



FORMER NESTLE FACTORY, HAYES

ARCHAEOLOGICAL DESK-BASED ASSESSMENT

MAY 2017



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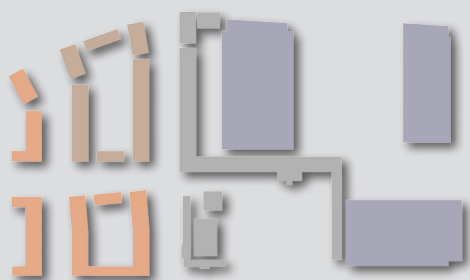
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The Archaeological Desk-Based Assessment contains a review of available existing sources in order to assess the potential and significance of any likely archaeological remains that may survive within the boundary of the study site.

The report also assess the potential impact of previous development within the site which may have had on the anticipated archaeological resource.



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**ARCHAEOLOGICAL
DESK-BASED
ASSESSMENT**

**THE FORMER NESTLE
FACTORY SITE
NESTLES AVENUE
HAYES
LONDON**

**November 2014
Updated May 2017**

**Planning Authority:
London Borough of
Hillingdon**

**Site centred at:
TQ 1013 7921**

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EXECUTIVE SUMMARY

The former nestle factory site, Nestles Avenue, Hayes, London has been assessed for its archaeological potential.

There are no designated or non-designated archaeological assets on the site and none in the vicinity of the site; the development will therefore not have an impact on any designated or non-designated assets. Historic building issues are considered in a separate report.

The potential for as yet to be discovered archaeological assets is limited due to an episode of Brickearth extraction in the early 1900s and subsequent development. This potential lies solely with structural remains associated with the early 20th century munitions factory which may survive outside the footprint of the existing development.

Built Heritage issues will be addressed by means of a separate Heritage Statement and ES Chapter.

On the basis of all the available information, it is suggested that the Council's heritage advisors are likely to require archaeological mitigation measures. A programme of targeted archaeological investigation to determine levels of archaeological survival outside the existing footprint of the development, would secure the archaeological interest of the site.

The archaeological mitigation could be secured by an appropriately worded planning condition.

1.0 INTRODUCTION AND SCOPE OF STUDY

- 1.1 This archaeological desk-based assessment has been prepared by Chris Clarke of CgMs Consulting on behalf of SEGRO and Barratt London.
- 1.2 The subject of this Assessment comprises a site, also referred to as the study site, approximately 12.2ha in extent at the former nestle factory site, Nestles Avenue, Hayes, London. The site is centred at TQ 1013 7921, lying approximately 500m southeast of Hayes town centre (Fig. 1).
- 1.3 In accordance with government policy on archaeology within the planning process (Section 12 of the National Planning Policy Framework) and policies in the Hillingdon Development Plan and Local Plan, this assessment draws together the available archaeological, topographic and land-use information in order to clarify the archaeological potential of the study site.
- 1.4 Additionally, in accordance with the 'Standard and Guidance for Historic Environment Desk-Based Assessments' (Chartered Institute for Archaeologists (IfA) 2014), it incorporates an examination of evidence in the Greater London Historic Environment Record (GLHER), and Hillingdon Local Studies Library, incorporates published and unpublished material and charts historic land-use through a map regression exercise. A site inspection was undertaken in October 2014.
- 1.5 Built Heritage issues will be addressed by means of a separate Heritage Statement and ES Chapter.
- 1.6 As a result, the assessment enables relevant parties to assess the significance of any designated and non-designated heritage assets on the study site, assess the potential for as yet to be discovered archaeological assets and enables potential impacts on assets to be identified, along with the need for design, civil engineering or archaeological solutions.

2.0 PLANNING BACKGROUND AND DEVELOPMENT PLAN FRAMEWORK

2.1 In March 2012, the government published the National Planning Policy Framework (NPPF). More recently (March 2014), Planning Practice Guidance (PPG) has been published on-line.

2.1.1 Section 12 of the NPPF, entitled *Conserving and enhancing the historic environment* provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 12 of the NPPF can be summarised as seeking the:

- Delivery of sustainable development
- Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment
- Conservation of England's heritage assets in a manner appropriate to their significance, and
- Recognition that heritage contributes to our knowledge and understanding of the past.

2.1.2 Section 12 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term. Paragraph 128 states that planning decisions should be based on the significance of the heritage asset, and that level of detail supplied by an applicant should be proportionate to the importance of the asset and should be *no more than sufficient* to review the potential impact of the proposal upon the significance of that asset.

2.1.3 *Heritage Assets* are defined in Annex 2 of the NPPF as: a building, monument, site, place, area or landscape positively identified as having a degree of significance meriting consideration in planning decisions. They include designated heritage assets (as defined in the NPPF) and assets identified by the local planning authority during the process of decision-making or through the plan-making process.

2.1.4 Annex 2 also defines *Archaeological Interest* as a heritage asset which holds or potentially could hold, evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.

2.1.5 A **Designated Heritage Asset** comprises a: World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area.

2.1.6 **Significance** is defined as: The value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.

2.1.7 In short, government policy provides a framework which:

- Protects nationally important designated Heritage Assets (which include World Heritage Sites, Scheduled Ancient Monuments, Listed Buildings, Protected Wreck Sites, Registered Parks and Gardens, Registered Battlefields or Conservation Areas).
- Protects the settings of such designations.
- In appropriate circumstances seeks adequate information (from desk based assessment and field evaluation where necessary) to enable informed decisions.
- Provides for the excavation and investigation of sites not significant enough to merit *in-situ* preservation.

2.2 In considering any planning application for development, the planning authority will be mindful of the framework set by government policy, in this instance the NPPF, by current Development Plan Policy and by other material considerations.

2.3 The relevant Strategic Development Plan framework is provided by the London Plan published 22 July 2011. Policy relevant to archaeology states:

POLICY 7.8 HERITAGE ASSETS AND ARCHAEOLOGY

STRATEGIC

- A. LONDON'S HERITAGE ASSETS AND HISTORIC ENVIRONMENT, INCLUDING LISTED BUILDINGS, REGISTERED HISTORIC PARKS AND GARDENS AND OTHER NATURAL AND HISTORIC LANDSCAPES, CONSERVATION AREAS, WORLD HERITAGE SITES, REGISTERED BATTLEFIELDS, SCHEDULED MONUMENTS, ARCHAEOLOGICAL REMAINS AND MEMORIALS SHOULD BE IDENTIFIED, SO THAT THE DESIRABILITY OF SUSTAINING AND ENHANCING THEIR SIGNIFICANCE AND OF UTILISING THEIR POSITIVE ROLE IN PLACE SHAPING CAN BE TAKEN INTO ACCOUNT.**

B. DEVELOPMENT SHOULD INCORPORATE MEASURES THAT IDENTIFY, RECORD, INTERPRET, PROTECT AND, WHERE APPROPRIATE, PRESENT THE SITE'S ARCHAEOLOGY.

PLANNING DECISIONS

C. DEVELOPMENT SHOULD IDENTIFY, VALUE, CONSERVE, RESTORE, RE-USE AND INCORPORATE HERITAGE ASSETS, WHERE APPROPRIATE.

D. DEVELOPMENT AFFECTING HERITAGE ASSETS AND THEIR SETTINGS SHOULD CONSERVE THEIR SIGNIFICANCE, BY BEING SYMPATHETIC TO THEIR FORM, SCALE, MATERIALS AND ARCHITECTURAL DETAIL.

E. NEW DEVELOPMENT SHOULD MAKE PROVISION FOR THE PROTECTION OF ARCHAEOLOGICAL RESOURCES, LANDSCAPES AND SIGNIFICANT MEMORIALS. THE PHYSICAL ASSETS SHOULD, WHERE POSSIBLE, BE MADE AVAILABLE TO THE PUBLIC ON-SITE. WHERE THE ARCHAEOLOGICAL ASSET OR MEMORIAL CANNOT BE PRESERVED OR MANAGED ON-SITE, PROVISION MUST BE MADE FOR THE INVESTIGATION, UNDERSTANDING, RECORDING, DISSEMINATION AND ARCHIVING OF THAT ASSET.

LDF PREPARATION

F. BOROUGHES SHOULD, IN LDF POLICIES, SEEK TO MAINTAIN AND ENHANCE THE CONTRIBUTION OF BUILT, LANDSCAPED AND BURIED HERITAGE TO LONDON'S ENVIRONMENTAL QUALITY, CULTURAL IDENTITY AND ECONOMY AS PART OF MANAGING LONDON'S ABILITY TO ACCOMMODATE CHANGE AND REGENERATION.

G. BOROUGHES, IN CONSULTATION WITH ENGLISH HERITAGE, NATURAL ENGLAND AND OTHER RELEVANT STATUTORY ORGANISATIONS, SHOULD INCLUDE APPROPRIATE POLICIES IN THEIR LDFS FOR IDENTIFYING, PROTECTING, ENHANCING AND IMPROVING ACCESS TO THE HISTORIC ENVIRONMENT AND HERITAGE ASSETS AND THEIR SETTINGS WHERE APPROPRIATE, AND TO ARCHAEOLOGICAL ASSETS, MEMORIALS AND HISTORIC AND NATURAL LANDSCAPE CHARACTER WITHIN THEIR AREA.

2.4 The following 'saved' policies have been retained from the Hillingdon Unitary Development Plan to provide a framework for the consideration of development proposals affecting archaeological features:

BE3 THE LOCAL PLANNING AUTHORITY WILL ENSURE WHENEVER PRACTICABLE THAT SITES OF ARCHAEOLOGICAL INTEREST ARE INVESTIGATED AND RECORDED EITHER BEFORE ANY NEW BUILDINGS, REDEVELOPMENT, SITE WORKS, GOLF COURSE OR GRAVEL EXTRACTION ARE STARTED, OR DURING EXCAVATION AND CONSTRUCTION. DEVELOPMENT WHICH WOULD DESTROY IMPORTANT ARCHAEOLOGICAL REMAINS WILL NOT BE PERMITTED.

2.4.1 Subsequently, Part 1 of the Hillingdon Local Plan was adopted in November 2012. The following policy was introduced to support the existing 'saved' policy until the publication of Part 2 of the Local Plan:

Policy HE1: Heritage

THE COUNCIL WILL:

- 1. CONSERVE AND ENHANCE HILLINGDON'S DISTINCT AND VARIED ENVIRONMENT, ITS SETTINGS AND THE WIDER HISTORIC LANDSCAPE, WHICH INCLUDES: HISTORIC VILLAGE CORES, METRO-LAND SUBURBS, PLANNED RESIDENTIAL ESTATES AND 19TH AND 20TH CENTURY INDUSTRIAL AREAS, INCLUDING THE GRAND UNION CANAL AND ITS FEATURES; DESIGNATED HERITAGE ASSETS SUCH AS STATUTORILY LISTED BUILDINGS, CONSERVATION AREAS AND SCHEDULED ANCIENT MONUMENTS; REGISTERED PARKS AND GARDENS AND HISTORIC LANDSCAPES, BOTH NATURAL AND DESIGNED; AND ARCHAEOLOGICALLY SIGNIFICANT AREAS, INCLUDING ARCHAEOLOGICAL PRIORITY ZONES AND AREAS.**
- 2. ACTIVELY ENCOURAGE THE REGENERATION OF HERITAGE ASSETS, PARTICULARLY THOSE WHICH HAVE BEEN INCLUDED IN ENGLISH HERITAGE'S 'HERITAGE AT RISK' REGISTER OR ARE CURRENTLY VACANT.**
- 3. PROMOTE INCREASED PUBLIC AWARENESS, UNDERSTANDING OF AND ACCESS TO THE BOROUGH'S HERITAGE ASSETS AND WIDER HISTORIC ENVIRONMENT, THROUGH SECTION 106 AGREEMENTS AND VIA COMMUNITY ENGAGEMENT AND OUTREACH ACTIVITIES.**
- 4. ENCOURAGE THE REUSE AND MODIFICATION OF HERITAGE ASSETS, WHERE APPROPRIATE, WHEN CONSIDERING PROPOSALS TO MITIGATE OR ADAPT TO THE EFFECTS OF CLIMATE CHANGE. WHERE NEGATIVE IMPACT ON A HERITAGE ASSET IS IDENTIFIED, SEEK ALTERNATIVE APPROACHES TO ACHIEVE SIMILAR CLIMATE CHANGE MITIGATION OUTCOMES WITHOUT DAMAGE TO THE ASSET.**

2.5 No Scheduled Ancient Monuments, World Heritage Sites, Registered Parks and Gardens or Registered Battlefields sites lie within the study site.

2.5.1 The site is located within the Botwell: Nestle, Hayes Conservation Area, as designated by the London Borough of Hillingdon.

2.5.2 The site also contains four locally buildings as designated by the London Borough of Hillingdon. These consist of:

- Nestle Works: main factory building
- Nestle Works: gates and railings
- Nestle Works: former canteen
- Nestle Works: lodge

Built Heritage issues will be addressed by means of a separate Heritage Statement and ES Chapter.

2.5.3 The site lies approximately 200m to the northeast of the Cranford Park North 'Archaeological Priority Area' **identified** in the London Borough of Hillingdon.

2.6 This desk-based assessment therefore aims to meet the national and local planning policy set out above, in clarifying the archaeological potential of the study site and the need or otherwise for mitigation measures.

3.0 GEOLOGY AND TOPOGRAPHY

3.1 Geology

3.1.1 The British Geological Survey (2013) indicate that the solid geology in the vicinity of the site consists of London Clay, forming the London Basin, overlain by superficial deposits of Lynch Hill Gravel Member.

3.1.2 In June 2014 a programme of geotechnical investigation was undertaken on site. A horizon of modern made ground was identified across the site varying in thickness between 0.30m to 1.80m thick. Made ground directly overlay a mix of silt, clay and gravel deposits (Geosyntec 2014; Appendix A).

3.1.3 Historic maps (see Fig. 8) suggest that some or all of the site has been dug for Brickearth and/or gravel, indicated by an escarpment is marked in the northeast corner of the site on the 1914 Ordnance Survey map implying that significant ground reduction has taken place on site.

3.2 Topography

3.2.1 The study site is located on level ground at a height of approximately 33m Above Ordnance Datum (AOD). It is likely that 20th century development of the site has masked the original topography.

3.2.2 The course of the River Crane is located approximately 175m to the east of the site. The Grand Union Canal borders the site to the northeast.

4.0 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND, WITH ASSESSMENT OF SIGNIFICANCE

4.1 Timescales used in this report:

Prehistoric

Palaeolithic	450,000	-	12,000	BC
Mesolithic	12,000	-	4,000	BC
Neolithic	4,000	-	1,800	BC
Bronze Age	1,800	-	600	BC
Iron Age	600	-	AD 43	

Historic

Roman	AD 43	-	410	
Anglo Saxon/Early Medieval	AD 410	-	1066	
Medieval	AD 1066	-	1485	
Post Medieval	AD 1486	-	1749	
Modern	AD 1750	-	Present	

4.2 **Introduction**

4.2.1 This assessment comprises a review of archaeological evidence within a 1km radius of the study site, referred to as the study area, held on the Greater London Historic Environment Record (GLHER), together with a historic map regression exercise charting the development of the study area from the 17th century onwards.

4.2.2 A specialist Palaeolithic assessment was commissioned to support Section 4.3 (Appendix B).

4.2.3 This chapter reviews existing archaeological evidence for the site and the archaeological/historical background of the general area and, in accordance with NPPF, considers the archaeological interest of the site.

4.2.4 Chapter 5 subsequently considers the site conditions and whether the theoretical potential identified in this chapter is likely to survive.

4.3 **Early Prehistoric (Palaeolithic & Mesolithic)**

4.3.1 The Lynch Hill Gravels underlying the study site are an acknowledged source of Palaeolithic material in West London (BGS 1996; Wymer 1999; MoLAS 2000). A number of Palaeolithic finds are recorded within 1km of the study site; including a group of five handaxes (050021/00/00, TQ 095 795), a group of three handaxes and one core (05207/00/00, TQ 100 797) and a second group of three handaxes, one core and several flakes (050022/00/00, TQ 106 796). However, all of these finds are poorly provenanced (they have been allocated only six figure National Grid References in the GLHER). It is apparent that the bulk of these finds were retrieved in isolation, probably during gravel extraction.

4.3.2 A specialist Palaeolithic assessment, based on available resources and detailed **knowledge of the area's** Early Prehistoric potential, was produced by QUEST to support this Archaeological Assessment (Appendix B). The specialist assessment presents the known evidence for Palaeolithic activity within the vicinity of Hayes and considers the study site to have a low potential for activity associated with this period.

4.3.3 An isolated Mesolithic tranchet axe has also been recorded from the general vicinity of the site (050139/00/00, TQ 1000 7900).

4.3.4 Despite the presence of Lynch Hill Gravels at depth, the site is considered to have a low potential for Palaeolithic activity; the potential for Mesolithic material is thought to be nil.

4.4 **Later Prehistoric (Neolithic, Bronze Age & Iron Age)**

4.4.1 Investigations adjacent to the Hayes Road at the Western International Market site, c350m southeast of the site, identified a penannular enclosure, a gully, and multiple pits and postholes dating to the Neolithic period. The evidence indicates that several phases of Neolithic occupation took place in this location, which included the possible remains of a sub-rectangular enclosure (MLO78246, TQ 10604 78763; MLO99413, TQ 10575 78679).

4.4.2 The excavations at the Western International Market site also recorded a range of Bronze Age remains, represented by a cremation cemetery, a concentration of pits, agricultural field boundaries, and a possible large scale boundary ditch (MLO99407, TQ

10608 78765; MLO99409, TQ 10589 78801; MLO78248, TQ 10590 78790). Later Iron Age occupation of the site consisted of three circular posthole arrangements and multiple pit clusters, associated with roundhouse construction and domestic activity (MLO99415, TQ 10612 78752).

4.4.3 An evaluation at Blair Close in 1993, c175m south of the site, recovered a small residual assemblage of Prehistoric pottery and worked flint. Initial assessment suggested the pottery could be Bronze Age (MLO59169, TQ 1018 7871).

4.4.4 Several other small assemblages of Prehistoric worked flint have also been recovered in the southeastern part of the study area (050446/00/00, TQ 1075 7875; 050395/00/00, TQ 1045 7839).

4.4.5 Later Prehistoric activity within the study area is represent by several phases of activity on the eastern bank of the River Crane, suggesting there was significant activity taking place in the immediate landscape. The potential of the study site for Prehistoric features is identified as moderate.

4.5 **Roman**

4.5.1 A number of Roman features were excavated during the archaeological investigations at the Western International Market site. The features consisted of three post-built structures, several domestic rubbish pits, and elements of a field system (MLO99422, TQ 10588 78697).

4.5.2 Several shallow Roman pits and gullies were found during the evaluation 175m south of the study site at Blair Close (ELO9541, TQ 10192 78757).

4.5.3 The potential of the study site for Roman evidence is therefore considered to be low to moderate.

4.6 **Anglo-Saxon & Medieval**

4.6.1 Further discoveries during the Western International Market site excavations identified the remains of an enclosed Anglo-Saxon settlement, consisting of a ditch enclosing at least one hall like building, multiple rectangular post-built structures and a grubanhaus (MLO99425, TQ 10613 78755).

- 4.6.2 A possible grubanhaus and two ditches containing Anglo-Saxon pottery were found during excavations at Blair Close (MLO59171, TQ 1021 7870).
- 4.6.3 A settlement at Botwell was probably present from the Anglo-Saxon period onwards, as the settlement was mentioned in documentary sources dating to 831 (52939/00/00, TQ 0970 8000).
- 4.6.4 Evidence for Late Medieval settlement in the south of the study area at Cranford is recorded in the Domesday book, but its exact location is unclear (MLO68566, TQ 1023 7825). The earthwork remains of Cranford le Mote manor house, positioned adjacent to the River Crane, is thought to have once been located within the boundaries of the former Cranford village (MLO11303, TQ 1039 7840).
- 4.6.5 Other settlements recorded in the Domesday Book include the village of Hayes to the north, and a smaller hamlet at Dawley to the west (Open Domesday 2014). Such evidence suggests the immediate landscape was intensively occupied and formed during this period.
- 4.6.6 A Late Medieval boundary ditch and two postholes were found during the Hayes Road excavations to the southeast of the site (MLO78249, TQ 10634 78506).
- 4.6.7 The potential of the study site for Anglo-Saxon and Medieval evidence is considered to be low, although the presence of peripheral settlement activity and field boundaries cannot be precluded.

4.7 **Post Medieval and Modern (including map regression exercise)**

- 4.7.1 During the Post-Medieval period the site is likely to have been farmed agricultural land.
- 4.7.2 An early cartographic view of the site is provided by Rocque's map of 1754 (Fig. 3), which depicts the site lying within arable agricultural land a short distance to the west of the River Crane. A track is shown crossing the site southeast-northwest.
- 4.7.3 The 1807 Ordnance Survey Drawing (Fig. 4) indicates the layout of the site remains unchanged. The Grand Union Canal now forms the northeast boundary of the site.
- 4.7.4 The Hayes Enclosure map (Fig. 5) and associated Apportionment record the site in use as allotments. The layout of the site remains unaltered in 1864-65 (Fig. 6) and 1895 (Fig. 7).

- 4.7.5 By 1914 (Fig. 8) orchards have been planted in three different areas of the site, with three different trackways leading into the site. An escarpment is marked in the northeast corner of the site indicating that significant ground reduction has taken place on site. Large-scale Brickearth extraction is well documented in the 19th and early 20th century on the Brickearth terraces of West London and particularly along the Grand Union Canal corridor, this it is assumed that this process has occurred on part if not most of the site.
- 4.7.6 **Contemporary sales documents record that The Sandow's Cocoa and Chocolate** Factory was constructed on site in 1914 (following publication of the Ordnance Survey map of that year). A contemporary photo shows that the Factory comprised two substantial brick buildings, consisting of a four storey brick built factory set back from the canal, and a smaller engine house with tall chimney (Plate 1). The Factory was sold to Peter, Cailer, Kohler, Swiss Chocolate Company in 1916.
- 4.7.7 The grounds immediately around the chocolate factory were compulsory purchased by the Government for the construction of Munitions Filling Factory No.7 in 1915. This was in response to a critical shortage of shells and munitions required as part of the conflict raging on the Western Front. The Factory, when complete, covered 200 acres, with the site occupying the northern part of the complex. The immediate proximity of the **Great Western Railway and Grand Union Canal made the site's** location ideal for transporting material in and out of the plant (Collier 2014).
- 4.7.8 When completed, the Factory as a whole covered 200 acres and consisted of 397 buildings, constructed at approximately 75 foot (22.86m) intervals, connected by a network of raised walkways along which ran narrow gauge railways (Plate 3). The floor level of the majority of buildings were raised up on brick foundations or columns to match the height of the walkways. The space in between the buildings, designed as a measure to minimise the effects of accidental explosions, was left as open space, and was even used to grow crops later in the war. The simplicity of the building design is demonstrated by the fact that the first elements of the factory were considered operational just 28 days following commencement of construction (Collier 2014).
- 4.7.9 A plan of Munitions Filling Factory No.7 in 1919 (Fig. 9) indicates that the current site boundary covers the northern area of the munitions factory complex. The individual factory buildings connected to the system of raised walkways, and separated by intervals of open ground occupy the majority of this area. Railway sidings and

associated warehouse buildings are located adjacent to the northern boundary. The two pre-existing chocolate factory buildings can be seen in the central northern part of the site.

4.7.10 Following the World War I armistice in November 1918 the factory was rapidly decommissioned with only a skeleton staff employed by the beginning of 1919 (Collier 2014).

4.7.11 In 1929 The Nestle Company took ownership of the chocolate factory. Aerial photographs taken of the site in 1930 and 1932 indicate that the layout of the site has changed significantly (Plates 4 & 5). The original chocolate factory is still present, although the greater majority of the munitions factory buildings and walkways have been removed. The railway warehouses and few single storey northeast-southwest aligned rectangular huts appear to have been retained, with the remaining area left as open ground or landscaped as playing fields. A substantial three storey factory complex has been constructed abutting the original factory building.

4.7.12 By 1935 (Fig. 10) the full layout of the site is recorded on the Ordnance Survey map **published that year. The layout of the 'Cocoa Factory' is consistent with that observed** in the earlier aerial photographs. The majority of the western part of the site is occupied by a sports ground, tennis courts and bowling green. The area to the south of the Factory contains mixed woodland with a number of small buildings located near the main gateway leading onto the newly constructed Nestle Avenue. Part of the site adjacent to the southeast boundary has been subdivided into smaller enclosures including a garden plot surrounding the newly built Lodge. The railway sidings have been extended along the northern boundary.

4.7.13 By 1966 (Fig. 11) the Factory complex has been expanded. The small rectangular buildings between the factory and sports field have been demolished and replaced by three large factory buildings, with the canteen now depicted in close proximity to these buildings. An extension to the main factory building is depicted in the northeast corner of the site. Several smaller buildings have been constructed in the southeast corner.

4.7.14 By 1975 (Fig. 12), the Factory has been expanded further to the northwest and east. The railway sidings and warehouses have been cleared, replaced by areas of hardstanding.

4.7.15 By 2013 (Fig. 13), the sports ground adjacent to the northwest boundary has been replaced by an additional factory building and loading yard. In the southeast corner of the site two smaller buildings have been demolished followed by the construction of a large car park.

4.7.16 **The site's archaeological and historical potential for the** Post-Medieval and Modern periods is entirely invested in any surviving below ground remains associated with the First World War munitions factory.

4.8 **Negative Evidence**

4.8.1 Three negative archaeological evaluations have taken place in within c500m of the study site (ELO4760, TQ 0940 7972; ELO13781, TQ 0930 7952; ELO561, TQ 09450 79500).

4.9 **Assessment of Significance**

4.9.1 There are no designated archaeological assets on or particularly close to the study site.

4.9.2 There are no non-designated archaeological assets recorded on the GLHER within the study site.

4.9.3 This study concludes that the potential for as yet to be discovered archaeological evidence is limited and is likely to comprise peripheral Prehistoric, Roman, and Medieval artefacts and features. This evidence is of local interest, although if present, is likely to have been significantly impacted by 20th century Brickearth extraction and development. If structural remains associated with the World War I munitions factory survive which could be considered of local to regional interest.

5.0 SITE CONDITIONS, THE PROPOSED DEVELOPMENT AND IMPACT ON HERITAGE ASSETS

5.1 Site Conditions

- 5.1.1 The site is currently occupied by multiple 20th century factory buildings and ancillary buildings associated with Nestle Works (Plates 6 & 7). Access roads, loading yards and car parks subdivide these buildings (Plates 8 & 9). Grassed areas line the former Nestle Avenue entrance (Plate 10).
- 5.1.2 From at least the Post-Medieval period onwards, the site is likely to have been arable agricultural land. Repeated ploughing is likely to have had a widespread damaging impact on any sub-surface horizons.
- 5.1.3 Brickearth extraction during the early 20th century within the boundary of the site is likely to have had a widespread destructive impact on any sub-surface horizons.
- 5.1.4 The construction of the first factory buildings in the 1914-20 period is likely to have had a localised destructive impact on any sub-surface horizons.
- 5.1.5 Subsequent clearance of the site and construction of the 20th century Nestle Works and facilities is likely to have had a severe widespread destructive impact on any sub-surface horizons within the footprint of the development. This impact on sub-surface horizons is demonstrated by the geotechnical survey results which have identified a substantial horizon of modern Made Ground across the site, which directly overlies natural deposits.

5.2 The Proposed Development

- 5.2.1 The site is being considered for mixed commercial and residential development.

5.3 Impact on Heritage Assets

- 5.3.1 The proposed development would not impact any designated archaeological assets.
- 5.3.2 The proposed development will not impact on any non-designated archaeological assets recorded on the GLHER.

- 5.3.3 It is considered that due to the limited archaeological potential identified within the study site and the likely widespread truncation of sub-surface horizons by 20th Brickearth extraction and development, it is concluded that the proposed development will not have a significant impact on any archaeological deposits.
- 5.3.4 Due to the anticipated levels of truncation the potential for as yet to be discovered archaeological assets is likely to be limited to structural remains associated with the early 20th century munitions factory, which may survive outside the footprint of the existing development, could be considered to be of local to regional importance.

6.0 SUMMARY AND CONCLUSIONS

- 6.1 The former nestle factory site, Nestles Avenue, Hayes, London has been assessed for its archaeological potential.
- 6.2 In accordance with government planning policy, (NPPF section 12 paragraph 128) a desk-based assessment has been undertaken to clarify the archaeological interest of the site.
- 6.3 There are no designated or non-designated archaeological assets on the site and none in the vicinity of the site; the development will therefore not have an impact on any designated or non-designated archaeological assets.
- 6.4 The potential for as yet to be discovered archaeological assets is limited due to an episode of Brickearth extraction in the early 1900s and subsequent development. This potential lies solely with structural remains associated with the early 20th century munitions factory which may survive outside the footprint of the existing development.
- 6.5 **On the basis of all the available information, it is suggested that the Council's heritage advisors are likely to require archaeological mitigation measures. A programme of targeted archaeological investigation to determine levels or archaeological survival outside the existing footprint of the development, would secure the archaeological interest of the site.**
- 6.6 The archaeological mitigation could be secured by an appropriately worded planning condition.

SOURCES CONSULTED

1. **General**

British Library
Greater London Historic Environment Record
Hounslow Local Studies Library

2. **Internet**

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3. **Cartographic**

1754 Rocque
1807 Ordnance Survey Drawing
1839 Hayes Enclosure Map
1864-5 Ordnance Survey
1895 Ordnance Survey
1914 Ordnance Survey

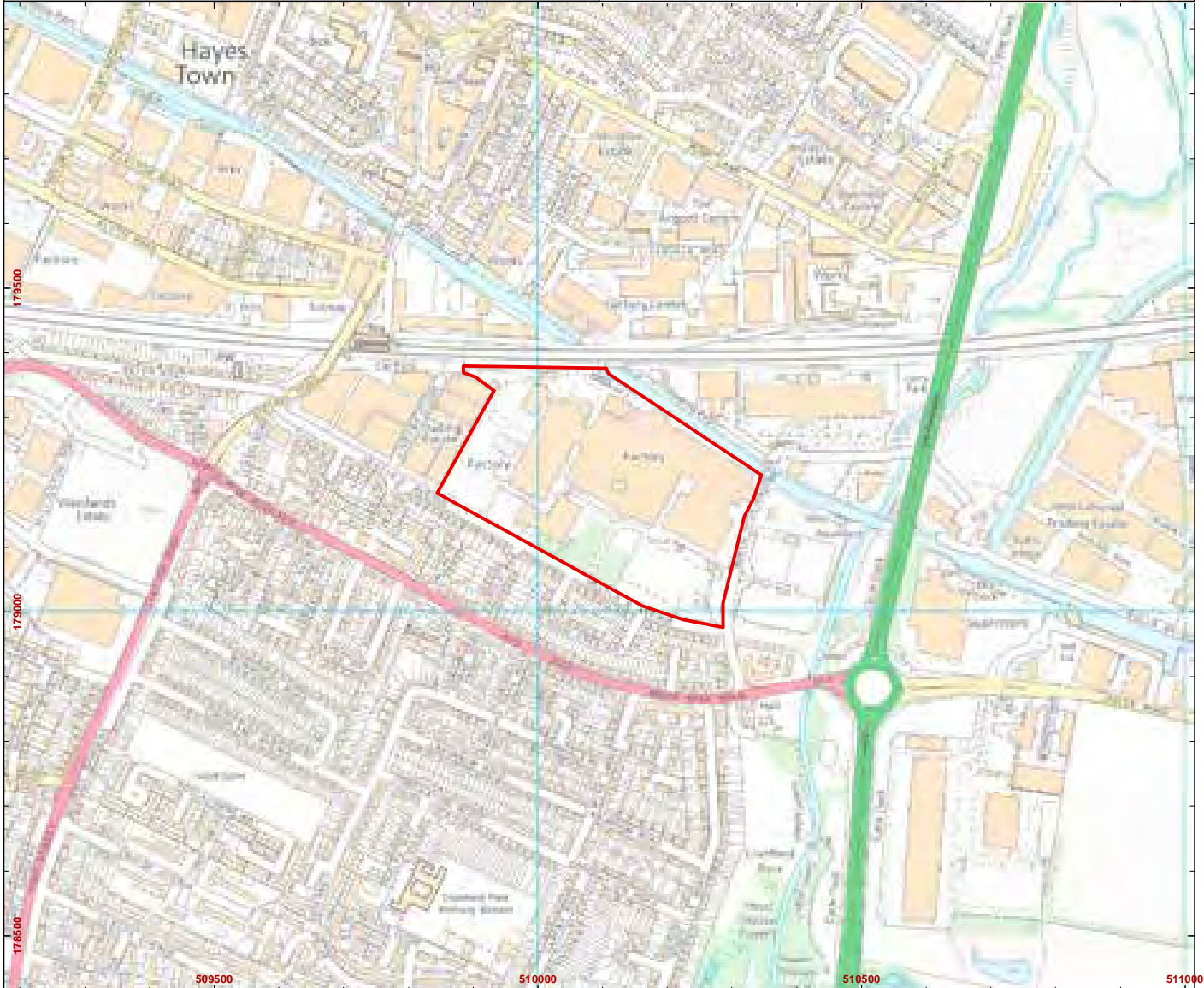
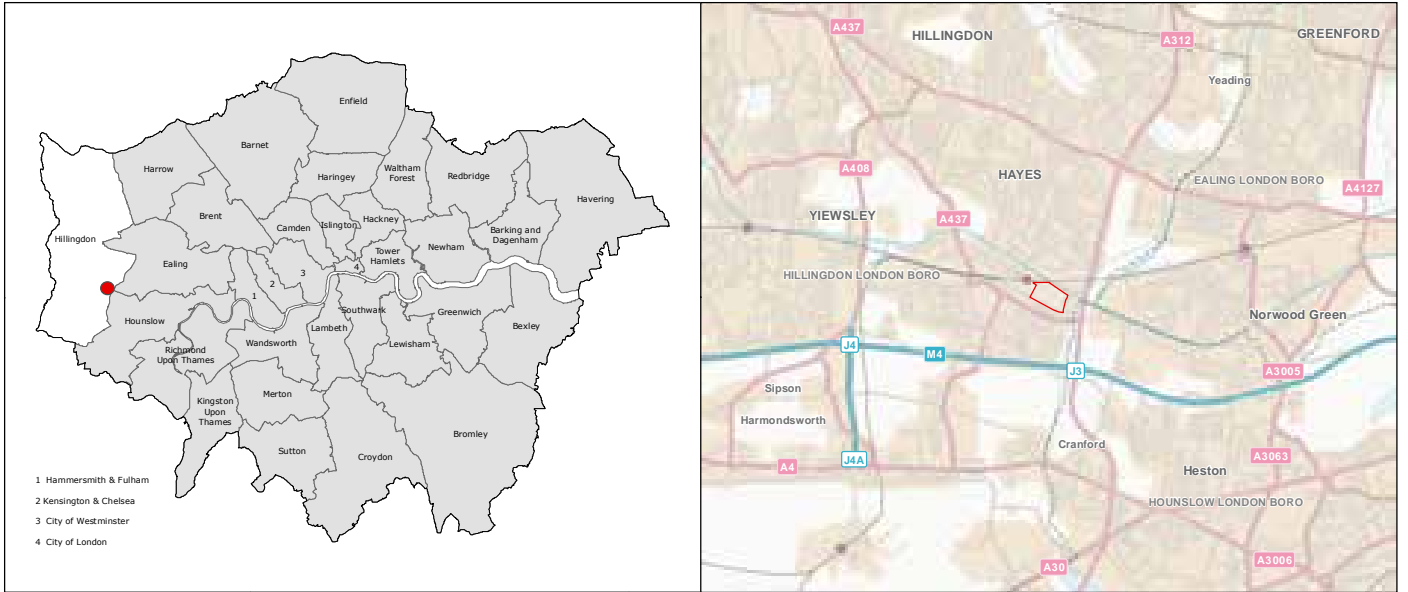
1919 Plan of Munitions Filling Factory No.7

1935 Ordnance Survey

1963-66 Ordnance Survey


1974-75 Ordnance Survey

2013 Google Earth View



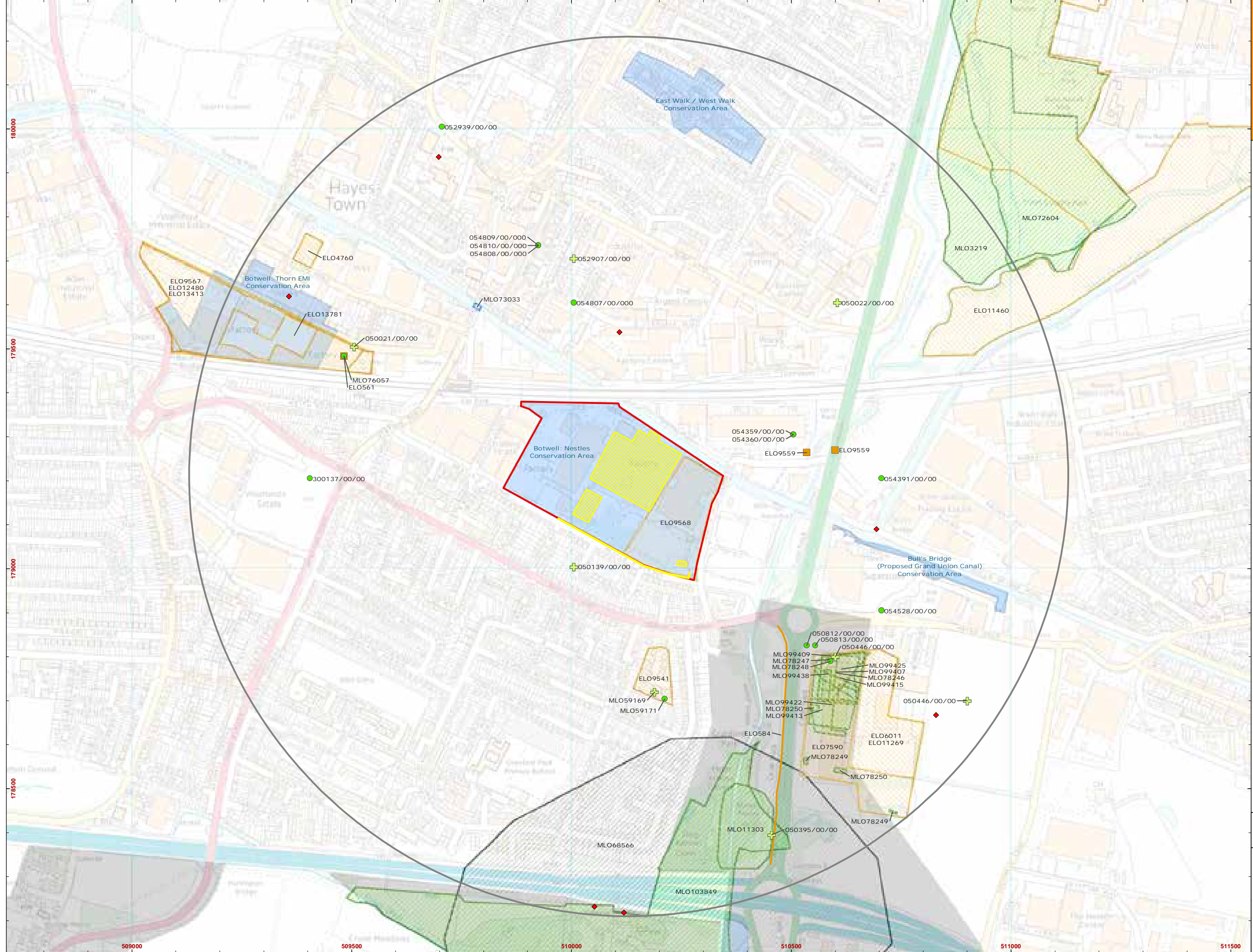
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0 250m

Figure 1:
Site Location


Cgms
CONSULTING
Planning • Heritage
www.cgms.co.uk

Site Boundary

N



- Site Boundary
- Search Area (1km radius)
- Designated Heritage Assets:**
 - ◆ Listed Building
 - Conservation Area
- Non-Designated Heritage Assets:**
 - Monument
 - + Findspot
 - Monument
 - Historic Building
 - Place
 - Locally Listed Building
 - Archaeological Priority Area
- Previous Archaeological Work:**
 - Event
 - Event
 - Event



Scale at A3: 1:8,000
0 250m

Figure 2:
Summary of cultural heritage designations (data from the GLHER)



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 Site Boundary




Not to Scale:
Illustrative Only

Figure 3:
1754 Rocque



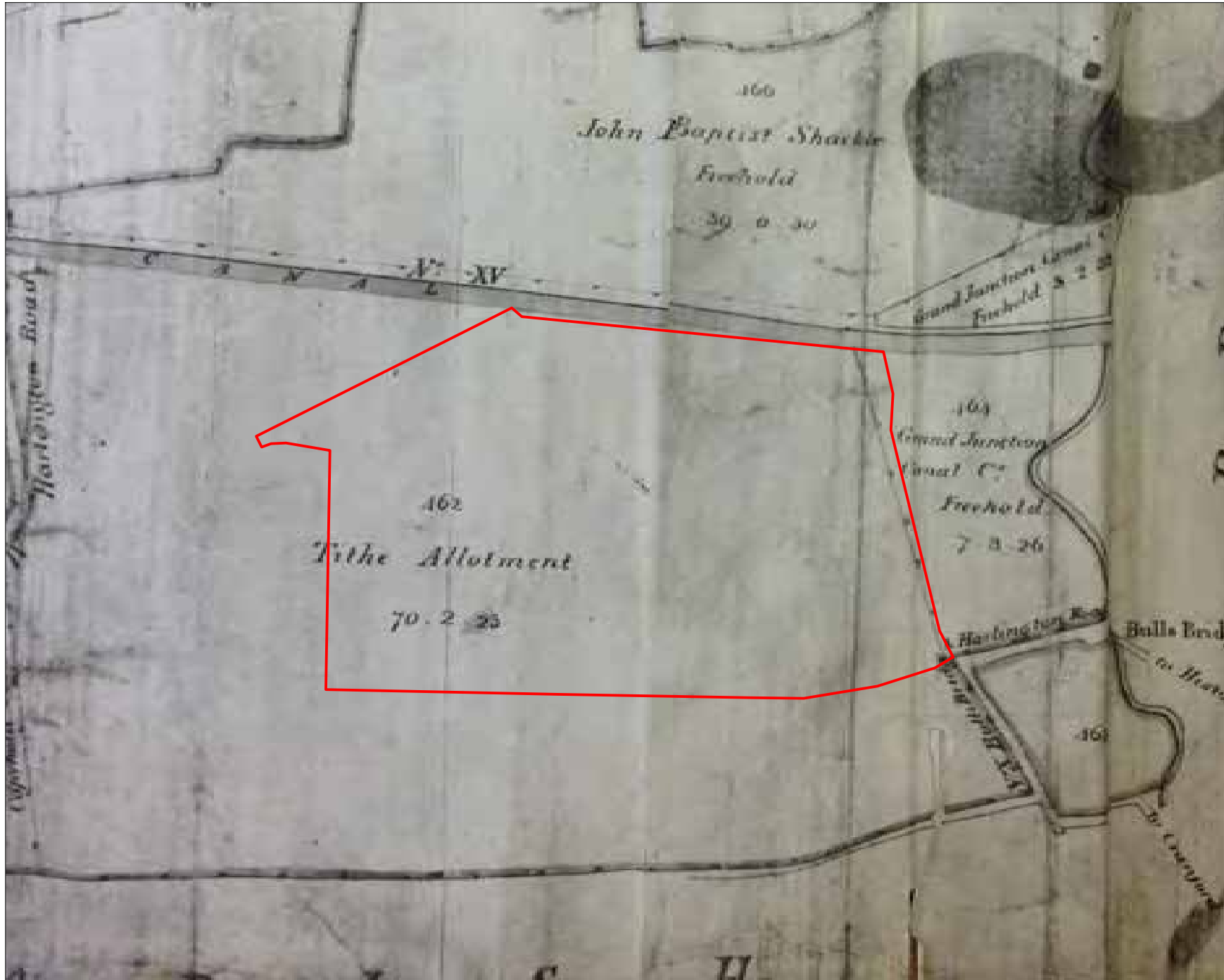
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 Site Boundary




Not to Scale:
Illustrative Only

Figure 4:
1871 Ordnance Survey
Drawing



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 Site Boundary



Not to Scale:
Illustrative Only

Figure 5:
1839 Hayes Enclosure
Map



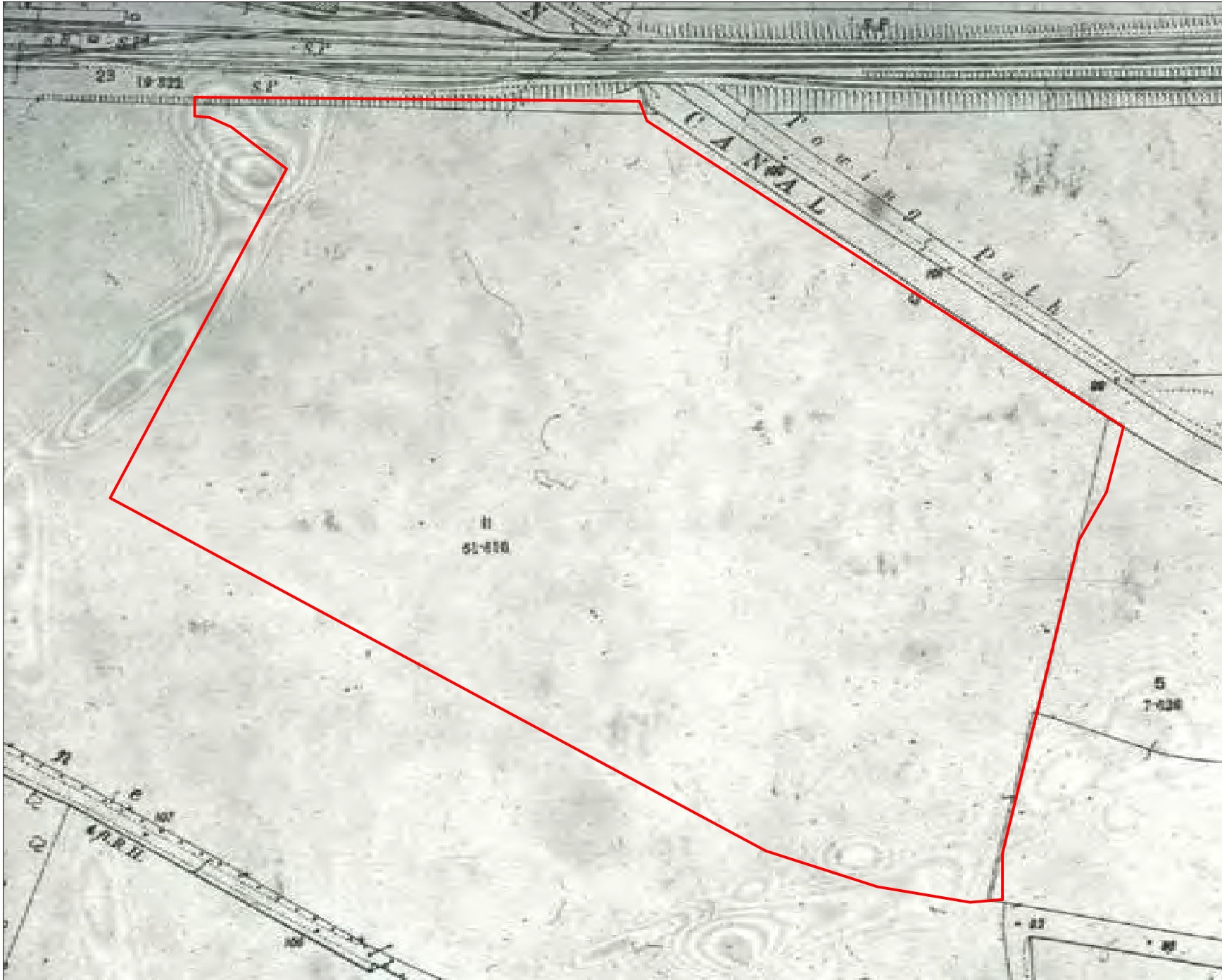
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 Site Boundary




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Illustrative Only

Figure 6:
1864-5 Ordnance Survey



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 Site Boundary




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Figure 7:
1895 Ordnance Survey



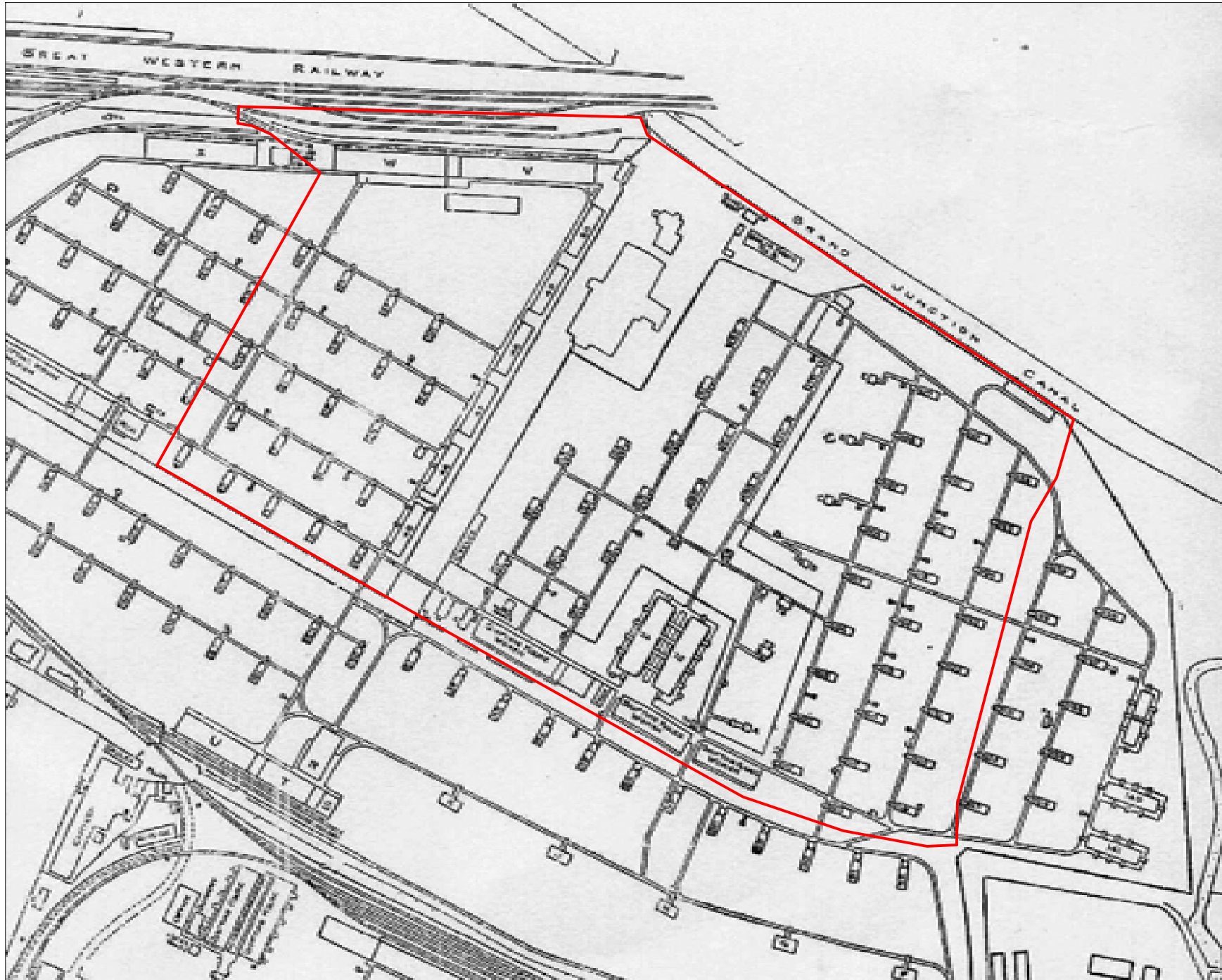
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 Site Boundary




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Figure 8:
1914 Ordnance Survey



Planning • Heritage
www.cgms.co.uk

 Site Boundary




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Illustrative Only

Figure 9:
1919 Plan of Munitions
Filling Factory No.7



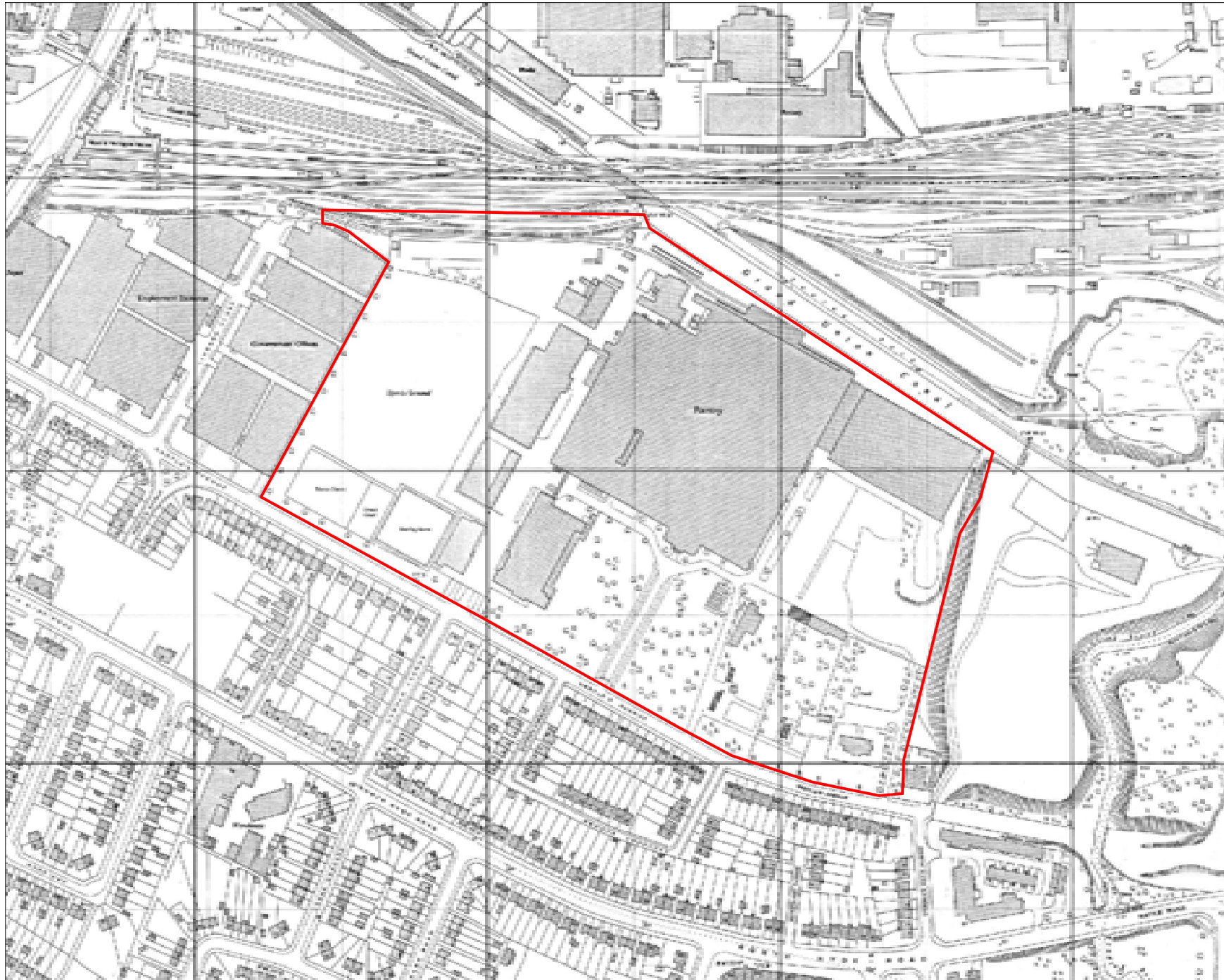
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 Site Boundary



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Figure 10:
1935 Ordnance Survey



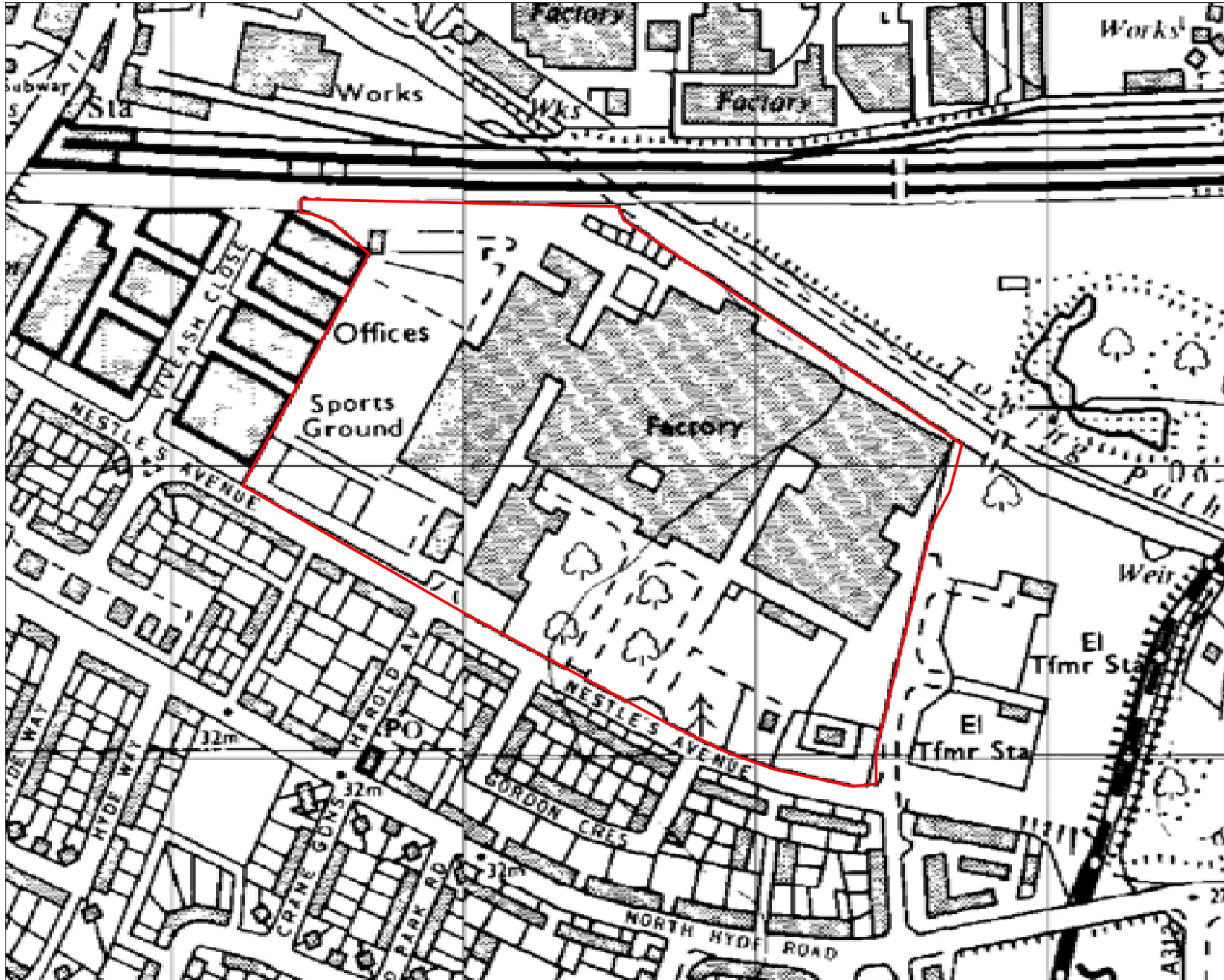
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www.cgms.co.uk

 Site Boundary




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Illustrative Only

Figure 11:
1963-66 Ordnance Survey



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 Site Boundary




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Illustrative Only

Figure 12:
1974-75 Ordnance Survey



Planning • Heritage
www.cgms.co.uk

 Site Boundary



Not to Scale:
Illustrative Only

Figure 13:
2013 Google Earth View

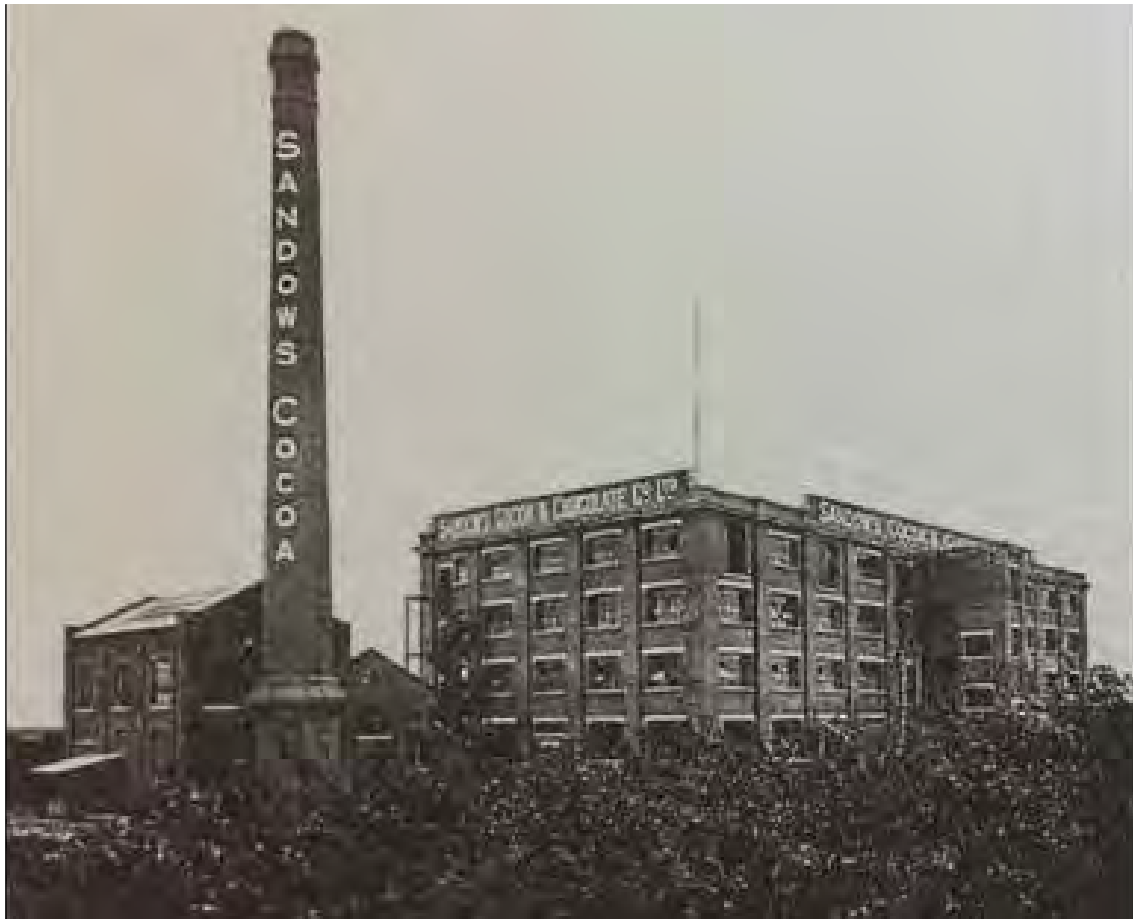


Plate 1: Sandow's Coco Factory c1914

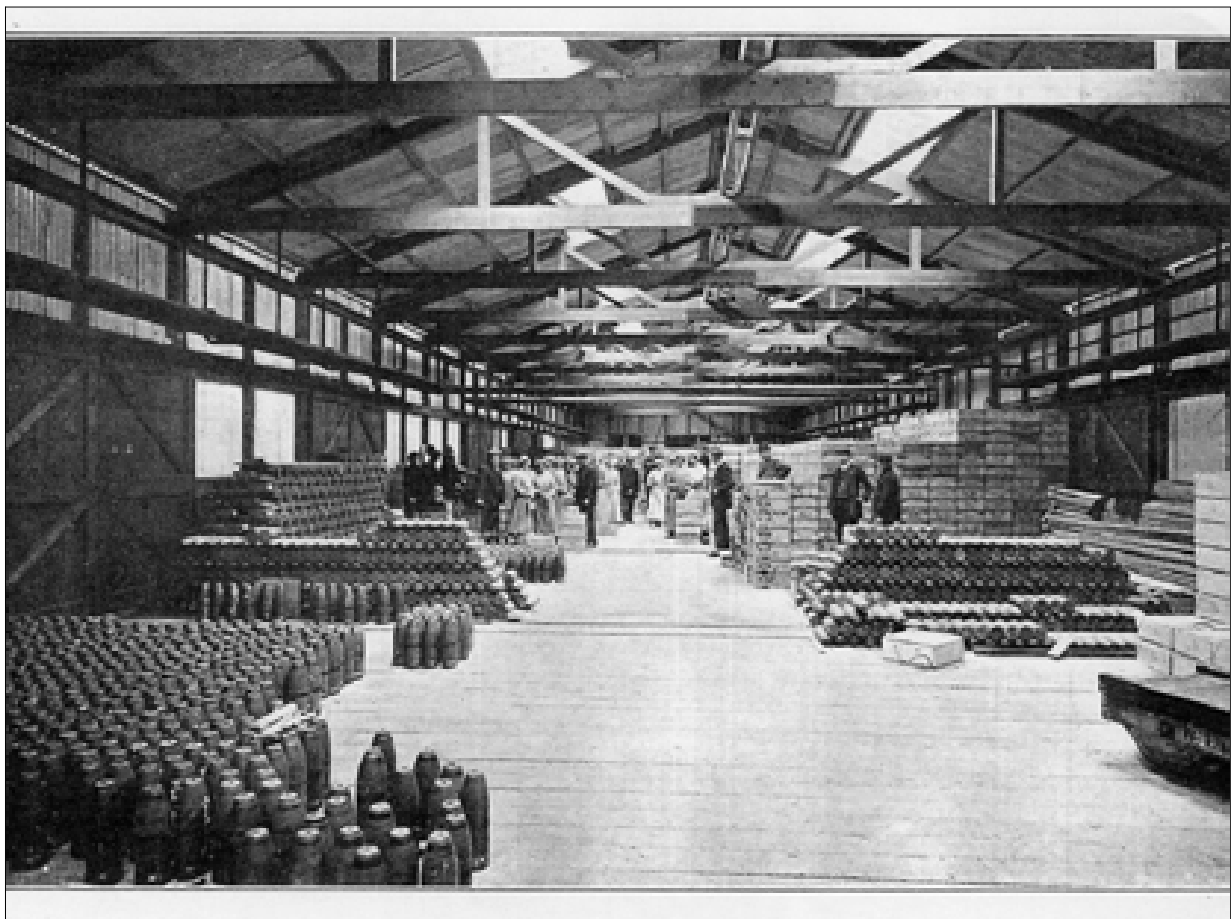


Plate 2: Empty shell store



Plate 3: View of walkway and immediate area



<http://www.britainfromabove.org.uk/image/EPW032897>

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Plate 4: Aerial view of Nestle Works 1930 looking east



Plate 5: Aerial view of Nestle Works 1932 looking west



Plate 6: General view of the factory buildings



Plate 7: General view of the factory buildings



Plate 8: General view of access roads/loading bays



Plate 9: General view of access roads/loading bays



Plate 10: General view of grounds adjacent to Nestle Avenue

Appendix A – Geotechnical Survey



engineers | scientists | innovators

Phase 2 Environmental Assessment of the Nestlé Site in Hayes, Middlesex (Final)

Prepared for

Nestlé UK Ltd

Prepared by

Geosyntec Consultants Ltd.
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Project Number GCU0124024



June 2014

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Project No: GCU0124024
Report Ref: GCU0124024 Phase 2 Final Report
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Document Production / Approval Record (final documents only)

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Prepared by	Nick Roe		June 2014	Project Manager
Reviewed & Approved by	Dr. Marcus Ford		June 2014	Project Director

EXECUTIVE SUMMARY

Geosyntec Consultants Ltd (Geosyntec) was retained by Nestlé UK Ltd (Nestlé), to conduct a Phase 2 assessment of potential soil and groundwater contamination sources at the Nestlé Facility on North Hyde Gardens in Hayes, Middlesex. These investigations aimed to understand the potential for and the scale of potential liabilities associated with ground contamination at the site.

The Phase 2 programme of intrusive investigations followed, and was based upon the findings of, a detailed Phase 1 audit of the site, which has been reported separately but summarized herein. The overall Phase 2 Environmental Assessment was split into two distinct tasks:

- Phase 2A – an assessment of broader groundwater quality within the sand and gravel and Chalk aquifers beneath the site (both classified as Principal Aquifers), in order to provide an understanding of whether a significant groundwater liability exists at the site derived from on-site or possibly off-site operations, and;
- Phase 2B – a targeted soil source zone investigation of potential contamination issues identified in the Phase 1 report, associated with hydrocarbons and mercury, and possible unknowns such as hazardous chemical or waste (including solvent) storage and use areas and Made Ground quality. This mainly targeted shallow soils (Made Ground and subsoils).

As indicated above the main purpose of this investigation programme was to define the apparent magnitude and extent of the soil and groundwater liability that may have to be managed under a site closure, sale and redevelopment scenario. However, consideration has also been given to a need for the Nestlé Hayes facility to hand back its IPPC permit, linked to the on-site boiler house operation (Combustion >50MW), which in 2007 replaced a previous IPC authorisation for the site. It is noted that a focused investigation, specifically linked to the presence of asbestos containing material beneath the main building, is being undertaken (and will be reported) separately.

Main Phase 2 Investigation Findings

The key findings of this Phase 2 Environmental Assessment of the Nestlé Hayes facility can be summarised as follows:

Site Geology & Hydrogeology

- The main shallow groundwater flow path beneath the site is predominantly within the highly permeable sand and gravel aquifer unit (River Thames Terrace Gravels), the top of which is typically found at a depth of around 1.5-2.5 metres below groundwater level (mbgl). This is classified as a Principal Aquifer which is vulnerable to pollution due to the close proximity of the ground surface;
- Groundwater flow within the sand and gravel aquifer is inferred to be broadly towards the southeast, with expected base flow into the River Crane, located ~150m to the east of the eastern site boundary (refer to Figure 1), but from around 200m or more down gradient of the site given the reported southeasterly groundwater flow direction (refer to Figure 5b);
- It is noted that the canal water level appears marginally lower than groundwater levels which indicates that there is a local hydraulic gradient to the north, close to the canal, and potential

groundwater flow locally in this direction. However canals, by design, are lined with low permeability material (such as clay) to prevent them leaking, and as such there can be expected to be only very limited groundwater flow in this direction;

- The sand and gravel aquifer is thin, typically comprising 1.5-3m of high permeability lithology. It is overlain in part by clayey gravel and/or gravelly clay. It is directly underlain by London Clay, which separates it from Chalk bedrock at depth. The thickness of the London Clay aquiclude is understood to be approximately 60m thick below the site (from the onsite abstraction well borehole log) and therefore should protect the Chalk aquifer from surface activities (i.e. the Chalk is not vulnerable to pollution);

Made Ground & Sub-Soil Contamination Results

- No volatile organic compounds, including chlorinated aliphatic hydrocarbons, were detected at significant levels (rarely detected at all);
- The area within and around the footprint of the former and existing boiler houses, extending to the north of these to the former heavy fuel oil (HFO) and diesel tanks, and along the strip of the site between the main building and the canal, commonly exhibited visual and/or olfactory indications of hydrocarbon contamination (refer to Figure 6). Whilst this area was subject to extensive soil excavation and corrective action around the time of the late 1990s when fuel oil entered the canal, it is clear that residual contamination remains. In this area there appears to be a relatively widespread up to ~0.5m thick band of residual fuel impacted soils starting at a depth of between about 0.5-1m;
- The distribution of hydrocarbon contaminated soils, as reported by the laboratory, follows a similar pattern (refer to Figure 7), although reported concentrations are not that high (only 8 locations reporting total petroleum hydrocarbons (TPH) above 50 mg/kg, with most in the 100s mg/kg range and comprising both aromatic and aliphatic components in most cases. One sample contained much higher TPH (about 17,500 mg/kg) and this was collected centrally from the footprint of the former boiler house. Because the hydrocarbons detected were typically long chain heavy-end fractions, no TPH result was above commercial end-use Generic Assessment Criteria (GAC). In the case of potential residential end use up to 3 locations had TPH Hazard Quotients >1. No PCBs were detected where samples were collected;
- Poly aromatic hydrocarbons (PAHs) are a component of fuel oils and can be a risk driver in shallow soils. Low levels of PAHs were quite widespread in shallow soils beneath the site (refer to Figure 8). Typically a range of individual PAH compounds were reported. 8 samples had >10 mg/kg total PAHs, including 3 samples in the 100s to low 1,000s mg/kg range. Some of these higher results were from soils in the southern half of the site. This included the peak concentration (2,001 mg/kg in WS28), which was in the southeast area and thought to be associated with the presence of industrial slag material as a component of the Made Ground locally, noting this sample did have a slight hydrocarbon odour and contain some TPH;
- In the case of PAHs the commercial GAC was only exceeded for 3 sample locations, 2 in the area of the boiler house and the third the peak concentration in the southeast area. In the case of potential residential end use, 8-9 sample locations failed respective GACs, and these locations were widely distributed (Figure 8);

- Trace metal and metalloid results for soil samples highlighted the presence of 4 main contaminants of potential concern in this respect, namely mercury; arsenic; chromium 6+ and lead (refer to Figure 9). Of these lead and chromium were only found to be relatively elevated very locally (2 marginal exceedences of commercial and/or residential GACs for lead and one residential GAC exceedence for chromium, all in the northern area of the site). In the case of arsenic there were no commercial GAC exceedences but 4 residential GAC exceedences, again all in the northern area of the site (including close to the hazardous chemical and waste storage compounds);
- In the case of mercury, this was by far the most widely reported of the trace metals, albeit at low to trace levels typically (refer to Figure 10). The mercury present was initially expected to be in the form of elemental mercury given the known source of mercury release in the past was due to small scale losses from mercury switches. However, speciated mercury soil analysis was carried out for which it was reported that the elemental mercury was not a dominant species within the total mercury composition. Comparing the speciated soil mercury results with GACs for mercury indicates that none of the elemental or inorganic mercury results are above the respective GAC's for residential with plant uptake or commercial end use;
- Locally asbestos containing material (ACM) was found in shallow soils samples (6 of 39 samples screened). Four (4) samples contained fibres (rather than bound ACM). These were reported at very low levels ($\leq 0.001\%$ by mass), in samples that did not visibly contain ACM. They mainly comprised the chrysotile form, the least hazardous type; although it is noted that exposure to all fibrous asbestos is to be avoided. All of these 4 samples were from the area close to the two boiler houses, where hydrocarbon related impacts have also been identified;
- Initial soil gas monitoring has not reported elevated landfill gas concentrations (methane; carbon dioxide). One exception to this was WS3, however this was confirmed to be associated with a gas pipe leak which we understand has been subsequently repaired.

Groundwater Contamination Results

- Deep (Chalk aquifer) groundwater has not been found to be contaminated;
- Shallow groundwater (specifically within the sand and gravel aquifer) has been found not to be impacted by petroleum hydrocarbons (TPH), even in the northern boundary area where soil hydrocarbons contamination is quite widespread. This reflects the immobile nature of long chain, heavy end hydrocarbon fractions present, which appear to be predominantly linked to HFO. Also no impacts on groundwater by volatile organic compounds (VOCs) has been found;
- Shallow groundwater is impacted by what may be considered trace levels of certain PAH compounds, plus the trace metals and metalloids, arsenic, nickel and mercury and limited hexavalent chromium (Cr^{6+}), some likely derived from leaching of Made Ground materials and the residual fuel contaminated zone. Mercury impacted groundwater was only observed in BH1, likely derived from historic losses of elemental mercury to ground (from historic losses from mercury switches);

- A Preliminary Controlled Waters Risk Assessment exercise, for the sand and gravel aquifer, identified certain PAHs, chromium 6+, mercury and nickel concentrations exceeding relevant Generic Assessment Criteria (GAC) for the protection of surface water and drinking water quality. Potential migration of contaminated groundwater off-site within the sand and gravel aquifer and its potential discharge to the River Crane was identified as the principal potential exposure pathway – receptor scenario;
- The 3 monitoring wells where reported PAH concentrations were most elevated (>1 µg/l) are all located in the northern area of the site where reasonably widespread soil contamination by hydrocarbon fuels has been identified (refer to Figure 6-8). These were BH1 (3-12 µg/l), BH2 (2-30 µg/l; much reduced in May 2014 sampling round) and BH9 (1.4 µg/l in February 2014 only). In more down gradient wells (BH3-6), closer to the down gradient eastern boundary reported, BH3 and BH5 reported no PAHs (< limit of detection (<LOD)), BH4 0.7 µg/l total PAHs and BH6 0.3 µg/l in December 2013 but <LOD in May 2014. Therefore, it appears that a reasonable level of attenuation is taking place in the shallow aquifer between the area of residual hydrocarbon contamination near the canal and the eastern boundary;
- The risk of significant PAH impact on the River Crane about 200+ metres down gradient of the boundary area wells is considered negligible, provided groundwater PAH concentrations remain at this level. Further, and particularly because the sand and gravel unit is a Principal Aquifer, the identified groundwater contamination must be stable to declining (must be no evidence of an expanding plume). Groundwater within the River Terrace sand and gravels, even though it is classified as a Principal aquifer, is not considered a plausible receptor in its own right, given the site urban/industrial setting, but rather a migration pathway to the local river. The Chalk aquifer at depth, has also been sampled twice during this investigation, via the site abstraction well and has not been found to be contaminated (this groundwater body is used locally for non-potable water supply locally and therefore is considered to be a receptor);
- Down gradient attenuation of dissolved phase mercury and nickel was apparent, with reported concentrations below laboratory method detection limits at or close to the down gradient site boundary (BH2 and BH5). Mercury and nickel contamination is inferred to have limited mobility in groundwater, under normal conditions, and unlikely to pose a risk to the wider aquifer or surface water receptors. However, with respect to mercury, there are a number of points of note here, as follows.

Mercury Specific Discussion

- The peak concentration of 41 µg/l mercury in BH1 is similar to aqueous solubility and therefore this suggests some free mercury has got into the shallow sand and gravel aquifer system in the past. Elemental mercury is very dense and if released into the subsurface would tend to migrate down through soil profiles until it reaches a low permeability horizon (in this situation the London Clay immediately beneath the sand and gravel aquifer);
- It was reported that elemental mercury was seen in soils during the CGCP enabling excavation, to the south of the existing boiler house, so it has been released at the site (in this area from to-be-expected small amounts of mercury in switches). Finding elevated groundwater concentrations in BH1 also suggests it has been released around the boiler house(s) building footprint (not just to the south). The site drainage plan shows localised in-

floor drains for “dirty water” that are directed east and west within the existing boiler house. The east directed drains connect to the outside drainage system that passes close to BH1. The deeper underground ducts that link from the former boiler house to the Undercroft area in the main building are positioned between the existing boiler house and the CGCP. Released elemental mercury globules could have infiltrated into drains or deep structures and migrated within them until they encountered a point of poor integrity whereby they could have migrated down into underlying Made Ground or sub-soils, under their specific gravity;

- *Excavation associated with the CGCP development appeared to have gone to a depth of between 1.5-2m (WS31 reported 1.8m concrete infill), and the borehole logs for BH1 and BH8 highlight the depth to the top of the main sand and gravel aquifer is 2.4-2.5m. Whilst this excavation would not explain the presence of elevated mercury in BH1 groundwater on the northeast side of the boiler house, it might have allowed elemental mercury to migration to the base of the excavation (which if free to do so would do so rapidly) and inadvertently introduced mercury into the sand/gravel aquifer. Any small globules of elemental mercury in the shallow aquifer would be expected to reside at its base, with little potential for lateral movement once in a low spot;*
- *BH1 is located in a relatively up-gradient location of the site near the boiler house and canal. Groundwater sampled from 4 monitoring wells, which together are expected to represent groundwater that is down gradient of the Boiler House (BH1) area, namely BH2-BH5, did not detect mercury (refer to Figure 11). Consequently there does not appear to be a shallow plume of mercury contaminated groundwater migrating down gradient to the southeast in the sand/gravel aquifer;*
- *At the pH and ORP (redox) of BH1 groundwater the stable species of mercury is expected to remain as elemental mercury. However an important point to note, linked to possible mercury mobility in groundwater, is that elevated (alkaline) pH can greatly promote mercury migration. Analysis on samples taken during the period of December 2013 – May 2014, indicates that shallow groundwater in some site wells has become alkaline (pH8.5-9.7), specifically BH1-2, BH8 and WS22. In BH1, groundwater mercury concentration increased from 3 µg/l (at pH7.07) in December 2013 to 41 µg/l (at pH8.92) in February 2014. A similar trend is also observed within down-gradient well WS22 where between February and May 2014 pH has increased from 9.59-9.87 with a comparable mercury rise from 0.21 µg/l to 1.24 µg/l. It might be reasonable to assume that the increased pH, which may be due to some loss of sodium hydroxide used locally, and that this may be leaching more mercury from unsaturated shallow soils and within the aquifer. As such the ongoing monitoring of groundwater quality in the principal area of concern, close to and down gradient of the boiler house, is recommended during 2014 (along with internal audit of caustic storage and use to check that significant losses are not occurring);*
- *Even with an absence of a groundwater migration pathway for dissolved mercury due to hydro-chemical controls (if substantiated), if some elemental mercury remains in Made Ground, beneath and around the boiler house in particular, this represents a future risk to groundwater, if this area was redeveloped. This is simply because any open excavation and indeed structures (like foundation piles) run the risk of introducing mercury to greater depth and potentially into the sand and gravel aquifer. As a List 1 substance this is simply not*

allowed. It is noted that the pragmatic regulatory view might be expected to be that mercury, which has already locally migrated to depth in the past, and which is not causing deterioration of groundwater quality, would be acceptable to leave in-situ. List 1 substances must be prevented from entering groundwater and a developer of the site would have to adhere to this requirement, if the mercury contamination remained (something that would need preparatory work and planning, including contingency plans).

LIMITATION

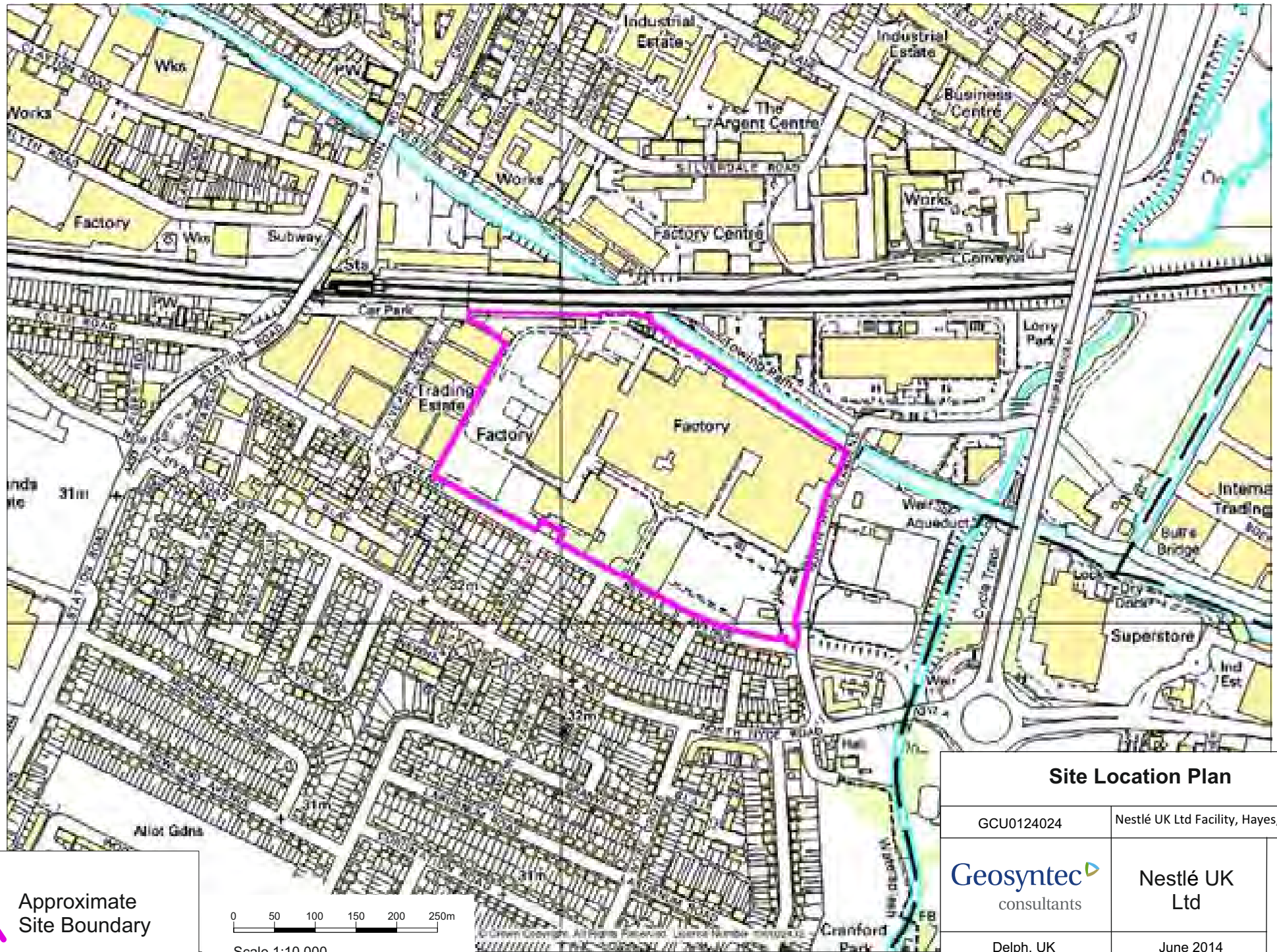
Geosyntec Consultants Ltd (Geosyntec) has prepared this report for the sole use of Alps Group Ltd and Nestlé UK Ltd in accordance with the Agreement under which our services were performed. No other warranty, express or implied, is made as to the professional advice included in this report or any other services provided by us. This report may not be relied upon by any other party without the prior and express written agreement of Geosyntec, which will not be unreasonably withheld.


Unless otherwise stated in this report, the assessments made assume that the site and facilities will continue to be used for their current purpose without significant change. The conclusions and recommendations contained in this report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested. Information obtained from third parties has not been independently verified by Geosyntec, unless otherwise stated in the report.

Where assessments of works or costs required to reduce or mitigate any environmental liability identified in this report are made, such assessments are based upon the information available at the time and may be subject to further investigations or information which may become available. It is therefore possible that cost estimates, where provided, may vary outside stated ranges. Where assessments of works or costs necessary to achieve compliance have been made these are based upon measures which, in Geosyntec's experience could normally be negotiated with the relevant authorities under present legislation and enforcement practice, assuming a pro-active and reasonable approach by site management.

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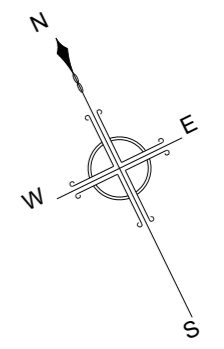
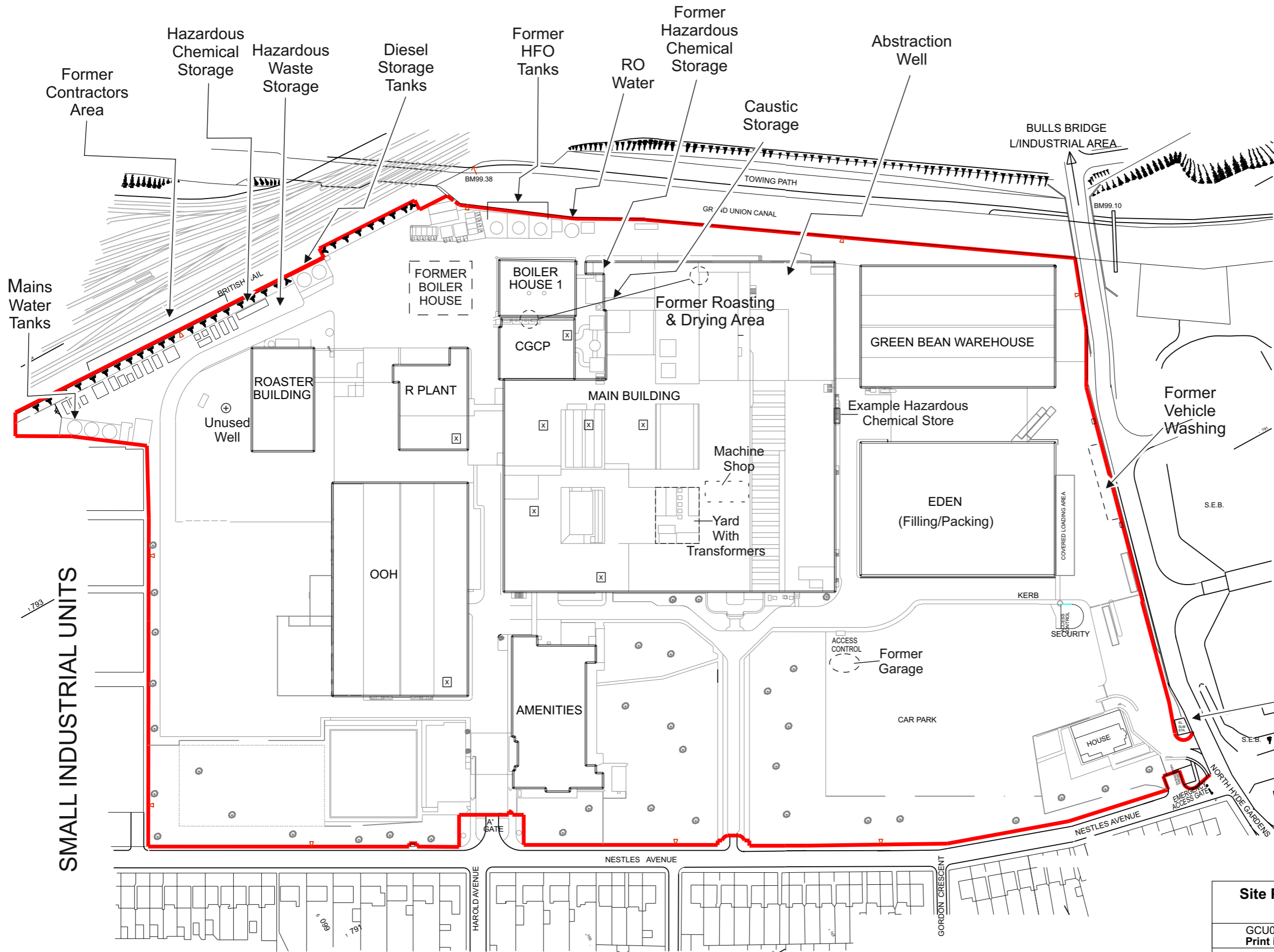



 Approximate Site Boundary

0 50 100 150 200 250m
 Scale 1:10,000

Site Location Plan

GCU0124024	Nestlé UK Ltd Facility, Hayes, Middlesex	
	Nestlé UK Ltd	Figure 1
Delph, UK	June 2014	

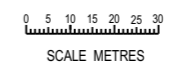


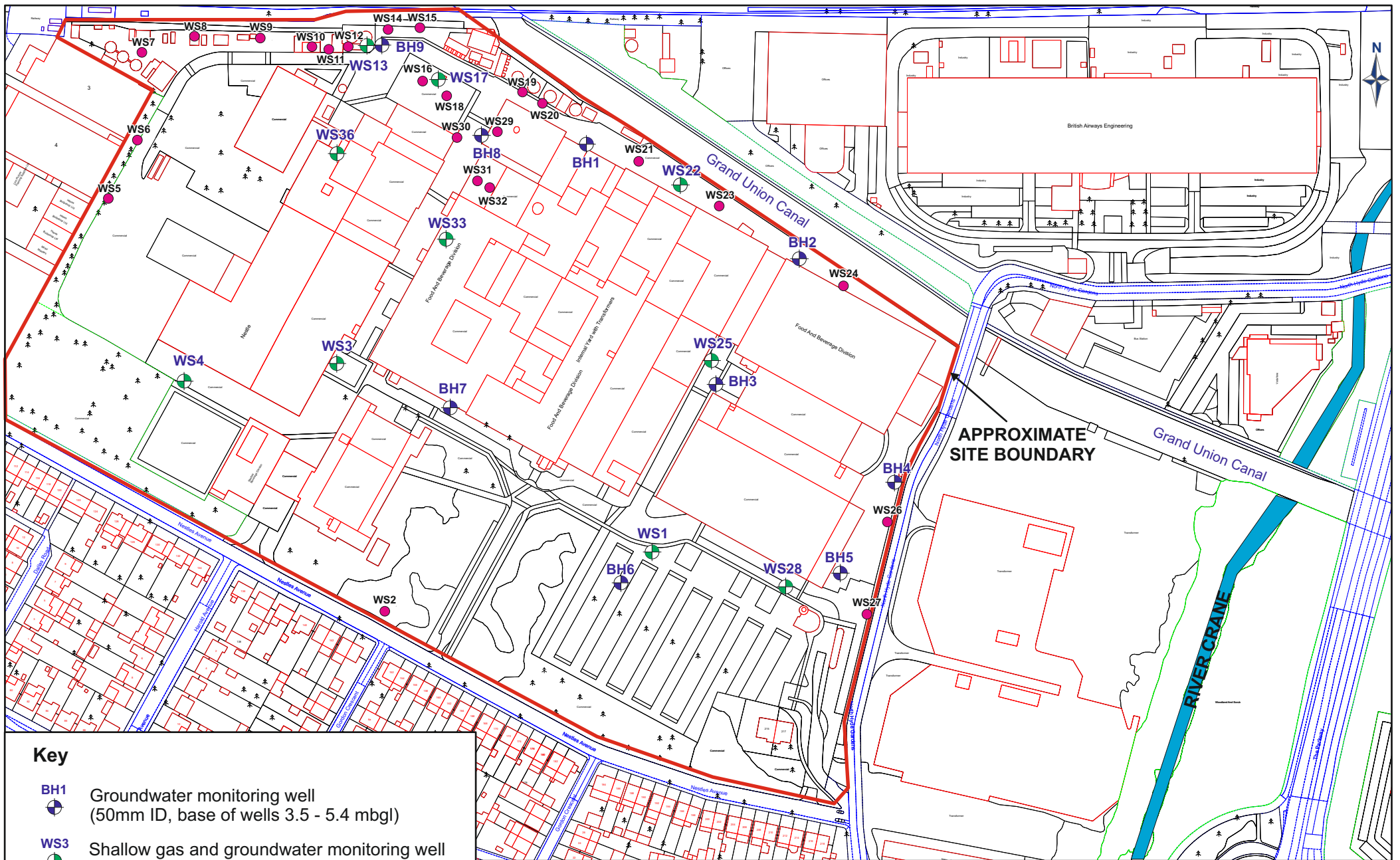
— Approximate Site Boundary

⊠ Engineering or Maintenance Area (Approx. Location)

ELECTRICAL STATION & PREMISES

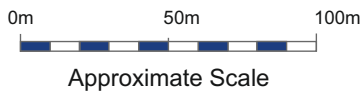
Site Plan Showing Key Buildings and Features		
GCU0124024 Print in colour	Nestlé UK Ltd, Hayes, Middlesex	
 Geosyntec consultants	Nestlé UK Ltd	Figure 2
	Delph, UK	June 2014





Key

- **BH1** Groundwater monitoring well
(50mm ID, base of wells 3.5 - 5.4 mbgl)
- **WS3** Shallow gas and groundwater monitoring well
(25mm ID, base of wells ≤ 2.0 mbgl)
- **WS2** Shallow soil sampling location (≤ 2.0 mbgl)



Geosyntec
consultants

Nestlé UK
Ltd

Figure
3


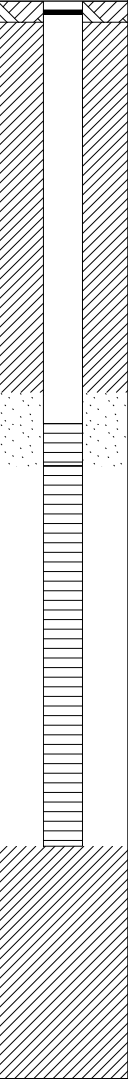


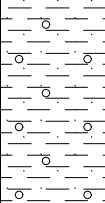
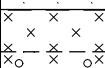
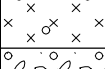

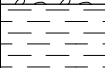



**Site Plan Showing all Phase 2
Investigation Locations**

Delph, UK

June 2014

Nestlé UK Ltd, Hayes

GCU0124024
Print in colour

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 29/11/2013 Logged By: NR Driller: Geotron UK Ltd.		Borehole Elevation: 30.47 maOD Borehole Diameter: 200mm Installation Diameter: 50mm ID Slot Size: 1-2mm Method: HSA / WS		Borehole Reference: <h1 style="text-align: center;">BH1</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.60		MADE GROUND: Old concrete. Friable, cannot use core barrel. Breaker used to remove layer.					
0.80		Soft grey/black sandy gravelly CLAY. Possibly reworked in upper section.	Black staining with oil type hydrocarbon odour, 0.8 - 1.0m.		1.7 ppm		
1.90		Soft grey/brown SILT. Grading to black peat in places with some fibrous rootlets/ plant material.	Moist.		6.8 ppm		
2.10		Soft grey/brown gravelly SILT. Gravel is medium to coarse of flint.	Moist.		9.1 ppm		
2.40		Grey gravelly coarse SAND. Gravel is fine of flint.	Wet.		7.7 ppm		
		From 2.5m - grading to sandy GRAVEL of fine to coarse, angular to sub rounded flint.			4.1 ppm		
		Poor recovery from 2.8 - 4.0m. Inferred gravelly SAND.			2.0 ppm		
					9.0 ppm		
4		Firm to stiff brown CLAY Becoming grey from 4.5m. End of boring: 5.1 mbgl.	Dry.				
5.10							
6							

Notes: Hand dug to 1.2 mbgl. Sand and gravel collapse on extraction of augers, 4.0 - 2.2 mbgl. Geosock fitted.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 02/12/2013
 Logged By: NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 30.50 maOD
 Borehole Diameter: 200mm
 Installation Diameter: 50mm ID
 Slot Size: 1-2mm
 Method: HSA / WS

Borehole Reference:

BH2

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.60		MADE GROUND: Old concrete. Friable, cannot use core barrel. Breaker used to remove layer.				
0.80		Brown clayey GRAVEL of medium to coarse flint. Possibly reworked in upper section.	Wet.			
1.30		Soft gravelly SILT. Grading to black peat in places with some fibrous rootlets/plant material. 1 large cobble of flint.	Moist to wet.		1.8 ppm	
1.50		No recovery. Inferred SAND & GRAVEL.	Wet.		3.4 ppm	
2.00		No recovery. Inferred SAND & GRAVEL.			5.4 ppm	
2.40		Brown SAND & GRAVEL. Sand is coarse. Gravel is fine to medium, occasionally coarse of angular to sub rounded flint.	Wet.		3.6 ppm	
3.00		Some clean gravel horizons. ~10 - 20 cm thick.	Wet.		5.4 ppm	
3.70		Brown gravelly coarse SAND. Gravel is fine to medium, occasionally coarse of angular to sub rounded flint.	Wet.		5.5 ppm	
4.00		Stiff brown CLAY.	Dry.			
4.80		End of boring: 4.8 mbgl.				

Notes: Hand dug to 1.2 mbgl. Sand and gravel collapse on extraction of augers, 4.0 - 2.0 mbgl. Geosock fitted.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 28/11/2013
 Logged By: NR
 Driller: Geotron UK Ltd.


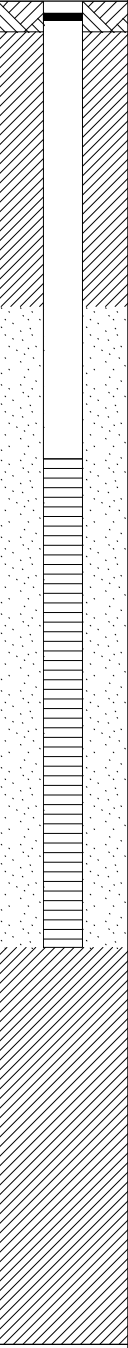
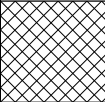
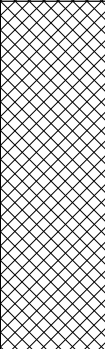
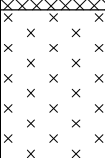



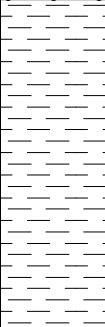

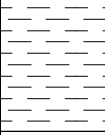

Borehole Elevation: 30.06 maOD
 Borehole Diameter: 200mm
 Installation Diameter: 50mm ID
 Slot Size: 1-2mm
 Method: HSA / WS

Borehole Reference:
BH3

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.35		Soft brown slightly gravelly CLAY with occasional rootlets. Gravel is fine rarely medium to coarse of flint. Possibly reworked in upper sections.			4.1 ppm	
1.30		Dark grey clayey GRAVEL. Gravel is medium to coarse, angular to sub rounded of flint.	Wet.		3.8 ppm	
1.50		Gravelly coarse SAND becoming sandy GRAVEL from 1.6m. Gravel is medium to coarse, angular to sub rounded of flint.	Wet.		2.8 ppm	
2		Band of coarse brown SAND from 2.6 - 2.8m.			5.0 ppm	
3.40		Stiff brown CLAY.			5.2 ppm	
3.90		End of boring: 3.9 mbgl.	Dry.		5.9 ppm	
4					4.2 ppm	
6						

Notes: Hand dug to 1.2 mbgl. Geosock fitted.

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 17/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.		Borehole Elevation: 29.47 maOD Borehole Diameter: 200mm Installation Diameter: 50mm ID Slot Size: 1-2mm Method: HSA / WS		Borehole Reference: <h1 style="text-align: center;">BH4</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.33		MADE GROUND: slightly clayey sandy gravel of fine to coarse brick and stone of mixed lithologies. With occasional pieces of asphalt and slag type material. At 0.8m: Partial obstruction of hole - sloping concrete surface. Hole off-set and re-cored. Cobbles of / broken concrete below obstruction.					
1.50		Black/ dark grey SILT with occasional rootlets.	Wet				
2.00		Grading to clayey slightly sandy GRAVEL of medium to coarse flint.	Wet		0.5ppm		
2.90		Stiff brown/grey CLAY. From 3.0 - 3.1m: Coarse SAND. END: 4.4m: Into London Clay.	Dry		0.5ppm		
4.00					0.3ppm		
4.40							
Notes: Hand dug to 1.2 mbgl. Window sample to depth. GW monitoring well installed.							



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 28/11/2013
 Logged By: NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 29.58 maOD
 Borehole Diameter:
 Installation Diameter:
 Slot Size:
 Method:



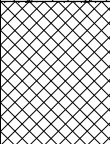
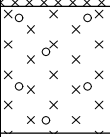
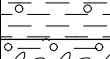
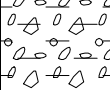
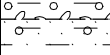
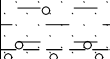



Borehole Reference:

BH4a

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with 20mm steel reinforcement bar.				
0.40		MADE GROUND: Coarse beige gravel. (sub-base).	Dry.		1.3 ppm	
0.50		MADE GROUND: Brown medium sand. (sub-base).	Dry.		1.7 ppm	
0.60		MADE GROUND: Dark brown/grey slightly clayey sandy gravel. Gravel is fine to medium occasionally coarse of brick and flint, with rare fragments of wood. Possibly with some ash.	Dry.			
0.90		MADE GROUND: 1 very large cobble/boulder encountered at 0.9 m. Flat surface, possibly large brick or paving slab.	Dry.			
1.00		Obstruction and refusal at 0.9 - 1.0 mbgl.	Dry.			
2						
4						
6						

Notes: Hand dug to 0.9mbgl. Refusal on large brick/paving slab obstruction. Backfilled with bentonite, cement at surface.

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 29/11/2013 Logged By: NR Driller: Geotron UK Ltd.	Borehole Elevation: 29.20 maOD Borehole Diameter: 200mm Installation Diameter: 50mm ID Slot Size: 1-2mm Method: HSA / WS	Borehole Reference: <h2 style="text-align: center;">BH5</h2>		
		Coordinates: ,				
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.30		MADE GROUND: Brown/black slightly silty, gravelly coarse sand. Gravel is of flint with some slag. occasional small cobble sized pieces of red brick and slag.	Dry.		3.2 ppm	
1.00		Soft black/grey slightly gravelly SILT with some rootlets and fragments of wood. Slightly peaty in places. Gravel is fine to coarse of flint.	Moist.		1.2 ppm	
1.60		Soft grey slightly gravelly CLAY. Gravel is fine to coarse of flint.	Dry.		3.8 ppm	
1.80		Quickly grading to clayey GRAVEL of fine to coarse, angular to sub rounded flint.	Dry.		5.0 ppm	
2.40		Becoming sandy clayey GRAVEL towards 2.4m.	Moist.		6.2 ppm	
2.80		Grading to brown slightly clayey gravelly medium to coarse SAND.				
		Brown sandy GRAVEL of fine to coarse angular to sub rounded flint.	Wet.			
		Band of coarse SAND from 3.4 - 3.6m.			5.9 ppm	
4.00		Firm brown CLAY.	Dry.		8.2 ppm	
4.20		End of boring: 4.2 mbgl.			8.4 ppm	

Notes: Hand dug to 1.2 mbgl. Sand and gravel collapse on extraction of augers, 4.2 - 3.3 mbgl. Geosock fitted.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 26/11/2013
 Logged By: NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 30.06 maOD
 Borehole Diameter: 200mm
 Installation Diameter: 50mm ID
 Slot Size: 1-2mm
 Method: HSA / WS

Borehole Reference:

BH6

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Asphalt.			
0.10		MADE GROUND: Coarse gravel. (sub base).	Moist from 0.9m.		
0.15		MADE GROUND: Brown sandy Gravel. Gravel is fine to coarse, angular sub angular of brick, concrete and stone (suspected demolition rubble).			1.9 ppm
1.05		Becoming clayey from 0.7 m. Possible reworked natural deposits from this depth.	Moist from 1.05m.		0.0 ppm
		Brown sandy GRAVEL. Sand is coarse. Gravel is fine to coarse, angular to sub rounded of flint.	Wet from ~1.8m.		0.2 ppm
		Band of gravelly coarse SAND from 1.2 - ~1.8 m.			0.2 ppm
2					0.2 ppm
4		Firm dark brown CLAY.	Dry.		0.9 ppm
4.00		Becoming grey dark grey from 4.4m.			3.9 ppm
		End of boring: 5.2 mbgl.			2.7 ppm
5.20					3.5 ppm
6					

Notes: Hand dug to 1.2 mbgl. No Geosock fitted.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 26/11/2013
 Logged By: NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 31.06 maOD
 Borehole Diameter: 200mm
 Installation Diameter: 50mm ID
 Slot Size: 1-2mm
 Method: HSA / WS

Borehole Reference:

BH7

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Concrete with steel reinforcement bar.			
0.15		MADE GROUND: Brown sandy gravel of flint. Possibly reworked. Becoming clayey sandy gravel from 0.9m.			
1.00		Soft brown gravelly clay. Possibly reworked	Moist from 1.3m.		
1.40		Becoming slightly gravelly from 1.3m.			2.9 ppm
1.90		Brown slightly clayey slightly sandy GRAVEL. Gravel is coarse, angular to sub rounded of flint.	Faint black staining from 1.5 - 1.9m. Wet from 1.8m.		5.5 ppm
2		Becoming grey, slightly clayey medium to coarse GRAVEL of flint from 1.8m.	Wet.		6.7 ppm
		Brown sandy gravel of medium to coarse, angular to sub rounded flint.			6.6 ppm
		Band of coarse SAND from 3.65 - 3.85m.			6.2 ppm
					7.8 ppm
					8.1 ppm
4					7.9 ppm
					8.4 ppm
					5.8 ppm
6		Stiff brown CLAY.	Dry.		7.9 ppm
6.35		End of boring: 6.35 mbgl.			5.0 ppm

Notes: Hand dug to 1.2 mbgl. Sand and gravel collapse on extraction of augers, 6.0 - 5.4 mbgl. Well pipe placed and further collapse from 5.4 - 4.5 mbgl. No Geosock fitted.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 27/11/2013
 Logged By: NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 31.06 maOD
 Borehole Diameter: 200mm
 Installation Diameter: 50mm ID
 Slot Size: 1-2mm
 Method: HSA / WS

Borehole Reference:

BH8

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Concrete with steel reinforcement bar.			
0.50		MADE GROUND: Full and half bricks.			
0.60		Brown clayey GRAVEL of medium to coarse sub angular flint. Possibly reworked in upper section.	Moist. Faint black staining from 1.5 - 2.0m (possibly natural dark grey colouration).		
2		Brown sandy GRAVEL of fine to coarse angular to sub rounded flint.	Wet.		
2.50					4.7 ppm
					6.0 ppm
					2.5 ppm
					7.9 ppm
					7.4 ppm
					7.7 ppm
					7.0 ppm
					5.7 ppm
4					
4.60		Firm brown CLAY.	Dry.		8.2 ppm
		Becoming grey from 5.0m.			6.3 ppm
		End of boring: 5.4 mbgl.			
5.40					
6					

Notes: Hand dug to 1.2 mbgl. No Geosock fitted.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 27/11/2013
 Logged By: NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 31.15 maOD
 Borehole Diameter: 200mm
 Installation Diameter: 50mm ID
 Slot Size: 1-2mm
 Method: HSA / WS


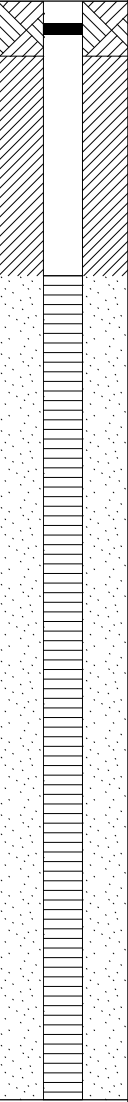
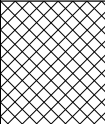
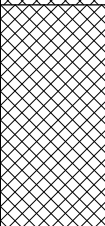
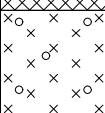
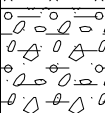
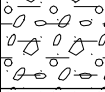




Borehole Reference:

BH9

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Concrete with steel reinforcement bar.			
0.20		MADE GROUND: Dark grey/black silty gravel of brick, slag and clinker. Becoming clayey gravel from ~0.8m. With some large cobble sized pieces of slag and 1 boulder of slag at 1.2m.	Dry to 0.8mbgl. Standing water in base of pit after 14 hours with iridescent hydrocarbon sheen and odour. Not observed below 1.45 mbgl.		5.5 ppm
1.50		Brown sandy GRAVEL of fine to coarse angular to sub rounded flint. Sand is coarse.	Moist.		+50 ppm / 7.8 ppm
1.80		No recovery. Inferred SAND & GRAVEL.	Wet.		7.7 ppm
2.50		Brown sandy GRAVEL of fine to coarse angular to sub rounded flint. Sand is coarse.	Wet.		5.9 ppm
3.80		Poor recovery. Inferred gravelly coarse SAND.	Wet.		5.8 ppm
5.20		Firm to stiff brown CLAY.	Dry.		7.7 ppm
5.30		End of boring: 5.3 mbgl.			

Notes: Hand dug to 1.2 mbgl. Geosock fitted.

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 20/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.		Borehole Elevation: 30.16 maOD Borehole Diameter: 120mm Installation Diameter: 25mm ID Slot Size: 1-2mm Method: Window sample		Borehole Reference: <h1 style="text-align: center;">WS1</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.23		MADE GROUND: Grey/brown slightly clayey sandy coarse gravel of brick and concrete.			10.0 ppm		
0.65		Black slightly sandy slightly gravelly SILT. Gravel is fine to medium of flint.			9.5 ppm		
0.85		Becoming gravelly SILT from 0.7m.			9.3 ppm		
		Black/brown slightly clayey slightly sandy GRAVEL of sub-rounded to angular, fine to coarse flint.			9.3 ppm		
		Becoming clayey from 1.1m			15.1 ppm		
1.20		Brown sandy GRAVEL of angular to subangular, fine to coarse flint.	Wet, NDO.		43 ppm		
		END: 2.0m - Refusal on coarse flint.			53 ppm		
					57 ppm		
2	2.00						
Notes: Hand dug to 1.2 mbgl. Gas well installed.							



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 19/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample


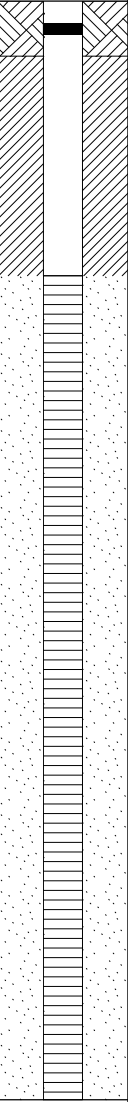
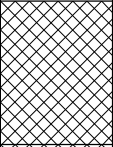
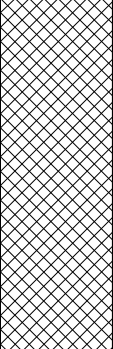



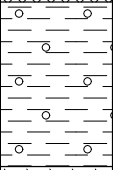


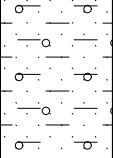



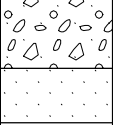


Borehole Reference:

WS2

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Grass over soft brown clayey sand with rootlets. (TOPSOIL).			
0.45		MADE GROUND: Soft brown slightly sandy clay with occasional fine - coarse gravel of mixed lithologies. Large brick pieces (up to half brick) from 0.9m.			0.2ppm
1.05		MADE GROUND: Brown clayey gravel of sub-angular to sub-rounded fine to coarse brick and stone of mixed lithologies.			0.2ppm
1.20		Brown/beige sandy GRAVEL of angular to subangular fine to medium, occasionally coarse flint. END 1.6m: Refusal on flint gravel.	Dry, NDO.		50ppm
1.60					24.4ppm
2					

Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 19/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.		Borehole Elevation: 31.20 maOD Borehole Diameter: 120mm Installation Diameter: 25mm ID Slot Size: 1-2mm Method: Window sample		Borehole Reference: <h1 style="text-align: center;">WS3</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: concrete with steel reinforcement bar.					
0.26		MADE GROUND: Soft brown clayey sandy gravel of fine to medium brick and stone of mixed lithologies.			18.2ppm		
					18.6ppm		
					27.2ppm		
0.90		Firm brown slightly gravelly CLAY. Gravel is of fine sub-angular flint.			25.1ppm		
		From 1.0m grading to clayey GRAVEL of fine to coarse of sub-angular flint.			21.0ppm		
1.20		Brown slightly clayey gravelly medium SAND. Gravel is of fine to medium sub-angular flint.	Wet		51ppm		
1.50		Sandy GRAVEL of fine to coarse angular flint.	Moist		55ppm		
1.90		Brown slightly gravelly medium SAND. Gravel is of fine to medium sub-angular flint.	Wet		40ppm		
2.00		END: 2.0m - refusal on flint gravel.			51ppm		

Notes: Hand dug to 1.2 mbgl. Gas well installed.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 19/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 31.19 maOD
 Borehole Diameter: 120mm
 Installation Diameter: 25mm ID
 Slot Size: 1-2mm
 Method: Window sample

Borehole Reference:

WS4

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.20		MADE GROUND: Slightly clayey slightly sandy gravel of fine to medium, occasionally coarse brick and stone of mixed lithologies.			18.9ppm	
0.45		MADE GROUND: Soft brown slightly sandy gravelly clay. Gravel is fine to coarse of brick and flint. From 0.85m becoming firm to stiff.			18.2ppm	
					36.1ppm	
					25.6ppm	
1.20		Brown sandy gravelly CLAY. Gravel of fine to coarse flint.	Moist, NDO		46ppm	
1.30		Slightly clayey gravelly medium to coarse SAND. Gravel is of fine to coarse sub-angular flint.	Moist, NDO		69ppm	
1.60		Brown slightly gravelly SAND. Gravel is of fine to coarse sub-angular flint. END: 2.0m - refusal on coarse flint gravel.	Moist, NDO		75ppm	
					48ppm	
2						

Notes: Hand dug to 1.2 mbgl. Gas well installed.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 17/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS5

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Dark brown clayey gravelly sand with rootlets (TOPSOIL). From 0.5m becoming with gravel of brick. From 0.85m becoming clayey sand with rare gravel of brick.			
0.90		Brown sandy gravelly CLAY. Gravel is of fine to coarse, angular to subangular flint with rare cobbles of flint.			0.0 ppm
1.20		Brown/red gravelly medium to coarse SAND. Gravel is of fine to coarse, angular to sub-angular flint. END: 2.0m - refusal on coarse flint gravel.	Dry, NDO.		0.4 ppm
2.00					0.4 ppm

Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 17/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS6

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Dark brown slightly clayey gravelly sand with rootlets. Gravel is fine to medium of ceramics and brick. From 0.9m becoming clayey.			
					0.0ppm
					0.0ppm
					0.0ppm
1.10		MADE GROUND: Sandy gravelly clay. Gravel is medium of brick and flint.			0.0ppm
1.20		Becoming gravelly clay with depth.			
1.30		Dark brown slightly clayey GRAVEL of flint with some rootlets.	Dry, NDO.		
		Red/brown slightly silty slightly gravelly medium SAND. Gravel is of fine to medium flint, occasionally coarse from 1.5m.			0.2ppm
		END: 1.8m - refusal on coarse flint gravel.			
1.80					
2					

Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 13/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS7

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Asphalt.				
0.06		MADE GROUND: Broken concrete (cobbles) with brown sand.				
0.30		Grey/brown silty gravelly sand. Gravel is fine to coarse with occasional cobbles of brick, concrete and slag type material.			0.0ppm	
0.70		Brown mottled slightly sandy clay. Sand is fine.	Dry.		0.1 ppm	
1.00		END: 1.0 m - refusal on flat surface. Possible covered void (duct).				
2						

Notes: Hand dug to 1.0 mbgl. Backfilled with arisings, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 17/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample


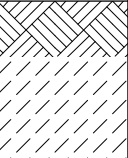

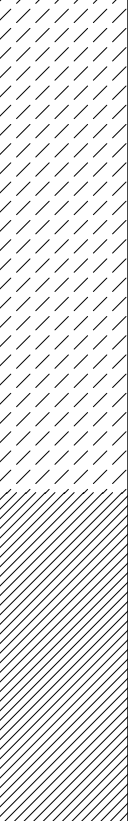




Borehole Reference:


WS8


Coordinates: ,


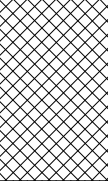
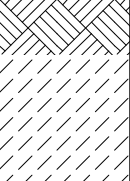
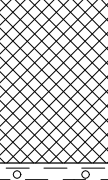

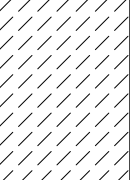



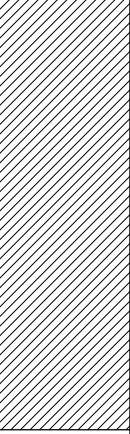


Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Concrete with steel reinforcement bar.			
0.10		MADE GROUND: Grey silty gravelly sand. Gravel is fine to medium, sub-angular to sub-rounded of brick and stone (mostly flint). 10cm band of soft grey sandy clay from 0.2 - 0.3m. Becoming clayey slightly gravelly sand with depth.			0.2ppm
					0.1ppm
0.80		Firm orange/brown sandy CLAY. From 1.1m becoming slightly gravelly. Gravel is of medium to coarse angular to sub-angular flint.			0.1ppm
					0.1ppm
1.20		Brown/orange gravelly medium to coarse SAND. Gravel is fine to coarse of angular to subangular flint. END: 2.3m - refusal on coarse flint gravel.	Dry, NDO.		0.1ppm
					0.1ppm
2					0.1ppm
					0.3ppm
2.30					


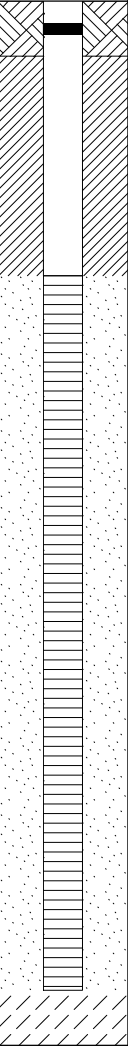
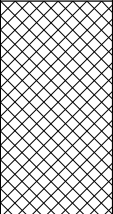
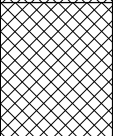

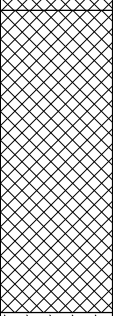

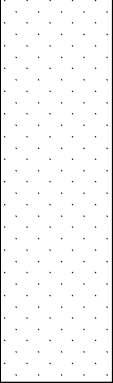




Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 17/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.		Borehole Elevation: Borehole Diameter: 120mm Installation Diameter: Slot Size: Method: Window sample		Borehole Reference: <h1 style="text-align: center;">WS9</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.06		MADE GROUND: inferred demolition rubble.					
0.30		Brown clayey gravelly medium SAND. Gravel fine to medium of flint.			0.0ppm		
		From 0.9m becoming slightly gravelly.					
					0.0ppm		
					0.0ppm		
1.10		Clayey sandy GRAVEL of fine to coarse, angular to sub-rounded flint.			0.0ppm		
1.20		Red/brown gravelly medium to coarse SAND. Gravel is coarse of angular to subangular flint.	Moist, NDO.				
		END: 1.8m - refusal on coarse flint gravel.			0.3ppm		
1.80							
2							
Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.							

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 17/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.		Borehole Elevation: Borehole Diameter: 120mm Installation Diameter: Slot Size: Method: Window sample		Borehole Reference: <h1 style="text-align: center;">WS10</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.26		MADE GROUND: Brown clayey gravelly fine sand. Gravel is fine to coarse of concrete with fragments of glass and ceramics. Boulder of slag type material at 0.9m.					
0.95		Clayey sandy GRAVEL of medium to coarse flint.				0.1ppm	
1.20		Brown/red slightly gravelly medium SAND. Gravel is medium to coarse of flint. END: 0.7m - refusal on coarse flint gravel.	Moist, NDO.			0.0ppm	
1.70						0.0ppm	
2							
Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.							

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 13/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.	Borehole Elevation: Borehole Diameter: 120mm Installation Diameter: Slot Size: Method: Window sample	Borehole Reference: <h1 style="text-align: center;">WS11</h1>		
		Coordinates: ,				
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.22		MADE GROUND: Dark grey/brown silty sandy gravel of fine to coarse with occasional cobbles of concrete, stone, brick and slag type material.	Dry.		0.1ppm	
0.66		END 0.66m - buried services encountered.			0.3ppm	
2						
Notes: Hand dug to 0.66 mbgl. Backfilled with arisings, concrete at surface.						

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 20/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.	Borehole Elevation: Borehole Diameter: 120mm Installation Diameter: Slot Size: Method: Window sample	Borehole Reference: <h1 style="text-align: center;">WS12</h1>		
		Coordinates: ,				
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.33		MADE GROUND: Coarse gravel (sub-base).				
0.60		MADE GROUND: Dark brown clayey sandy gravel of fine to coarse brick and stone of mixed lithologies. Becoming gravelly clay with depth.	Wet.		22.0 ppm	
0.90		Firm becoming stiff brown slightly gravelly CLAY. Gravel is fine to medium of flint.			19.3 ppm	
1.22		Brown grey sandy GRAVEL of fine to coarse angular to subangular flint.	Moist to wet. NDO.		16.3 ppm	
1.50 - 1.65m		From 1.50 - 1.65m: red/brown medium SAND. Becoming clayey SAND.			25 ppm	
2.0m		END: 2.0m - refusal on coarse flint gravel.			41 ppm	
2						
Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.						

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 17/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.		Borehole Elevation: 31.14 maOD Borehole Diameter: 120mm Installation Diameter: 25mm ID Slot Size: 1-2mm Method: Window sample		Borehole Reference: <h1 style="text-align: center;">WS13</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.39		MADE GROUND: Brown clayey sandy gravel of fine to medium (occasionally coarse with rare cobbles), sub-angular to sub-rounded brick and stone of mixed lithologies.			0.0ppm		
0.65		MADE GROUND: Brown gravelly clay. Gravel is of fine to medium, subangular to sub-rounded brick and stone of mixed lithologies.	Wet at 1.1				
1.20		Brown gravelly medium to coarse SAND. Gravel is of fine to coarse, angular to sub-angular flint. END: 1.9m - refusal on coarse flint gravel.	Wet becoming moist, NDO.		0.0ppm		
1.90					0.5ppm		
2					0.4ppm		
Notes: Hand dug to 1.2 mbgl. Gas well installed.							



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 17/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS14

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.27		MADE GROUND: Grey/brown clayey sandy gravel. Gravel is fine to coarse, rounded to subangular of mixed lithologies. END: 0.9m - refusal on hard surface - inferred concrete obstruction.	Dry.		0.1ppm	
0.90					0.1ppm	
2						

Notes: Hand dug to 0.9 mbgl. Backfilled with arisings, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 18/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS15

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Concrete with steel reinforcement bar.			
0.24		MADE GROUND: Grey/brown slightly clayey sandy gravel. Gravel is fine to coarse, angular to rounded of mixed lithologies.			0.0ppm
0.45		Becoming clayey with depth. Firm to stiff brown very slightly sandy slightly gravelly CLAY. Gravel is of fine to coarse, angular to sub-angular flint.			0.0ppm
					0.0ppm
					0.2ppm
1.40		Grey/brown clayey gravelly medium SAND. Gravel of fine to coarse flint. END: 2.0m - refusal on coarse flint gravel.	Moist, NDO.		0.4ppm
2.00					

Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 18/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS16

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Concrete with steel reinforcement bar.			
0.45		MADE GROUND: Slightly sandy coarse gravel of brick and concrete with occasional cobbles of concrete and half bricks. Becoming clay with brick fragment at base.	Water at 0.72mbgl, with oily sheen.		
1.20		Brown/beige slightly sandy gravelly CLAY. Gravel is fine to medium of flint. Becoming more sandy with depth.	Moist, NDO		0.2ppm 0.3ppm 0.2ppm
1.75 1.80		Slightly clayey sandy GRAVEL of coarse, angular flint. END: 1.8m - refusal on coarse flint gravel.	Moist, NDO		0.2ppm
2					

Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 18/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 31.18 maOD
 Borehole Diameter: 120mm
 Installation Diameter: 25mm ID
 Slot Size: 1-2mm
 Method: Window sample


Borehole Reference:

WS17

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.22		MADE GROUND: Grey/brown slightly sandy clayey gravel of fine to coarse subangular to sub-rounded brick and stone of mixed lithologies.			0.3ppm	
1.10		Firm grey gravelly clay. Gravel is fine to coarse of brick and stone of mixed lithologies.			0.2ppm	
1.20		Silty coarse gravel of brick and stone of mixed lithologies.			0.3ppm	
1.30		Firm beige/brown slightly gravelly sandy CLAY. Gravel is of fine angular to sub-angular flint.	Moist, NDO.		14.8ppm	
1.50		Firm sandy CLAY with discrete ~5-10cm bands of fine to medium sand. END: 2.0m - refusal on stiff clay.	Slight black staining apparent in some of the sand (not throughout), NDO.		0.3ppm	
2						

Notes: Hand dug to 1.2 mbgl. Gas well installed.

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 17/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.		Borehole Elevation: Borehole Diameter: 120mm Installation Diameter: Slot Size: Method: Window sample		Borehole Reference: <h1 style="text-align: center;">WS18</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.38		MADE GROUND: Grey slightly sandy slightly clayey gravel.	Dense black residual tar like coating on some gravel surfaces.		0.5ppm		
0.65		END: 0.65m - sloping concrete obstruction.			1.1ppm		
2							
Notes: Hand dug to 0.65 mbgl. Backfilled with arisings, concrete at surface.							



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 17/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS19

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.17		<p>MADE GROUND: Grey/brown slightly clayey sandy gravel of fine to coarse brick and tarmac, mostly coarse with depth.</p> <p>From 0.7m becoming clayey/with pockets of clay.</p> <p>END: 1.05m - refusal on submerged hard surface - inferred concrete obstruction.</p>	Wet from 0.6m.		0.0ppm	
1.05					0.0ppm	
2						

Notes: Hand dug to 1.05 mbgl. Backfilled with arisings, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 17/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample


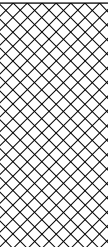

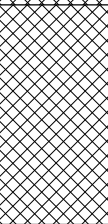

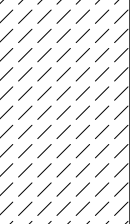
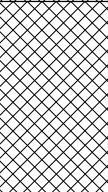

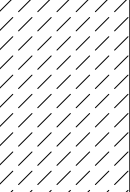
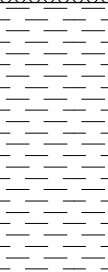

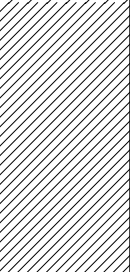
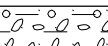


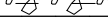
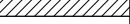
Borehole Reference:

WS20

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Concrete with steel reinforcement bar.			
0.08		MADE GROUND: Brown/grey sandy gravel of concrete and brick with occasional fragments of wood and glass. END: 0.95m - refusal on concrete obstruction.	Wet from 0.6m. Iridescent sheen to water in pit. Strong hydrocarbon odour and black tar like staining from 0.9m.		
					0.1ppm
					0.1ppm
					0.3ppm
					6.0ppm
0.95					
2					

Notes: Hand dug to 0.95 mbgl. Backfilled with arisings, concrete at surface.

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 18/02/2014 Logged By: NR Driller: Geotron UK Ltd.		Borehole Elevation: Borehole Diameter: 120mm Installation Diameter: Slot Size: Method: Window sample		Borehole Reference: <h1 style="text-align: center;">WS21</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.45		MADE GROUND: Dark grey slightly clayey sandy gravel of concrete and slag type material.	Strong unpleasant organic odour. Moist becoming wet from ~0.6m.		0.6ppm		
0.85		MADE GROUND: Soft gravelly clay. Gravel is fine to medium, subangular of concrete and slag type material.	Less odour.		0.3ppm		
1.20		Soft grey/brown CLAY.	Faint black staining and hydrocarbon odour at base of pit.		0.3ppm		
1.70		Decomposing wood layer (5cm) over slightly clayey sandy			63ppm		
1.80		GRAVEL of fine to medium, angular to subangular flint.					
		END: 1.8m - refusal on coarse flint gravel.					
2							
Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.							



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 18/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 30.34 maOD
 Borehole Diameter: 120mm
 Installation Diameter: 25mm ID
 Slot Size: 1-2mm
 Method: Window sample


Borehole Reference:

WS22

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.43		MADE GROUND: Grey sandy gravel. Becoming clayey from 0.8m.	Water at ~0.65, no odour.			
0.90		Soft brown/grey slightly gravelly CLAY. Gravel is fine to medium, angular to sub-angular of flint.			0.1ppm	
					0.0ppm	
					0.0ppm	
1.25		Soft grey CLAY. From 1.4m becoming firm, grey/brown mottled CLAY. END: 2.0m - refusal on stiff clay.			0.0ppm	
					36ppm	
					43ppm	
2.00						

Notes: Hand dug to 1.2 mbgl. Gas well installed.

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 18/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.		Borehole Elevation: Borehole Diameter: 120mm Installation Diameter: Slot Size: Method: Window sample		Borehole Reference: <h1 style="text-align: center;">WS23</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.17		MADE GROUND: Brown slightly clayey sandy gravel. Gravel is fine to medium, (mostly fine with depth) of mixed lithologies. Concrete slab at 0.55 - 0.6m. With slag type material from 0.6m.	Wet from ~0.5m, with slight sheen and slight hydrocarbon odour.		10.2ppm		
0.65		END: 0.65m - refusal on inferred concrete obstruction (submerged).			0.4ppm		
2							
Notes: Hand dug to 0.65 mbgl. Backfilled with arisings, concrete at surface.							



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 18/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample


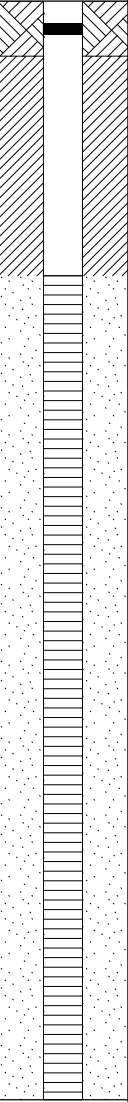
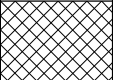
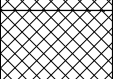


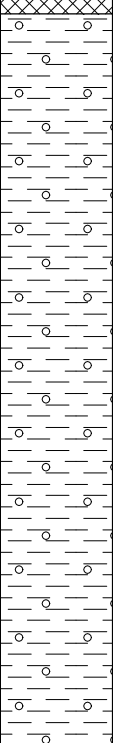



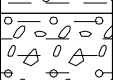

Borehole Reference:

WS24

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result
0		MADE GROUND: Concrete with steel reinforcement bar.			
0.11		MADE GROUND: Slightly clayey sandy gravel of brick, concrete and stone of mixed lithologies. From 0.6m - with asphalt pieces and small pockets of firm dark brown clay.	From 0.25 - 0.6m - very slight hydrocarbon odour.		0.3ppm
					0.2ppm
					0.2ppm
1.00		Firm dark brown CLAY with large cobble/boulder of concrete.			
1.20		Very soft brown CLAY.	Wet		46ppm
1.50		Clayey GRAVEL of coarse angular to sub-angular flint. END: 1.9m - refusal on coarse flint gravel.	NDO, moist.		
1.90					48ppm
2					

Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 18/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.		Borehole Elevation: 30.40 maOD Borehole Diameter: 120mm Installation Diameter: 25mm ID Slot Size: 1-2mm Method: Window sample		Borehole Reference: <h1 style="text-align: center;">WS25</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.16		MADE GROUND: Broken concrete.					
0.30		MADE GROUND: Gravelly clay. Gravel is fine to coarse of flint and concrete.			0.2ppm		
0.45		Firm brown slightly gravelly CLAY. Gravel is of fine to medium, angular to sub-angular flint. Grey mottle from 0.65m. From 1.2m: Becoming soft brown CLAY with occasional coarse flint gravel.	NDO. Wet from 1.2m.	  	0.2ppm 0.2ppm 0.2ppm		
1.80		Clayey GRAVEL of medium to coarse, sub-rounded black flint.	NDO, wet.		19ppm		
2.00		END: 2.0m - refusal on coarse flint gravel.					

Notes: Hand dug to 1.2 mbgl. Gas well installed.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 18/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS26

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.25		MADE GROUND: Weak/broken concrete. END: 0.65m - refusal on hard concrete obstruction.	NDO.		0.4ppm	
0.65					0.2ppm	
2						

Notes: Hand dug to 0.65 mbgl. Backfilled with arisings, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 18/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS27

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.29		MADE GROUND: Weak/broken concrete.			0.2ppm	
0.40		END: 0.75m - refusal on hard concrete obstruction.	Dry.			
		MADE GROUND: Brown/grey sandy gravel of fine to medium concrete.			0.2ppm	
0.70		MADE GROUND: Concrete with steel reinforcement bar.				
0.75		END: 0.75m - refusal on hard concrete obstruction.				

Notes: Hand dug to 0.75 mbgl. Backfilled with arisings, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 18/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 29.66 maOD
 Borehole Diameter: 120mm
 Installation Diameter: 25mm ID
 Slot Size: 1-2mm
 Method: Window sample

Borehole Reference:

WS28

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.29		MADE GROUND: Dark brown slightly clayey sandy gravel. Gravel is fine to coarse, sub-angular to rounded of brick and flint. From 0.7 - 0.75m - frequent brick fragments. From 0.75m - becoming clayey with some slag type material.	Reducing odour from 0.6 - 0.7m. Faint sweet hydrocarbon odour from 0.75 - 0.9m.		0.2ppm	
					0.3ppm	
					5.1ppm	
					4.6ppm	
					8.0ppm	
					16.5ppm	
					13.9ppm	
1.15		Soft brown/orange mottle sandy gravelly CLAY. Gravel is of fine angular to sub-angular flint. From 1.4 - 1.8m - soft grey slightly sandy CLAY. From 1.8m becoming firm gravelly CLAY. Gravel is coarse of angular to sub-angular flint. END: 2.0m - refusal on coarse flint gravel.			33ppm	
					43ppm	
					55ppm	
2						

Notes: Hand dug to 1.2 mbgl. End of hole at 2mbgl. Gas well installed.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 16/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.


Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:
WS29

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar. Weak/broken from ~0.35m.				
0.40		MADE GROUND: Light brown silty fine sand.	Dry.		31.3ppm	
0.50		MADE GROUND: Concrete with steel reinforcement bar (slabs of). END: 0.9m - refusal on hard concrete.			15.8ppm	
0.90					10.6ppm	
2						

Notes: Hand dug to 0.9 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.

		Client: Alps Group Ltd Project Number: GCU0124024 Location: Nestle Hayes Date Drilled: 20/02/2014 Logged By: RV/NR Driller: Geotron UK Ltd.		Borehole Elevation: Borehole Diameter: 120mm Installation Diameter: Slot Size: Method: Window sample		Borehole Reference: <h1 style="text-align: center;">WS30</h1>	
		Coordinates: ,					
Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result		
0		MADE GROUND: Concrete with steel reinforcement bar.					
0.31		MADE GROUND: Brown sandy gravel of fine to medium concrete, brick and flint. occasional large fragments of brick. From 0.9m - becoming clayey sandy gravel (as above) with occasional small pockets of clay.	NDO		15.8ppm		
					20.2ppm		
					14.2ppm		
					30.5ppm		
					24.6ppm		
					16.0ppm		
1.25		MADE GROUND: Gravelly silty sand. Gravel of concrete.			59ppm		
1.40		End: 1.4m - refusal on concrete cobble/slab.	Wet. Black stained with slightly tar like residue. No odour.				
2							
Notes: Hand dug to 1.2 mbgl. Reinstated with bentonite to 1.2 mbgl, backfilled with arisings, concrete at surface.							



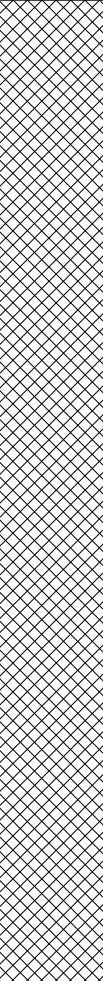
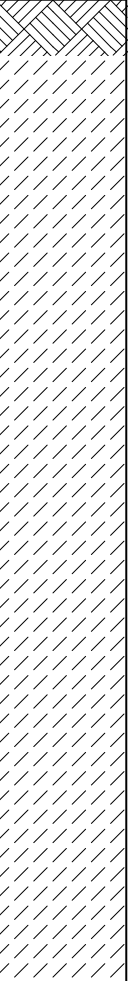
Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 20/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS31

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Multiple layers of concrete with steel reinforcement (some 1/4 inch reinforcement bar).				
1.80						
2						

Notes: Cored to 1.8mbgl. Reinstated with bentonite to ~1.2 mbgl, backfilled with concrete core sections, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 20/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation:
 Borehole Diameter: 120mm
 Installation Diameter:
 Slot Size:
 Method: Window sample

Borehole Reference:

WS32

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.40		MADE GROUND: Coarse, angular limestone gravel (sub-base).	Dry			
0.50		Brown sandy gravel fine to coarse brick and flint, with some wood fragments.	Dry, NDO.		65 ppm	
0.60		END: 0.6m - refusal on hard concrete obstruction.				

Notes: Hand dug to 0.6 m bgl. Backfilled with arisings, concrete at surface.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 20/02/2014
 Logged By: RV/NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 31.27 maOD
 Borehole Diameter: 120mm
 Installation Diameter: 25mm ID
 Slot Size: 1-2mm
 Method: Window sample

Borehole Reference:

WS33

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.15		MADE GROUND: Slightly clayey sandy medium gravel of brick and concrete.				
0.40		MADE GROUND: Soft orange/brown sandy gravelly silt. Gravel is of fine to medium, sub-angular to angular flint.				
					29.1 ppm	
					22.0 ppm	
					16.1 ppm	
					22.2 ppm	
1.15		Grey/beige sandy clayey GRAVEL of fine to coarse flint with some concrete.	Dry, NDO.			
1.30		Brown medium to coarse SAND.	Dry, NDO.		85 ppm	
1.40		Becoming clayey SAND.	Dry, NDO.			
		Becoming slightly clayey sandy GRAVEL of fine to coarse, sub-angular to angular flint.			76 ppm	
1.60		END: 1.6m - refusal on coarse flint gravel.				
2						

Notes: Hand dug to 1.2 mbgl. Gas well installed.



Client: Alps Group Ltd
 Project Number: GCU0124024
 Location: Nestle Hayes
 Date Drilled: 20/02/2014
 Logged By: NR
 Driller: Geotron UK Ltd.

Borehole Elevation: 30.94 maOD
 Borehole Diameter: 120mm
 Installation Diameter: 25mm ID
 Slot Size: 1-2mm
 Method: Window sample

Borehole Reference:

WS36

Coordinates: ,

Depth (m)	Legend	Description	Observations	Sample	Sample / Field Test Result	
0		MADE GROUND: Concrete with steel reinforcement bar.				
0.10		MADE GROUND: Slightly clayey sandy gravel of fine to coarse brick, concrete and stone (mostly flint). From 0.4 - 0.6m: Older layer of concrete (broken). At 0.8m: 150x100mm concrete slab. At 1.1m: Whole and half bricks.	Wet from 0.7m.			
1.20		Sandy GRAVEL of fine to coarse subangular to sub-rounded stone of mixed lithologies (mostly flint).	Wet, NDO. Black staining throughout.		22.3 ppm 16.2 ppm 12.1 ppm 10.0 ppm 43ppm 52ppm 41ppm	
2						
2.10						

Notes: Hand dug to 1.2 mbgl. Gas well installed.

Appendix B – Specialist Palaeolithic Assessment

NESTLE AVENUE, HAYES - SPECIALIST PALAEOLOGIC ASSESSMENT

By C. Green (QUEST – University of Reading)

This site is at the eastern end of an extensive remnant of the Lynch Hill Terrace lying between the River Colne to the west and the River Crane to the east. The Lynch Hill Terrace is well preserved in a number of similar remnants extending on the north side of the Thames between Maidenhead and west London (Acton/Ealing). In many places the Lynch Hill Gravel that underlies the terrace is overlain by 'brickearth', now termed the Langley Silt (Gibbard 1985).

Early OS mapping (1:10,650 1868-83 survey and 1897 and 1913/13 revisions) show the Hayes site as open fields with no indication of quarrying, although brickfields and gravel pits are indicated nearby. However British Geological Survey mapping of the locality (www.bgs.uk/geology_of_britain/) shows the Langley Silt missing at the site in an area obviously bounded by the artificial outlines of old brickpits. By 1920 the site was occupied by commercial premises.

These stages of development at the former nestle factory site can be paralleled to those at The Old Vinyl Factory site in Hayes, about 1.0 km WNW of the present site and on the same spread of Lynch Hill Gravel. The following paragraphs are adapted from a description of the Old Vinyl Factory site.

The Lynch Hill Gravel in the Yewsley area, to the west of the Old Vinyl Factory site and present site and forming the western half of the extensive terrace remnant on which the Hayes sites are located, has been described in some detail by Collins (1978). Collins describes a section in the Lynch Hill deposits as follows:

Made Ground

Humic silt

Fine-grained loam – up to 1m thick

Unstratified clayey gravel – up to 1.2m thick

Sandy silt – up to 1.5m thick

Lynch Hill Gravel – up to 6m thick

However in his general introduction he states that 'Most of the Yiewsley area was covered by a spread of Pleistocene gravel at least 10ft (3m) thick; this in turn was usually overlain by brickearths and solifluctions'

It is clear from his section drawings that the deposits in the Yewsley area were variable.

The Lynch Hill Terrace in the Yewsley area has been a prolific source of Palaeolithic artefacts. Collins states that collecting there started 'as early as 1889' and continued in the early years of the 20th century until mechanical excavation of gravel was introduced in the late 1920s.

There is obviously some potential for Palaeolithic artefacts to be present within the present Hayes site although none were specifically attributed to the Old Vinyl Factory site by Wymer (1968).

Collins tabulates the depths and stratigraphic units from which the Yiewsley artefacts appear to have come, based on somewhat tenuous records kept by the early collectors. There appear to have been Levallois artefacts in the 'brickearth' but the Acheulian hand-axes came mainly from the Lynch Hill Gravel itself, at depths greater than 13ft (4m) below the ground surface, though some were recovered from 'solifluction' gravel overlying the Lynch Hill Gravel.

Another significant point is the condition of the Yewsley artefacts. Wymer (1968) tabulates the condition of 299 'Non-Levalloisian' artefacts from the Yewsley/West Drayton area and records only 29 (9.7%) 'sharp or mint'. In other words most of the artefacts recovered from the Lynch Hill Terrace deposits are rolled and not therefore in primary context. Unfortunately we don't know the stratigraphic level from which the sharp or mint artefacts came.

To summarise: based on comparative work undated in the local area it seems unlikely that any 'brickearth' deposits currently survive within the former nestle factory site, and the removal of 'brickearth' by quarrying will have extended down to the top of either the Lynch Hill Gravel, or a 'solifluction gravel' overlying the Lynch Hill Gravel.

The upper part of any deposits present within the former nestle factory site are also likely to have been disturbed (to an unknown depth) by building construction, especially if any of the existing buildings contain basements.

An additional consideration at the Nestle Avenue site is its proximity to the River Crane with the natural slope of the ground beneath the site gently down towards the river, with the result that the eastern half of the site lies below the 30m contour, which approximately defines the topographic boundary of the Lynch Hill Terrace. It is quite likely that the terrace gravel in this situation will have experienced some downslope displacement during repeated episodes of cold climate and will not therefore be completely undisturbed.

Given the conditions described above, the Palaeolithic potential of the site is relatively low. This conclusion is based firstly on the view that the discovery of artefacts in primary context is extremely unlikely. None have been recorded from the Lynch Hill Gravel in this part of London; secondly, the discovery of any Levallois material is unlikely as it appears to have been closely associated with the Langley Silt which has reportedly been quarried away at this site; thirdly although substantial collections of artefacts have been recovered from the Lynch Hill Gravel in this part of London, the numbers per unit volume of gravel extracted are probably very low, which means that investigative trenching, were it to be undertaken, would be unlikely to recover significant numbers of artefacts. It will be relevant in any final assessment of the Palaeolithic potential of the site to consider also the relationship between the depth of any groundwork associated with the development and the reported depth distribution of artefacts in the Lynch Hill gravel in this general area. Finally, it should be remembered that most of the artefacts in late 19th and early 20th century collections were acquired when the gravel was being dug by hand, which will not be the method of excavation for any foundation works associated with the proposed development.

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