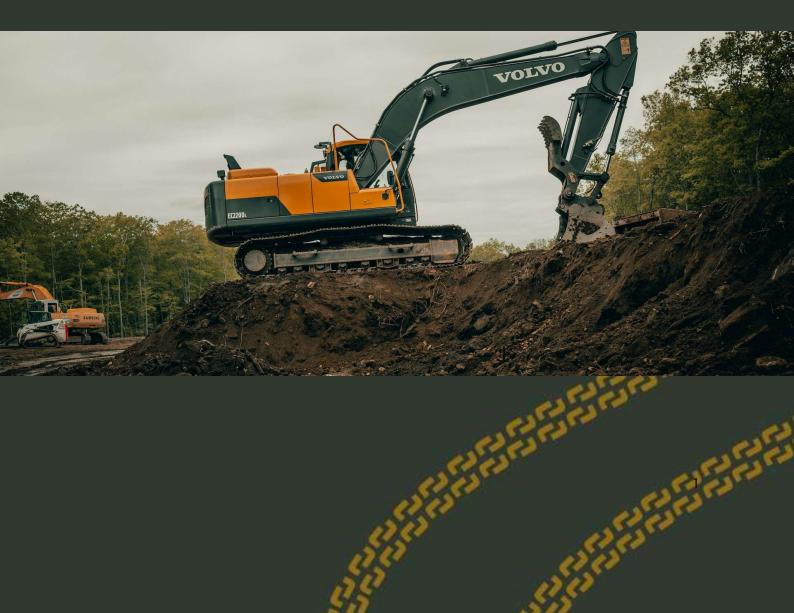




P23553_R1_REV1 October 2023







P23553_R1_REV1

Document Control

Title

Bishopsgate Goodsyard: Land Quality Desk Study

Client

Temple Group Ltd Clove Building 4 Maguire Street London SE1 2NQ



Reference

P23553_R1_REV1

Status

Final

Document Reference	Issue Date	Comments	Written by	Reviewed by	Approved by
P23553_R1	September 2023	Final draft	RMJ	ACW	JEM
P23553_R1_REV1	October 2023	Additional of Site walkover	ACW	-	JEM





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1. Introduction

1.1. Instruction

Yellow Sub Geo Ltd (Yellow Sub) was instructed by Temple Group Ltd (Temple; the Client) on behalf of Bishopsgate Goodsyard Regeneration Ltd (the Developer) to provide an updated Phase 1 land quality preliminary risk assessment (Desk Study) for Bishopsgate Goodsyard, Shoreditch, London (the Site). Instruction to proceed was provided by email from the Client on the 26th of May 2023, confirmed by Purchase Order POPO04167.

1.2. Brief

The former Bishopsgate Goodsyard in Shoreditch is being re-developed into a mixed residential and commercial use development. The brief was to provide an updated land contamination focussed desk study requested by the Greater London Authority (GLA) to support the proposed reserved matters application (RMA) for the redevelopment of the Site. This DTS focusses on plots 1, 4, 5, 6, 8, and 10 of the masterplan which form Reserved Matters Applications 1, 2, and 3. The boundaries of each RMA are shown in Appendix B.

1.3. Scope

This report presents records of desk study research, which is in-turn used to develop a conceptual site model and inform a preliminary environmental risk assessment. The information and assessment presented herein is considered sufficient to support the planning application process.

The report identifies key potential land contamination risks and uncertainties associated with the ground conditions which may require further assessment and/ or risk management in due course via suitable condition(s) linked to the future planning consent.

1.4. Limitations

This report is written strictly for the benefit of the Client and bound by the conditions presented in Appendix A.

Due to the focus of this work being ground conditions, the Envirocheck report used to inform this desk study uses the ground level boundary shown in Appendix B rather than the larger platform level boundary.





2. Desk Study

2.1. Terminology

Within this report, the Site refers to the boundary of RMAs 1-3 only. The wider site area refers to the overall development area as defined by the masterplan (i.e., inclusive of RMA 4).

The following section collates and presents available information pertinent to the Site and its local environs.

2.2. Site location and description

The Site and wider Site area comprises a former goodsyard and railway depot with Grade II listed heritage assets (arch structures), lying within an opportunity area identified in the Mayor's London Plan. A complex array of transport infrastructure traverses the Site and wider Site area, connecting into Liverpool Street Station. The London underground central line runs in a northeast to southwest direction below Site, the local/ suburban line tunnel runs east to west beneath the non-listed arches on Site and main line railways run in an open cutting in the south of Site. A safeguarded corridor lies adjacent to the main line to allow the future provision of extension to an 8-track railway. A Site location plan is presented as drawing P23553_R1_DO1. The Site address is as follows:

```
Land off Bethnal Green Road
Shoreditch,
London,
E1 6GY
```

The Site is bounded to the north by Bethnal Green Road and Sclater Street, to the east by Brick Lane, to the south by railway lines leading to Shoreditch Station, and to the west by Shoreditch High Street. The area of the Site is approximately 2.34Ha and the National Grid reference at the centre of the Site is TQ 33679 82240.

2.3. Planning history

The Site falls within two London boroughs: Hackney and Tower Hamlets, with the administrative boundary bisecting the Site. The London Borough of Hackney website holds records for 11No. planning applications at the Site, summarised below:

- 2023/0447: Granted Extension of temporary planning permission attached to 2020/3549 for a further 2 years until 31/05/2025.
- 2021/3204: Granted Application for temporary planning permission for the erection of an additional storey at second floor level to provide 658 m² of external seating space together with 175 m² of internal space for flexible retail, restaurant and indoor recreation use with ancillary storage/WCs/facilities space, until 31/05/2023.
- 2020/3549: Granted Extension of temporary planning permission attached to 2019/3490 for a further 2 years until 31/05/2023.
- 2019/3490: Granted Variation of opening hours attached to 2017/1990 to allow an additional hour of trading to 00:00 Monday Saturday and to 23:00 on Sundays.





- 2019/0967: No objection Notification from the Greater London Authority of a request for an Environmental Impact Assessment (EIA) scoping opinion in relating to the proposed redevelopment of the land at Bishopsgate Goodsyard.
- 2017/1990: Granted Variations to the conditions attached to planning permission 2015/3443. The proposed variations include increasing the number of cafes/restaurants from 16 to 20. Additionally, amendments to the design of the development are sought, which include adding glazed screens to the first-floor terraces and introducing a polycarbonate roof over the central two terraces and walkway.
- 2016/4369: Withdrawn decision Erection of internally illuminated advert hoarding.
- 2015/3443: Granted Extension of temporary planning permission attached to 2011/0255 until 31/05/2021.
- 2014/0845: Withdrawn decision Consultation response to 2014/0249.
- 2014/0249: ES Required Request for Scoping Opinion regarding the scope of the Environmental Impact Assessment to be undertaken in relation to the mixed-use redevelopment of the site.
- 2013/0573: Granted Variations to the conditions attached to planning permission 2011/0255. The proposed variations include increasing the number of cafes/restaurants from 12 to 16.

The London Borough of Tower Hamlets website holds records for 3No. planning applications at the Site, summarised below:

- PA/22/01155/NC: Objections raised Re-consultation relating to PA/21/02769 due to the submission of amended plans and additional information in relation to transport.
- PA/21/02769/NC: Objections raised Observation requested by the London Borough of Hackney for temporary planning permission for the erection of an additional storey at second floor level to provide 658 m² of external seating space and 175 m² of internal space for flexible retail, restaurant, and indoor recreation use with ancillary storage, WC, and facilities space, until 31st May 2023.
- PA/20/02596/NC: No objection Extension of temporary planning permission attached to 2019/3490 until 31/05/2023.

2.4. Site walkover

A Site walkover was undertaken by Yellow Sub on the 28th of September 2023 with Site access provided by Ballymore Group (Ballymore). Photos taken during the Site walkover can be found in Appendix E. A large array of arches ran west to east across the Site with Braithwaite Street running through the central Site area north to south. Ballymore advised that approximately 1/3rd of the arches were currently listed. The arches east of Braithwaite Street had various previous Site uses that still could be seen such as an old swimming pool which remains in-situ, event spaces, multiple train lines (that used to form part of Braithwaite Viaduct within the historic Bishopsgate Railway Station) and car parking. In one archway an old power pump for the trainline beneath (Central Line) remained. Demolition to support the initial development had begun in arches to the west of Braithwaite Street, with access to both archways from locked gates either side of the road.

South of the western arches, a locked palisade gate and fencing led onto a ramped pathway up to the top of the arches. Fly-tipping of general mixed waste was noted directly south of the gate. Above the arches is an expanse of heavily vegetated land running west to east approximately





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10m above street level. A cobbled pathway was noted across the area with planted conifer trees relating to a previous use as an event space. A raised mound was noted in the north of the area approximately 2m high noted to comprise fill of brick, concrete and occasional glass and ceramic.

Back at street level, several astroturf football pitches were noted north of the western arches however access was not possible. Shoreditch high street station runs across the north of Site, the entrance to the station is at street level off Braithwaite street, with the remainder of the station one storey above street level running west to east.

2.5. Topography

Topographic levels across the Site have been altered over the years with above ground viaducts, historic demolition and construction of underground railways lines and cuttings. There is a gradual and slight downwards slope across the Site area form 15m above ordnance datum (m aOD) to 14m aOD north to south.

2.6. Geology

According to British Geological Survey (BGS) 1:50,000 scale mapping, the general geological sequence underlying the Site is as follows:

- Superficial deposits: Taplow Gravel Member Sand and gravel.
- Bedrock geology:
 - London Clay Formation Clay, silt, and sand.
 - Lambeth Group
 - Thanet Sand Formation
 - White Chalk

The BGS holds records of numerous boreholes within the Site boundary, most of which are confidential and unavailable for review. Two boreholes within the wider site area were available for review, summarised in Table 2-1.

Borehole ref.	Strata	Maximum depth (m bgl*)
TQ38SW2O38	Made ground – topsoil, clay, and bricks	2.59
	Brown sandy clay	3.05
	Gravel and sand	7.01
	Stiff brown clay	7.16
	Stiff blue fissured clay	9.14
	Made ground – concrete	0.20
TQ38SW2O37	Made ground – topsoil, sand, and stones	0.76
	Made ground – concrete	1.02

 Table 2-1
 Strata encountered in historical borehole logs within the wider site area.





Borehole ref.	Strata	Maximum depth (m bgl*)
	Made ground – clay with brick fragments	3.35
	Brown sand with some gravel	5.18
	Gravel and sand	6.71
	Stiff brown clay	7.32
	Stiff blue fissured clay	9.45
¥ . I .I		

* m bgl: metres below ground level

2.7. Previous reports

2.7.1. Introduction

In 2008, Ove Arup & Partners Ltd (Arup) conducted a ground investigation at the former Bishopsgate Goodsyard at the request of Bishopsgate Goods Yard Regeneration Ltd. The report outlines the findings of the ground investigation, including a generic quantitative risk assessment (GQRA), and proposes a preliminary remediation strategy for the redevelopment. This section provides a summary of information presented in the report that is relevant to the RMA.

2.7.2. Background

The wider site area comprises a former railway station turned goods yard located northeast of Liverpool Street station near Shoreditch High Street. The proposed masterplan includes residential, office, and commercial retail spaces interconnected by plazas and elevated walkways. The site is complex due to the presence of the East London Line extension, a disused railway viaduct, and an active railway cutting and tunnel. It falls within two boroughs: Hackney and Tower Hamlets.

2.7.3. The Site

The site boundary considered in the Arup report is given in Figure 2.1 below. It is noted that the report covers a larger area than relevant for the RMA, though the Site boundary given in P23553_R1_D01 falls within the boundary in Figure 2.1.





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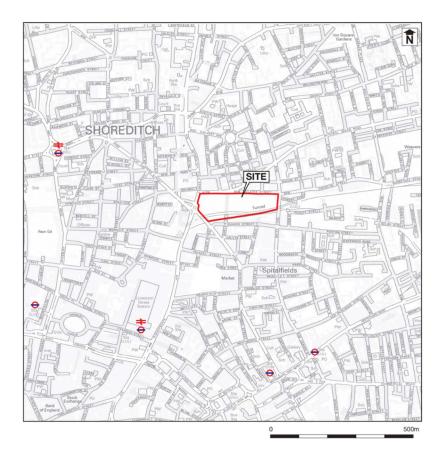


Figure 2-1 Site boundary for the previous report (Arup 2008).

2.7.4. Site history

The report outlines a site history beginning as fields with hedgerows and trees in 1560. In 1682, the site comprised side streets with rows of residential houses, becoming more built up through 1746. Mapping from 1813 shows unlabelled non-residential buildings in the southwest of the site, though most of the site remains residential. 1862 saw the Eastern Counties Railway Station replacing residential housing in the west of the site with railway tracks present in the east. Mapping from 1877-1880 shows a cab stand to the south of the station and a coal depot northeast of the railway sidings. In 1888, the station is labelled 'Great Eastern Railway Station (Goods)', marking the change from a passenger station to a goods station. In 1896, a passenger station called 'Bishopsgate low level station' is shown south of the goods yard building. The passenger station was closed in 1916. The report notes that the surrounding area is shown to be heavily bombed from 1939-1945, though no damage is shown within the site itself. A major fire took place at the goods yard in 1964, after which it was closed. The upper levels of the goods yard building were removed in 1967 and the western portion of the site was used as a car park from 1971, and a car and lorry park from 1980. A karting circuit was built in the west of the site in 2001.





2.7.5. Environmental setting

The report presents an interpreted local stratigraphy comprised of Made Ground, Alluvium, River Terrace Deposits (Taplow Gravel Member), Lambeth Group, Thanet Sand Formation, and Upper Chalk.

The Taplow Gravel Member is considered a minor aquifer. The soils above the Taplow Gravel Member have a high leaching potential, therefore, the groundwater in the Taplow Gravel Member is classed as highly vulnerable. The London Clay Formation is classified as a non-aquifer by the Environment Agency (EA). The White Chalk, Thanet Sand Formation, and lower part of the Lambeth Group are considered together as the Chalk/Basal Sands aquifer due to their hydraulic continuity. The White Chalk is classified as a major aquifer by the EA, while the Thanet Sand Formation and Lambeth Group are classified as minor aquifers. The site is not within an EA Source Protection Zone (SPZ) for potable groundwater supply.

In terms of hydrology, the site is located approximately 100m east of the former course of the river Walbrook, which is a tributary of the Thames. The Thames itself is about 1.7km south of the site.

2.7.6. Ground investigation

The ground investigation was conducted by Concept Site Investigation in early 2008, under specification from Arup. The investigation consisted of 21 machine excavated trial pits to 3.70m below ground level (bgl), 2 window sample boreholes to 5m bgl, 36 cable percussion boreholes to 37.5m bgl, 6 rotary boreholes to 62.6m bgl, laboratory testing of soil and ground water samples, and groundwater and gas monitoring.

The ground conditions observed on site comprised Made Ground, Alluvium, River Terrace Deposits and London Clay Formation. Made Ground constituents comprised gravel to cobble sized brick and concrete fragments, with occasional pottery and animal bone fragments.

2.7.7. Conceptual site model

The potential sources of contamination outlined in the report are Made Ground, rail land, former fuel tanks, electrical transformers, former bottling works, and asbestos. The potential pathways identified comprise the following:

- Ingestion of soils or dust.
- Inhalation of vapours, gases, or dust.
- Dermal Contact with soils or dust.
- Lateral and vertical migration of free phase product.
- Lateral migration of dissolved phase product.
- Leaching of contaminants directly to groundwater.
- Direct contact of building materials with soil and groundwater.

The potential receptors identified include site workers and neighbours during development, site users and maintenance workers after development, groundwater in the River Terrace Deposits minor aquifer, and building materials and services.





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2.7.8. Data evaluation

A total of 60 samples were collected and analysed from the Made Ground, including soils on the viaduct, across the site. Here is a summary of the key findings:

- Toxic metals, except for lead, were well below the commercial screening criteria. However, 10 out of the 60 samples showed lead concentrations over 750 mg/kg.
- Cyanide concentrations were very low and below detection limits.
- No asbestos was found in any of the tested samples.
- Sulphur concentrations were generally low, with occasional higher concentrations in the southwest area of the site.
- The pH of the soils varied but generally fell within the natural to alkaline range. The slight increase in alkalinity is attributed to the presence of construction rubble within the soil.
- Polychlorinated biphenyls (PCBs) were mostly below detection limits, except for two results. These findings are not considered significant or above the screening criteria.
- Phenol concentrations were consistently low across the site and well below the commercial screening criteria.
- Concentrations of polyaromatic hydrocarbons (PAHs) were assessed, and all four marker compounds were well below the screening criteria. Some higher PAH concentrations were reported in samples from specific boreholes in the northern half of the site.
- Concentrations of volatile aromatic hydrocarbons benzene, toluene, ethylbenzene and
- xylene (BTEX) were very low or below detection limits in most areas, with a few exceptions that remained below the screening criteria.
- Detailed analysis of petroleum hydrocarbons showed concentrations below the relevant screening criteria. Most of the hydrocarbons were in the heavier range, and minor concentrations of volatile hydrocarbons were reported.
- All herbicide concentrations were below the detection limits of the test method.
- Concentrations of lead were found to exceed the initial screening criteria in certain areas of the site.

Five samples were collected and analysed from the Alluvium during the investigation. The results indicated that all the concentrations of heavy metals, TPH, PAHs and BTEX were below the screening values. No detectable concentrations of PCBs, phenols, asbestos, or herbicides were recorded.

Six samples were collected and analysed from borehole samples of the River Terrace Deposits. The results indicated that all concentrations of heavy metals, TPH, PAHs and BTEX were below the screening values. No detectable concentrations of PCBs, phenols, asbestos, or herbicides were recorded.

2.7.9. Conclusions

A comprehensive ground investigation was conducted on site, including soil, leachate, and groundwater analysis, as well as ground gas monitoring. The results were compared to screening criteria, and no significant or widespread contamination was found. Although elevated levels of lead were observed in some samples, it was determined that this does not pose a significant risk to end users based on the Conceptual Site Model (CSM) for the development. Some mitigation measures are recommended during the development phase. The assessment of volatile





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contaminants, such as gases and vapours, showed very low concentrations that do not pose a risk. Groundwater quality in the shallow aquifer was deemed good, with most test results below detection limits or environmental standards. There were some instances of elevated selenium and petroleum hydrocarbons, but these did not exceed screening levels in the shallow aquifer.

2.8. Hydrogeology

The London Clay Formation is classified by the EA as unproductive strata. Unproductive strata are largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them.

The Taplow Gravel Member, Lambeth Group, and Thanet Sand Formation are classified by the EA as a Secondary A aquifer, comprised of permeable layers that can support local water supplies, and may form an important source of base flow to rivers. The White Chalk is classified by the EA as a Principal aquifer, considered to provide significant quantities of drinking water, and water for business needs.

Groundwater vulnerability on-Site is classed as high, and the Site does not lie within a SPZ. 3No. active water abstractions lie 121m northwest of the Site and a further 7No. lie 442m east of the Site.

2.9. Hydrology

2.9.1. Watercourses

There are no surface water bodies present on Site. However, the River Walbrook (tributary of the River Thames) runs culverted beneath Curtain Road 100m east of the Site. The River Thames is approximately 1.7km south of the Site.

2.9.2. Flooding

EA mapping indicates the Site is in Flood Zone 1 (low risk) of flooding from fluvial (river) sources. Small areas in the northern and southwestern portions of the Site are shown to be at a high risk of surface water (pluvial) flooding. BGS groundwater flooding susceptibility shows that there is potential for groundwater flooding to occur across the Site.





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2.10. Site history

2.10.1. Review of historical mapping

Table 2-2 Site history timeline.

Epoch	On-Site	Off-Site	Development consideration
1877–1880 (1:2,500)	Site use shown as 'Bishopsgate Station' with railway tracks covering most of the Site. Booking office shown in the north-western corner of the Site. Surface level at the station is shown to be 68 ft (20.7 m), 21 ft (6.4 m) higher than Sclater Street to the north. This is due to the viaduct raising the station above street level. A coal depot is shown in the centre of the Site, north of the railway tracks. Residential houses are shown in the north-eastern section of the Site.	The railway tracks extend east from the Site. The surrounding area is primarily residential with a brewery to the southeast and a theatre to the west. Brick Lane is shown to pass under the railway tracks at the eastern Site boundary.	Potential contamination associated with the coal depot and Site use as a railway station.
1896 (1:2,500)	The station is renamed to 'Bishopsgate Goods Station' and expanded with additional railway tracks at the northern Site boundary.	Additional railway tracks are shown immediately south of the Site.	Potential for on and off-Site sources of contamination associated with the goods yard and railway station.
1946-1947 (Aerial imagery)	Aerial imagery shows the western half of the Site to be covered by corrugated roofing and the eastern half comprises railway tracks and train carriages.	Derelict land is shown immediately north of the Site.	-







Epoch	On-Site	Off-Site	Development consideration
		Two warehouses are shown immediately north of the Site.	Potential off- Site
		A tobacco factory is shown 130 m south of the Site.	contamination associated
1948-1952 (1:1,250)	No change of Site use.	An electricity substation is shown 120 m south of the Site.	with multiple industries. Potential for
		A transport depot is shown 80 m northwest of the Site.	UXO due to the presence of
		Three ruins are shown within 100 m north of the Site.	'ruins'.
1952-1970		Unspecified works are shown 250 m south and 50 m north of the Site.	
(1:1,250)	No change of Site use.	An additional electricity substation is shown 240 m south of the Site.	-
1972-1975 (1:10,000)	Site use has changed to a car park.	_	Potential on- Site contamination from leaks and spills associated with Site use as a car park.
1982-1989	Site use is labelled 'car and lorry	Two garages are shown 50 m north and 70 m west of the Site.	
(1:1,250)	park'.	An additional unspecified works is shown 120 m south of the Site.	-
2023 (1:10,000)	Current Site use shows Shoreditch High Street station in the north section and a sports facility in the south.	_	-

2.10.2. Additional historical sources





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Aerial imagery flown in 1947 sourced from Britain from Above¹ shows an oblique view of the Site facing north, with two ruins in view to the north of the Site (Figure 2–2).



Figure 2-2 Aerial imagery flown in 1947 showing an oblique view of the Site facing north.

2.11. Environmental database search

An Envirocheck report was purchased as part of the desk study assessment. The full database report is provided in Appendix C. A summary of the database records is provided in Table 2.3 below with reference to entries within 250m of the Site, unless considered to be relevant at greater distances.

¹ https://www.britainfromabove.org.uk/en





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Table 2-3	Environmental	database records.

Distance (m)	Land use / permitted activity / authorisation	Development consideration
93 m (NW)	4No. discharge consents for cooling water discharged into underground water. 2No. are active and 2No. are historic.	None.
144 m (SE)	1No. integrated pollution prevention and control associated with fuel combustion.	Potential off-Site contamination.
58 – 238 m (N, NW)	3No. local authority pollution prevention and control associated with a printworks, petrol filling station, and dry cleaners.	Potential off-Site contamination.
247 m (SE)	1No. pollution incident to controlled waters involving a significant incident (category 2) of oil pollution.	Potential off-Site contamination.
121 m (NW)	3No. active water abstraction licences relating to an abstraction borehole for a heat pump.	None.
135 m (W)	1No. licenced waste management facility consisting of a metal recycling site.	Potential off-Site contamination.
173 m (W)	1No. registered waste treatment or disposal site consisting of a scrapyard.	Potential off-Site contamination.
3 – 250 m (all directions)	190No. contemporary trade directory entries, none of which are on-Site.	None.
129 m (NW)	1No. fuel station entry – now obsolete.	Potential off-Site contamination.





2.12. Geo-hazards

The Envirocheck report provided in Appendix C also includes information from the BGS regarding potential geo-hazards on or near the Site. These potential geo-hazards are summarised in Table 2-4 below.

Table 2-4	Summary of geo-hazards.
-----------	-------------------------

Ground Stability Hazards	The following potential ground stability hazards have been identified by the BGS on-Site:					
	Collapsible ground	Low				
	Compressible ground	No Hazard				
	Ground dissolution	No Hazard				
	Landslide ground	Very Low				
	Running sand	No Hazard				
	Shrinking or swelling clay Moderate					
Radon	The property is in a lower probability radon area (less the homes are estimated to be at or above the Action Level).					

2.13. Environmental designations

Online mapping (Defra) indicates there are no environmental designations covering the Site or the surrounding local area.

2.14. Preliminary UXO risk assessment

Zetica produce online mapping relating to potential risks associated with discovering unexploded ordnance (UXO). Based on this mapping, the Site is indicated to be at a high risk as the area is in a high-density bombing area of London. Additionally, a UXO find was recorded 500m south of the Site. In addition to the UXO mapping from Zetica, a review of post-war Ordnance Survey maps shows multiple ruins surrounding the Site, discussed in Table 2–2.





3. Preliminary Conceptual Site Model and Risk Assessment

The following section draws together the findings of the desk study to develop a preliminary conceptual site model. The relationship of identified sources, viable pathways and identified environmental receptors is considered and used as a technical basis to inform a qualitative assessment of risk to human health and the wider environment posed by the proposed ground conditions based on the continued use of the Site for commercial/industrial purposes.

3.1. Sources

The key identified potential contaminant sources are summarised as follows and covered within the risk assessment table in Section 3.4 below.

3.1.1. On-site source potential

- **Previous and current Site use with multiple railway lines, station and a goodsyard etc:** Potential for contamination associated with the coal depot and spills and leaks of chemicals, fuels, lubricants, etc.
- **Previous Site use as a car and lorry park:** Potential for spills and leaks of chemicals, fuels, lubricants, etc.
- **Demolition/change of Site use:** Made ground with the potential for asbestos associated with the demolition of the former goods station.
- Potential for encountering UXO.

3.1.2. Off-site source Potential

- **Historic infrastructure:** Potential for spills and leaks associated with the surrounding electricity substations.
- **Historic and current industry:** Potential for spills and leaks associated with the tobacco factory, unspecified works, garages, etc.

3.1.3. Potential contaminants

- Hydrocarbons including poly-aromatic hydrocarbons (PAHs).
- Metals and metalloids.
- Asbestos containing materials.

3.2. Pathways

3.2.1. Existing pathways

For the purposes of this risk assessment, it is assumed that the relevant pathways comprise:

• Direct contact with sub-surface materials (dermal soil/ leachate contact, soil ingestion and dust ingestion/ inhalation).





- Ingress into potable supply pipes.
- Leaching of contaminants and downwards migration into and through groundwater, contaminating the Secondary and Principal aquifers below Site. Migration of dissolved phase contamination in groundwater.
- Preferential flow through the drainage system.
- Migration of gas and/ or vapours through preferential pathways and/ or permeable subsurface materials.

3.2.2. Construction-phase pathways

In addition to the above, during the redevelopment of the Site it will be necessary to cause a period of exposure of bare earth. This in turn will allow for increased infiltration during rainfall events, and therefore an increased potential for leaching and throughflow of potential sub-surface contaminants. It will also represent a period of increased human exposure (both construction workers and users/ resident of neighbouring sites) to the soils and groundwater beneath the Site.

3.2.3. Future pathways following redevelopment

Following redevelopment, the Site will comprise both residential and commercial buildings. Therefore, the existing pathways will apply, with the addition of indoor vapour inhalation where buildings extend to the ground level (it is noted that many will be suspended above the existing infrastructure.

3.3. Receptors

The key identified potential environmental receptors are summarised as follows and covered within the risk assessment table in Section 3.4 below.

3.3.1. Human health

- Demolition, construction, and maintenance workers (short term acute risks).
- Off-Site residential and commercial occupants.
- Future commercial and residential Site occupants

3.3.2. Wider environment

- Secondary aquifers (Taplow Gravel Member, Lambeth Group, and Thanet Sand Formation). The bedrock aquifers of the Lambeth Group and Thanet Sand Formation are potentially protected by the London Clay Formation aquiclude.
- Principal aquifer at depth (White Chalk) also protected by the London Clay Formation.

3.4. Preliminary risk assessment

A summary of the potential contaminant linkages associated with the Site is presented in Table 3-1 (on-Site sources) and Table 3-2 (off-Site sources), alongside an assessment of the risks posed by each linkage. The contaminant linkages have been assessed using the risk assessment methodology described in CIRIA C552 (2001). As such, risk is considered to be a function of both





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the probability (likelihood) of contamination occurring at the study site and also the potential severity (consequence) of the environmental impacts associated with any such contamination. The classification system used to define contaminant probability, consequence and risk is described in Appendix D.



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Table 3-1On-Site pollutant linkage assessment.

Sources	Pathways	Receptors	Consequence	Probability	Risk	Risk management / remediation
Potential for spills and leaks of chemicals, fuels, lubricants, etc., from current and previous Site uses. Potential deposition of Made Ground, including asbestos containing material following the demolition of the former goods yard.	Direct human contact with contaminated materials (dermal,	Future Site users	Medium	Low likelihood	Moderate/ low	Whilst the findings of Arup (2008), indicated limited source potential on- Site this data should be supplemented by a development specific investigation and assessment. Where required, an appropriate remediation/ risk management strategy will be required to sever pathways and/or remediate the Site This may be delivered via a suitable pre-commencement planning condition.
	ingestion, inhalation).	Construction workers	Medium	Likely	Moderate	Risks to construction works can be adequately managed by standard precautions and health and safety procedures commensurate with working on brownfield sites as documented in a CEMP. This must include appropriate PPE, welfare/ hygiene arrangements and, if required, RPE.
	Ingress into potable supply pipes.	Future Site users	Medium	Low likelihood	Moderate/ low	A suitable ground investigation should be undertaken to allow an assessment of the proposed potable supply pipe design to be undertaken. This may include the provision of 'clean' service corridors.

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Sources	Pathways	Receptors	Consequence	Probability	Risk	Risk management / remediation
	Migration of gases and/or vapours through permeable subsurface materials and/or preferential pathways.	Future Site users	Medium	Low likelihood	Moderate/ low	Significant sources of ground gas and vapours have not been identified on-Site during previous ground investigations. However, this should be confirmed as part of a development specific investigation and assessment. Gas protection measures may be required where buildings are not suspended above the below infrastructure.
		Construction workers	Medium	Likely	Moderate	Risks to construction works should be assessed in the context of the results of the aforementioned site investigation. Should potential sources of ground gas and/or vapour be present, a safe system of work must be adopted for all groundworks and any entry in to excavations.
	Leaching and/or water mobile constituents passing through permeable sub-surface soils and/or shallow preferential pathways.	Secondary and Principal aquifers	Medium	Low likelihood	Moderate/ low risk	Groundwater vulnerability in the area is classed as high and secondary and principal aquifers underlie the Site. However, to date limited source potential has been identified on-Site, reducing the likelihood to low. Groundwater quality and ground conditions should be investigated as part of a suitable site investigation for the proposed development. Should foundation design of the development include piling, a Foundations Works Risk Assessment

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Sources	Pathways	Receptors	Consequence	Probability	Risk	Risk management / remediation
Unexploded ordnance within sediments beneath the Site						should be undertaken, secured by a pre- commencement planning condition.
	Construction workers Disturbance of UXO Future Site users	Construction workers	Severe	Low likelihood	Moderate	A detailed UXO desk study should be undertaken for the Site with recommendations adopted in all future below ground works
			Severe	Unlikely	Moderate/ low	None required. Whilst a potential severe consequence, there is no mechanism for future Site users to interact with potential UXO.





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Table 3-2Off-Site pollutant linkage assessment.

Sources	Pathways	Receptors	Consequence	Probability	Risk	Risk management / remediation
Potential for the migration of contamination from current and previous off- Site sources including the tobacco factory, unspecified works, garages, etc.	Direct human contact exposure pathways (dermal, ingestion, inhalation).	Future Site users	Medium	Unlikely	Low	None required.
		Construction workers	Medium	Low likelihood	Moderate/ low	Risk to construction works can be adequately managed by standard precautions and health and safety procedures commensurate with working on brownfield sites.
	Lateral migration of dissolved phase contamination. Ingress into potable supply pipes.	Future Site users	Medium	Unlikely	Low	None required.
	Lateral migration of dissolved phase contamination leading to migration of gases and/or vapours through permeable subsurface materials and/or preferential pathways.	Future Site users	Medium	Unlikely	Low	None required.

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Sources	Pathways	Receptors	Consequence	Probability	Risk	Risk management / remediation
	Leaching and/or water mobile constituents passing through permeable sub-surface soils and/or shallow preferential pathways.	Secondary and Principal aquifers	Medium	Low likelihood	Moderate/ low	Groundwater quality and ground conditions should be investigated as part of a suitable site investigation for the proposed development.





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4. Conclusions and recommendations

4.1. Land quality desk study

The earliest available mapping shows the Site use in the late 19th century to be a passenger railway station named 'Bishopsgate Station', suspended above street level in a viaduct. The surrounding area was primarily residential. Potentially contaminative industrial activities were noted surrounding the Site, including a tobacco factory, unspecified works, and two electricity substations. In 1888 the station was expanded and converted to a goods station named 'Great Eastern Railway Station (Goods)'. The surrounding area is shown to be heavily bombed during World War II, though no damage is shown within the Site itself. In 1964, a significant fire occurred at the goods yard, leading to its closure. Subsequently, in 1967, the upper levels of the goods yard building were demolished. From 1971, the western section of the Site was converted into a car park, which later expanded to accommodate both cars and lorries in 1980. In 2001, a karting circuit was constructed in the western part of the Site.

Based on the findings of the desk study and current Site use, an assessment of land quality has been undertaken in accordance with current guidance and best practice. On this basis, the potential risk to human health is considered to be MODERATE. The potential risk to the wider environment is assessed to be MODERATE TO LOW on the basis it is underlain by secondary and principal aquifers with high vulnerability.

Zetica UXO mapping and a review of post-war ordnance survey mapping has highlighted a risk of UXO at the site. Zetica mapping indicates that the area is at a **high risk of UXO**, and several ruins were noted on post-war mapping. Based on this, it is recommended that a detailed UXO assessment is undertaken.

4.2. Next steps

The preliminary conceptual site model and desk based preliminary risk assessment presented herein is considered sufficient to support the proposed RMA. However, the following should be considered as part of the proposed development in due course.

4.2.1. UXO desk study

In order to ensure that any works to disturb the ground are undertaken in a safe manner, it is recommended that a site-specific desk study be undertaken into the potential UXO risk on Site. This may the lead to the need for precautionary measures to be deployed during subsequent below ground works including and site investigation.

4.2.2. Site investigation

A suitably scoped and targeted site investigation should be undertaken to understand the ground, groundwater, and ground gas regime across the Site and to test the preliminary conceptual site model. Such an investigation will also provide the opportunity to characterise the ground for the purposes of geotechnical characterisation for foundation design.





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4.2.3. Remediation plan and verification reporting

Arup's 2008 report presented an outline remediation strategy. This strategy will need to further be refined based on the results of an updated Site Investigation and submitted to the Local Authorities (Both the London Boroughs of Tower Hamlets and Hackney). A subsequent verification report will also be required to demonstrate that the Site is suitable for its intended use.

4.2.4. CEMP

A Construction Environmental Management Plan (CEMP) should be implemented to ensure that potential construction phase environmental risks may be managed on Site.

4.2.5. Watching brief

A reactive watching brief should be maintained during the construction phase with suitable measures adopted should unexpected or unforeseen contamination be encountered.





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5. References

Arup **2008**. Bishopsgate Goods Yard – Ground Contamination Risk Assessment & Outline Remediation Strategy. London: Ove Arup and Partners Ltd.

CIRIA **2001**. Contaminated land risk assessment: A guide to good practice. CIRIA document reference C552.

DEFRA, 2020. Contaminated Land Statutory Guidance. Updated July 2023.

Environment Agency, **2022**. Land contamination: Technical Guidance webpages https://www.gov.uk/government/collections/land-contamination-technical-guidance

Environment Agency, **2017**. Groundwater protection webpages https://www.gov.uk/government/collections/groundwater-protection

Environment Agency, **2020**. Land quality risk management webpages. https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm





Appendix A Report conditions







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Report Conditions

This report has been prepared by Yellow Sub Geo Ltd. (Yellow Sub Geo) in its professional capacity as soil and groundwater specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client and is provided by Yellow Sub Geo solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report, taking account of the terms of reference agreed with the client. The findings are based on the information made available to Yellow Sub Geo at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology, and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

Where necessary and appropriate, the report represents and relies on published information from third party, publicly and commercially available sources which is used in good faith of its accuracy and efficacy. Yellow Sub Geo cannot accept responsibility for the work of others.

Site investigation results necessarily rely on tests and observations within exploratory holes only. The inherent variation in ground conditions mean that the results may not be representative of ground conditions between exploratory holes. Yellow Sub Geo take no responsibility for variation in ground conditions between exploratory positions.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, Yellow Sub Geo may, by prior written agreement, agree to such release, if it is acknowledged that Yellow Sub Geo accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. Yellow Sub Geo accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual, or otherwise, against Yellow Sub Geo except as expressly agreed with Yellow Sub Geo in writing. Yellow Sub Geo reserves the right to withhold and/ or negotiate the transference of reliance on this report, subject to legal and commercial review.

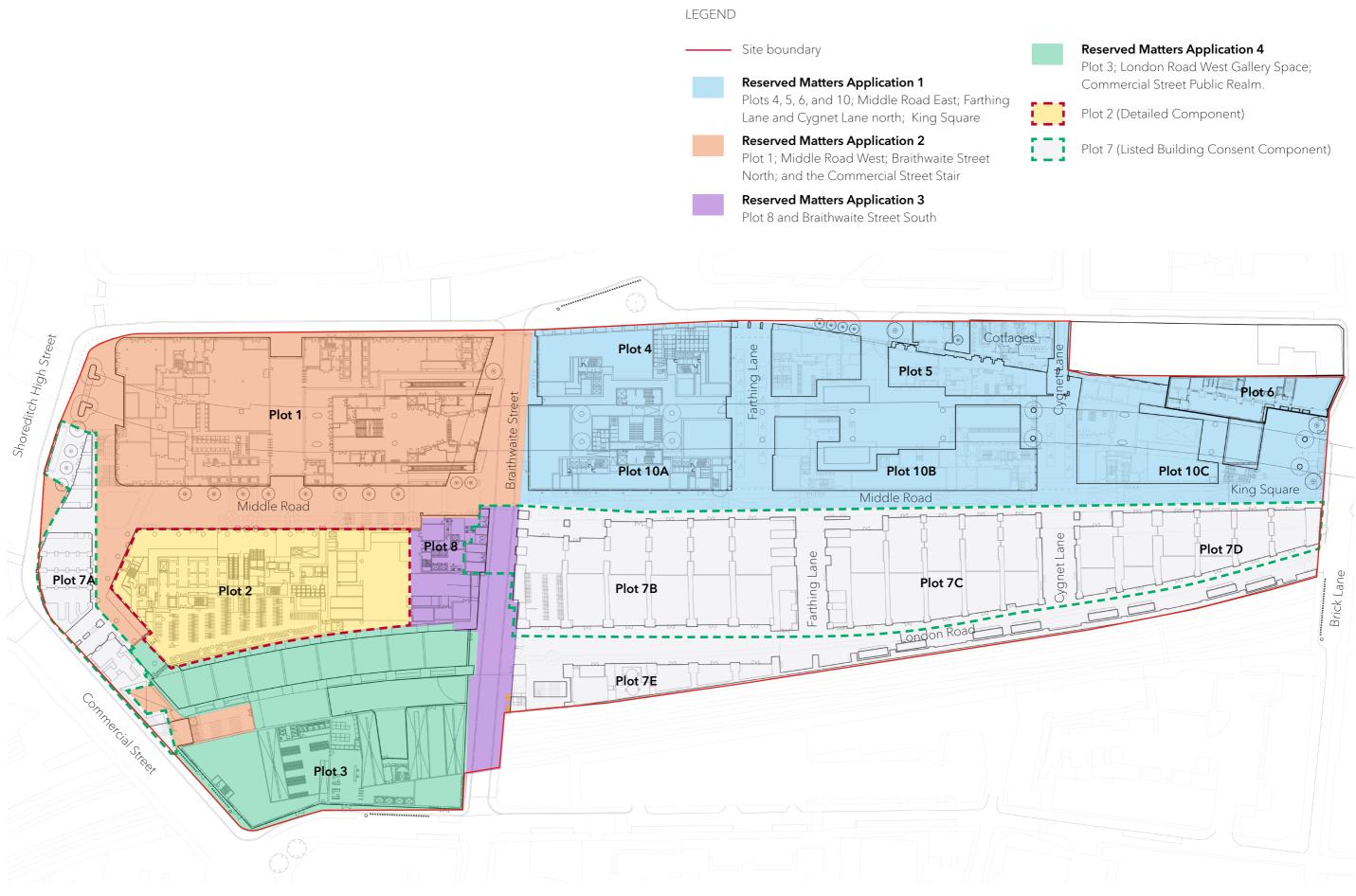




Appendix B Drawings provided by the Client

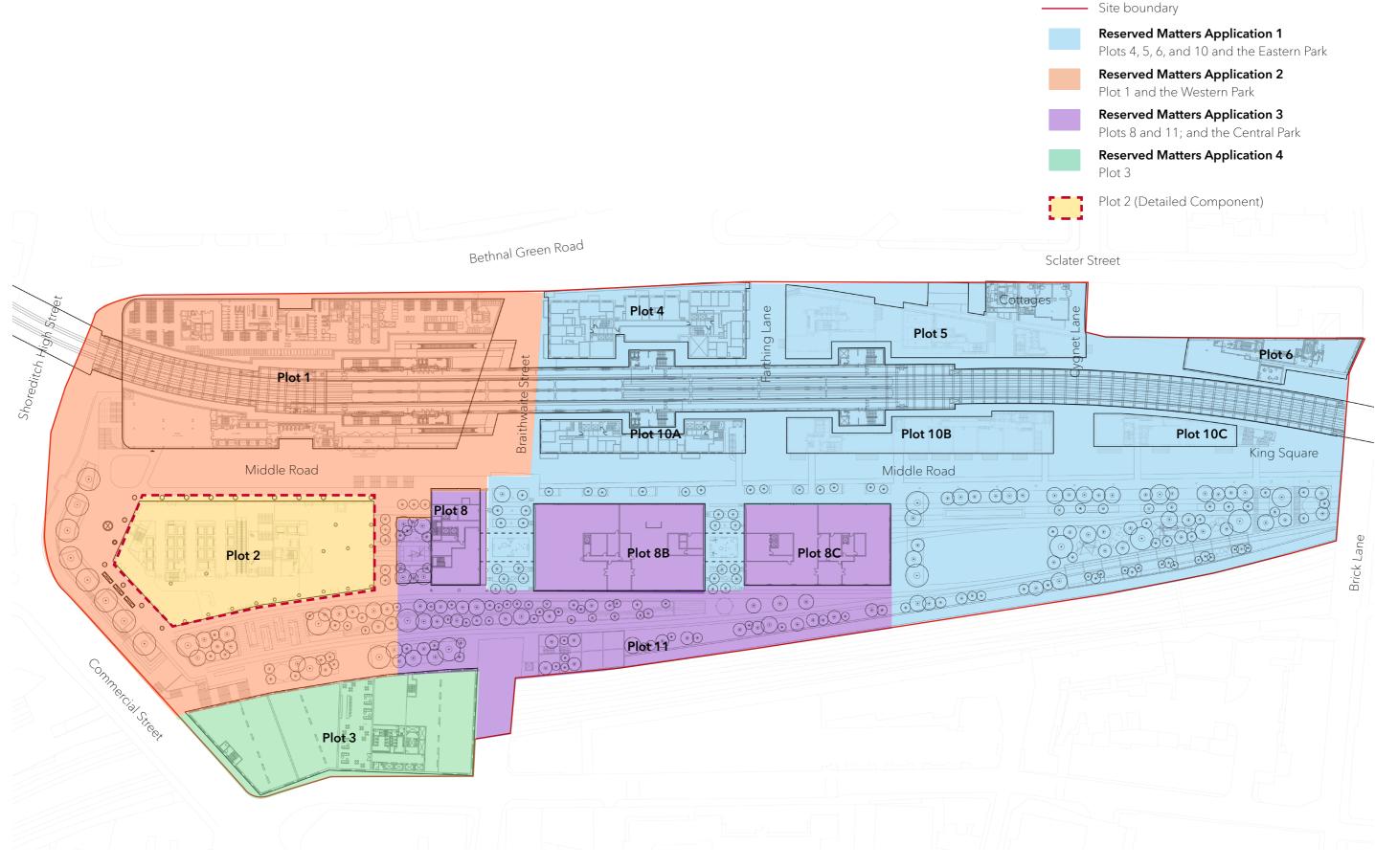


Planning Boundaries - Ground Level





Planning Boundaries - Platform Level



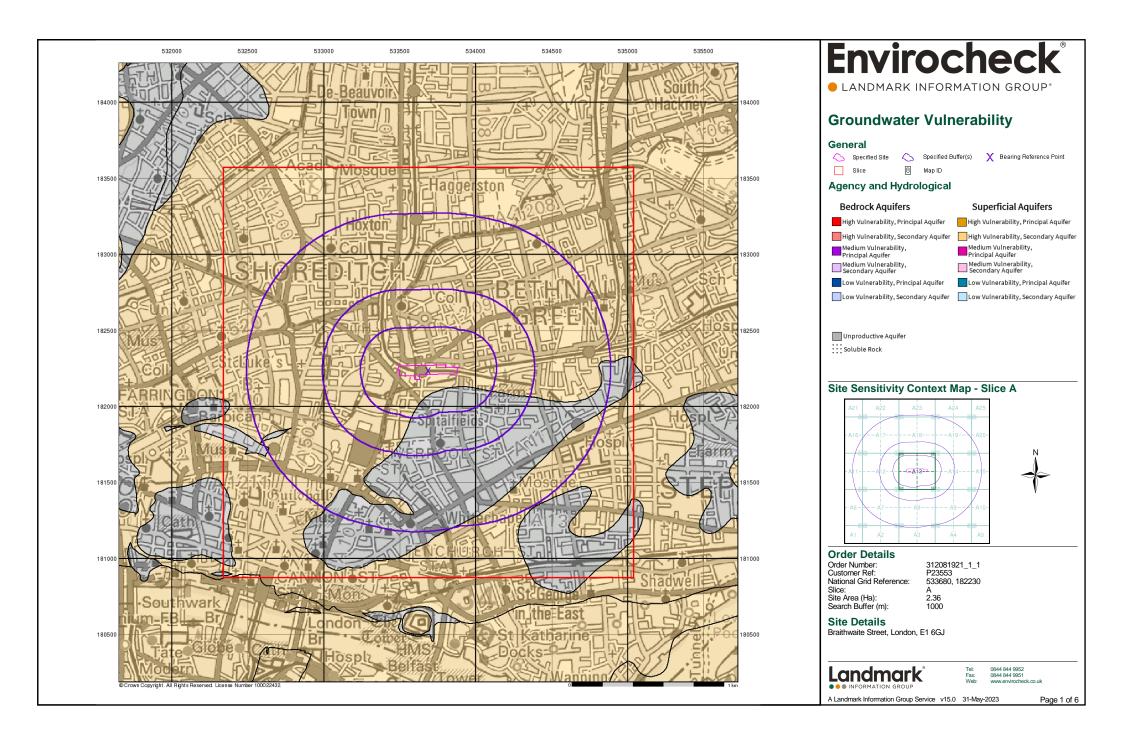


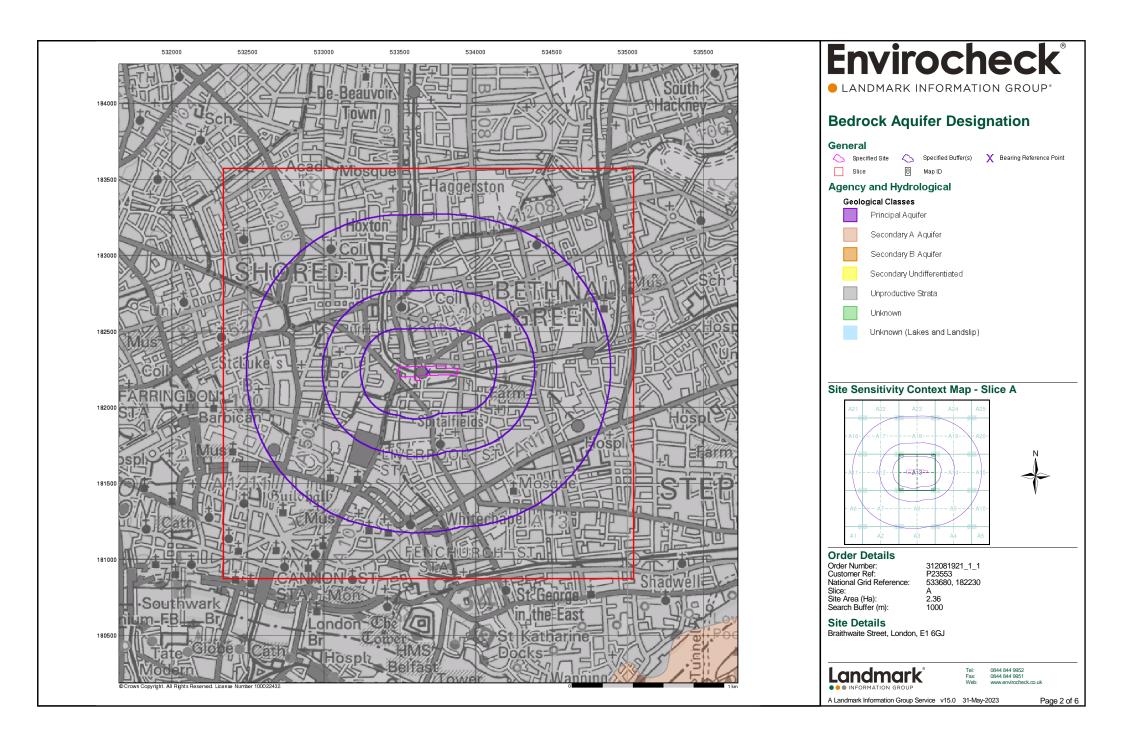
- LEGEND

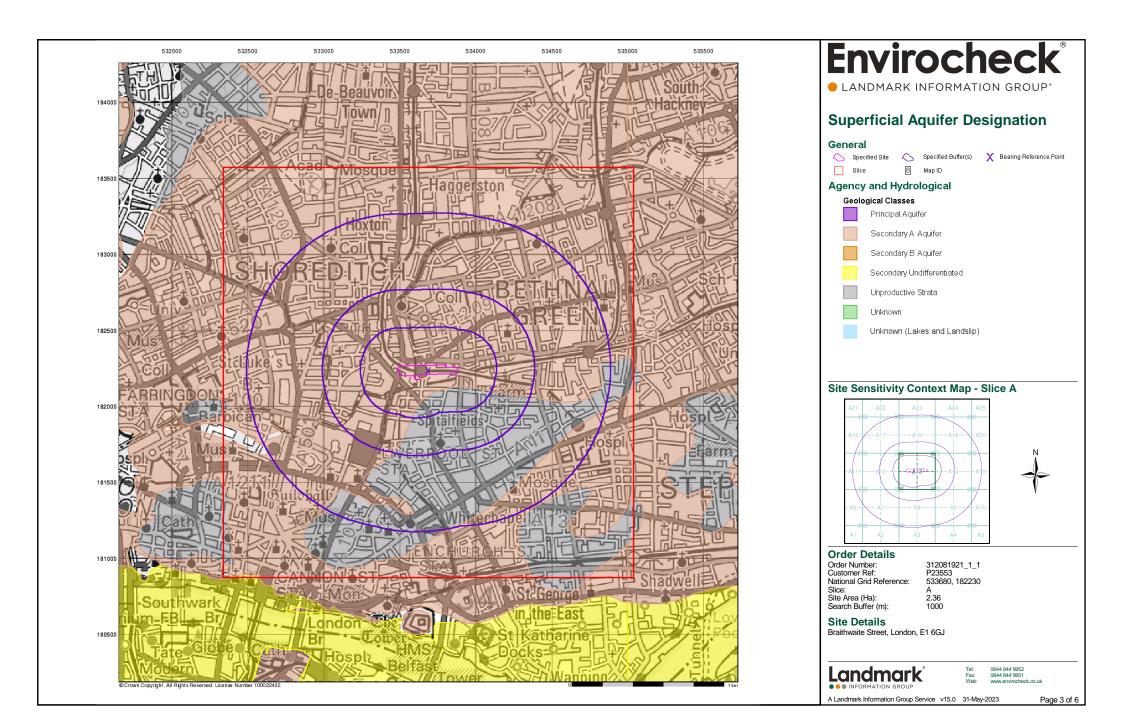


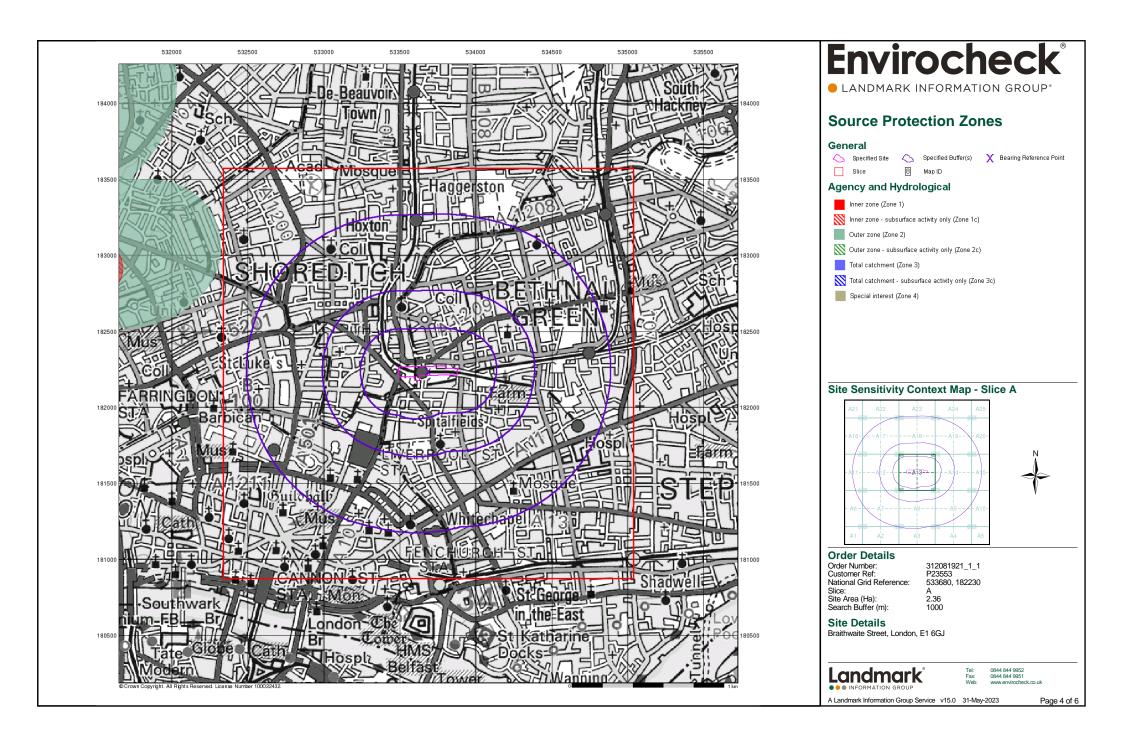


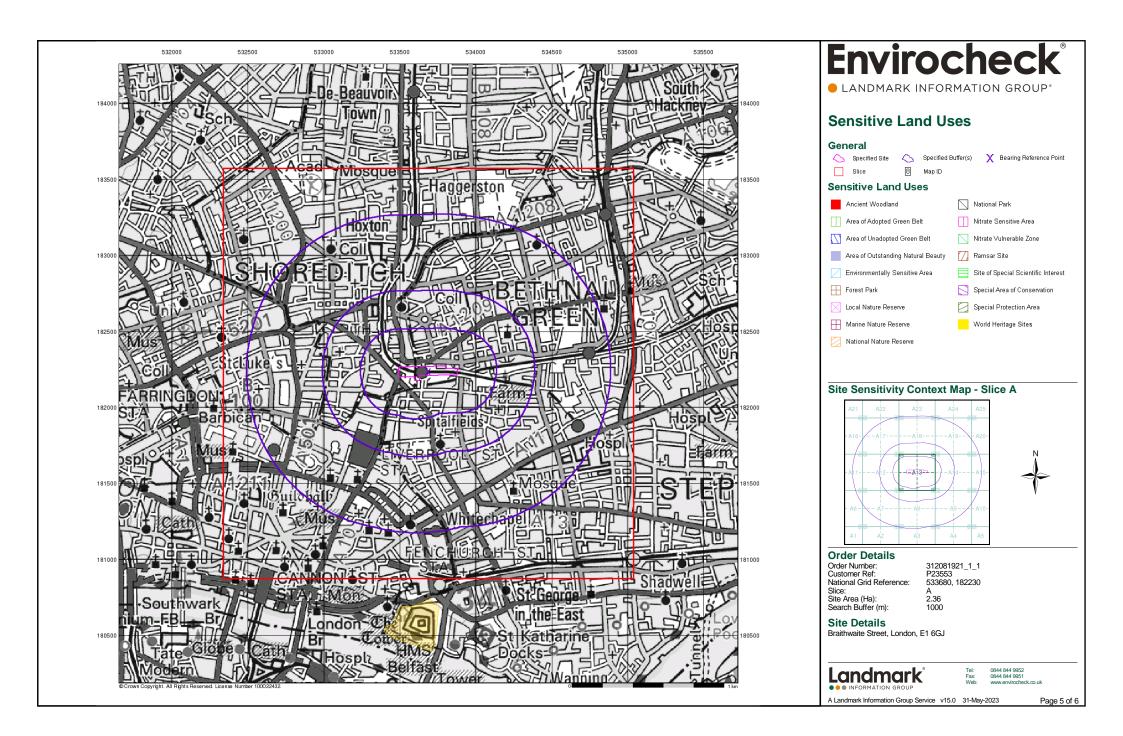
Appendix C Envirocheck report

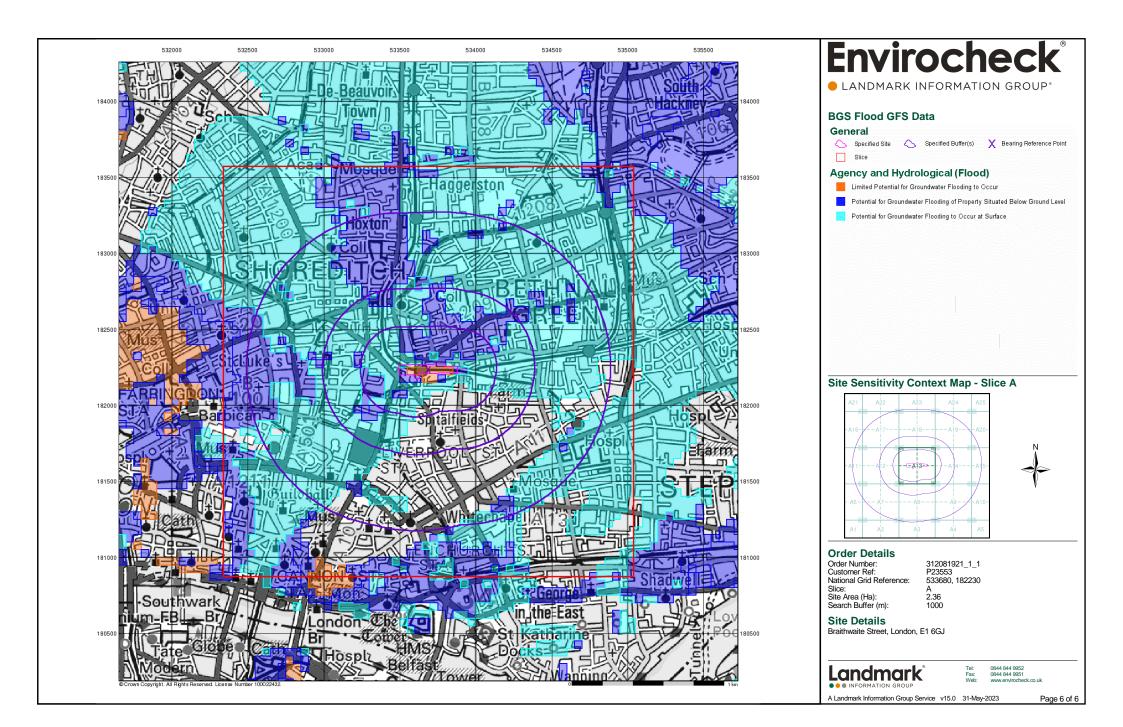


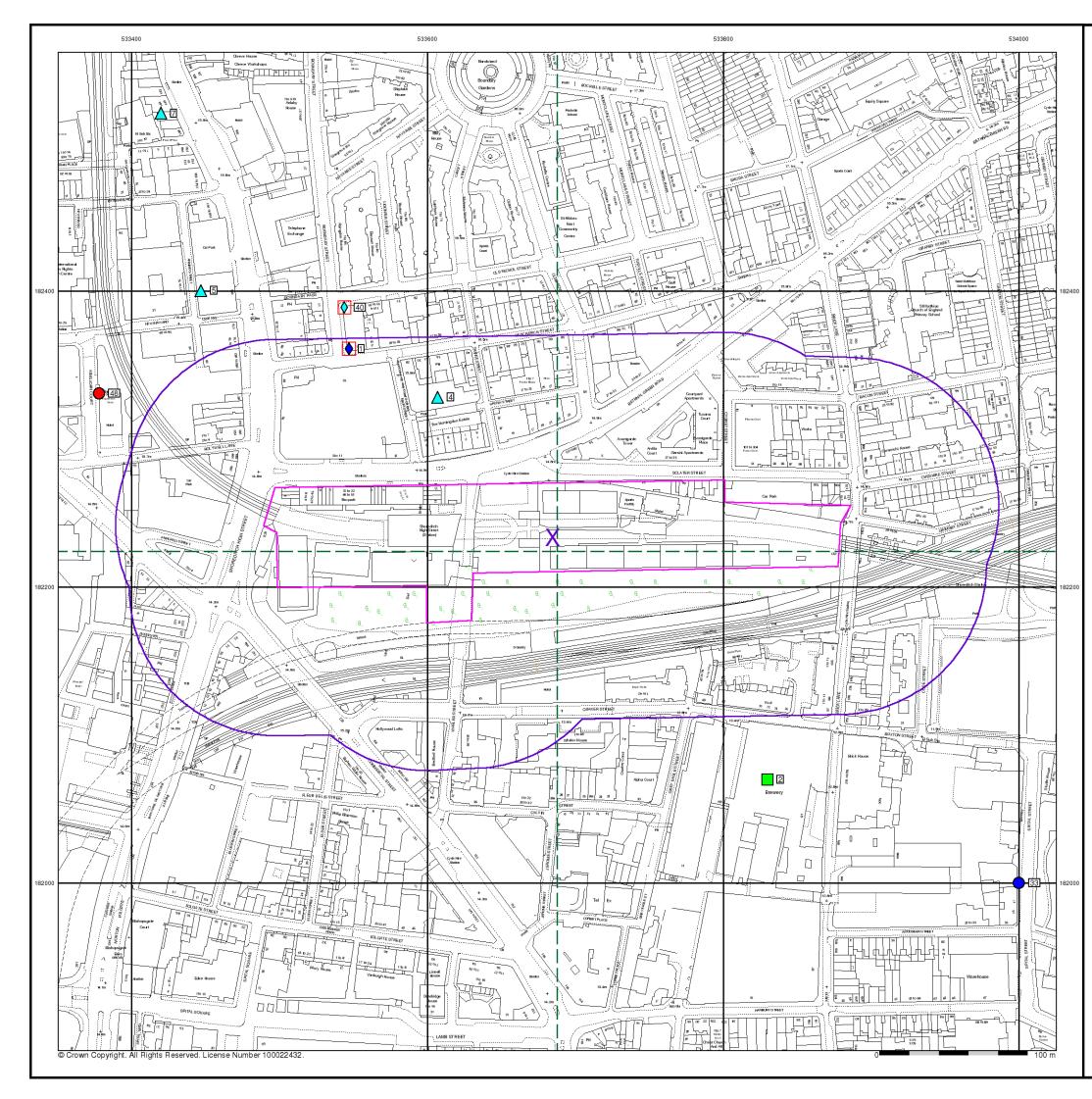










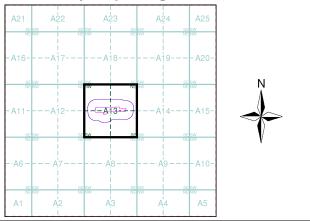


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General



Site Sensitivity Map - Segment A13



Order Details

U · · U	
Order Number:	312081921_1_1
Customer Ref:	P23553
National Grid Reference:	533680, 182230
Slice:	Α
Site Area (Ha):	2.36
Plot Buffer (m):	100

Site Details

Braithwaite Street, London, E1 6GJ



Tel: Fax: Web

0844 844 9952 0844 844 9951 www.envirocheck.co.uk