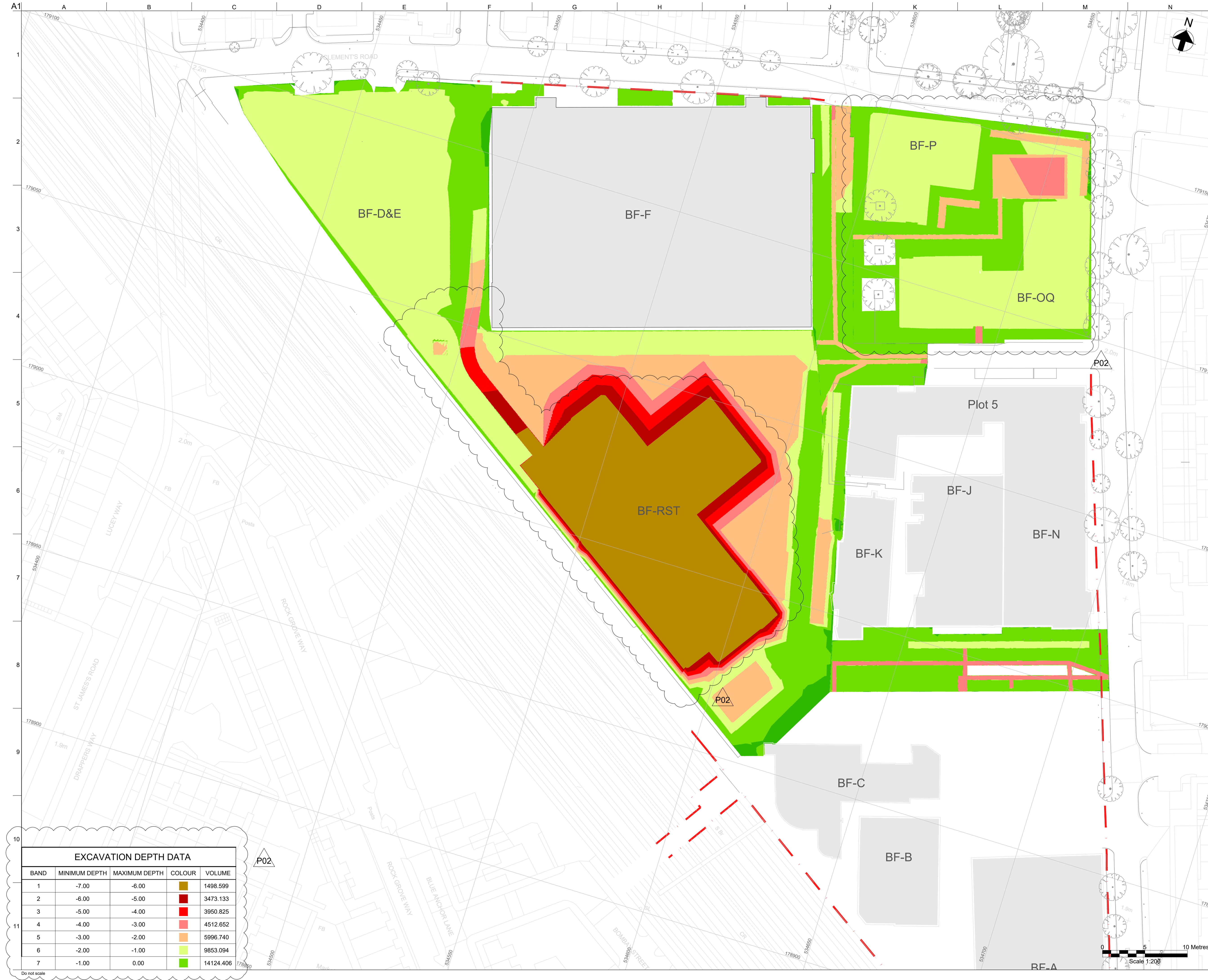
Scale at A1 1:1000

Discipline Civil

Job No	Drawing Status
237092-00	For Information

Drawing No
BER-ARP-BFXXX-XX-SK-D-82001





- Notes**
1. This drawing is for information purposes only and is subject to design development in future design stages.
 2. This drawing compares proposed formation levels with estimated existing to give an indication of earthworks required to achieve proposed scheme.
 3. Bulk excavation levels do not allow for localised pit excavation. It is assumed this will be undertaken under a different contract.
 4. Please refer to sketch BER-ARP-BFXXX-XX-SK-D-82003 for proposed excavation contours.
 5. The volumes provided on this drawing are for indicative and are information only. The volumes have been produced from assumptions on existing and proposed levels. It is expected that the Contractor confirm and validate all excavation volumes.
 6. For all excavations in close proximity to Building BF-F, please refer to AKTII design information for proposed excavation methodology.

P02	05/06/20	MA	CM	RR
Tender Addendum				
P01	18/03/19	AM	CM	RR
Controlled Issue - Aconex				
Issue	Date	By	Chkd	Appd

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Client
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Job Title
**The Bermondsey Project
 Biscuit Factory - Phase 1
 Enabling and Demolition Works**

Key Plan

Drawing Title
**Biscuit Factory
 External Areas Earthworks
 Indicative Formation Levels
 Isopac**

Scale at A1 1:1000
 Discipline Civil

Job No
237092-00 For Information
 Drawing No
BER-ARP-BFXXX-XX-SK-D-82002

EXCAVATION DEPTH DATA

BAND	MINIMUM DEPTH	MAXIMUM DEPTH	COLOUR	VOLUME
1	-7.00	-6.00	Dark Green	1498.599
2	-6.00	-5.00	Red	3473.133
3	-5.00	-4.00	Light Red	3950.825
4	-4.00	-3.00	Orange	4512.652
5	-3.00	-2.00	Light Orange	5996.740
6	-2.00	-1.00	Yellow	9853.094
7	-1.00	0.00	Light Green	14124.406

