



# ET Planning

For Surrey Heath  
Borough Council

## **Gypsy and Traveller and Travelling Showpeople Deliverability Assessment**

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## Non – Technical Executive Summary

### Aim of the Gypsy and Traveller and Travelling Showpeople Deliverability Assessment

- 1.1 The primary aim of this Gypsy and Traveller and Travelling Showpeople ('GTTS') Deliverability Assessment is to provide Surrey Heath Borough Council ('The Council') with a robust assessment of the deliverability of two specific sites for Gypsies and Travellers which are under consideration for allocation in the Surrey Heath Local Plan 2019-2038.
- 1.2 It is anticipated that the outcomes of the Assessment will assist the Council in determining whether the sites are suitable for allocation. It will help to inform a policy basis for which a Local Plan policy for respective site allocations for Gypsy and Travellers could be developed.

### Key findings

- 1.3 When developing Local Plans, 'Planning Policy for Traveller Sites' ('PPTS') requires Local Planning Authorities to identify and keep up to date a supply of specific deliverable sites sufficient to provide five years' worth of sites against locally set targets.
- 1.4 Two sites have been assessed through this Gypsy and Traveller and Travelling Showpeople Deliverability Assessment. These are:
  - An extension to an existing Gypsy and Traveller site at **Swift Lane, Bagshot** - to provide **5 additional pitches**, and
  - A new Gypsy and Traveller site at **Land South of Broadford Lane, Chobham** - for between **13-16 pitches**.
- 1.5 These sites were consulted on in the Regulation 18 Draft Surrey Heath Local Plan: Preferred Options (2019 – 2038) Additional Site Allocations for Gypsy and Travellers and Travelling Showpeople which took place in August 2022. This consultation noted that in advance of the Regulation 19 Local Plan Consultation, further site-specific work would be undertaken in order to better understand the deliverability of the sites identified. This study sets out in detail the work that that has been undertaken.



- 1.6 To assess the sites, firstly a desktop analysis was undertaken to review possible constraints which could affect the delivery of each site.
- 1.7 In addition, a number of supporting technical studies were also instructed relating to site specific issues identified through the desktop analysis. These are outlined below:
- Contamination (for both sites given the former land uses); and
  - Highways (for both sites). In addition a further highways technical note was produced for Broadford Lane owing to comments from Surrey Council Council regarding the access; and
  - Odour and Air Quality Assessments (for Broadford Lane only, given the close proximity to the Waste Water treatment Works).
- 1.8 The above studies and their results and implications for each of the sites are discussed in more detail throughout the report.
- 1.9 The findings of this report consider that **Swift Lane is suitable for allocation for 5 pitches** in the Regulation 19 Plan based on the following reasons:
- The site provides a logical extension to this existing Gypsy and Traveller site.
  - There are no known legal constraints which would affect the availability of the site.
  - It is anticipated that the site could accommodate 5 pitches, which would help to meet some of the identified need in the borough.
  - It is anticipated that the site could qualify for exceptional circumstances to justify release from the Green Belt. However, it will be for the Council to determine whether they consider if they do or not.
  - The site is considered to be a reasonable distance from services and facilities, with safe access to the highway network able to be provided.

- The site is located within 5 km of the Thames Basin Heaths SPA and it is considered that adequate avoidance measures can be put in place.

1.10 It is considered however that **Land South of Broadford Lane, Chobham is not suitable for allocation** in the Regulation 19 Plan based on a number of reasons in combination, in summary these are due to:

- Issues with regard to Bridleway 16 and the ability for this to be safely used for access. The County Council do not consider the bridleway constitutes a suitable access for the site, owing principally to the inability to add passing places. This was a suggested mitigation measure to ensure the safety of users of Broadford Lane, given the nature and increase in traffic movements.
- The impact on the viability of the site taking account of the need to mitigate odour impacts from the adjacent Waste Water treatment Works, in addition to the need to remediate land contamination and address ecological issues.

## Disclaimer

- 1.11 The inclusion of potential sites, buildings or areas within the study does not preclude them from being developed for other purposes.
- 1.12 The boundaries of the sites, buildings and areas are based on the information available at the time. The assessment does not limit an extension or contraction of these boundaries for the purposes of a planning application.
- 1.13 The information that accompanies the assessment is based on data available at the time of the study and there may be some omissions and/or factual inaccuracies.
- 1.14 There may be additional constraints on some sites that were not identified at the time of the survey and that planning applications will continue to be treated on their own merits at the time of the planning application rather than on the information contained within the assessment. Likewise, some of the identified constraints may have been removed since the information was compiled. Issues may arise during the course of a detailed planning

application that could not or were not foreseen at the time of the study.

## 1. Introduction

- 1.1 This Gypsy and Traveller and Travelling Showpeople (GTTS) Deliverability Assessment has been undertaken by ET Planning on behalf of Surrey Heath Borough Council (SHBC).
- 1.2 SHBC are preparing a new Local Plan for the Borough which will set out the strategy and policies that will guide the development of the Borough up to 2038.
- 1.3 As part of the plan-making process, SHBC is required to seek to address the needs of all groups, including those with specific housing requirements. This includes making provision for Gypsy and Traveller and Travelling Showpeople (GTTS) sites within the Local Plan, through the allocation of pitches and plots. This assessment considers the deliverability of two potential sites for Gypsy and Traveller pitches which have been identified by SHBC.

## 2. Legislative context

- 2.1 Section 124 of the Housing and Planning Act 2016 introduced a requirement under Section 8 of the Housing Act 1985 for local authorities to undertake a periodical review of housing needs of the people residing or resorting to their area with respect to the provision of sites on which caravans (and houseboats) can be stationed.
- 2.2 By providing suitable permanent accommodation, it is likely that the risk of unauthorised encampments across the borough will reduce.
- 2.3 There is also several instances of established case law and decisions relating to Gypsy and Traveller and Travelling Showpeople.

## 3. National Planning Policy for Traveller Sites

- 3.1 Planning Policy for Traveller Sites ('PPTS') sets out the government's planning policy for traveller sites and provides guidance in respect of how reviews of the housing needs for Gypsies, Travellers and Travelling Showpeople should be assessed.
- 3.2 It is important to note that following the judgment in the Court of Appeal in the case of *Smith v SSLUHC & Ors*, the Government has reverted the definition of Gypsies and Travellers used in Planning Policy for Travellers Sites to that adopted in 2012, with this change applying from 19 December 2023 for plan and decision making.
- 3.3 The resultant definitions are set out below:

### *Gypsies and Travellers:*

- 3.4 Persons of nomadic habit of life whatever their race or origin, including such persons who on grounds only of their own or their family's or dependants' educational or health needs or old age have ceased to travel temporarily or permanently, but excluding members of an organised group of travelling showpeople or circus people travelling together as such.

### *Travelling Showpeople:*

- 3.5 Members of a group organised for the purposes of holding fairs, circuses or shows (whether or not travelling together as such). This includes such persons who on the grounds of their own or their

family's or dependants' more localised pattern of trading, educational or health needs or old age have ceased to travel temporarily or permanently, but excludes Gypsies and Travellers as defined above.

3.6 PPTS must be taken into account in the preparation of development plans. Local planning authorities preparing plans for and taking decisions on traveller sites should also have regard to the policies in the National Planning Policy Framework so far as relevant.

3.7 PPTS in paragraph 7 states that:

*'In assembling the evidence base necessary to support their planning approach, local planning authorities should:*

*a) pay particular attention to early and effective community engagement with both settled and traveller communities (including discussing travellers' accommodation needs with travellers themselves, their representative bodies and local support groups)*

*b) cooperate with travellers, their representative bodies and local support groups; other local authorities and relevant interest groups to prepare and maintain an up-to-date understanding of the likely permanent and transit accommodation needs of their areas over the lifespan of their development plan, working collaboratively with neighbouring local planning authorities*

*c) use a robust evidence base to establish accommodation needs to inform the preparation of local plans and make planning decisions'*

3.8 PPTS states that local authorities should set targets for Traveller accommodation that address the identified needs. Additionally, local authorities are required to identify a supply of *deliverable* sites to meet the need for Traveller accommodation for the next five years and identify sufficient *developable* sites or broad locations with potential to meet the need for Traveller accommodation arising in the 6 – 10 and 11 – 15 year periods of the Local Plan.

3.9 PPTS sets out that Green Belt boundaries should only be altered in exceptional circumstances. If a Local Planning Authority wishes to

make an exceptional, limited alteration to the defined Green Belt boundary to meet a specific identified need for a Traveller site, it should only do so through the plan-making process.

## 4. Council's Evidence Base to date

- 4.1 In preparation for making site allocations, a detailed Gypsy and Traveller Accommodation Assessment (GTAA) has been carried out for SHBC. The purpose of the GTAA is to provide a robust assessment of current and future need for Gypsy, Traveller and Travelling Showpeople accommodation in the Borough. Needs are assessed through a combination of desk-based research, stakeholder interviews and engagement with members of the travelling community.
- 4.2 The Council's current Gypsy and Traveller Accommodation Assessment (GTAA) was prepared by Opinion Research Services (ORS) and dates from 2020 when the 2015 'planning definition' was in use.
- 4.3 The GTAA sets out that the Council has an identified need for 32 Pitches for Gypsies and Travellers meeting the 2015 planning definition and 14 plots for Travelling Showpeople meeting the 2015 planning definition over the period 2020 – 2040, with the majority of that need falling within the first five years of the plan period. The GTAA also sets out that the Council has an identified need for 32 pitches for Gypsies and Travellers that do not meet the planning definition. One pitch arose from a household whose status was unknown. In addition, the GTAA 2020 concluded that the Council had an identified need for 14 Travelling Showpeople plots, with the full need for Travelling Showpeople arising from households that met the 2015 planning definition.
- 4.4 In response to the outcome of the Court of Appeal case and following the update to the planning definition, the Council asked ORS to provide the Council with a revised breakdown of its identified needs for Gypsies and Travellers not meeting the 2015 'planning definition', based on the following:
- a. Needs arising from households who have previously travelled for work but who have subsequently ceased to travel permanently (which would now fall within the planning definition);
  - b. Needs arising from households who have never travelled for work (which would fall outside of the 'planning definition').



4.5 The further breakdown indicates that of those not meeting the 2015 'planning definition', a total of 5 households had previously travelled, but have now ceased to travel permanently. These households did not generate any current or future needs for pitches. 1 household confirmed that they had travelled for work in the past and would therefore meet the 2023 planning definition; this household generated a need for 3 pitches. A remaining 11 households had never travelled for work and were identified as generating a need for 29 pitches across the period up to 2040. The change in the planning definition did not affect the breakdown of need required for Travelling Showpeople as set out in the GTAA 2020, as all households were considered to meet the planning definition in the first instance. The resultant breakdown of needs for Gypsies and Travellers is set out in Table 1 below.

	<b>0-5</b>	<b>6-10</b>	<b>11-15</b>	<b>16-20</b>	
<b>Years</b>	2020-25	2025-30	2030-35	2035-40	Total
<b>Pitches required for Gypsy and Travellers meeting the 2023 planning definition</b>	25	3	3	4	35
<b>Additional need for unknown Gypsy and Traveller households</b>	0	0	1	0	1
<b>Additional need for Gypsy and Traveller households that do not meet the 2023 planning definition</b>	14	5	5	5	29
<b>Total identified needs</b>	39	8	9	9	65

**Table 1: Identified needs for Gypsies and Traveller meeting the revised planning definition**

4.6 In terms of existing provision, there are four existing Gypsy and Traveller and Travelling Showpeople sites within Surrey Heath as of February 2024. For Gypsies and Travellers these are:

- Kalima, Chobham (15 pitches) – public site;

- Swift Lane, Bagshot (14 pitches) – public site; and
- Land S. Junction 3 of the M3, Lightwater (2 pitches) – private site;

4.7 For Travelling Showpeople existing provision is located at Bonds Drive, Chobham (6 pitches/plots) which is a private site. There is a current planning application (23/0707/PMR) at Bonds Drive for the variation of condition 1 of application ref. SU14/0676 granted 27 October 2014 to allow an additional mobile home, this application is currently awaiting determination (as of February 2024).

4.8 The Council has undertaken extensive work to seek to identify deliverable sites, however it is understood that as a result of environmental constraints and the availability of land for the proposed use, the identification of deliverable sites has been challenging for the Borough.

#### Other engagement/ consultation exercises

4.9 The Council undertook a consultation on the Regulation 18 Draft Local Plan between March – May 2022. Draft Policy H12: Site Allocations for Gypsy and Travelling Showpeople Accommodation identified Diamond Ridge Woods, Camberley (HA12/01) for 4 indicative pitches. Following the consultation, a Preliminary Ecological Appraisal and a Badger Monitoring Report were prepared for the site. These suggest that the site is not suitable for development for ecological reasons.

4.10 The March – May 2022 consultation noted that a further consultation would be undertaken in Summer 2022 which would identify further potential Gypsy and Traveller sites. Accordingly, between August – September 2022 Surrey Heath consulted on two additional potential Gypsy and Traveller sites. The sites for Gypsies and Travellers were:

- Swift Lane site extension, Bagshot (Windlesham Ward) (5 pitches)
- Land South of Broadford Lane, Chobham (13 – 16 pitches).

4.11 A further site for Travelling Showpeople at Bonds Drive extension, Chobham for 5 to 9 Travelling Showpeople plots, was also included in the above consultation, however this site is not included in this deliverability assessment. This is because an active high court

injunction has prevented the Council from accessing the site; the Council has therefore been unable to carry out feasibility work necessary to understand if the site is deliverable for the proposed use.

- 4.12 A number of comments were received through the consultation in relation to each of the two Gypsy and Traveller sites. Broadly these related to highways, biodiversity, physical and locational considerations, flood risk and Green Belt. These also form part of the evidence base.

## 5. Methodology for the Deliverability Assessment

- 5.1 In terms of the method used by ET Planning to assess deliverability, a desk study of the sites has been undertaken; the first stage of this desk study involved looking at each site and its planning history.
- 5.2 A RAG rating was then undertaken regarding high level environmental assessments. This is in line with the methodology undertaken previously by Surrey Heath in their respective Gypsy and Traveller and Travelling Showpeople Site Identification Paper. The scoring for the RAG rating exercise is outlined in table 2 below.

**Table 2: Part 1 Assessment (Desk based) RAG criteria:**

Criteria	Designation	<b>RED – site does not satisfy the criteria</b>	<b>AMBER – criteria may be capable of being satisfied</b>	<b>GREEN – Criteria is satisfied</b>
<b>Flood Risk</b>	Environment Agency Indicative Flood Mapping and Strategic Flood Risk Assessment (SFRA). Area at risk of flooding.	<i>The site is within Flood Zone 3a and/or 3b (functional flood plain) and is not suitable for Gypsy, Traveller or Travelling Showpeople use.</i>	<i>The site is within Flood Zone 2 requiring further investigation and application of policy tests.</i>	<i>The site is not affected by identified areas of indicative flooding and/or is located in Flood Zone 1.</i>
<b>Environmental Designations</b>	Special Protection Area, Special Area of Conservation, RAMSAR Site, Site of Special Scientific Interest, National Nature Reserve, Site of Nature Conservation	<i>The site is within an international or national environmental designation or within 400m of the Thames Basin Heath SPA.</i>	<i>The site is within the buffer or close proximity to an international or national designation and could therefore have a negative impact. The site is covered by a local designation or is within close proximity and could therefore</i>	<i>The site is not within or within close proximity of an international, national or local environmental designation.</i>

			<i>have a negative impact.</i>	
<b>Green Belt and Landscape Designations</b>	Green Belt.	<i>Not applicable as not an absolute constraint.</i>	<i>The site is within the Green Belt or is within or close to a sensitive landscape area and could have a negative impact requiring further investigation.</i>	<i>The site is not located in the Green Belt or in close proximity to a sensitive landscape area.</i>
<b>Potentially Contaminated or Unstable Land Issues</b>	Potentially contaminated or unstable land.	<i>The site is located within or adjacent to, a landfill site or the land is unstable and has been identified as unsuitable for residential use.</i>	<i>The site is potentially contaminated or unstable and requires further investigation.</i>	<i>There are no known contamination or unstable land issues.</i>
<b>Noise Issues</b>	Noise issues relating to existing land uses or transport corridors.	<i>Not applicable as not an absolute constraint.</i>	<i>The site is located adjacent to noisy land uses which requires further investigation.</i>	<i>There are no noisy adjacent land uses and therefore no noise impact on the site.</i>
<b>Residential Amenity</b>	Location of site in relation to existing dwellings.	<i>Not applicable as not an absolute constraint.</i>	<i>The site is adjacent to existing dwellings and requires further investigation.</i>	<i>There are no adjacent dwellings and therefore no impact on residential amenity.</i>
<b>Historic Assets</b>	Scheduled Ancient Monuments (SAM), Registered Parks and Gardens,	<i>Not applicable as not an absolute constraint.</i>	<i>The site is within a SAM, Registered Park and Garden, a Battlefield or Conservation Area or</i>	<i>The site is not within or adjacent to any historic asset.</i>

	Battlefields, Conservation Areas, Listed Buildings, Non-designated heritage assets.		<i>adjacent to a historic asset.</i>	
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- 5.3 A number of other more detailed considerations were then reviewed in more detail, relating to aspects such as flood risk and highways and the findings of studies were taken into consideration to suggest possible designs for the site.
- 5.4 Furthermore, a number of studies were commissioned to provide additional information on a number of aspects related to the deliverability of each site; these related to the design and capacity of each site, alongside other detailed environmental considerations. These are discussed in relation to each site within their relevant section.
- 5.5 Designing Gypsy and Traveller Sites: Good Practice Guide May 2008 sets out good practice in respect of the design of Gypsy and Traveller sites. It was intended to provide potential developers and existing site owners with an understanding of the design features needed to help ensure a site is successful, easy to manage and maintain, including site location, layout, size and the services and facilities need to make it operate effectively. This publication was withdrawn on 1 September 2015, but it still establishes good principles and best practice for designing sites in the absence of any alternative guide. can be a useful guide in considering design options for a site. In summary, sites that are not 'transit' sites are generally expected to provide individual plots containing space for 1 mobile home, 1 touring caravan and parking with space for an amenity building (to house washing facilities).

## 6. Considerations for the Assessment of Deliverability and Site Suitability

- 6.1 The two identified Gypsy and Traveller sites, below, were assessed for their deliverability and site suitability as part of this Gypsy and Traveller and Travelling Showpeople Deliverability Assessment:
- Swift Lane site extension, Bagshot (Windlesham Ward)– 5 pitches
  - Land South of Broadford Lane, Chobham – 13-16 pitches
- 6.2 Both sites are located within the administrative boundaries of Surrey County Council (SCC) and Surrey Heath Borough Council (SHBC).
- 6.3 There are a number of factors which could affect the deliverability and/or suitability of the sites. The key factors which would apply to both sites are discussed in more detail below and within their individual site proformas in section 8 of the report.

### Deliverability

- 6.4 Annex 2: Glossary of the National Planning Policy Framework 2023 ('NPPF') defines deliverable as:

*'To be considered deliverable, sites for housing should be available now, offer a suitable location for development now, and be achievable with a realistic prospect that housing will be delivered on the site within five years. In particular:*

*a) sites which do not involve major development and have planning permission, and all sites with detailed planning permission, should be considered deliverable until permission expires, unless there is clear evidence that homes will not be delivered within five years (for example because they are no longer viable, there is no longer a demand for the type of units or sites have long term phasing plans).*

*b) where a site has outline planning permission for major development, has been allocated in a development plan, has a grant of permission in principle, or is identified on a*

*brownfield register, it should only be considered deliverable where there is clear evidence that housing completions will begin on site within five years.'*

- 6.5 It then defines developable as:  
*'to be considered developable, sites should be in a suitable location for housing development with a reasonable prospect that they will be available and could be viably developed at the point envisaged'.*

### Availability

- 6.6 Availability is also linked to the deliverability of any potential sites; if a site is not available for use as a Gypsy and Traveller or Travelling Showpeople site, it cannot be expected to come forward for that use and therefore would be difficult to meet the definition of deliverable as set out in the NPPF glossary.

### The Green Belt

- 6.7 44% of land within Surrey Heath is designated as Metropolitan Green Belt. The fundamental aim of green belt policy is to prevent urban sprawl by keeping land permanently open. The NPPF in paragraph 138 states that the five purposes of the Green Belt are:

- 1. 'To check the unrestricted sprawl of large built-up areas.*
- 2. To prevent neighbouring towns merging into one another.*
- 3. To assist in safeguarding the countryside from encroachment.*
- 4. To preserve the setting and special character of historic towns.*
- 5. To assist in urban regeneration, by encouraging the recycling of derelict and other urban land. '*

- 6.8 The Government attaches great importance to Green Belts. Paragraph 145 of the NPPF states that:

*'Once established, **there is no requirement for Green Belt boundaries to be reviewed or changed when plans are being prepared or updated.** Authorities **may choose to review and***



**alter Green Belt boundaries where exceptional circumstances are fully evidenced and justified**, in which case proposals for changes should be made only through the plan-making process. **Strategic policies should establish the need for any changes to Green Belt boundaries, having regard to their intended permanence in the long term, so they can endure beyond the plan period.** Where a need for changes to Green Belt boundaries has been established through strategic policies, detailed amendments to those boundaries may be made through non- strategic policies, including neighbourhood plans' (ET Planning emphasis added, in bold)

6.9 Policy E of the PPTS relates to traveller sites in Green Belt. Paragraph 16 states:

*'Inappropriate development is harmful to the Green Belt and should not be approved, except in very special circumstances. Traveller sites (temporary or permanent) in the Green Belt are inappropriate development. Subject to the best interests of the child, **personal circumstances and unmet need are unlikely to clearly outweigh harm to the Green Belt and any other harm so as to establish very special circumstances.**'* (ET Planning emphasis added, in bold). Therefore, it is likely to be necessary to release sites from the Green Belt (as an inset), should the Council wish to include them as allocations within the emerging Local Plan.

6.10 Paragraph 17 then states:

*'Green Belt boundaries should be altered only in exceptional circumstances. **If a local planning authority wishes to make an exceptional, limited alteration to the defined Green Belt boundary (which might be to accommodate a site inset within the Green Belt) to meet a specific, identified need for a traveller site, it should do so only through the plan-making process and not in response to a planning application.** If land is removed from the Green Belt in this way, it should be specifically allocated in the development plan as a traveller site only.'* (ET Planning emphasis added, in bold)

6.11 Furthermore, when defining Green Belt boundaries, paragraph 148 of the NPPF states that plans should:

- 'a) ensure consistency with the development plan's strategy for meeting identified requirements for sustainable development;*
- b) not include land which it is unnecessary to keep permanently open;*
- c) where necessary, identify areas of safeguarded land between the urban area and the Green Belt, in order to meet longer-term development needs stretching well beyond the plan period;*
- d) make clear that the safeguarded land is not allocated for development at the present time. Planning permission for the permanent development of safeguarded land should only be granted following an update to a plan which proposes the development;*
- e) be able to demonstrate that Green Belt boundaries will not need to be altered at the end of the plan period; and*
- f) define boundaries clearly, using physical features that are readily recognisable and likely to be permanent.'*

6.12 Planning Practice Guidance sets out ways in which the impact of removing land from the Green Belt can be offset by compensatory improvements. It is suggested that if any sites are allocated within the Green Belt that compensatory improvements are included within the policy criterion, these could for instance include<sup>1</sup>:

- new or enhanced green infrastructure;
- woodland planting;
- landscape and visual enhancements (beyond those needed to mitigate the immediate impacts of the proposal);
- improvements to biodiversity, habitat connectivity and natural capital;
- new or enhanced walking and cycle routes; and
- improved access to new, enhanced or existing recreational and playing field provision.

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<sup>1</sup> Paragraph: 002 Reference ID: 64-002-20190722 of the Planning Practice Guidance

- 6.13 Surrey Heath have undertaken a range of evidence based studies in respect of the function of the Green Belt within Surrey Heath across the plan-making period. This has included:
- The Surrey Heath Green Belt and Countryside Study 2017;
  - The Surrey Heath Sites Appraisal 2018;
  - The Chobham Village Green Belt Boundaries Study and Addendum 2022;
  - The Surrey Heath Green Belt Review 2022 and Green Belt Review Addendum 2023.
- 6.14 The sites are assessed within the Green Belt Review Addendum 2023, which examines the function of parcels of land against Green Belt purposes 1 – 4, the impact that the release of Parcels would have upon the integrity of the wider Green Belt and the relative sustainability of areas of the Green Belt.
- 6.15 Each of the two sites within this deliverability assessment has an assessment relating to Green Belt within their respective proformas in this report which sets out what the Council may wish to consider as part of a wider consideration as to whether there are exceptional circumstances to warrant the the release of the relevant site.

## 7. Assessment of Potential Sites

- 7.1 In this section of the report, we provide a more comprehensive evaluation framework comprising of two distinct stages. For each site we undertake a stage 1 review which is characterised as a high level initial RAG assessment, whilst Stage 2 involves a meticulous qualitative review of the evidence presented in the preceding section.
- 7.2 Stage 1 serves as a preliminary gauge, employing a Red, Amber, Green (RAG) assessment to discern the high level feasibility of proposed sites within the context of the emerging local plan. Meanwhile, Stage 2 delves deeper into the qualitative aspects, scrutinising the detailed evidence furnished in the preceding section. The culmination of these stages then concludes to provide informed judgments regarding whether the identified sites could be deemed as representative of deliverable allocations within the emerging Local Plan.

### Site 1: Swift Lane site extension

Site Ref:	HA12/02	Site address:	Swift Lane
Parish:	Bagshot	Ward:	Windlesham & Chobham

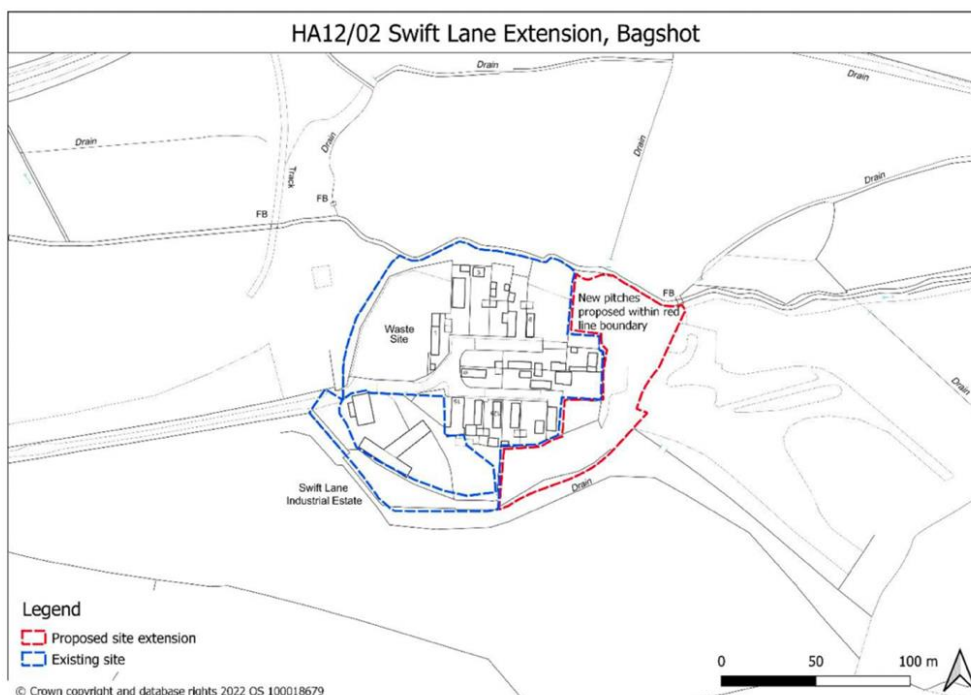


Fig 3: Site Plan of the existing site (blue boundary) and proposed site extension (red line) (taken from Surrey Heath Consultation Document)



*Fig 4: Aerial photograph of existing site (Bing maps)*

- 7.3 A desktop assessment has been undertaken, this firstly looks at the site background, and then assesses a number of possible constraints which may affect the deliverability and/or suitability of the site for allocation.

#### Site background

#### **Site location, description and existing land use**

- 7.4 The site is located at the end of Swift Lane, which is to the east of Bagshot and north of the M3 motorway. The site is located approximately 0.5km from the settlement of Bagshot which is identified as a District Centre in the Core Strategy and Development Management Policies DPD, therefore the site is in close proximity to a highly sustainable settlement, with its associated services and facilities. The site is considered to form a logical extension to the established gypsy and traveller site at Swift Lane which comprises 14 pitches and bounds the site to the west.
- 7.5 As set out in the Council's Interim Sustainability Appraisal Addendum which was published in August 2022 with regards to Swift Lane, the existing site is thought to be located on the site of a former landfill, and it is likely that this also applies to the land currently under

consideration as a potential location for an extension. Also, the land under consideration for an extension is understood to have been used for unauthorised activities over recent years, likely leading to further ground contamination (although it could be that the worst of the contamination is associated with land outside of the site to the east).

- 7.6 The site is not currently located within a defined settlement and is situated within the Green Belt.

### **Previously developed land**

- 7.7 The NPPF (2023) defines previously developed land in Annex 2 as:

*'Land which is or was occupied by a permanent structure, including the curtilage of the developed land (although it should not be assumed that the whole of the curtilage should be developed) and any associated fixed surface infrastructure. This excludes: land that is or was last occupied by agricultural or forestry buildings; land that has been developed for minerals extraction or waste disposal by landfill, where provision for restoration has been made through development management procedures; land in built-up areas such as residential gardens, parks, recreation grounds and allotments; and land that was previously developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape.'*

- 7.8 From the desktop analysis it is considered that the site would not meet the definition of previously developed land, however the site has been subject of past unlawful development including for the siting of caravans.

### **Proposed capacity**

- 7.9 The proposed capacity for the Swift Lane extension is 5 pitches.

### **Planning history**

- 7.10 The site has a long and complex planning history, much of it relating to previous breaches of planning control. The site has been the subject of past unlawful activity including the siting of caravans (not for Gypsy and Traveller use), and therefore has been cleared. There

have been a number of enforcement appeals on the site. There was, formerly a refuse disposal facility on part of the site and this has resulted in parts of the land on which it was sited being raised above the level of the adjacent fields.

## **Neighbouring uses**

7.11 The site is adjacent to an established Gypsy and Traveller Site and Bagshot Community Recycling Centre on the western boundary. The site is bound by the Windlebrook and woodland to the north, and by open fields with wooded boundaries to the east and south. The M3 motorway is situated c.200m to the south. A public right of way is located to the south of the site, which connects to a network of public rights of way that connect Bagshot, Windlesham and Lightwater.

## **Availability**

7.12 The site is not currently in use as a Gypsy and Traveller site, however as noted in the site description it is adjacent to an existing one and this allocation would be an extension to this site.

7.13 The site is within the ownership of Surrey Heath Borough Council who are willing to bring the site for the use of Gypsy and Traveller pitches. It is therefore understood that the site is available.

7.14 In terms of legal constraints, there are no known legal constraints (such as tenancies, ransom strips etc) which would preclude delivery of the site.

## **Desktop Study Phase 1 - RAG Rating**

7.15 As outlined above, an initial desktop study was undertaken on the site. The high-level results are outlined below, however the site generally scored green or amber on the majority of the categories. It did score negatively on one factor which related to its current location inside the Green Belt, however this is not considered an absolute constraint (i.e. it can be overcome by amendments to Green Belt boundaries) and is discussed in more detail in subsequent chapters of this report.

Criteria	Score
Flood Risk	<i>Amber – the site is located within Flood Zone 2.</i>
Environmental Designations	<i>Green – The site is not within or within close proximity of an international, national or local environmental designation.</i>
Green Belt and Landscape Designations	<i>Red - however this is not classified an absolute constraint.</i>
Potentially Contaminated or Unstable Land Issues	<i>Amber – two potential sources of contamination have been identified on site.</i>
Noise Issues	<i>Amber – The site is located adjacent to potentially noisy land uses which requires further investigation.</i>
Residential Amenity	<i>Amber - The site is adjacent to existing dwellings and requires further investigation</i>
Historic Assets	<i>Green - The site is not within or adjacent to any historic asset.</i>

### Desktop Study Phase 2- Detailed review of constraints

7.16 A second level of possible development constraints have then been analysed. The rationale behind their analysis and whether they are deemed to be a constraint is considered below:

<b>Possible constraint</b>	<b>Information</b>	<b>YES/NO?</b>
Green Belt	Policy E of the PPTS states that traveller sites (temporary or permanent) within the Green Belt are inappropriate development.	YES
Area of Outstanding Natural Beauty	The NPPF requires great weight be given to conserving the landscape and scenic beauty of Areas of Outstanding Natural Beauty	NO
Site of Special Scientific	Natural England designate SSSIs. These are a conservation designation denoting a protected area extremely valuable for	NO



Interest (SSSI)	its flora, fauna, physiological and geological features.	
Thames Basin Heaths SPA	Natural England advise that it is not possible to prevent harm arising from residential development with 400m of the SPA.	NO
Thames Basin Heaths SPA 400m buffer		NO
Thames Basin Heath SPA 5km buffer?	Proposals for residential development outside of the Thames Basin Heath SPA and 400m buffer will be required to provide appropriate measures to avoid adverse effects upon the Thames Basin Heath Special Protection Area in accordance with the Council's adopted Avoidance Strategy (or as subsequently amended).	YES
Public Safety Zone for Farnborough Airport	Development in this area would be contrary to Department of Transport Circular 01/10 which seeks to prevent new development in the PSZ, and to reduce it over time as circumstances allow.	NO
Ancient Woodland	Ancient woodland takes hundreds of years to establish and is defined as an irreplaceable habitat.	NO
Tree Preservation Order	A TPO is a written order made by a LPA which in general terms makes it an offence to cut down, top, lop, uproot, wilfully damage or destroy a protected tree without the LPAs consent.	NO
Local Wildlife Site	Local Wildlife Sites are areas of land that are especially important for their wildlife. They are corridors for wildlife, forming key components of ecological networks.	NO
Conservation Area	Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance	NO

	of which it is desirable to preserve or enhance.	
Flood Zone	The NPPF sets out a sequential approach to development with the aim to steer development away from area of highest risk (Zone 3). Surface water flooding could also act as a constraint on development. Information provided from the Environment Agency and Strategic Flood Risk Assessment (SFRA).	The site is located within Flood Zone 2. Flood zone 3 is located to the north.
Within 250m of landfill site	Landfill is the disposal of waste into or onto land by means of burial.	The site is located within 250m recycling centre, and other historic landfill uses.
Agricultural Land Classification (ALC)	ALC uses a grading system to assess and compare the quality of agricultural land in England and Wales. ALC is graded from 1 to 5 with 1 being 'excellent quality agricultural land'.	Grade 4 – Poor quality agricultural land

7.17 The second desktop study has found that the site is located within the Green Belt. Other constraints appear to be limited however the site is located within Flood Zone 2 and partly 3. Furthermore, the location of the nearby recycling centre may affect deliverability. The site is grade 4 agricultural land which is not considered to be a major constraint.

7.18 Following the above desktop analysis, a number of these suitability considerations will be discussed in more detail below:

### Suitability Assessments

#### Green Belt

7.19 The site was assessed through the Surrey Heath Green Belt Review Addendum (2023), under parcel reference BG7. The study found the Parcel to exhibit an urbanised character, with a very low level of function against the purposes of the Green Belt. The Study concluded

that the release of land from the Green Belt in this location would pose a negligible risk to the integrity of the wider Green Belt.

7.20 A map showing parcels considered in Bagshot is provided below.

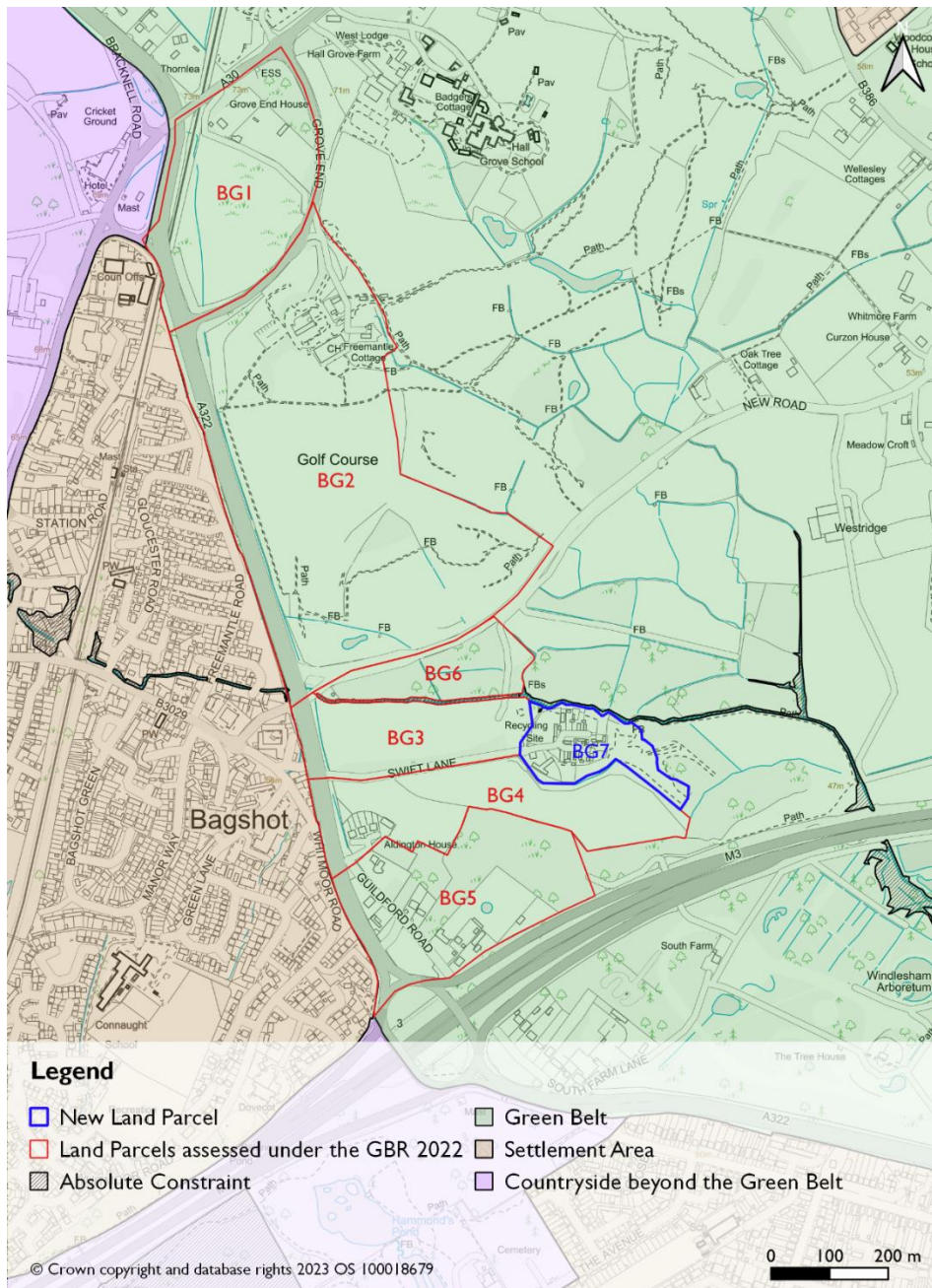


Fig 5: Surrey Heath Borough Council Green Belt Review Addendum (2023)

What are the exceptional circumstances to consider the release of the site from the Green Belt?

- 7.21 As with Policy set out within the National Planning Policy Framework (NPPF), Paragraph 16 of PPTS clarifies that inappropriate development is harmful to the Green Belt and should not be approved, except in very special circumstances. Traveller sites in the Green Belt, whether temporary or permanent, are inappropriate development; personal circumstances and unmet need are unlikely to clearly outweigh harm to the Green Belt and any other harm so as to establish very special circumstances.
- 7.22 Green Belt boundaries should be altered only in exceptional circumstances (Paragraph 17). PPTS advises that if a local planning authority wishes to make an exceptional, limited alteration to the defined Green Belt boundary (which might be to accommodate a site inset within the Green Belt) to meet a specific, identified need for a traveller site, it should do so only through the plan making process and should be specifically allocated in the development plan as a traveller site only.
- 7.23 It is for the Council to conclude whether Exceptional Circumstances exist that warrant a limited alteration to be made to Green Belt boundaries to accommodate any given site. However, in considering whether Exceptional Circumstances exist which warrant the release of the Swift Lane site (in its extended form) from the Green Belt, the Council may wish to consider the following:
- The scarcity of available and deliverable sites to meet the borough's traveller needs (The Council have been unable to find suitable sites outside of the Green Belt. As earlier outlined the Council have undertaken five Call for Sites exercises and have been unable to find a site which is not located within the Green Belt); and
  - That the existing site is well established; and
  - The area as a whole also includes a range of existing 'built up/urbanising' uses, including a nearby recycling centre, the established gypsy site and the M3 and A322. As such, there is a built and urbanised quality to the immediate area and the site expansion would not be out of keeping with this; and
  - The Surrey Heath Green Belt Review Addendum 2023 identifies the site as having a very low function against

purposes 1 – 4 of the Green Belt and suggests that the release of the site would have a negligible risk upon the integrity of the wider Green Belt; Regarding the site contribution to/impact on openness, the Site relates to an existing gypsy and traveller site. The proposals seek to modestly extend the site, not create an entirely new development, and it is not considered to contribute additional harm or increase the prominence of the existing development. The screening of the wider site is well established and the proposals are well contained within an existing clearing. It is noted that further screening to create a robust defensible edge to the new extended site could be secured as a requirement of a future allocation, to further preserve Green Belt openness (this is particularly the case with the eastern boundary, where new planting is recommended to meet part f of the NPPF paragraph 143 in terms of establishing a strong eastern boundary); and

- In its extended form, the site could meet some the need arising from existing pitches, which are over-crowded. The Site could offer enhancements which would also benefit the existing site, in terms of the potential provision of play space and the potential off site improvements to Swift Lane (widening to allow an extended passing place).

7.24 The Council should consider the above factors when considering the release of the Site from the Green Belt.

### Landscape Assessments

7.25 The site falls adjacent to an area of moderate landscape sensitivity within the Green Belt (as highlighted within the Surrey Heath Landscape Sensitivity Study 2021).

7.26 The Council published an interim Sustainability Appraisal Addendum in August 2022 when they consulted upon the site. Regarding the site the SA noted that the site was *'located in the Green Belt; however, the land under consideration for an extension is thought to be significantly degraded, with built form (etc) associated with unauthorised activities only having been quite recently cleared. A footpath runs adjacent to the site, which may be a well-used route linking residents of Bagshot to Windlesham Arboretum, and the wider*

*wooded landscape between the M3 and the A322 north of Lightwater. However, it is not clear that this is the case, given that the footpath passes alongside and crosses over the M3. Also, it could potentially be the case that the extension brings environmental improvements that serve to improve the experience of those using the footpath'*



*Fig 6: Showing the Right of Way via Footpath 64 (orange dotted line) to the south of the site*

7.27 If the Council were to allocate the site, it is suggested that given the Green Belt and countryside location, a defensible site boundary should be included which is sensitive to the countryside setting. The Council have commissioned a Landscape Sensitivity Assessment which was published in 2021. This should be used when determining if any site-specific appropriate criterion should be included within the relevant Local Plan policy to ensure an acceptable impact upon the adjacent area of moderate landscape sensitivity (to be informed by a future landscape assessment).

#### Impact of site on local character and amenity

7.28 The site is adjacent to an existing established Gypsy and Traveller site. The extension of the site would be for a small increase of 5



itches and unlikely to result in additional impact to the character and appearance of the area.

7.29 It is considered that the proposed pitches, parking areas and driveways that would be created would not be dissimilar to the existing hardstanding currently in place. The development of the site would be single storey and low rise in nature.

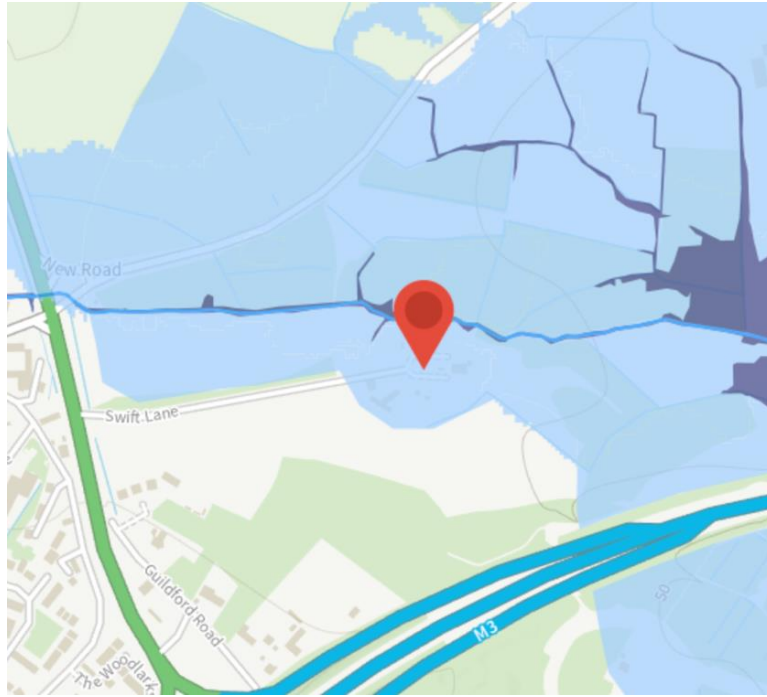
7.30 Furthermore, an extensive defensible boundary treatment should be located on site which would mean that the site would be well screened. It is considered that boundary treatments could act as a visual barrier to the wider countryside and Green Belt.



*Fig 7: Site (location shown above by a red star) in relation to other built form and Bagshot (by white marker)*

### Strategic Flood Risk Assessments

7.31 No Strategic Flood Risk Assessments have been undertaken on site. However, some desktop analysis has been taken in relation to flood risk. This shows that the site is located within Flood Zone 2 (light blue shading on map), with Flood Zone 3 located to the north (darker blue line to the north).



*Fig 8: Map showing sites location within Flood Zone 2, with flood zone 3 located to the north (adjacent to red marker) (source: Flood Map for Planning Service)*

7.32 Flood zone 2 has a medium probability of flooding. Areas located within flood zone 2 have been shown to have between a 0.1% – 1% chance of flooding from rivers in any year or between 0.1% – 0.5% chance of flooding from the sea in any year. Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map). A review of the extent of flooding from surface water has been undertaken. This shows that part of the east of the site is at high risk from surface water flooding, this means that this small area has a chance of flooding of greater than 3.3% each year. A small proportion of the site is also at medium risk which means this area has a chance of flooding between 1-3.3% each year.

7.33 Caravans and mobile homes intended for permanent residential use are classified as highly vulnerable within Annex 3 of the NPPF 2012, which categorises uses by their vulnerability to flooding. This does not mean that the site could not be allocated, however a site-specific flood risk assessment should be produced at planning application stage. The assessment should demonstrate to the decision-maker how flood risk will be managed now and over the development's



lifetime, taking climate change into account, and with regard to the vulnerability of its users. The flood risk assessment could include detailed modelling and where relevant any mitigation measures that may be required.

- 7.34 The Council need to balance any flood risk considerations as part of any wider balance, including the need to provide gypsy and traveller pitches as identified through the GTAA.



*Fig 9: Extent of flooding from surface water, site shown to the right of the cross.*

#### Noise and Air Quality impacts

- 7.35 In terms of noise sources there are a number of potential noise and air quality sources nearby to the site. The M3 is located to the south of the site and Bagshot Community Recycling Centre is located to the west. These will also be relevant for air quality.

- 7.36 The above are not anticipated to be significant concerns for the site. Officers have reported that following visits to the site noise and air quality are not considered to be problematic. Additionally, the site is situated at a considerable distance from the motorway, with a wooded landscape in between that provides some noise attenuation.

7.37 If the Council were to allocate the site and policy requirement should include the need for the submission of a noise assessments to ensure an acceptable level of noise emissions to residents.

### Contamination

7.38 A Phase I and II Geo-Environmental Assessment (GEA)(December 2022) has been produced by EPS to consider whether potential contamination is a constraint to delivery.

7.39 The GEA notes in paragraph 5.1 that records indicate that a historic landfill relating to 'Commercial Environmental Permitting Regulations' was first recorded on site in 1925. Historical mapping indicates that the site was used as a refuse tip from 1969 to 1985. A Household, Commercial and Industrial Waste Station site, first licensed in 1992, is present 80m to the west of the site.

7.40 The report reviews contaminant sources. This identifies the following potential sources on site:

- Historic Landfilling on site – site labelled as a refuse tip between c. 1969 and 1985; and
- Historic use as a Nursery – given that no historic structures are indicated on historic maps it is unlikely that any bulk storage of herbicides and pesticides has taken place on site and as such this is not considered to be an active source.

7.41 Table 6.5 within the GEA demonstrates the methodology used to provide an overall risk rating with respect to any potential sources of contamination that may affect the site. An overall risk rating is assigned to each potential contaminant considered the assessed likely and severity.

7.42 In terms of the results of the TPH analysis for the soil samples are considered to have a very low risk rating however are considered to be potentially active and therefore it is recommended that further investigation is undertaken to assess the risk.

7.43 Overall, the preliminary risk classification of the site in relation to the proposed redevelopment is considered to be very low to moderate. As such, some limited site investigation work is recommended.

7.44 In terms of the Tier II Generic Quantitative Contaminated Land Risk Assessment, this finds that:

- Exceedances of arsenic and benzo(a)pyrene were found in samples of Made Ground at specific depths and locations within the site.
- Due to the heterogeneous nature of Made Ground soils and limited sampling locations, further exceedances are likely.
- It is concluded that Made Ground soils across the site may pose a risk to human health.
- The primary pathway of exposure is ingestion of soil and indoor dust or oral background exposure.
- Proposed hard standing areas on the site are expected to effectively mitigate risks to future users by breaking the contamination pathway.
- If vegetated borders are planned, it is recommended to use a nominal thickness of clean imported soil as a barrier and implement a no dig membrane to prevent accidental exposure to underlying contamination, considering the proposed site use.

7.45 Groundwater analysis was conducted on samples from WS101, WS104, and WS106, comparing results with freshwater Environmental Quality Standards (EQS), UK Drinking Water Standards (DWS), and World Health Organization (WHO) DWS. This finds that:

- Exceedances of screening criteria were found for boron, copper, nickel, zinc, anthracene, benzo(ghi)perylene, and fluoranthene in various locations.
- Exceedances of UK/WHO DWS for boron, nickel, and anthracene were noted, but the site's distance from groundwater Special Protection Zones (SPZ) and absence of nearby drinking water abstractions mitigate significant risk to drinking water.
- Exceedances of freshwater EQS for metals and PAHs were observed, likely confined to perched water within the Made Ground.
- Potential dilution effects and a chemical fail rating of the nearby surface water receptor suggest identified contaminants are not likely of significant concern, and proposed development is not expected to increase risk.

- 7.46 In terms of Ground Gas, the worse-case hazardous gas flow rates (Q<sub>hg</sub>) were calculated according to BS8485:2015+A1:2019, resulting in a worst-case scenario of 0.0094l/h, indicating a Characteristic Situation 1 (CS1) classification. However, consistent encounters with carbon dioxide concentrations exceeding 5% in boreholes with unsaturated response zones suggest a more appropriate classification of Characteristic Situation 2 (CS2) with low hazard potential. Further gas monitoring is recommended to confirm this classification before determining suitable mitigation measures for the proposed development. Enclosed living spaces raised above ground are likely to naturally disperse ground gas laterally, but for those constructed directly on the ground, the risk will need to be mitigated by the incorporation of suitable gas mitigation measures will be necessary.
- 7.47 To summarise outline remedial measures, relating to the installing of hard standing (which will break the pathway between low level contamination identified within the soil and future site users), approach to vegetated borders, enclosed living spaces and use of raft foundations for lightly loaded structures. The document concludes that active pollutant pathways have been confirmed by the intrusive investigation works. However, it is considered that required remedial measures are not overly onerous and are unlikely to pose a significant constraint to the viability of developing the site for the intended end use.
- 7.48 Should the site be allocated for development, a requirement should be placed on the allocation for:
- Further assessment is undertaken in order to confirm that Windle Brook is not significantly affected by contaminants identified within the perched water underlying the site. This could include sampling of river water upstream and downstream of the site;
  - Further ground gas monitoring is undertaken in accordance with published guidance to expand the existing data set and confirm the initial ground gas assessment;
  - Following the above, a remediation strategy and verification plan is prepared for approval by the regulators prior to commencement of development works; and

- The design of any proposed foundations or roadways should take into consideration the significant thickness of heterogenous Made Ground beneath the site and the potential for chemicals to be present within the ground which could adversely affect concrete structures installed within.

### Heritage Assessments

7.49 No heritage assessments have been undertaken as part of this report. However, following the phase 1 and phase 2 desktop studies it was considered that this was not necessary at this time given that these do not appear to be a constraint to development at present.

### Design and site capacity

7.50 Architectural drawings have been produced to determine the capacity and potential design for the site, which have been linked to the highways work undertaken for this report. These are intended to act as an illustration to show that the site is capable of accommodating the development rather than fixing development. The design of the scheme is based on each pitch accommodating the following:

- One mobile home;
- One touring caravan;
- Parking for 2 vehicles;
- Amenity block, comprising bath/shower room, W.C and a kitchen/amenity area
- Waste/recycling storage.

7.51 Within each site, 2 parking spaces can be accommodated per pitch, with room for vehicles to manoeuvre. Covered cycle parking is also provided. Refuse vehicles would enter the site, turn on-site and exit in a forward gear. Refuse bins would be located at communal points within the site, with residents expected to bring their refuse to these points to enable refuse collectors able to move through the site more efficiently.

7.52 An area of land has also been safeguarded within the red line boundary to allow for a play area. This is in response to a number of consultation comments which suggested there were a number of

children on site and the nearest play facilities are situated some distance from the site, at c.1km.

7.53 It is suggested that pitches are located to the south and eastern boundary of the site and have been designed to be located furthest away from the small section of Flood Zone 3 which is located on the northern part of the site.

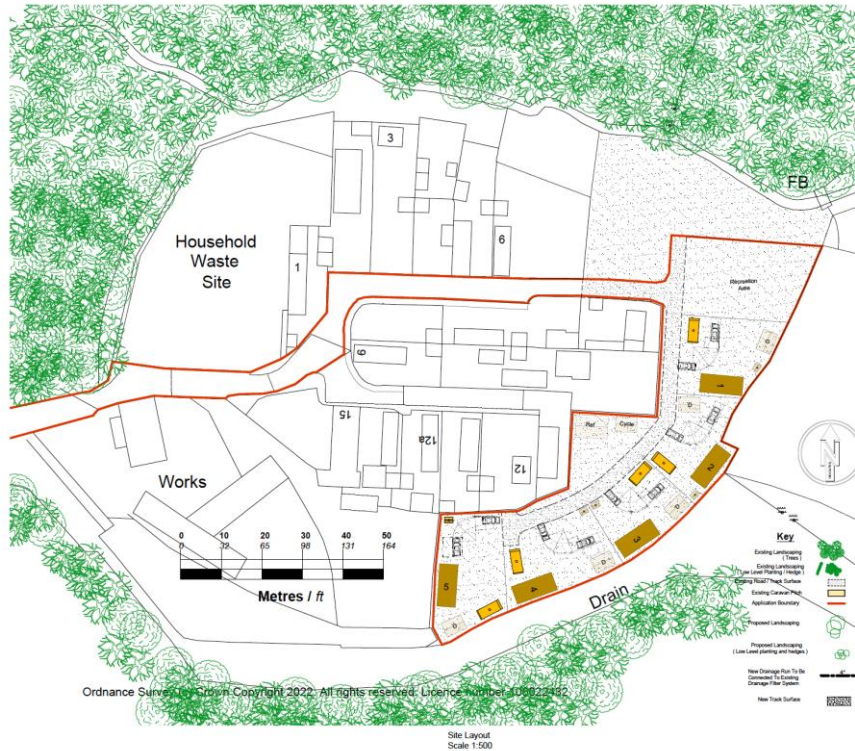


Fig 10: Illustrative capacity drawings for Swift Lane (5 pitches)

## Transport and Highways

7.54 A Transport Appraisal has been prepared by Motion, in relation to this site, the appraisal for both sites can be viewed in full in Appendix 2.

### *Local Highway Network*

7.55 The site is accessed from Swift Lane via the southbound A322. In the vicinity of this site, the A322 is a dual carriageway with a footpath provided on both sides of the carriageway. The A322 is subject to a speed limit of 50 miles per hour (mph), with Swift Lane subject to the national speed limit.

### *Public transport*

- 7.56 The nearest bus stops to the site are the Bagshot Green stops located some 610 metres west of the site. These stops provide shelter, street lighting and timetable information for the convenience and safety of service users.
- 7.57 Bagshot Railway Station is located some 1.2 kilometres from the site, accessible by pedestrian footpaths. This station is located on the line between Aldershot and Ascot (Berks) stations, with services running in each direction every half hour. These services stop at Aldershot, Ash Vale, Frimley, Camberley, Bagshot and Ascot (Berks).
- 7.58 The site is therefore considered to be located in a sustainable location, in close proximity to public transport nodes and local services and amenities.

### *Access*

- 7.59 The site will use the existing site access, as the site is currently used to transport caravans into and out of Swift Lane. Swept path analysis showing a 4x4 towing a standard caravan into and out of the site can be found in the Motion study.
- 7.60 Due to the narrowness of Swift Lane, it is advised that the passing place on Swift Lane, located approximately 60 metres west of the junction between the A322 and Swift Lane, be widened to improve the existing access arrangements. It is proposed for the highway controlled shrubbery one metre either side of the carriageway to be removed and the ground to be flattened in order to provide adequate passing facilities.
- 7.61 It is highly recommended that these widening improvements be made regardless of whether the site is extended.

### *Parking*

- 7.62 It is anticipated that two parking spaces per pitch will be provided, including manoeuvring space for vehicles. It is deemed that there will be no overspill of car parking onto the local highway as this parking provision is anticipated to meet the needs of the future residents. Covered cycle parking will be provided at each pitch across the site.

*Trip analysis*

7.63 It is anticipated that the site would result in a small increase in trips. However, increases in trips of this magnitude would have an imperceptible impact on the operation of local transport networks. Severe, residual impacts on the operation of the highway network are therefore not expected to arise as a consequence of the proposed development.

Accessibility

7.64 A key objective is to ensure that Traveller communities have good access to community services and facilities, particularly in respect of education and healthcare.

7.65 An assessment has been undertaken to assess the accessibility of the site to local services. The site would be accessed via the existing site and therefore it is considered that the site can provide safe access to the highways network.

7.66 In terms of distances to local services, a high-level analysis has been undertaken using Google Maps to establish the distance from the site to a number of key services and facilities locally. Given the high-level nature of this analysis it does not take into account conditions or highway safety i.e. whether there is a suitable footpath which would need to be considered should the site be allocated and/or a planning application be submitted.

Distance to:	
Primary school	0.7 miles to Connaught Junior School
GP surgery	0.8 Miles to Park House Surgery
Convenience Shop	0.7 Miles to Co-op Bagshot
Public transport route?	Bus stop: 0.4 Miles Train station: 0.8 Miles
Play park/ children's play area	0.8 miles to School Lane Field

7.67 The site is considered to be a reasonable distance from services and facilities.



### Thames Basin Heath Special Protection Area

7.68 The site is not located within the Thames Basin Heath SPA or within 400m of it, however the Thames Basin Heaths Special Protection Area (SPA) is located within 5km of the site. SPAs and SACs are European designated sites protected in the UK by Conservation of Habitats and Species Regulations 2017 (as amended).

7.69 Housing developments, where there is a net gain of one or more houses within 5 km of the Thames Basin Heaths SPA are required to contribute towards avoidance measures (Suitable Alternative Natural Greenspace, SANG and Strategic Access Management and Monitoring, SAMM), to offset the likely significant effects on the SPA. This should be made clear in the policy wording should the site be allocated.

### Suggested approach for the site

7.70 Following the above desktop studies and additional evidence base work, it is considered that the site is deliverable for Gypsy and Traveller accommodation for the following reasons:

- The site provides a logical extension to the existing Swift Lane site.
- There are no known legal constraints which would affect the availability of the site.
- It is anticipated that the site could accommodate 5 pitches, which would help to meet some of the identified need in the borough.
- The site is considered to be a reasonable distance from services and facilities, with safe access to the highway network able to be provided.
- Whilst the site is located within 5 km of the Thames Basin Heaths SPA, it is considered that adequate avoidance measures can be put in place.

7.71 Further investigation may be required to see where suitable soft landscaping could be included on site.

- 7.72 In considering whether exceptional circumstances exist that warrant the release of the site from the Green Belt, regard should be had to the information set out above, regarding the deliverability of the site. If minded to release the site from the Green Belt, it is recommended that relevant criterion should be added to the site allocation policy to ensure a number of factors are considered including the creation of a defensible boundary to create a soft edge to the newly inset site from the Green Belt.
- 7.73 Policy criterion should be included to cover matters such as flood risk, requiring the submission of assessments to fully consider these matters.
- 7.74 The Council should consider on-site constraints as part of the wider planning balance exercise, including the need to provide gypsy and traveller pitches as identified through the GTAA.
- 7.75 These recommendations are made based on the best available information, as summarised above and detailed in evidence studies.

## Site 2: Land south of Broadford Lane, Chobham

Site Ref:	HA12/03	Site address:	Land South of Broadford Lane, Chobham
Parish:	Chobham		

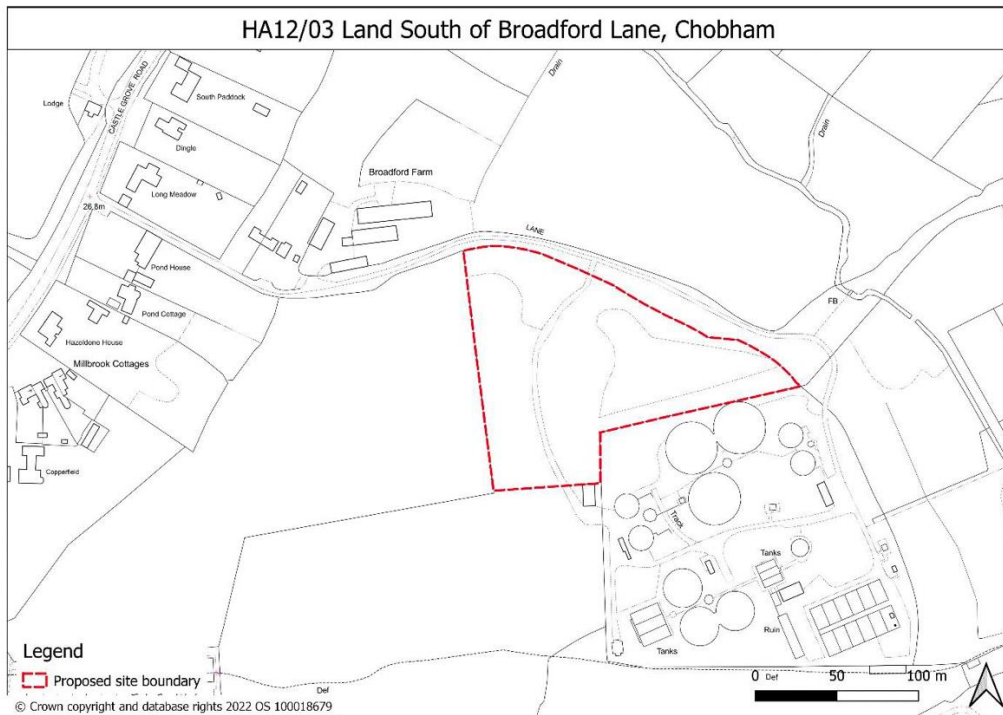


Fig 11: Site Plan

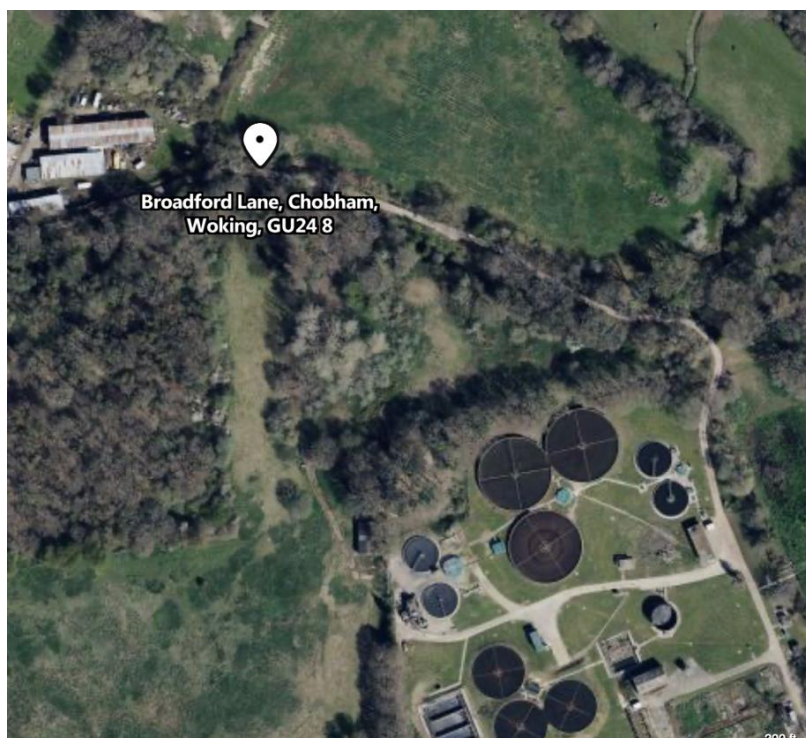


Fig 12: Aerial photograph of site (Bing Maps)

7.76 A desktop assessment has been undertaken, this firstly looks at the site background, and then assesses a number of possible constraints which may affect the deliverability and/or suitability of the site for allocation.

### **Site location, description and existing land use**

7.77 The site is triangular in shape and is located to the south of the settlement area of Chobham and to the east of Castle Grove Road, adjacent to the Broadford Lane Waste Water Treatment Works which were constructed in the 1970's.

7.78 The site is located within the Green Belt, approximately 0.4km from the defined settlement of Chobham which itself is noted as being 'washed over' by Green Belt in Local Plan Policy CP1 (Spatial Strategy); the policy states that the village has limited capacity to accommodate any new development. The site comprises of vacant open land which is currently used for grazing.

### **Proposed capacity**

7.79 The proposed capacity for the site is anticipated to be between 13-16 Pitches.

### **Planning history**

7.80 There is no relevant planning history for the site.

### **Previously developed land**

7.81 The NPPF defines previously developed land in Annex 2: Glossary as:

*'Land which is or was occupied by a permanent structure, including the curtilage of the developed land (although it should not be assumed that the whole of the curtilage should be developed) and any associated fixed surface infrastructure. This excludes: land that is or was last occupied by agricultural or forestry buildings; land that has been developed for minerals extraction or waste disposal by landfill, where provision for restoration has been made through development management procedures; land in built-up areas such as residential gardens, parks, recreation grounds and allotments; and land that was*

*previously developed but where the remains of the permanent structure or fixed surface structure have blended into the landscape.'*

7.82 From the desktop analysis it is not considered that the land would fall within the definition of previously developed land.

### **Neighbouring uses**

7.83 The site is located adjacent to Waste Water Treatment Works (south of the site) and open fields (north, west and east of the site).

### **Cross boundary issues**

7.84 The site is located within Surrey Heath, however it is located close to the edge of the administrative boundary with Woking Borough Council ('WBC'). WBC are a statutory consultee in the Local Plan process and have been consulted upon all Development Plan Documents. WBC responded to the most recent consultation on Additional Site Allocations for Gypsy and Travellers and Travelling Showpeople (Regulation 18) Consultation where they raised no objection to the potential allocation of the site and its proximity to the boundary of their Borough. Within their representation Woking Borough Council confirmed that they can currently meet their identified need for Gypsies and Travellers.

### **Availability**

7.85 The site is not currently in use as a Gypsy and Traveller Site. There are no known legal issues (bar ownership, which is discussed in more detail below), which may affect the site coming forward, however it is acknowledged that the occupiers of the adjacent Waste Water Treatment Works, Thames Water, may wish to expand their site in future and the site would form a logical extension to the Works.

7.86 At the time of the identification of Broadford Lane as a potential Gypsy and Traveller site, Land Registry records indicated Surrey Heath Borough Council to be the legal owner of the site, however Surrey County Council have since asserted that the land should have been transferred to the County in 1974 following local government

re-organisation. Following review, Surrey Heath Borough Council has agreed to transfer the land to Surrey County Council.

7.87 Transfer of the land to SCC may not preclude provision of the site as the site would remain in public ownership. However further engagement with Surrey County Council would be necessary to understand whether they are willing to make the site available for the proposed use and at what cost.

7.88 In addition to the above, it is noted that Broadford Lane is unregistered. Should improvements be required to Broadford Lane in order to accommodate the proposed use, Surrey Heath would need to secure ownership of the lane, through the compulsory purchase process.

Desktop Study Phase 1- RAG rating

7.89 As outlined above, an initial desktop study was undertaken on the site. The high-level results are outlined below, however the site generally scored green on the majority of the categories. It did score negatively on one factor which related to its current location inside the Green Belt, however this is not considered an absolute constraint (i.e. it can be overcome by amendments to Green Belt boundaries) and is discussed in more detail in subsequent chapters of this report.

Criteria	Score
Flood Risk	<i>Green – the site is located within Flood zone 1 which has the lowest probability of flooding.</i>
Environmental Designations	<i>Green – The site is not within or within close proximity of an international, national or local environmental designation.</i>
Green Belt and Landscape Designations	<i>Red - however this is not classified an absolute constraint.</i>
Potentially Contaminated or Unstable Land Issues	<i>Amber – The site is potentially contaminated or unstable and requires further investigation.</i>
Noise Issues	<i>Amber - The site is located adjacent to potentially noisy land uses which requires further investigation.</i>

Residential Amenity	<i>Green – There are no adjacent dwellings and therefore no impact on residential amenity.</i>
Historic Assets	<i>Green – The site is not within or adjacent to any historic asset.</i>

Desktop study Phase 2- Detailed review of constraints

7.90 A second level of possible development constraints have then been analysed. The rationale behind their analysis and whether they are deemed to be a constraint is considered below:

<b>Possible constraint</b>	<b>Explanation</b>	<b>YES/NO?</b>
Green Belt	Policy E of the PPTS states that traveller sites (temporary or permanent) within the Green Belt are inappropriate development.	YES
Area of Outstanding Natural Beauty	The NPPF requires great weight be given to conserving the landscape and scenic beauty of Areas of Outstanding Natural Beauty	NO
Site of Special Scientific Interest (SSSI)	Natural England designate SSSIs. These are a conservation designation denoting a protected area extremely valuable for its flora, fauna, physiological and geological features.	NO
Thames Basin Heaths SPA?	Natural England advise that it is not possible to prevent harm arising from residential development with 400m of the SPA.	NO
Thames Basin Heaths SPA 400m buffer		NO
Thames Basin Heath SPA 5km buffer?	Proposals for residential development outside of the Thames Basin Heath SPA and 400m buffer will be required to provide appropriate measures to avoid adverse effects upon the Thames Basin Heath Special Protection Area in accordance with the Council's adopted Avoidance Strategy (or as subsequently amended).	YES

Public Safety Zone for Farnborough Airport	Development in this area would be contrary to Department of Transport Circular 01/10 which seeks to prevent new development in the PSZ, and to reduce it over time as circumstances allow.	NO
Ancient Woodland	Ancient woodland takes hundreds of years to establish and is defined as an irreplaceable habitat.	NO
Tree Preservation Order?	A TPO is a written order made by a LPA which in general terms makes it an offence to cut down, top, lop, uproot, wilfully damage or destroy a protected tree without the LPAs consent.	NO
Local Wildlife Site	Local Wildlife Sites are areas of land that are especially important for their wildlife. They are corridors for wildlife, forming key components of ecological networks.	NO
Conservation Area?	Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance.	NO
Flood Zone	The NPPF sets out a sequential approach to development with the aim to steer development away from area of highest risk (Zone 3). Surface water flooding could also act as a constraint on development. Information provided from the Environment Agency and Strategic Flood Risk Assessment (SFRA).	The site is located within Flood Zone 1.
Within 250m of landfill site?	Landfill is the disposal of waste into or onto land by means of burial.	YES (Broadford Lane Landfill, Broadford Lane, Chobham)



Agricultural Land Classification	ALC uses a grading system to assess and compare the quality of agricultural land in England and Wales. ALC is graded from 1 to 5 with 1 being 'excellent quality agricultural land'.	Grade 4 – Poor quality agricultural land
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7.91 This second assessment has shown that the site is located within the Green Belt, there appear to be limited constraints in relation to flooding as the site is located in Flood Zone 1. Furthermore, the location of the nearby landfill site and Waste Water treatment Works may affect deliverability. The site is grade 4 agricultural land which is not considered to be a major constraint.

7.92 Following the above desktop analysis, a number of these suitability considerations will be discussed in more detail below:

### Suitability Assessments

#### Green Belt

7.93 The site was assessed through the Surrey Heath Green Belt Review Addendum (2023), under parcel reference CH34. The study found the Parcel to have a moderate high level of function against the purposes of the Green Belt and as posing a moderate level of risk to the integrity of the Green Belt in the event of release.

7.94 A map showing parcels considered in Chobham is provided in fig 13.

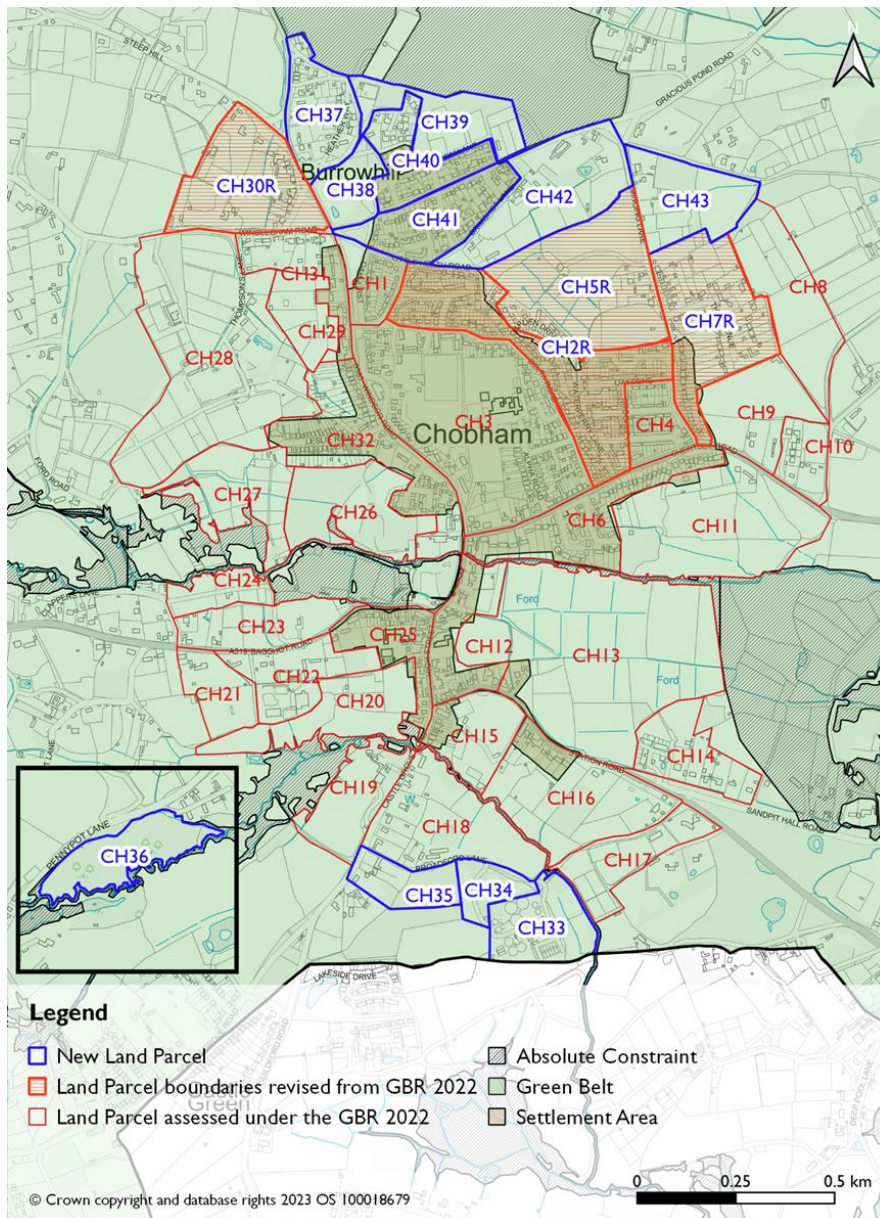


Fig 13: Surrey Heath Borough Council Green Belt Review Addendum (2023)

*What are the exceptional circumstances to consider the release of the site from the Green Belt?*

7.95 As with Policy set out within the National Planning Policy Framework (NPPF), Paragraph 16 of PPTS clarifies that inappropriate development is harmful to the Green Belt and should not be approved, except in very special circumstances. Traveller sites in the Green Belt, whether temporary or permanent, are inappropriate development; personal circumstances and unmet need are unlikely to clearly outweigh harm to the Green Belt and any other harm so as to establish very special circumstances.

7.96 Green Belt boundaries should be altered only in exceptional circumstances (Paragraph 17). PPTS advises that if a local planning authority wishes to make an exceptional, limited alteration to the defined Green Belt boundary (which might be to accommodate a site inset within the Green Belt) to meet a specific, identified need for a traveller site, it should do so only through the plan making process and should be specifically allocated in the development plan as a traveller site only.

7.97 It is for the Council to conclude whether Exceptional Circumstances exist that warrant a limited alteration to be made to Green Belt boundaries to accommodate any given site. However, in considering whether Exceptional Circumstances which warrant the release of the site from the Green Belt, the Council may wish to consider the following:

- The scarcity of available and deliverable sites to meet the borough's traveller needs (The Council have been unable to find suitable sites outside of the Green Belt. As earlier outlined the Council have undertaken five Call for Sites exercises and have been unable to find a site which is not located within the Green Belt); and
- The site is well contained in the wider landscape, with the capacity for a modest development of limited impact; and
- The site is seen in the context of the Broadford Lane Sewage Works, which provides a 'built up/urbanising' context for the proposals. As such, there is already a built and urbanised quality to the neighbouring site; and
- The site is well defined by wooded field boundaries would generally provide reasonable Green Belt boundaries in this location, with the capacity for a modest expansion; and
- Regarding the site contribution to/impact on openness, the proposals seek a modest development. The screening of the site is well established and the proposals are well contained within an existing clearing. It is noted that further screening to create a robust defensible edge to the new extended site could be secured as a requirement of a future allocation, to further preserve Green Belt openness;

- As set out below, there are a number of challenges associated with the the site, including odour impacts and highways access, which are considered to impact upon the viable delivery of the site

7.98 The Council should consider the above factors when considering the release of the Site from the Green Belt.

### Landscape Assessments

7.99 The site is located within an area of moderate landscape sensitivity within the Green Belt (as highlighted within the Additional Site Allocations for Gypsy and Travellers and Travelling Showpeople, 2022 consultation document).

7.100 The Council published an interim Sustainability Appraisal in February 2022 when they consulted upon the site. Regarding the site the SA noted that the site was:

*'located in the Green Belt, and would comprise a new stand-alone site, as opposed to an extension to an existing site. The land is thought to be degraded, associated with a former landfill, plus there is an adjacent sewage works, but there is reason to suggest landscape sensitivity nonetheless. This is primarily because Broadford Lane is a bridleway, and whilst seemingly open to vehicular use, has a speed limit of 10 mph. It is also a historic lane (shown on the pre-1914 OS map), and potentially valued as a link between Chobham and common land / heathland landscapes to the south east. Also, there is a need to consider the historic character of Castle Grove Road in the vicinity of Broadford Lane, where there are two grade 2 listed buildings, including one on the corner with Broadford Lane, as well as another locally listed building and several others shown on the pre-1914 OS map, potentially including buildings linked to a former brickworks. Finally, there is a need to note an adjacent field to the south, which crosses over into Woking Borough, and is thought to be associated with significant ground contamination issues. There would be a need to ensure a defensible Green Belt boundary'*

7.101 It is suggested that the existing mature vegetation on site is retained to limit the impact of the site on the rural landscape and relevant criterion should be included within an emerging policy if the site were to be allocated.

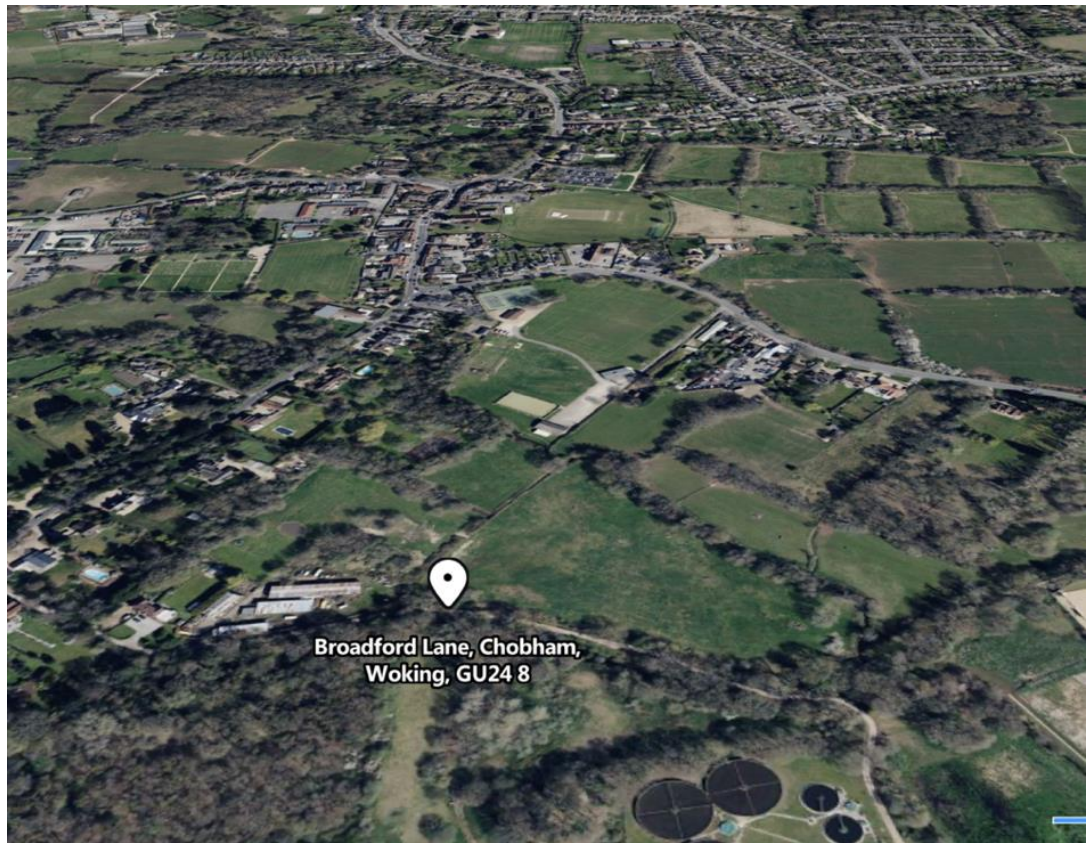
7.102 If the Council were to allocate the site, it is suggested that given the Green Belt and countryside location a defensible site boundary should be included which is sensitive to the countryside setting. The Council have commissioned a Landscape Sensitivity Assessment which was published in 2021. This should be used when determining if any site-specific appropriate criterion should be included within the relevant Local Plan policy. Further assessments may be needed to be undertaken.

#### Impact of site on local character and amenity

7.103 The site is located along a lane which is rural in nature. The site is currently undeveloped.

7.104 The development of the site for Gypsy and Traveller pitches would result in development which is single storey and low rise in nature, well screened by established and extensive defensible boundary planting which acts as a visual barrier. This is discussed in greater detail in the Green Belt chapter.





*Fig 14: The sites' location (shown via white marker) in relation to built form and Chobham (top of picture) – (Source: Bing Maps).*

### Heritage Assessments

7.105 No heritage assessments have been undertaken as part of this report as heritage is not considered to be a constraint to development.

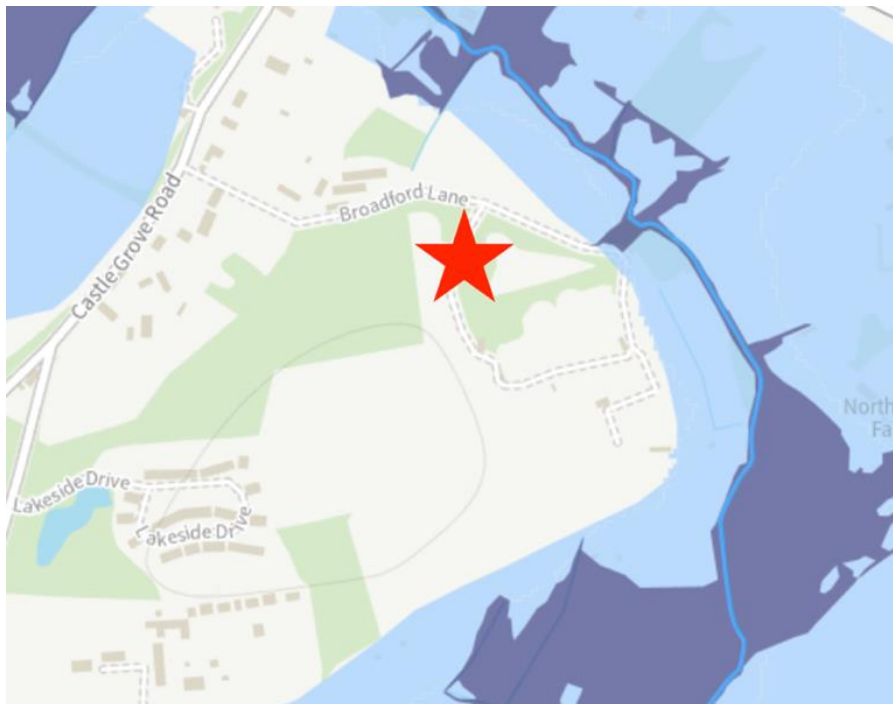
### Strategic Flood Risk Assessments

7.106A Strategic Flood Risk Assessment has not been undertaken to support this study. However, some desktop analysis has been taken in relation to flood risk.

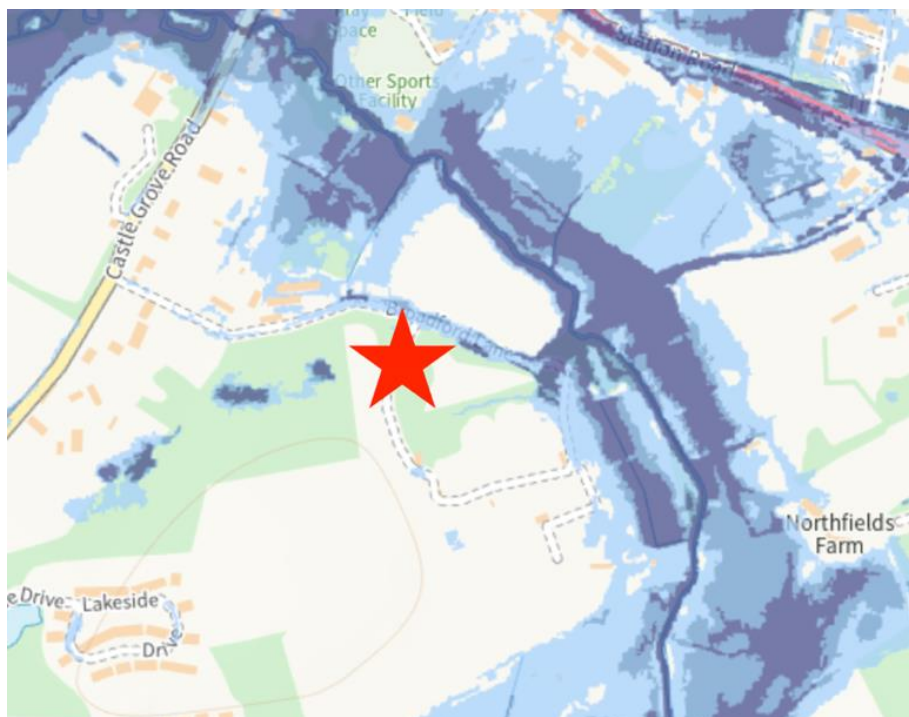
7.107 The site is located within Flood Zone 1 which has the lowest probability. Areas deemed to be in flood zone 1 have been shown to be at less than 0.1% chance of flooding in any year. Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3).

7.108 There are very few restrictions in terms of flood risk to development on flood zone 1 areas, the exception is for development over 1

hectare in size which must have a flood risk assessment undertaken as part of a planning application and areas deemed to be at high risk of flooding from rainfall known as Critical Drainage Areas.



*Fig 15: Map showing the sites location within Flood Zone 1 (red star shows the sites approximate location) (source: Flood Map for Planning Service)*



*Fig 16: Extent of risk of flooding from surface water, the sites approximate location is shown as a red star (source: Flood Map for Planning Service)*

7.109 In terms of risk from surface water flooding on site, the site is at very low risk. This means that this area has a chance of flooding of less than 0.1% each year. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding. Therefore, flood risk is not considered to be a factor which precludes the delivery of this site.

### Contamination Assessments

7.110 An Environmental Desk Study and Preliminary Risk Assessment (May 2022) has been carried out for the Site and land to the south, so it is considered a wider catchment.

7.111 Regarding past uses and risks the report comments at 10.1 that:

*"It has been reported that the site has historically existed as part of a nursery, before becoming part of a brick field and quarry, prior to becoming a refuse tip*

*It is therefore concluded that not only would there appear to be some potentially significant contamination sources present, but should the site be considered for residential use then this will introduce sensitive receptors, for which the CSM has identified a number of pathway linkages.*

*The most potentially significant of these linkages have initially been considered to relate to the contact, ingestion and inhalation of soil dust (including asbestos fibres), along with the general presence of potentially explosive gases emerging at the surface."*

7.112 As set out in the Council's Sustainability Appraisal which was published in February 2022 as a result of its historic use as a landfill site, the site may have contamination issues which will need to be explored further should the site be allocated or subject to a planning application. Additionally, the Site is near to the Broadford Lane landfill and the impacts of this will need to be determined.

7.113 The Environmental Desk Study and Preliminary Risk Assessment (May 2022) goes on to recommend at 10.2 that:



*"In view of the above conclusion it would be necessary to fully characterise the ground conditions on the site, both chemically and physically, by means of an intrusive investigation*

*It is also expected that ground gases will be active in this area due to the presence of underlying degrading waste material, and therefore this would need to be taken into consideration at the design stage of the project, to allow for effective mitigation.*

*It is suggested therefore that a more detailed Phase II investigation proposal is put forward once the layout details of the site have been finalised."*

7.114A Tier 2 Contaminated Land Generic Quantitative Risk Assessment (September 2023) has been produced for the site. This noted that in terms of potential active sources for contamination on-site, there is potential from historic landfilling with potential for contaminated soils and ground gases associated with deposition of commercial and industrial waste within the historic landfill between c. 1950's and 1970's.

7.115A Tier II Generic Quantitative Contaminated Land Risk Assessment was then undertaken, The report identifies exceedances of lead, cyanide, and asbestos in specific samples of Made Ground collected from WS104 and WS103. While only two locations have been investigated, due to the heterogeneous nature of Made Ground soils, it is likely that further exceedances exist elsewhere on the site, posing a potential risk to human health. Primary pathways for exposure to lead include ingestion of soil and dust, while cyanide exposure primarily occurs through ingestion of soil and dust. Asbestos exposure is primarily through inhalation of dust, although the identified material is cement bound. Proposed hardstanding areas are expected to effectively mitigate risks to future site users, but if vegetated borders are planned, a layer of clean imported soil is recommended as a barrier, along with a no-dig membrane between the clean soil and underlying contaminated ground to prevent accidental exposure.

7.116The groundwater analysis conducted on samples from WS104 revealed exceedances of screening criteria for several determinants

including copper, nickel, total cyanide, anthracene, and fluoranthene. However, no significant risk to drinking water is posed as the UK Drinking Water Standards (DWS) were not exceeded, the site is not within a groundwater source protection zone, there are no drinking water abstractions within 2km, and the clay deposits limit contaminant migration. Similarly, surface water risk is minimal as exceedances are largely confined to perched water in the Made Ground, and dilution would occur before reaching the River Bourne. The proposed development is not expected to introduce new pathways or increase risk.

7.117 The hazardous gas flow rates calculated for the site indicate a potential classification of Characteristic Situation 1 (CS1) according to BS8485:2015+A1:2019. However, due to consistent encounters with carbon dioxide concentrations above 5% in recent site investigations and historical boreholes, a classification of Characteristic Situation 2 (CS2) with low hazard potential is deemed more appropriate. Further gas monitoring is recommended before determining mitigation measures for the proposed development. While most enclosed living spaces are expected to be raised above ground, those directly on the ground will require suitable gas mitigation measures to mitigate any risk from ground gas emanation.

7.118 The report concludes with the following recommendations should the proposals be progressed beyond the feasibility stage it is recommended that:

- Given the size of the site, further site investigation works is undertaken to increase the data set, especially in areas where a significant thickness of Made Ground is expected;
- Further assessment is undertaken in order to confirm that the drain and River Bourne are not significantly affected by contaminants identified within the perched water underlying the site. This could include sampling of river water upstream and downstream of the site. However, potential impacts from the adjacent Waste Water Treatment Works would also need to be considered;
- Further ground gas monitoring is undertaken in accordance with published guidance to expand the existing data set and confirm the initial ground gas assessment;

- Following the above, a remediation strategy and verification plan is prepared for approval by the regulators prior to commencement of development works; and
- The design of any proposed foundations or roadways should take into consideration the significant thickness of heterogenous Made Ground beneath the site and the potential for chemicals to be present within the ground which could adversely affect concrete structures installed within. Soft alluvial soils were also encountered within the eastern areas.

### Odour Assessment

7.119 An Odour Assessment has been undertaken by Redmore Environmental (dated January 2024). This notes in summary that an Odour Assessment was conducted at the site which is located next to the Chobham Wastewater Treatment Works (WwTWs) to determine the potential odour emissions and their impact on future residents. The assessment used data from the facility and industry research to estimate the odour concentrations and compared them to benchmark levels.

7.120 The results showed that the predicted odour concentrations were above the benchmark levels and the impacts were considered significant. Further investigations were recommended to better understand the potential odour impacts on future occupants of the site.

7.121 Surrey Heath Borough Council met with Thames Water on 27<sup>th</sup> November 2023 to discuss the Odour Assessment and the implications for the potential Gypsy and Traveller site. It was noted that further site-specific evidence would be required to support the allocation, including a site audit and sampling. There would also be a need to better understand potential noise and light pollution impacts upon future residents.

7.122 It was also noted that upgrades to address odour issues could cost upwards of £1 million, which would need to be borne by the Council as the developer. The cost of both further evidence and mitigation itself is significant and should feed into consideration of the viability of the site.

7.123 Notwithstanding this, if minded to allocate the site, the policy wording for any potential future allocation should require demonstration that there would not be any significant odour or noise impacts on future residents. This would also ensure that the allocation of a gypsy and traveller site would not affect the long term viability of the sewerage works, in terms of the co-existence of the uses.

#### Air Quality Assessment

7.124 In addition, an Air Quality Assessment has been undertaken by Redmore Environmental (dated January 2024), this notes that one Air Quality Management Area (AQMA) has been declared in the borough. This is described as *'the strip of land from Frimley Road, Camberley to Ravenswood Roundabout, Camberley which embraces the M3 Motorway and the houses on both side of the motorway which border the highway'* – this AQMA is located approximately 8km west of the proposed site and is considered unlikely to cause air quality impacts over this distance and therefore has not been considered further in the context of the Air Quality Assessment.

7.125 Paragraph 4.6 of the Air Quality Assessment notes that the proposed use is for residential land use. The site is considered to be a location of relevant exposure to elevated pollutant concentrations in accordance with DEFRA guidance. However, the site is not located within an AQMA and recent NO<sub>2</sub> monitoring results recorded near the site indicated compliance with the recent Air Quality Objective (AQO). As such, exposure of future residents of the relevant AQO is not predicted and the location is considered suitable for the proposed end use.

7.126 The Air Quality Assessment concludes that the site has the ability to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with travelling to and from the site during operation. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities was predicted to be not significant. It then notes that based on the results, air quality factors are not considered to be a constraint to use the site for residential development.

### Impact on Neighbours

7.127 As noted above, the site is adjacent to a Waste Water Treatment Works. For the above reasons, it is recommended that the proposals demonstrate that the gypsy and traveller site would not affect the long term viability of the sewerage works, in terms of the co-existence of the uses (through the submission of detailed assessments as set out above).

### Transport/ Highways

7.128 A Transport Appraisal has been prepared by Motion, in relation to this site, the appraisal for both sites can be viewed in full in Appendix 2.

#### *Local highway network*

7.129 The local highway network is formed by a plethora of local roads with a fork creating two distinct north-south paths through the area. One such path is Chobham Road which turns into Castle Grove Road, the other being the A322 Bagshot Road.

7.130 In the vicinity of the junction between the A322 and Chobham Road, the A322 is a single carriageway road with one lane in each direction. There is regular street lighting and footways on either side of the carriageway.

#### *Public transport*

7.131 The nearest bus stops to the site are located some 800 metres from the site, on the A3046 Station Road. These stops include street lighting and timetable information to increase the convenience and safety of service users. These stops are serviced by route 73 which runs hourly from Kingfield Green to Chobham Bowling Green Road via Woking, Horsell and Mimbridge.

7.132 Further bus stops, located on the A319 High Street, provide access to route 39A and 87.

7.133 The site is therefore considered to be located in a sustainable location, in close proximity to public transport nodes and local services and amenities.

### *Access*

7.134 The site will utilise Broadford Lane to access the site. Swept path analysis undertaken shows a 4x4 towing a standard caravan accessing the site with ease through this route. There is a need for a small amount of widening of Broadford Lane, as well as the existing access to the site itself, in order to allow a low loader transporting a static caravan to access the site. It is proposed that this access widening be provided in the form of 'grasscrete' so as to minimise the impact. Swept path analysis of a low loader, including the necessary widening areas is included within the Motion Appraisal.

7.135 Visibility splays from Broadford Lane onto Castle Grove Road are in excess of Manual for Street (MfS) requirements for a 40 miles per hour (mph). Splays of 2.4m by 200 metres are achievable to the north, with 2.4m by 215 metres achievable to the south.

7.136 Broadford Lane is unregistered. Should improvements be required to Broadford Lane in order to accommodate the proposed use, Surrey Heath would need to secure ownership of the lane, through the compulsory purchase process.

### *Parking*

7.137 It is anticipated that two parking spaces per pitch will be provided across both Sites, including manoeuvring space for vehicles. It is deemed that there will be no overspill of car parking onto the local highway as this parking provision is anticipated to meet the needs of the future residents. Covered cycle parking can be provided at each pitch across the site.

### *Proposed Trip Generation*

7.138 The site is expected to result in a small increase in trips. However, increases in trips of this magnitude would have an imperceptible impact on the operation of local transport networks. Severe, residual impacts on the operation of the highway network are therefore not expected to arise as a consequence of the Proposed Development.

### *Accessibility*

7.139A key objective is to ensure that Traveller communities have good access to community services and facilities, particularly in respect of education and healthcare.

7.140An assessment has been undertaken to assess the accessibility of the site to local services. The site would be accessed via Broadford Lane.

7.141In terms of distances to local services and facilities, a high-level analysis has been undertaken using Google Maps to establish the distance from the site to a number of key services and facilities. Given the high-level nature of this analysis it does not take into account conditions or highway safety i.e. whether there is a suitable footpath which would need to be considered should the site be allocated and/or a planning application be submitted.

Distance to:	
Primary school	0.8 Miles to St Lawrence C of E Primary School
GP surgery	1 mile to Chobham and West End Medical Practice
Convenience Shop	0.6 Miles to Tesco express
Public transport route? i.e. bus stop	Bus stop:0.6 miles Train station: 2.9 miles to Woking train station
Play park/ children’s play area	0.7 Miles

7.142The site is considered to be a reasonable distance from services and facilities.

*Additional technical note – October 2023*

- 1.1 An additional Broadford Lane Survey Technical Note was provided by Motion in October 2023. This technical note supplements a more comprehensive transport appraisal of the Site which is set out in the Motion Report entitled “Potential Traveller Sites, Surrey Heath, Transport Appraisal” dated February 2023.
- 1.2 The technical note provides the details of a traffic survey which was undertaken over a 4-day period in August 2023 and agreed in advance with officers of Surrey County Council (SCC). The table

above demonstrates that during the 96 hours of surveys undertaken, the following movements were observed on the lane:

- an average of 17 pedestrians per day.
- an average of 1 equestrian per day.
- an average of 5 cyclists per day.
- an average of 50 cars / vans per day.
- An average of 7 lorries per day – which were observed to be primarily related to maintenance work that appeared to be being undertaken at the sewage treatment works.

1.3 The technical note states that *'movements of the above magnitude indicate that it would be unusual to meet another user on the lane, travelling by whatever mode, rather than the norm'*.

1.4 The Technical Note concludes that it can be expected that overall trip volumes would be lower than the settled community, as the working characteristic of many gypsies and travellers may result in residents working away for extended periods of time or on a week-by-week basis. It notes that this, when combined with the low volume of users of Broadford Lane means that the risk of two users meeting on the Lane is low. It therefore concludes that the use of the Site for up to 16 gypsy and traveller pitches would not lead to either an unacceptable impact on highway safety or severe residual cumulative impacts on the road network.

1.5 With reference to paragraph 115 of the NPPF, Motion do not consider that there are any transport or highway reasons identified why a future planning application should be withheld or refused.

#### Additional information

##### *Suitability of Bridleway 14 for the proposed use*

7.143 Notwithstanding the above, Surrey County Council has raised a number of concerns in respect of the conclusions reached within the Transport Appraisal. Their concerns can be summarised as follows:

- A 2.4 x 79m splay is significantly below the desirable 2.4 x 120 vis splay under DMRB guidance for a road with a 40mph speed limit. Even if the minimum visibility splay of 90m were accepted, the achievable visibility splay still falls short of this;



- The Appraisal does not address the fact that there would be insufficient space to allow longer vehicles to pull safely clear of Castle Grove Road, which could result in vehicles protruding into, or reversing back onto the carriageway, in the event that a vehicle was exiting Broadford Lane.
- There is potential for conflict with vehicles emerging from Pond House which shares the same access and has restricted visibility of the lane. Whilst the Transport Appraisal suggests that two-way access and egress is possible, this would only apply to a car positioned at the far left of the access waiting to pull out. The vehicle tracking suggests a car and trailer would require most of the width of the access to turn in, so if another vehicle was present this would be very problematic.
- The Transport Appraisal indicates that the proposed development could generate up to an additional 152 vehicle trips on a typical weekday. SCC regard this as a significant intensification of use of the access, increasing road safety risks, in particular for vulnerable road users accessing the Public Bridleway.
- It is recognised that the Appraisal mentions passing places but the suggested sites are on unregistered land and are too few to provide a safe refuge for horses, cyclists and pedestrians.
- It is disagreed that the chances of a non-motorised user meeting a vehicle on the lane is low. The Non-Motorised User Survey indicates that the average number of pedestrian movements on the two week days studied is 22, which is considered to constitute moderate use for such a path. As such, whilst the chances that any given vehicle will meet an NMU user is fairly low, each NMU user is highly likely to meet a motorised vehicle.

7.144 Surrey Heath has explored whether the concerns raised could be addressed with Motion and Surrey County Council, however whilst it is recognised that additional speed surveys could be completed to gain a better understanding of the suitability of the access between Castle Grove Road and Broadford Lane, it is unlikely that concerns regarding the provision of passing places, the availability of space to pull off the highway and risks to non-motorised users could be addressed, particularly as there is no capacity to provide additional passing places closer to Castle Grove Road. As a result, Surrey County Council remain of the view that the suggested level and size

of vehicles movements on a narrow public bridleway with no linear refuge presents an extreme risk to the safety of all public users and would accordingly object to any planning application coming forward on the grounds of highways safety.

### Thames Basin Heath Special Protection Area

7.145 Thames Basin Heaths Special Protection Area (SPA) is located approximately 1.4 km to the south-east of the site. A further two parcels of land, which are jointly designated under the Thursley, Ash, Pirbright & Chobham Special Area of Conservation (SAC) and Thames Basin Heaths SPA are located 1.8 km to the north and 2.9 km to the west of the site respectively. SPAs and SACs are European designated sites protected in the UK by Conservation of Habitats and Species Regulations 2017 (as amended).

7.146 There are four Sites of Nature Conservation Interest (SNCIs) located within 1 km of the site. SNCIs are afforded some protection via local planning policy. There are four Sites of Nature Conservation Interest (SNCIs) located within 1 km of the site. Himalayan balsam was recorded on site. This species is listed under Schedule 9 of the Wildlife and Countryside Act, 1981 (as amended) as an invasive plant species.

7.147 The site is located within 5 km of the Thames Basin Heaths SPA. Housing developments, where there is a net gain of one or more houses, within 5 km of the Thames Basin Heaths SPA are required to contribute towards avoidance measures (Suitable Alternative Natural Greenspace, SANG and Strategic Access Management and Monitoring, SAMM), to offset the likely significant effects on the SPA. This should be made clear in the policy wording should the site be allocated.

### Ecology

7.148 A Preliminary Ecological Appraisal (PEA) was undertaken for the site in September 2022.

7.149 Himalayan balsam was recorded on site. This species is listed under Schedule 9 of the Wildlife and Countryside Act, 1981 (as amended) as an invasive plant species. The Appraisal also identified evidence of

Badger Activity and recommended that further survey work should be undertaken between February – April (during the active Badger season). The resultant Badger Monitoring Report identified a degree of Badger activity, but concluded that this would not represent an absolute constraint to the development, although a licence would be required for the closure of sett entrances.

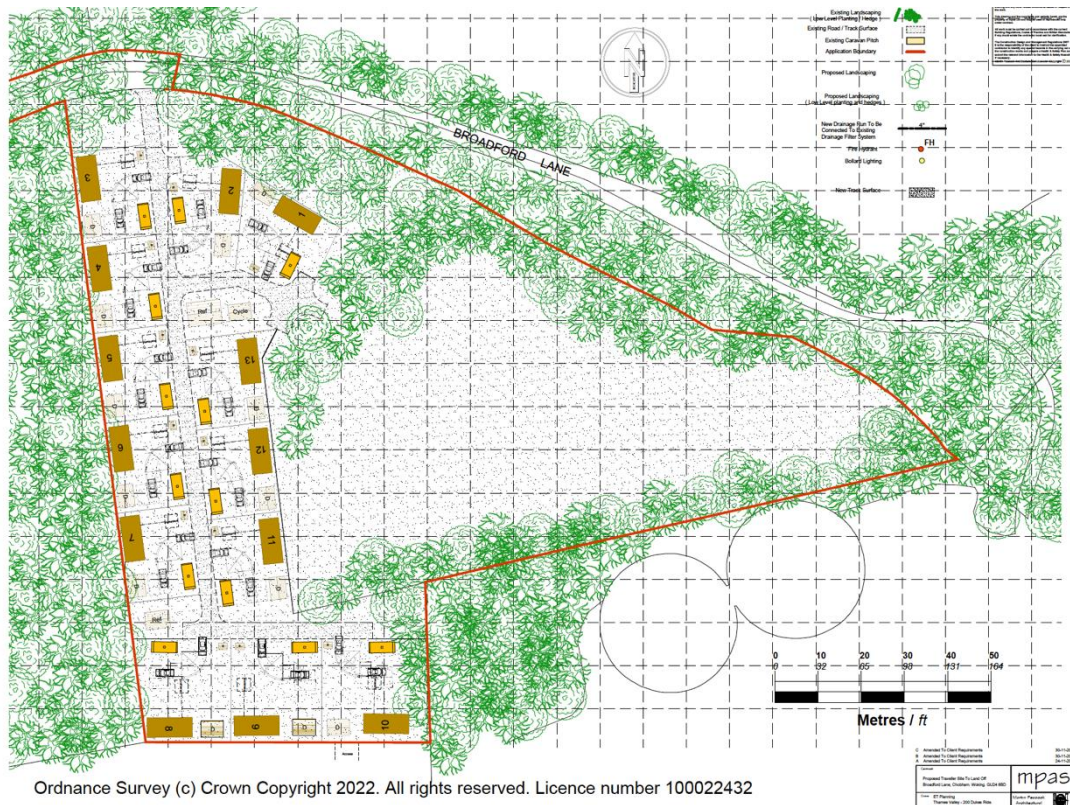
### Design and site capacity

7.150 Architectural drawings have been produced for each site to determine the capacity and potential design for the site, which have been linked to the highways work undertaken for this report. These are indented to act as an illustration rather than fixing development, therefore the illustrative designs have been created to show that the site has capacity for the number of pitches proposed and that suitable sizes and requirements fit on site. The design of the scheme is based on each pitch accommodating the following:

- i) One mobile home;
- ii) One touring caravan;
- iii) Parking for 1 – 2 vehicles;
- iv) Amenity block, comprising bath/shower room, W.C and a kitchen/amenity area
- v) Waste/recycling storage.

7.151 Within each site, 2 parking spaces are being provided per pitch, with room for vehicles to manoeuvre and covered cycle parking also provided. Refuse vehicles would enter the sites, turn on-site and exit in a forward gear. Refuse bins are located at communal points within the sites, with residents expected to bring their refuse to these points and refuse collectors able to move through the site more efficiently.

7.152 Taking account of the findings of the contamination, ecological and odour studies, the easternmost part of the site is considered to be more constrained than the western half of the site. An illustrative drawing has therefore been produced to show that 13 pitches could be accommodated within the western section of the site.



*Fig 17: Illustrative layout showing a potential capacity of 13 pitches.*

7.153 It is acknowledged that a number of trees are also located within site. Where the removal of trees is required to facilitate new traveller pitches and/or new access, the woodland that is lost should be replaced with like-for-like or better quality habitat. It is suggested that if the site were to be allocated that relevant criterion relating to ecology and trees/biodiversity is included within the policy.

### Suggested approach for the Site

7.154 Whilst none of the supporting feasibility studies taken alone indicates that the site is not deliverable, some key concerns arise as a result of these, including that:

- Whilst the Transport Appraisal indicates the Site to be deliverable in respect of the proposed access, parking, proposed trip generation and accessibility, Surrey County Council have expressed significant concerns in respect of the suitability of Broadford Lane for the purposes of site access.
- Results of the Odour Assessment showed that the predicted odour concentrations were above the benchmark levels and the impacts were considered significant. Following on from

engagement with Thames Water, the costs of addressing odour issues are likely to be significant and may have an impact on the viability of the allocation.

- 7.155 Taking account of the concerns set out above, in addition to other factors, such as the presence of protected species and the presence of contaminated land which may also affect the viability of the site, it is concluded that the site is likely to be undeliverable. The Council may wish to have regard to this evidence in considering whether there are exceptional circumstances to warrant the alteration of Green Belt boundaries in order to accommodate the site.
- 7.156 Notwithstanding this, if minded to allocate the site, it should be noted that the Environmental Desk Study and Preliminary Risk Assessment (May 2022) provides recommendations that the policy would need to require should the Site be allocated.
- 7.157 Likewise the Odour Assessment recommends that further work is undertaken to ensure that potential residents would not be adversely affect by odour, it is therefore recommended that further work is explored before taking the site further. In addition, should this work be able to adequately mitigate odour it is suggested the policy wording for any potential future allocation (in addition to requiring the above) should also require demonstration that there would not be any significant odour or noise impacts on future residents.

## 8. Assessment Outcomes

- 8.1 Two sites have been assessed through this Gypsy and Traveller and Travelling Showpeople Deliverability Assessment. These are:
- An extension to an existing GTTS site at **Swift Lane, Bagshot** - to provide **5 additional pitches**, and
  - A new site at **Land South of Broadford Lane, Chobham** - for between **13-16 pitches**.
- 8.2 These sites were consulted on in the Regulation 18 Draft Surrey Heath Local Plan: Preferred Options (2019 – 2038) Additional Site Allocations for Gypsy and Travellers and Travelling Showpeople which took place in August 2022. This consultation noted that in advance of the Regulation 19 Local Plan Consultation, further site-specific work would be undertaken in order to better understand the deliverability of the sites identified. This study sets out in detail the work that that has been undertaken.
- 8.3 Both sites have been assessed for their site suitability and deliverability.
- 8.4 Both sites are located within the Metropolitan Green Belt, however the Council could choose to remove the sites from the Green Belt through the Local Plan process, as outlined in Policy E of the PPTS, if the sites meet the exceptional circumstances within the NPPF.
- 8.5 Illustrative drawings have been created which show each site has the capacity to hold a number of pitches. The design of the scheme is based on each pitch accommodating the following:
- One mobile home;
  - One touring caravan;
  - Parking for 1 – 2 vehicles;
  - Amenity block, comprising bath/shower room, W.C and a kitchen/amenity area
  - Waste/recycling storage.

- 8.6 To assess the sites, firstly a desktop analysis was undertaken to review possible constraints which could affect the delivery of each site.
- 8.7 In addition, a number of supporting technical studies were also instructed relating to site specific issues identified through the desktop analysis. These are outlined below:
- Contamination (for both sites given the former land uses); and
  - Highways (for both sites). In addition a further highways technical note was produced for Broadford Lane owing to comments from Surrey Council Council regarding the access; and
  - Odour and Air Quality Assessments (for Broadford Lane only, given the close proximity to the Waste Water treatment Works).
- 8.8 The above studies and their results and implications for each of the sites have been discussed in more detail throughout the report.
- 8.9 The findings of this report consider that **Swift Lane, Bagshot is suitable for allocation for 5 pitches** in the Regulation 19 Plan based on the following reasons:
- The site provides a logical extension to this existing Gypsy and Traveller site.
  - There are no known legal constraints which would affect the availability of the site.
  - It is anticipated that the site could accommodate 5 pitches, which would help to meet some of the identified need in the borough.
  - It is anticipated that the site could qualify for exceptional circumstances to justify release from the Green Belt. It will be for the Council to determine whether they do or not.
  - The site is considered to be a reasonable distance from services and facilities, with safe access to the highway network able to be provided.
  - The site is located within 5 km of the Thames Basin Heaths SPA and it is considered that adequate avoidance measures can be put in place.

8.10 It is considered however that **Land South of Broadford Lane, Chobham is not suitable for allocation** in the Regulation 19 Plan based on a number of reasons in combination, in summary these are due to:

- Issues with regard to Bridleway 16 and the ability for this to be safely used for access. The County Council do not consider the bridleway constitutes a suitable access for the site, owing principally to the inability to add passing places. This was a suggested mitigation measure to ensure the safety of users of Broadford Lane, given the nature and increase in traffic movements.
- The impact upon the viability of the site taking account of the need to mitigate odour impacts from the adjacent Waste Water treatment Works, in addition to the need to remediate land contamination and address ecological issues.



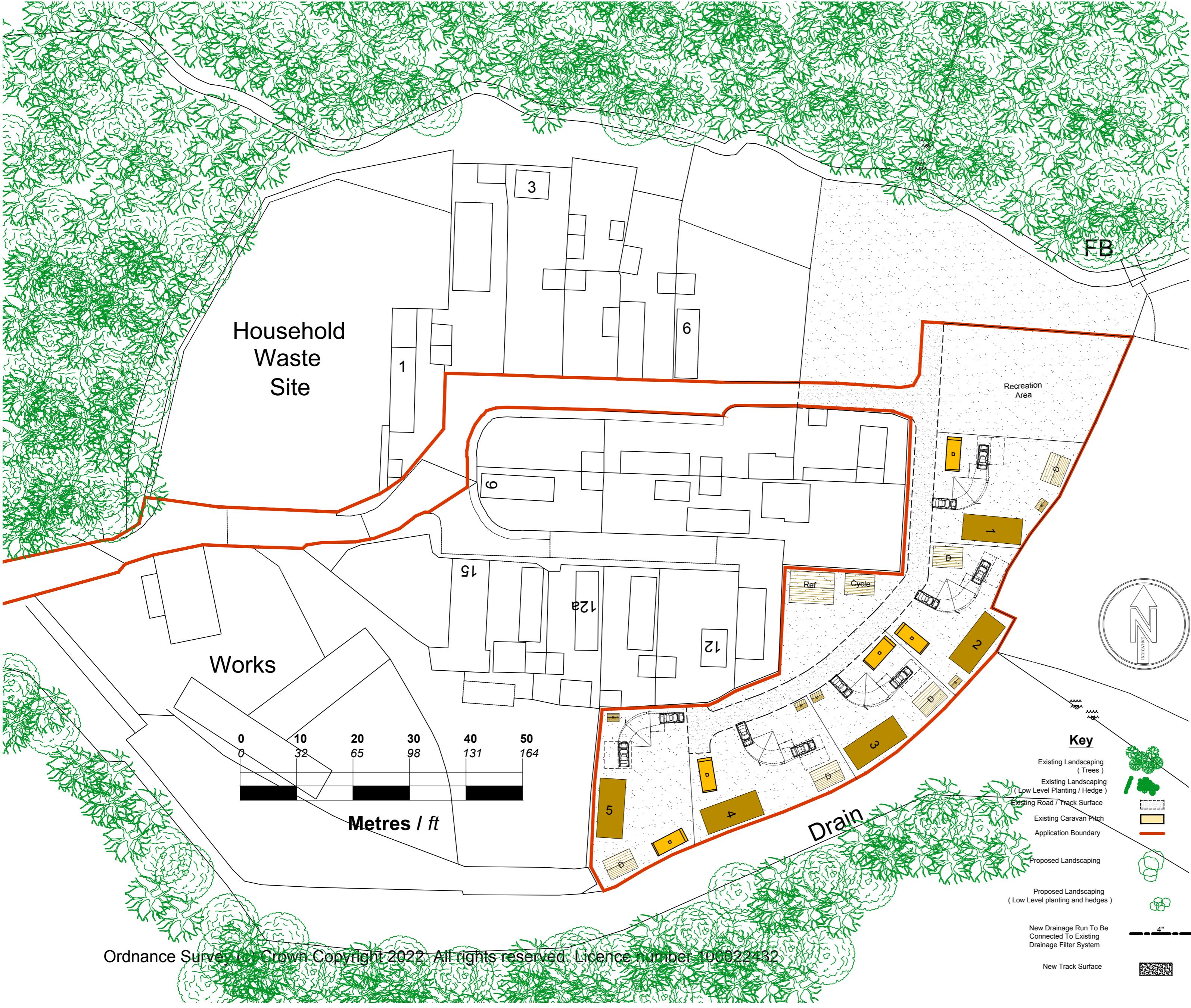
## Appendices

### 1. Illustrative capacity drawings

## 1a Extension to Swift Lane illustrative layout



**NOTES**  
 1. Dimensions only are to be used from this drawing. If any doubt exist the contractor must ask for clarification. On no account must the contractor scale off this drawing.  
 2. Contractors and sub contractors must check and agree all dimensions before preparing workshop drawings or commencing work on site.  
 3. Contractors are responsible for informing neighbours of any disturbance caused on this drawing to adjacent sites. Drawing and any other related documents issued in respect of this work.  
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 6. The Construction Design and Management Regulations 2007: It is the responsibility of the client to ensure the appointed contractor to identify any special hazards in the carrying out of the construction work and prepare a Health & Safety Plan and submit the relevant information to the Health & Safety Executive if necessary.  
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Site Layout  
 Scale 1:500

**Key**

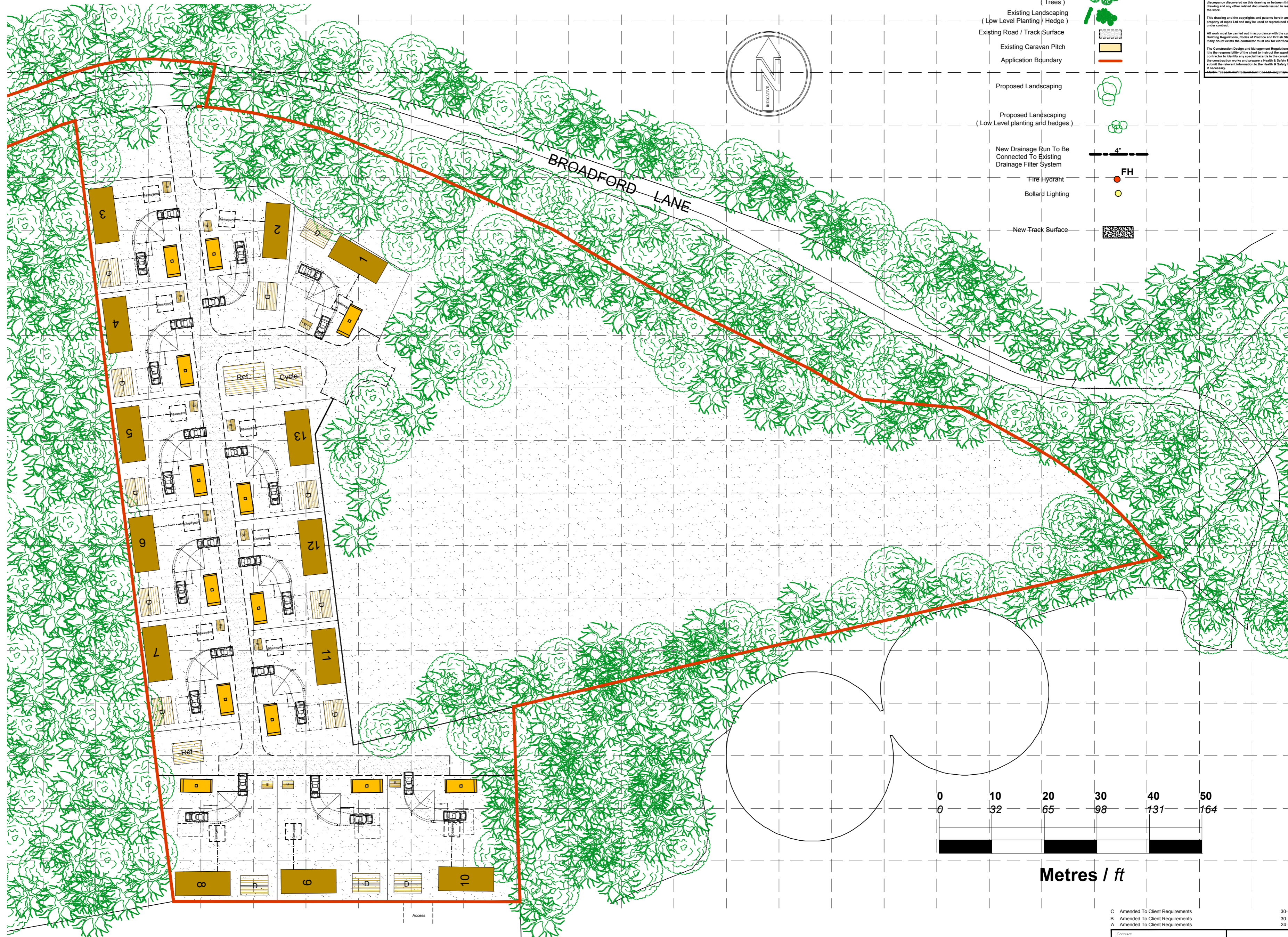
- Existing Landscaping ( Trees )
- Existing Landscaping ( Low Level Planting / Hedge )
- Existing Road / Track Surface
- Existing Caravan Pitch
- Application Boundary
- Proposed Landscaping
- Proposed Landscaping ( Low Level planting and hedges )
- New Drainage Run To Be Connected To Existing Drainage Filter System
- New Track Surface

C	Amended To Client Requirements	30-11-2022
B	Amended To Client Requirements	30-11-2022
A	Amended To Client Requirements	24-11-2022
Contract		
Proposed Extension To Existing Gypsy / Traveller Site To Land Off Swift Lane, Bagshot, GU19 5NJ.		
Client	ET Planning Thames Valley - 200 Dukes Ride, Crowthorne, RG45 6DS	mpas Martin Peacock Architectural Services Limited
Site Layout As Proposed		Old Reading Room Main Street, Stanforth, Settle North Yorkshire YO24 5PE. Tel: 07745 234 261
Drawn	MDP	Rev No
Scale	1:500 @A2	2022-52
Date	02-11-2022	Revision
		501
		C



1b Broadford Lane – western parcel





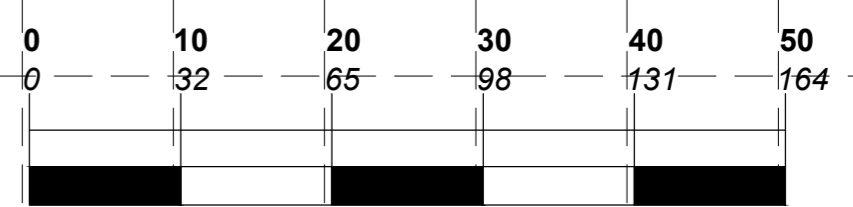
**Key**

- Existing Landscaping (Trees)
- Existing Landscaping (Low Level Planting / Hedge)
- Existing Road / Track Surface
- Existing Caravan Pitch
- Application Boundary
- Proposed Landscaping
- Proposed Landscaping (Low Level planting and hedges)
- New Drainage Run To Be Connected To Existing Drainage Filter System
- Fire Hydrant
- Bollard Lighting
- New Track Surface

**NOTES**  
 Dimensions only are to be used from this drawing. If any doubt exist the contractor must ask for clarification. On no account must the contractor scale off this drawing.  
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4"

FH



**Metres / ft**

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Site Layout  
 Scale 1:500

C Amended To Client Requirements	30-11-2022
B Amended To Client Requirements	30-11-2022
A Amended To Client Requirements	24-11-2022
Contract	
Proposed Traveller Site To Land Off Broadford Lane, Chobham, Woking, GU24 8BD	
Client	ET Planning Thames Valley - 200 Dukes Ride, Crowthorne, RG45 6DS
Client	Martin Peacock Architectural Services Limited
Drawing	
Site Layout As Proposed West Site	
Drawn	MDP
Scale	1:500 @A2
Date	02-11-2022
Rev No	2022-51
Drawing No	510
Revision	C



## 2. Transport Appraisal from Motion – February 2023



Potential Traveller Sites  
Surrey Heath

**Transport Appraisal**

For

ET Planning

## Contents

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2.0	Transport Policy .....	1
3.0	Highway Access Suitability .....	3
4.0	Proposed Allocations.....	7
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B	Indicative Chobham Site Layout Plans
C	Swept Path Analysis: Bagshot Site, Standard Towing Caravan
D	Swept Path Analysis: Swift Lane Passing Place Widening
E	Swept Path Analysis: Chobham Site, Standard Towing Caravan
F	Swept Path Analysis: Chobham Site, Static Caravan
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H	Broadford Lane Passing Places Area of Search
I	TRICS Reports



## 1.0 Introduction

- 1.1 Motion is instructed by ET Planning to prepare a Transport Appraisal to investigate the suitability of allocating two sites within the emerging Surrey Heath Local Plan for use as traveller and gypsy settlements. These are located at Swift Lane, Bagshot (the “Bagshot Site”) and land south of Broadford Lane, Chobham (the “Chobham Site”).
- 1.2 Both sites are located within the administrative boundaries of Surrey County Council and Surrey Heath Borough Council and their locations are illustrated on Figure 1.1 below.

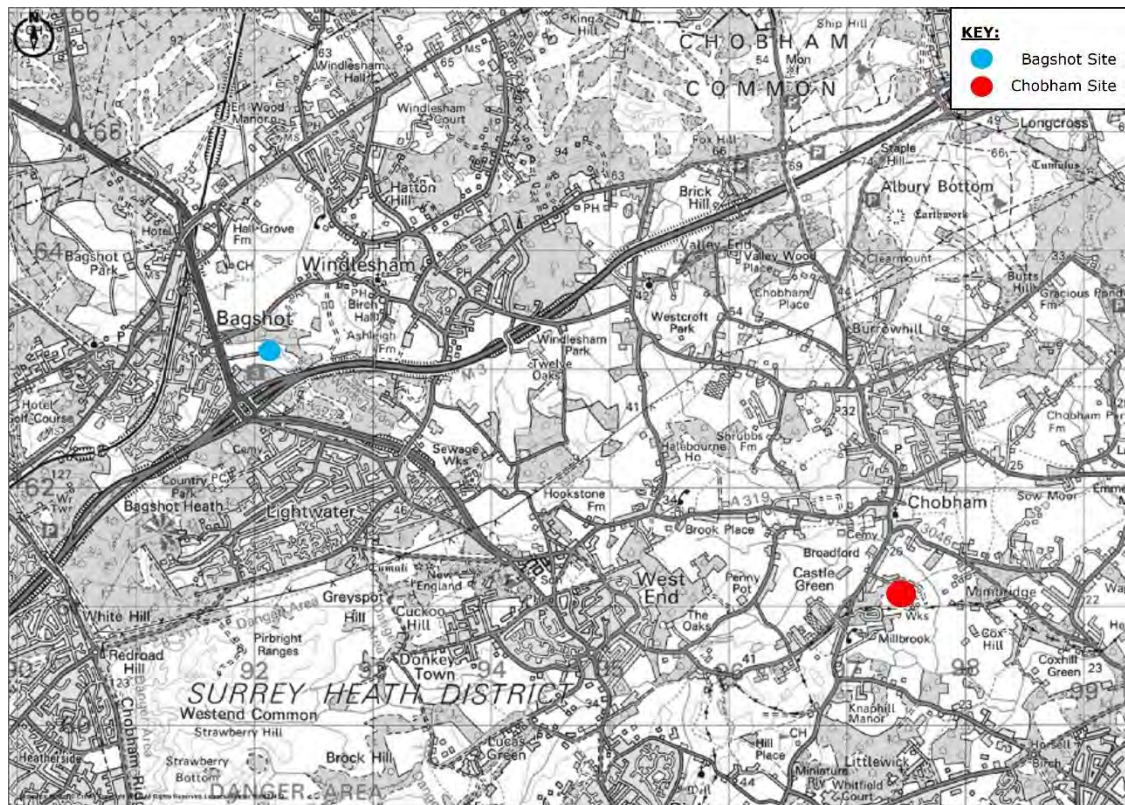


Figure 1.1: Site Locations

- 1.3 This Transport Appraisal has been prepared to investigate the suitability of allocating two sites for use as traveller and gypsy settlements within the emerging Surrey Heath Local Plan. These comprise the extension of the existing traveller site at Swift Lane, Bagshot (the “Proposed Bagshot Allocation”) and the establishment of a traveller site on land south of Broadford Lane, Chobham (the “Proposed Chobham Allocation”).
- 1.4 This Transport Appraisal has been prepared in accordance with current best practice guidelines and demonstrates that:
- ▶ The proposed allocations accord with national and local policies relevant to transport;
  - ▶ Safe and suitable access can be achieved; and,
  - ▶ The change in travel demand associated with the proposed allocations will not lead to severe harm to the operation of the existing highway network.
- 1.5 Following this introduction, this Transport Appraisal is split into five sections as follows:

- ▶ Section 2 outlines the transport planning policies that are considered to be relevant to plan making and to any site allocations;
- ▶ Section 3 sets out the highway suitability of the area surrounding the Sites;
- ▶ Section 4 provides an overview of the proposed allocations and details of their proposed access; and
- ▶ Section 5 assesses the trip generating potential of the proposed allocations and provides an overview of the impacts these are likely to have.

1.6 A summary and conclusion is provided at Section 6 which is that with reference to paragraph 111 of the NPPF, there are no transport or highway reasons identified why a future planning application should be withheld or refused. Both sites are therefore suitable for allocation.

## 2.0 Transport Policy

### Overview

- 2.1 As this Transport Appraisal is looking at the possibility of allocating the sites discussed, the key policy document which sets the context for the possible allocations comprises the National Planning Policy Framework (July 2021).

### National Planning Policy Framework (NPPF)

- 2.2 The National Planning Policy Framework (NPPF) July 2021 sets out the Government's planning policies for England and how they are expected to be applied.
- 2.3 The NPPF presumes in favour of sustainable development and is a material consideration in planning decisions. Paragraph 104 says that;

*"Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:*

*a) the potential impacts of development on transport networks can be addressed;*

*b) opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*

*c) opportunities to promote walking, cycling and public transport use are identified and pursued;*

*d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and*

*e) patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places."*

- 2.4 Section 9 of the NPPF deals with 'Promoting Sustainable Transport'. Paragraph 105 states that:

*"Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making."*

- 2.5 Off-street parking provision is referred to by Paragraph 105, which says that, in setting local parking standards for development, local planning authorities should take into account accessibility; the type, mix and use of the development; the availability of and opportunities for public transport; local car ownership levels; and an overall need to reduce the use of high-emission vehicles.

- 2.6 Paragraph 108 states:

*"Maximum parking standards for residential and non-residential development should only be set where there is a clear and compelling justification that they are necessary for managing the local road network, or for optimising the density of development in city and town centres and other locations that are well served by public transport (in accordance with chapter 11 of this Framework). In town centres, local authorities should seek to improve the quality of parking so that it is convenient, safe and secure, alongside measures to promote accessibility for pedestrians and cyclists."*

- 2.7 Paragraph 110 addresses the relationship between development and sustainable transport as follows:

*"In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:*

*a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;*

*b) safe and suitable access to the site can be achieved for all users; and*

*d) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."*

2.8 Paragraph 111 says that "Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."

2.9 Paragraph 112 suggests that development should be located and designed where practical to, among other things, give priority to pedestrians and cycle movements, have access to high quality public transport facilities, create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians and consider the needs of people with disabilities by all modes of transport. Additionally, allow efficient delivery of goods and access by emergency vehicles and be designed to enable charging of plug-in and other ultra-low emission vehicles.

### Summary

2.10 On the basis of the above review, it is evident that the location of a site in relation to sustainable modes of transport is a key consideration when assessing the acceptability of a proposal. Similarly safe and suitable access is a requirement.

2.11 Importantly though, NPPF recognises the different opportunities for maximising sustainable travel opportunities which arise between urban and rural areas, further recognising that car sharing is a sustainable travel mode.

2.12 NPPF also qualifies access requirements as being suitable hence the need to consider the nature of a development and expected usage when designing access rather than following a "one size fits all" approach. This is particularly pertinent to gypsy and traveller sites and the travel characteristics associated with these.



### 3.0 Highway Access Suitability

#### Site Locations

##### **Swift Lane, Bagshot**

- 3.1 The Bagshot Site is located at the end of Swift Lane, immediately off the A322, some 360 metres north of Junction 3 of the M3. It is located within the administrative boundaries of Surrey County Council and Surrey Heath Borough Council. Its location is illustrated in Figure 3.1 below.
- 3.2 The Bagshot Site is currently occupied by a Garage / MOT facility, Bagshot Community Recycling Centre and the Swift Lane Gypsy and Traveller Site.

##### **Land South of Broadford Lane, Chobham**

- 3.3 The Chobham Site is located on land south of Broadford Lane, Chobham, immediately off Castle Grove Road. It is located within the administrative boundaries of Surrey County Council and Surrey Heath Borough Council.
- 3.4 The locations of the Proposed Allocations are illustrated in Figure 3.1 below.

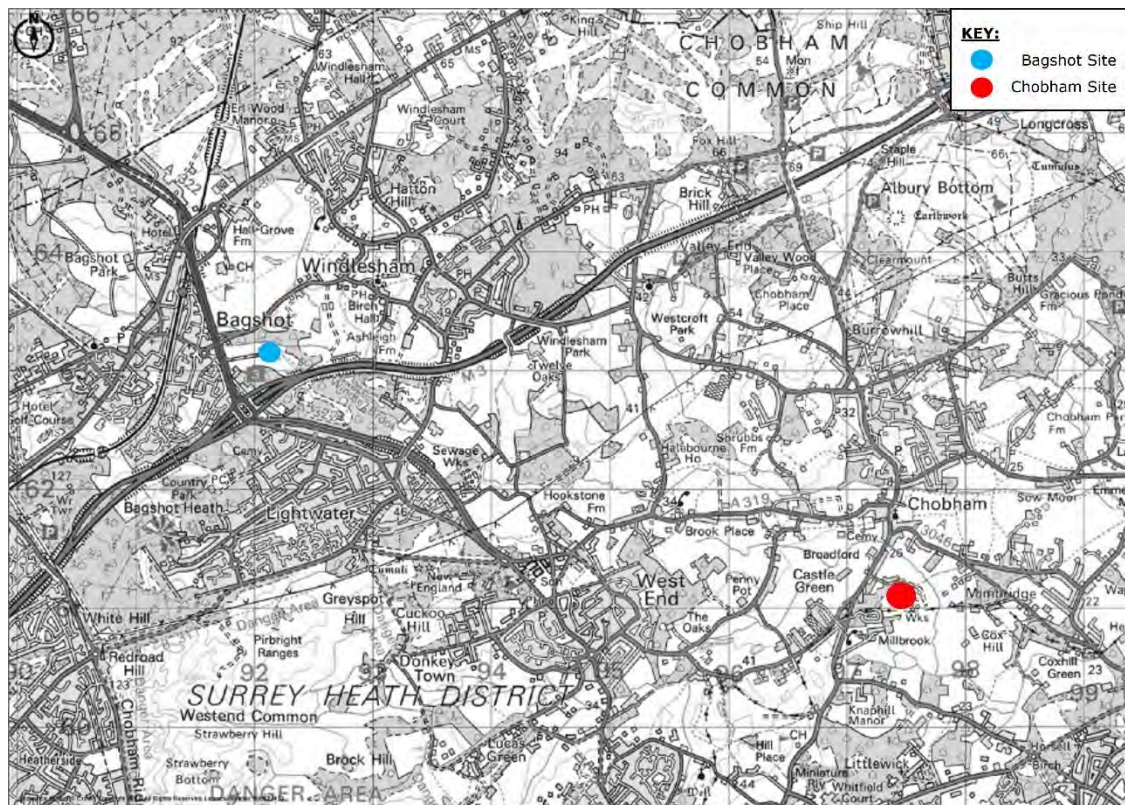


Figure 3.1: Site Locations

#### Local Highway Network

##### **Swift Lane, Bagshot**

- 3.5 The local highway network is centred around the A322, which forms the principal north-south route through the area. The A322 provides connections to the A332 and the A329(M) to the north, as well as Junction 3 of the M3 being located some 360m from Bagshot Site.

3.6 The A322 in the vicinity of the Bagshot Site is a dual carriageway road, with two lanes in each direction. There are footways on the eastern side of the carriageway and regular streetlighting provided on both sides.

3.7 There is no on-street car parking in the vicinity of the Bagshot Site.

**Land South of Broadford Lane, Chobham**

3.8 The local highway network is formed by a network of local roads with a fork creating two distinct north-south routes through the area. One such route is Chobham Road which turns into Castle Grove Road, the other being the A322 Bagshot Road.

3.9 In the vicinity of the junction between the A322 and Chobham Road, the A322 is a single carriageway road with one lane in each direction. There is regular street lighting and footways on either side of the carriageway.

**Road Safety**

3.10 ID42-015 of the NPPG recommends that:

*"an analysis of the injury accident records on the public highway in the vicinity of the site access for the most recent three-year period, or five-year period in the proposed site has been identified as within a high accident area."*

3.11 Personal Injury Accident (PIA) data recorded within the immediate vicinity of both sites has been obtained from the CrashMap for the last available five-year period covering 2016 to 2020.

**Swift Lane, Bagshot**

3.12 No PICs were identified within 100 metres of the junction between the A322 and Swift Lane that were a result of vehicles using the junction. As such, it is deemed unlikely that an increased use of the junction will result in increased highway accident rates in the vicinity of the Bagshot Site.

**Land South of Broadford Lane, Chobham**

3.13 No PICs were identified in the road network adjacent to the Chobham Site during the time frame specified above.

3.14 For completeness, a search of the area adjacent to the Chobham Site from 1st January 2020 to the present was undertaken. A single PIC was identified at the junction between Broadford Lane and Castle Grove Road. This incident occurred on July 26 2021 during hours of daylight on dry roads. Vehicle 1, a motorcycle over 125cc and up to 500cc was proceeding normally along the carriageway, not on a bend while vehicle 2, a goods vehicle 7.5 tonnes mgw and over was moving off. Both vehicles sustained an impact to their front sides, with vehicle 1 entering the ditch at the incident site. Injuries categorised as 'serious' were received by the rider or rider of vehicle 1.

3.15 Owing to the fact that this PIC is an isolated incident, it is deemed probable that this was caused by driver error. As such, it is considered that there is no deficiency in highway design, geometry or layout that impedes on highway safety in the vicinity of the Chobham Site.

**Walking and Cycling**

3.16 Walking and cycling are generally considered sustainable alternative methods of transport to the private car. Such modes of transport are also considered for longer journeys as ways of accessing other methods of travel such as the bus or train. The Chartered Institution of Highways and Transportation (CIHT) released two documents, 'Planning for Walking' in April 2015 and 'Planning for Cycling' in October 2014. The documents provide an insight into the sustainable methods of transport, including:

- ▶ "Across Britain about 80% of journeys shorter than 1 mile are made wholly on foot...but beyond that distance cars are the dominant modes" (Planning for Walking, 2015).
- ▶ "Majority of cycling trips are used for short distances, with 80% being less than five miles and with 40% being less than two miles" (Planning for Cycling, 2014)."

### **Swift Lane, Bagshot**

- 3.17 The Bagshot Site is accessed from Swift Lane via the southbound A322. Swift Lane itself has no footways, nor any street lighting. In the vicinity of this site, the A322 is a dual carriageway with a footpath provided on both sides of the carriageway. The A322 is subject to a speed limit of 50 miles per hour (mph), with Swift Lane subject to the national speed limit.
- 3.18 On the western side of the A322, there is a network of residential streets, as well as public transport nodes and Bagshot town itself. Unsignalised pedestrian crossings are provided at multiple points along the A322 which give access to both sides of the A322 in the vicinity of the Bagshot Site.

### **Land South of Broadford Lane, Chobham**

- 3.19 The Chobham Site is accessed from Broadford Lane via Castle Grove Road. Broadford Lane constitutes public bridleway route 16 and has no footways and no street lighting. In the vicinity of this junction, Castle Grove Road is a single carriageway road with one lane in each direction. Castle Grove Road is subject to a speed limit of 40mph. Footways are present on the eastern side of the carriageway and no street lighting is provided.
- 3.20 Chobham village is located some 420 metres north of this junction. It has several amenities, including multiple supermarkets, pubs and restaurants, a primary school, Chobham village hall, the Chobham cricket grounds, a church and a dentist's surgery.

## **Public Transport**

### **Swift Lane, Bagshot**

- 3.21 The nearest bus stops to the Bagshot Site are the Bagshot Green stops located some 610 metres west of the site. These stops provide shelter, street lighting and timetable information for the convenience and safety of service users. The route details provided at these stops are summarised in Table 3.1 below.

<b>Route Number</b>	<b>Stops Served</b>	<b>Frequency</b>
34	Guildford Friary Bus Station – Bellfields – Jacobs Well – Westfield – Kingfield Green – Woking Railway Station – Knaphill – Bisley – Lightwater – Bagshot Square – Camberley Pembroke Broadway	hourly
35	Guildford Friary Bus Station – Mayford – Woking Railway Station – Knaphill – Bisley – Lightwater – Bagshot Square – Camberley Pembroke Broadway	hourly
500	Staines Elmsleigh Bus Station – Sunningdale Railway Station – Staines – Egham – Virginia Water – Sunningdale – Windlesham – Lightwater – Bagshot Square – Camberley Pembroke Broadway – Frimley Park Hospital	8 services per day

Table 3.1: Bus Services Near the Bagshot Site

- 3.22 Bagshot Railway Station is located some 1.2 kilometres from the site, accessible through pedestrian footpaths. This station is located on the line between Aldershot and Ascot (Berks) stations, with services running in each direction every half hour. These services stop at Aldershot, Ash Vale, Frimley, Camberley, Bagshot and Ascot (Berks).

**Land South of Broadford Lane, Chobham**

- 3.23 The nearest bus stops to the Chobham Site are located some 800 metres from the site, on the A3046 Station Road. These stops include street lighting and timetable information to increase the convenience and safety of service users. These stops are serviced by route 73 which runs hourly from Kingfield Green to Chobham Bowling Green Road via Woking, Horsell and Mimbridge.
- 3.24 Further bus stops, located on the A319 High Street, provide access to route 39A and 87. Details of these services is provided in Table 3.2 below.

Route Number	Stops Served	Frequency
73	Kingfield Green – Woking Railway Station – Horsell – Mimbridge – Chobham	hourly
39A	Woking Railway Station – Goldsworth Park – Knaphill – Chobham	3 services a day
87	Chobham – Lightwater – Collingwood College	one service to the college one service from the college

Figure 3.2: Bus Services Near the Chobham Site

**Summary**

- 3.25 It has been demonstrated that both of the proposed allocations are situated in locations which are accessible by sustainable modes of transport, being in reasonable proximity to public transport nodes and local services and amenities. It is also apparent that the adjoining highway network is not subject to an abnormally high rate of accidents.



## 4.0 Proposed Allocations

- 4.1 Two sites are being considered for allocation as traveller sites in Surrey Heath. The Bagshot Site, located on land at the end of Swift Lane, Bagshot, constitutes an extension of an existing site, with five new pitches proposed.
- 4.2 The Chobham Site, on land off Broadford Lane, Chobham, constitutes a new site, with the potential for c.13 – 16 pitches.
- 4.3 The indicative site layout plans for the Bagshot Site and the Chobham Site are included at **Appendix A** and **B**, respectively.

### Swift Lane, Bagshot

#### Access

- 4.4 The Bagshot Site will use the existing site access, as the site is currently used to transport caravans into and out of Swift Lane. Swept path analysis showing a 4x4 towing a standard caravan into and out of the site is included at **Appendix C**.
- 4.5 As well as the existing gypsy and traveller site, Swift Lane also serves as the access route for Bagshot Community Recycling Centre and a Garage services / MOT centre. Due to the width of Swift Lane combined with the multiple land uses that it serves, it is recommended that the existing passing place on Swift Lane, located approximately 160 metres east of the junction between the A322 and Swift Lane, be widened to improve access for emergency vehicles such as fire engines, as well as for cars to pass a 4x4 towing a caravan. path analysis showing a 4x4 towing a caravan passing another 4x4 towing a caravan is included at **Appendix D**.
- 4.6 Irrespective of the potential allocation, due to the existing land uses at this location, it is recommended that these widening improvements be made. This is to provide more reliable emergency access to the existing land uses at the eastern end of Swift lane.
- 4.7 Alternative locations for passing places on Swift Lane may be submitted if the above is found to be unsuitable.

#### Parking

- 4.8 Two parking spaces per pitch will be provided, including manoeuvring space for vehicles. It is deemed that there will be no overspill of car parking onto the local highway as this parking provision is anticipated to meet the needs of the future residents.
- 4.9 Covered cycle parking will be provided at each pitch.

### Land South of Broadford Lane, Chobham

#### Access

- 4.10 The Chobham Site will utilise Broadford Lane to access the site. Swept path analysis, included at **Appendix E**, shows a 4x4 towing a standard caravan accessing the site through this route. A 4x4 towing a standard caravan is able to enter Broadford Lane from Castle Grove Road while another vehicle is waiting to exit Broadford Lane. Permanent widening at the access into the site from Broadford Lane would be required to facilitate safe and suitable access.
- 4.11 A low loader would be used to bring static caravans onto the Site upon initial occupation. Due to the width of the metalled surface of Broadford Lane, there is the risk that the movement of the abnormal load would result in soft verges being over-run. In order to prevent damage to the verges it is recommended that temporary, heavy duty matting is utilised to protect them. This is common practice in the movement of abnormal loads when such movements are infrequent, which would be the case with

the movement of static caravans to and from the site. The matting is laid whilst the low-loader travels the route and removed when the low-loader leaves. Swept path analysis of the areas of verge that would benefit from temporary reinforcing is included at **Appendix F**.

- 4.12 The responsibility of providing the temporary matting will fall to the individual arranging delivery of the static caravans. Haulage companies specialising in abnormal loads are typically able to provide such services as reinforcement is commonly required when moving plant or when using mobile cranes.
- 4.13 The static caravans will constitute abnormal loads. As such, the Highway Authority will be notified in advance of any planned movements. An approach route and necessary timing restrictions or traffic management will be agreed at this point with a view to minimising risk and disruption to other road users.
- 4.14 The management of construction traffic and abnormal loads, including any temporary works necessary to facilitate these, would be controlled via a planning condition imposed on any future planning permission if the site is allocated and came forward for approval.
- 4.15 It is however emphasised that the movement of static caravans to and from the site is a very infrequent activity.

#### **Junctions on Access Route**

- 4.16 Visibility splays that are achievable from the access measure at 2.4m by 25m to the west of the access and 2.4m by 25m to the east. Guidance in Manual for Streets (MfS) identifies these as safe and suitable visibility splays for roads on which traffic speeds are 20mph or less, which is the case with Broadford Lane.
- 4.17 Castle Grove Road in the vicinity of the junction of Broadford Lane onto Castle Grove Road, is subject to a 40mph speed limit. According to DMRB, the desirable visibility along Castle Grove Road to and from a car waiting to turn out of Broadford Lane is 120m from a setback distance of 2.4m. One step and two steps below desirable are permitted variants and these would allow visibility distances of 90m and 70m respectively. As illustrated on the plan included at **Appendix G**, a visibility splay of 2.4m by 79m metres is achievable to the north, with at least 2.4m by 120 metres achievable to the south. The visibility splay to the south exceeds the desirable distance set out in DMRB. To the north the visibility splay lies between desirable and acceptable variants.
- 4.18 Guidance is provided in Manual for Streets 2 (MfS2) regarding the calculation of stopping sight distances. The calculation is based on the measured speed of traffic rather than the posted speed limit. The use of measured speeds rather than posted speed limits in the design of junctions is also advocated in CD123 of DMRB.
- 4.19 In order to further investigate the suitability of visibility to the north from the junction of Broadford Lane onto Castle Grove Road, a speed survey using radar gun was undertaken during the afternoon of 8<sup>th</sup> February 2023. Weather conditions were dry and bright. No road works or unusual highway conditions were observed. 100 vehicle speeds were recorded for traffic travelling southwards towards the junction. The results of the survey revealed that the average speed of traffic was 32mph with the 85<sup>th</sup> percentile speed being 38mph. The speed of traffic is reflective of the local highway conditions in particular that the junction is only a short distance from the built-up area subject to 30mph speed restrictions.
- 4.20 Referring to guidance set out in Chapter 10 of MfS2, a stopping sight distance of 68m is required in situations in which the 85<sup>th</sup> percentile measured speed of approaching traffic is 38mph. As demonstrated on the drawing included at **Appendix G**, clear visibility of 2.4m x 68m to the north is achievable.
- 4.21 Based on the analysis set out above, it is concluded that safe and suitable visibility is achievable at the junction of Broadford Lane onto Castle Grove Road.

#### **Non-Motorised Users**

- 4.22 Traffic Advisory Leaflet 3/04 provides guidance on Quiet Lanes. These are defined as minor ways which are appropriate for shared use by walkers, cyclists, horse riders and motorised users. Key characteristics of a Quiet Lane are:
- ▶ Low traffic speeds (85<sup>th</sup> percentile speeds <35mph)
  - ▶ Low traffic flows (<1,000 vehicles per day)
  - ▶ Narrow road widths (<5m)
- 4.23 Broadford Lane meets all three of these characteristics and will continue to do so in the event that the Chobham Site is allocated. Surrey County Council Countryside Access team will be consulted on any planning application submitted for the site, taking account of the status of Broadford Lane as a bridleway.

#### **Traffic Impact**

- 4.24 As set out in Section 5, the volume of traffic arising from the proposed allocation is not expected to be significant and in itself would not give rise to traffic impact concerns. However there are other, albeit infrequent, users of the lane including tankers serving the adjacent sewage treatment works (STW). There is therefore a risk of two vehicles travelling in opposite directions meeting and being unable to pass. Nevertheless, this is currently the case and observation on site has identified vehicles being able to pass. The frequency of HGV traffic serving the STW is low and so the risk of an HGV encountering another vehicle on Broadford Lane is low. Furthermore traffic exiting the proposed allocation is able to see vehicles approaching in both directions along Broadford Lane. Therefore in the unlikely event that an HGV (or other vehicle) is approaching, the vehicle exiting the site would wait for the approaching vehicle to pass. Likewise should a vehicle be approaching the proposed allocation when an HGV or other vehicle exits the STW, the proposed access arrangement for the proposed allocation in itself forms a new passing place enabling both vehicles to pass each other.
- 4.25 As established in Section 5, gypsy and traveller sites can be expected to result in fewer vehicle movements than the equivalent number of homes of the settled community. Moreover it can be expected that the temporal distribution of traffic over the course of the day / week will be less likely to be focussed on peak highway periods, in contrast to the settled community which would be characterised by higher levels of movements during commuter peaks and hence a higher risk of vehicles encountering each other during the narrower time periods in which they are travelling.
- 4.26 As a consequence, the likelihood of two vehicles meeting on the approaches to or at the access of a gypsy and traveller site is greatly diminished compared to the equivalent number of homes in the settled community, in particular as it can be expected that residents are working away from the site for much of the week.
- 4.27 In this context, the proposed allocation in itself is not considered to drive a need to provide new passing places along Broadford Lane. However for the benefit of all users of Broadford Lane, it is recommended that the opportunity for new passing places is investigated. The plan provided at [Appendix H](#) identifies where this area of search should focus.

#### **Parking**

- 4.28 Two parking spaces per pitch will be provided, including manoeuvring space for vehicles. It is deemed that there will be no overspill of car parking onto the local highway as this parking provision is anticipated to meet the needs of the future residents.
- 4.29 Covered cycle parking will be provided at each pitch.

## 5.0 Trip Analysis

### Proposed Trip Generation

- 5.1 To calculate the trip attraction potential of a net increase of either five pitches (Bagshot) or c.13 – 16 pitches (Chobham), reference has been made to the TRICS database. Sites within the TRICS category '16 – Mixed: A – Miscellaneous' that included permanent gypsy and traveller sites have been identified. An average was taken of the trip rates of these sites to arrive at an overall trip rate for both sites.
- 5.2 The analysis set out below considers the net change in vehicle trips i.e. the trips arising from a net increase of five pitches (Bagshot) and up to 16 pitches (Chobham). A summary of the calculated average peak hour trip rates is provided in Table 5.1 below and the full TRICS output for reference included in **Appendix I**.

Time Period	Trip Rates (Per pitch)			Trips Generated (5 pitches, Bagshot)			Trips Generated (16 pitches, Chobham)		
	Arr	Dep	Two-Way	Arr	Dep	Two-Way	Arr	Dep	Two-Way
AM Peak (08:00-09:00)	0.33	0.50	0.83	2	3	4	5	8	13
PM Peak (17:00-18:00)	0.30	0.25	0.55	2	1	3	5	4	9
Daily (07:00-19:00)	4.75	4.78	9.53	24	24	48	76	76	152

Table 5.1: Total People Trip Generation

- 5.3 The table above shows that the proposed Bagshot allocation is expected to result in an additional 48 two-way vehicle trips across a typical weekday, with some 4 two-way vehicle trips in the morning peak period and 3 two-way vehicle trips in the evening peak period.
- 5.4 The Chobham Site is anticipated to result in an increase of 13 two-way vehicle movements in the morning peak period, with 9 two-way vehicle movements expected in the evening peak period. Over the course of a typical weekday, the Chobham Site is expected to result in an increase of 152 two-way vehicle movements.
- 5.5 It is however noted that there are very few gypsy and traveller sites included in the TRICs database and so the data set out above should be considered in this context. Having regard to the itinerant working characteristics of many gypsies and travellers that may result in residents working away from the site either for extended periods of time or on a week-by-week basis, the data above could be considered a worst-case scenario. In reality it can be expected that there would be fewer vehicle journeys made during the weekday network peak periods reflecting fewer daily journeys to work.
- 5.6 This reality has been recognised in several appeal decisions regarding gypsy and traveller sites. For just one example the extract below is taken from the Inspectors Decision Notice for appeal reference APP/J1915/W/19/3234671 (paragraph 18):

*'The nomadic lifestyle of gypsies and travellers obviously involves travelling for both economic and other purposes, towing their caravan. This involves the use of a private vehicle irrespective of location and so, whilst travelling, the same opportunities for using public transport simply do not apply. When away travelling, it will be necessary to access services and facilities wherever they are, rather than leaving and returning to the site on a daily basis for work. In this sense, and notwithstanding the TRICS data referred to, I would therefore expect overall vehicle trips to be lower than those of the settled community who are working.'*

- 5.7 This reinforces that gypsy and traveller sites can be expected to result in fewer vehicle movements and differing traffic patterns than the equivalent number of homes of the settled community.

**Summary**

- 5.8 The proposed allocations would result in a small increase in trips. However, increases in trips of this magnitude would have an imperceptible impact on the operation of local transport networks. Severe, residual impacts on the operation of the highway network are therefore not expected to arise as a consequence of the proposed allocations.

## 6.0 Summary and Conclusion

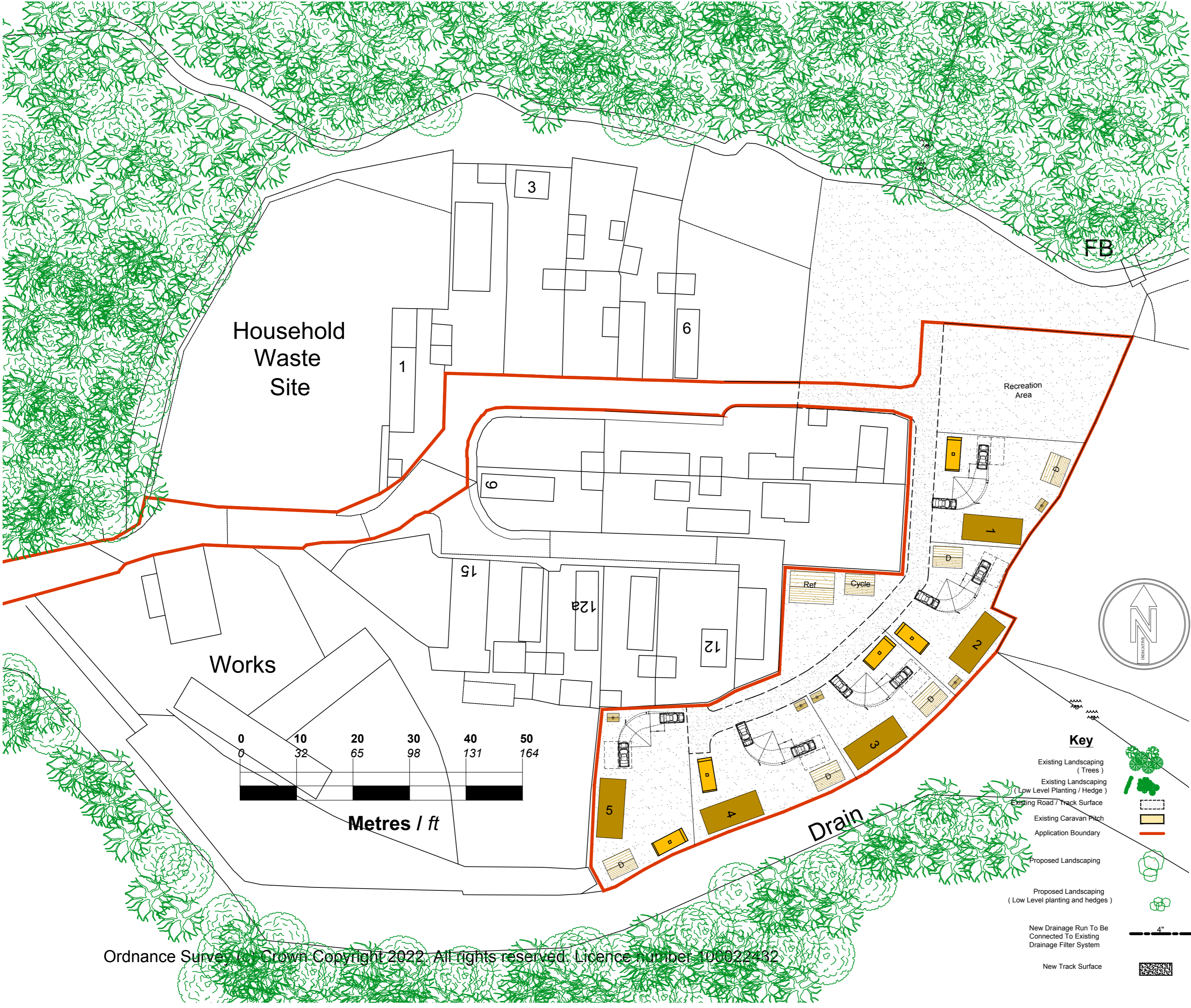
- 6.1 Motion is instructed by ET Planning to prepare a Transport Appraisal in relation to the allocation of two sites for use by travellers at Swift Lane, Bagshot (the "Bagshot Site") and land south of Broadford Lane, Chobham (the "Chobham Site").
- 6.2 Both sites are located within the administrative boundaries of Surrey County Council and Surrey Heath Borough Council.
- 6.3 This Transport Appraisal has been prepared to assess the suitability of the potential allocations from a highways perspective.
- 6.4 Both of the proposed allocations are situated in locations which are accessible by sustainable modes of transport, being in close proximity to public transport nodes and local services and amenities. It is also apparent that the adjoining highway network is not subject to an abnormally high rate of accidents.
- 6.5 The proposed allocations are forecast to result in small increases in trips during the AM and PM peak periods and across the course of a typical weekday, which are expected to have an imperceptible impact on the operation of local transport networks. Severe, residual impacts on the operation of the highway network are therefore not expected to arise as a consequence of the Proposed Allocations.
- 6.6 For both proposed allocations, potential locations on the approach lanes have been identified for passing places. The provision of passing places are recommended however having regard to the likely traffic flows and government guidance regarding Quiet Lanes, not considered to be essential for the allocation to be acceptable.
- 6.7 Appropriate parking provision has been made, with reference to the accessibility of the Sites and type of allocation proposed.
- 6.8 In summary this transport appraisal has demonstrated that:
- ▶ The Proposed Allocations accord with national and local policies relevant to transport;
  - ▶ Safe and suitable access can be achieved; and,
  - ▶ The change in travel demand associated with the Proposed Allocations will not lead to severe harm to the operation of the existing highway network.
- 6.9 With reference to paragraph 111 of the NPPF, there are therefore no transport or highway reasons identified why a future planning application should be withheld or refused. Both sites are therefore suitable for allocation.

## Appendix A

### Indicative Bagshot Site Layout Plans



**NOTES**  
 1. All dimensions are to be used from this drawing. If any doubt exist the contractor must ask for clarification. Do not accept the contractor scale of this drawing.  
 2. Contractors and sub-contractors must check and agree all dimensions before preparing workshop drawings or commencing work on site.  
 3. Contractors are responsible for informing neighbours of any disturbance caused by this drawing to adjacent sites. Drawing and any other related documents issued in respect of this work.  
 4. This drawing and the copyright and patents herein are the property of mpas Ltd and may be used or reproduced only under contract.  
 5. All work must be carried out in accordance with the current Building Regulations, Codes of Practice and British Standards. If any doubt exists the contractor must ask for clarification.  
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Site Layout  
 Scale 1:500

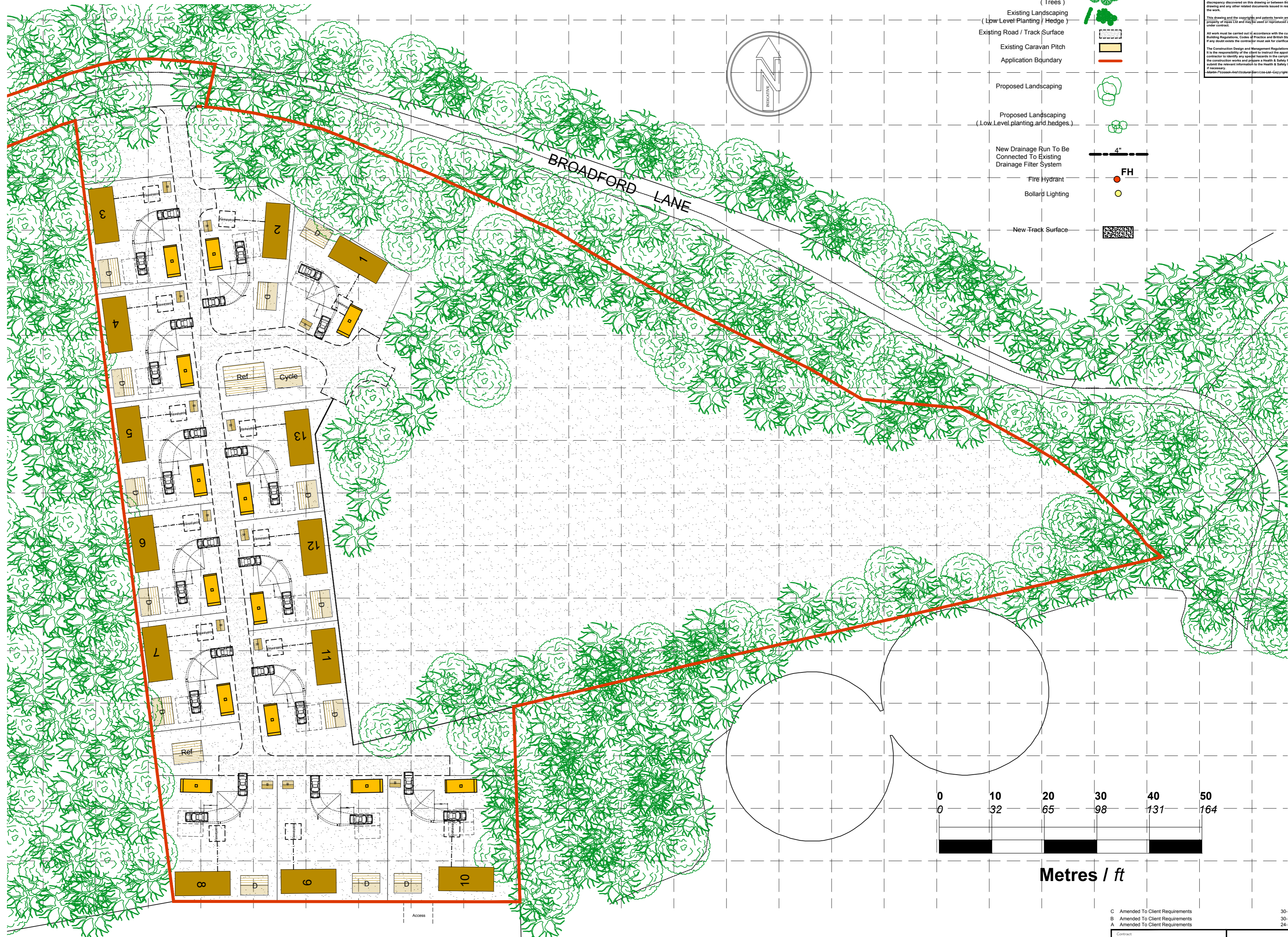
C	Amended To Client Requirements	30-11-2022
B	Amended To Client Requirements	30-11-2022
A	Amended To Client Requirements	24-11-2022
Contract		
Proposed Extension To Existing Gypsy / Traveller Site To Land Off Swift Lane, Bagshot, GU19 5NJ.		
Client	ET Planning Thames Valley - 200 Dukes Ride, Crowthorne, RG45 6DS	mpas Martin Peacock Architectural Services Limited
Drawing		Old Reading Room Main Street, Stanforth, Settle North Yorkshire YO24 3PE. Tel: 07745 234 261
Site Layout As Proposed		
Drawn	MDP	Rev No
Scale	1:500 @A2	2022-52
Date	02-11-2022	Revision
		501 C



## Appendix B

### Indicative Chobham Site Layout Plans





**Key**

- Existing Landscaping (Trees)
- Existing Landscaping (Low Level Planting / Hedge)
- Existing Road / Track Surface
- Existing Caravan Pitch
- Application Boundary
- Proposed Landscaping
- Proposed Landscaping (Low Level planting and hedges)
- New Drainage Run To Be Connected To Existing Drainage Filter System
- Fire Hydrant
- Bollard Lighting
- New Track Surface

**NOTES**  
 Dimensions only are to be used from this drawing. If any doubt exist the contractor must ask for clarification. On no account must the contractor scale off this drawing.  
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Site Layout  
 Scale 1:500

C Amended To Client Requirements	30-11-2022
B Amended To Client Requirements	30-11-2022
A Amended To Client Requirements	24-11-2022
Contract	
Proposed Traveller Site To Land Off Broadford Lane, Chobham, Woking, GU24 8BD	
Client	ET Planning Thames Valley - 200 Dukes Ride, Crowthorne, RG45 6DS
Client	Martin Peacock Architectural Services Limited
Drawing	
Site Layout As Proposed West Site	
Drawn	MDP
Scale	1:500 @A2
Date	02-11-2022
Rev No	2022-51
Drawing No	510
Revision	C



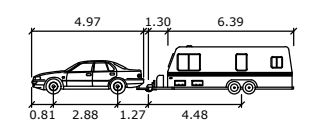
## Appendix C

Swept Path Analysis: Bagshot Site, Standard Towing Caravan

C:\Users\charlie\Documents\2211070-TK11\A\Caravan\With New Layout.dwg



Rev: Description: Date: Rev By: Chk'd:



**4x4 with Caravan**

	metres
Car Width	: 2.03
Trailer Width	: 2.48
Car Track	: 1.75
Trailer Track	: 2.33
Lock to Lock Time	: 6.0
Steering Angle	: 35.9
Articulating Angle	: 70.0



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Project:  
**Surrey Heath G&T Sites**

Title:  
**Swept Path Analysis  
 4x4 Towing Standard Caravan**

Client:  
**ET Planning**

Drawing Status:

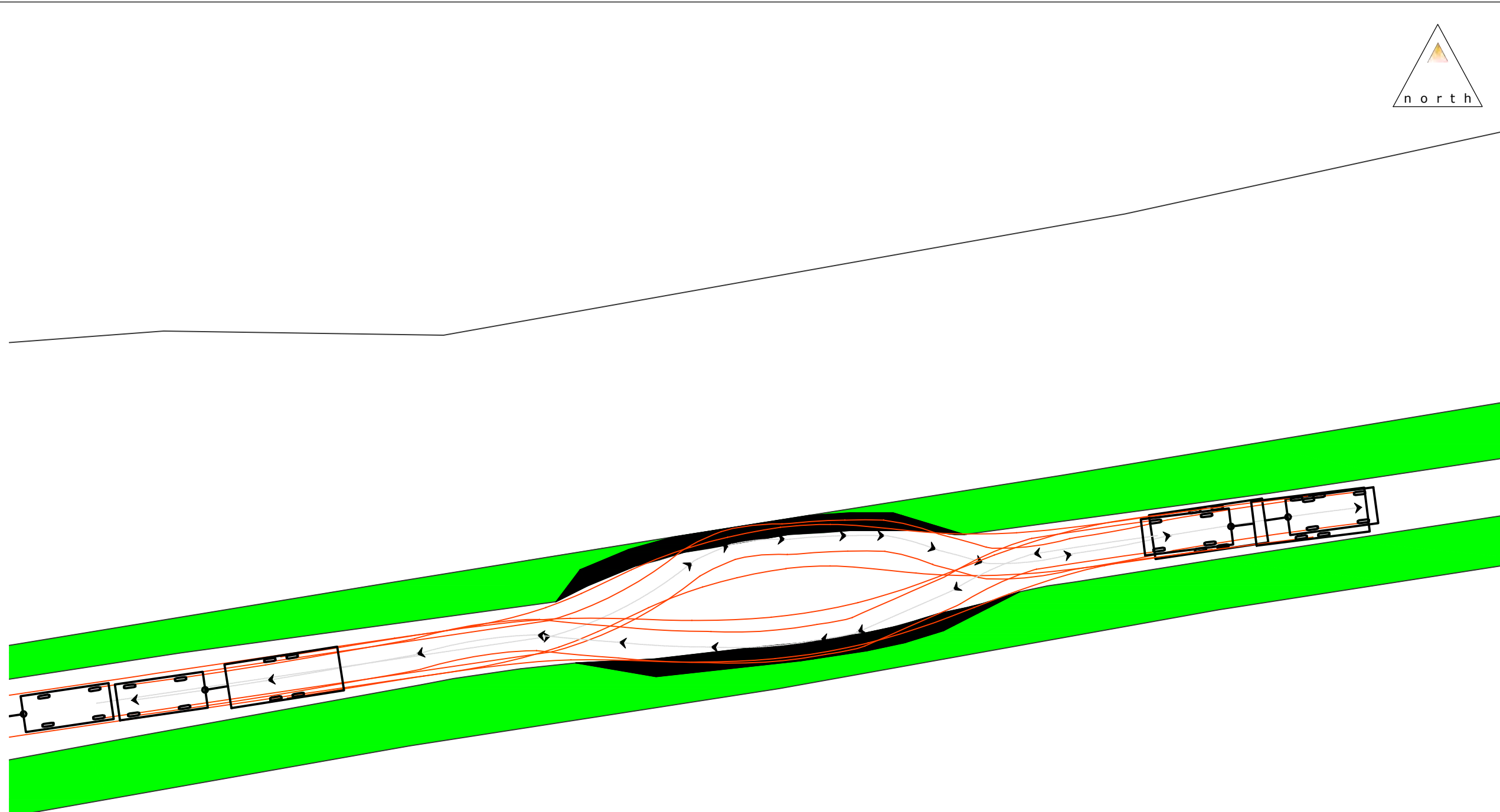
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Drawn: CH Checked: JNR Approved: JNR  
 Drawing: **2211070-TK11** Revision: **A**

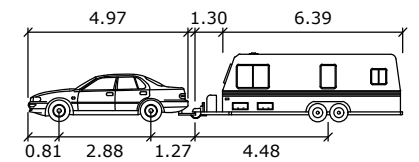
## Appendix D

Swept Path Analysis: Swift Lane Passing Place Widening

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Rev: Description: Date: Rev By: Chk'd:



4x4 with Caravan

	units
Car Width	: 2.03
Trailer Width	: 2.48
Car Track	: 1.75
Trailer Track	: 2.33
Lock to Lock Time	: 6.0
Steering Angle	: 35.9
Articulating Angle	: 70.0



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Title:  
**Swept Path Analysis  
 Widened Passing Place**

Client:  
**ET Planning**

Drawing Status:

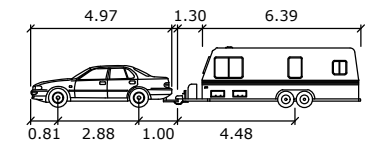
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Drawn: CH Checked: JNR Approved: JNR

Drawing: **2211070-TK12** Revision:

## Appendix E

Swept Path Analysis: Chobham Site, Standard Towing Caravan



4x4 with caravan

	units
Car Width	: 2.03
Trailer Width	: 2.48
Car Track	: 1.88
Trailer Track	: 2.33
Lock to Lock Time	: 6.0
Steering Angle	: 35.9
Articulating Angle	: 70.0



Road width measured on-site

Permanent verge widening required



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Title:  
**Swept Path  
4x4 Towing Standard Caravan**

Client:  
**ET Planning**

Drawing Status:  
Scale: 1:1000 (@ A3) Date: 21/02/2023

Drawn: CH Checked: JNR Approved: JNR

Drawing: **2211070-TK01** Revision: **D**

G:\Users\charlie.hitchcock\Documents\Motion\Sites\2211070\Drawings\2211070-TK01\2211070-TK01-Palmerford Caravan.dwg



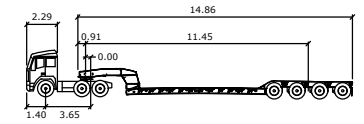
## Appendix F

Swept Path Analysis: Chobham Site, Static Caravan

LONG MEADOW

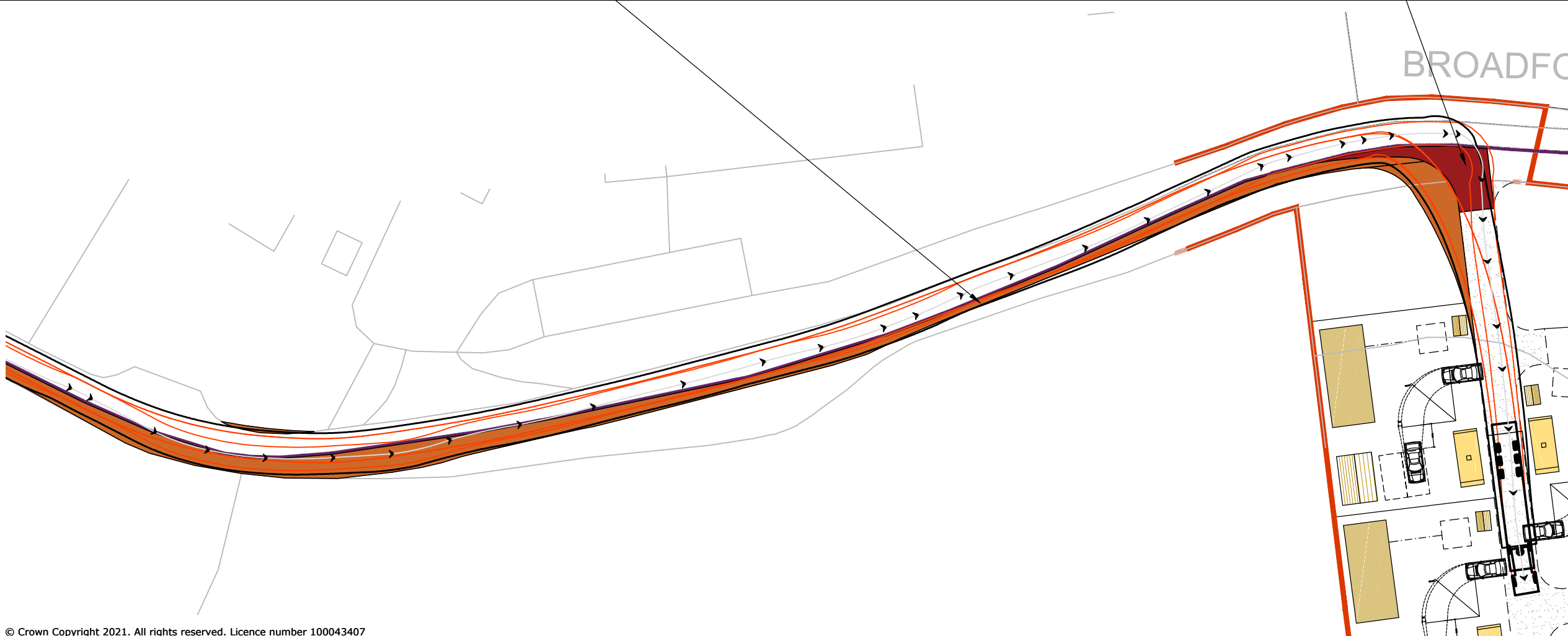
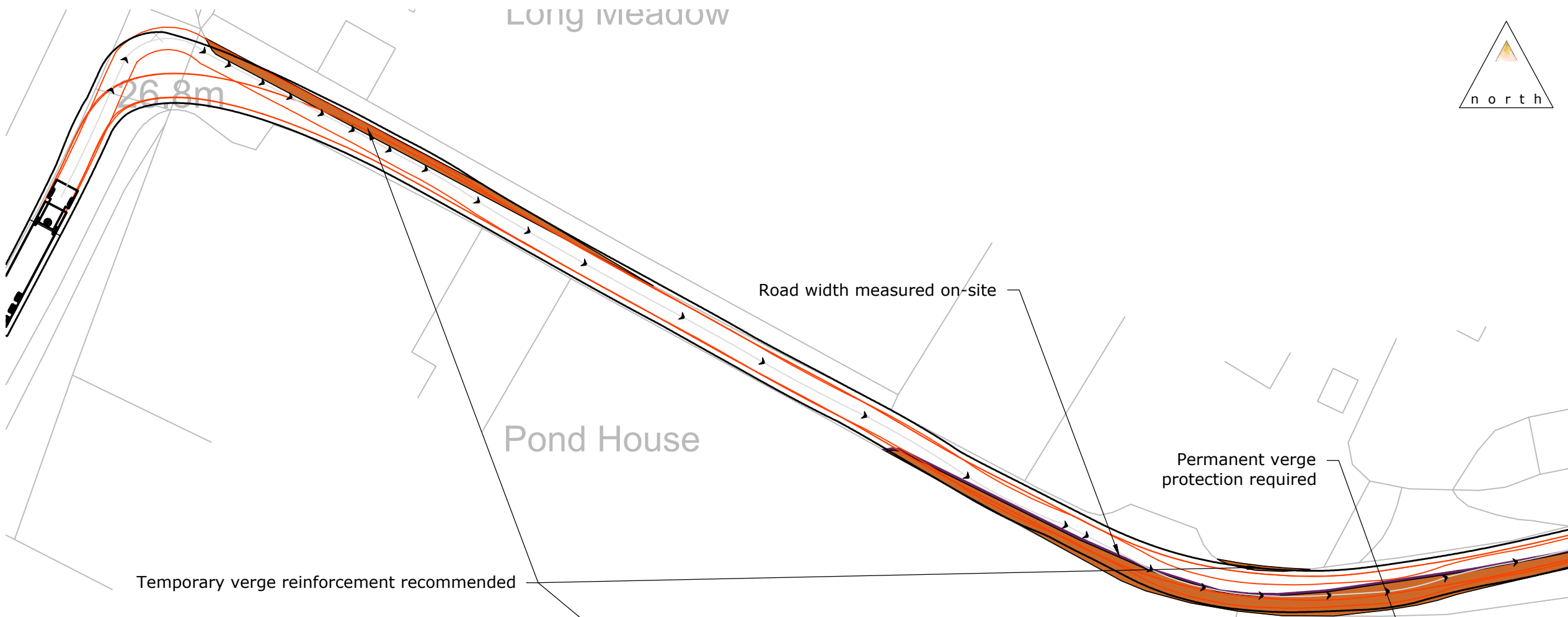


Rev: Description: Date: Rev By: Chk'd:



Low Loader with Static Caravan

meters			
Tractor Width	: 2.29	Lock to Lock Time	: 6.0
Tractor Track	: 1.40	Steering Angle	: 30.7
Trailer Width	: 3.65	Articulating Angle	: 70.0
Trailer Track	: 0.91		



BROADFO



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Client:  
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Drawing Status:

Scale: 1:500 (@ A3) Date: 21/02/2023

Drawn: CH Checked: JNR Approved: JNR

Drawing: 2211070-TK02 Revision: E

## Appendix G

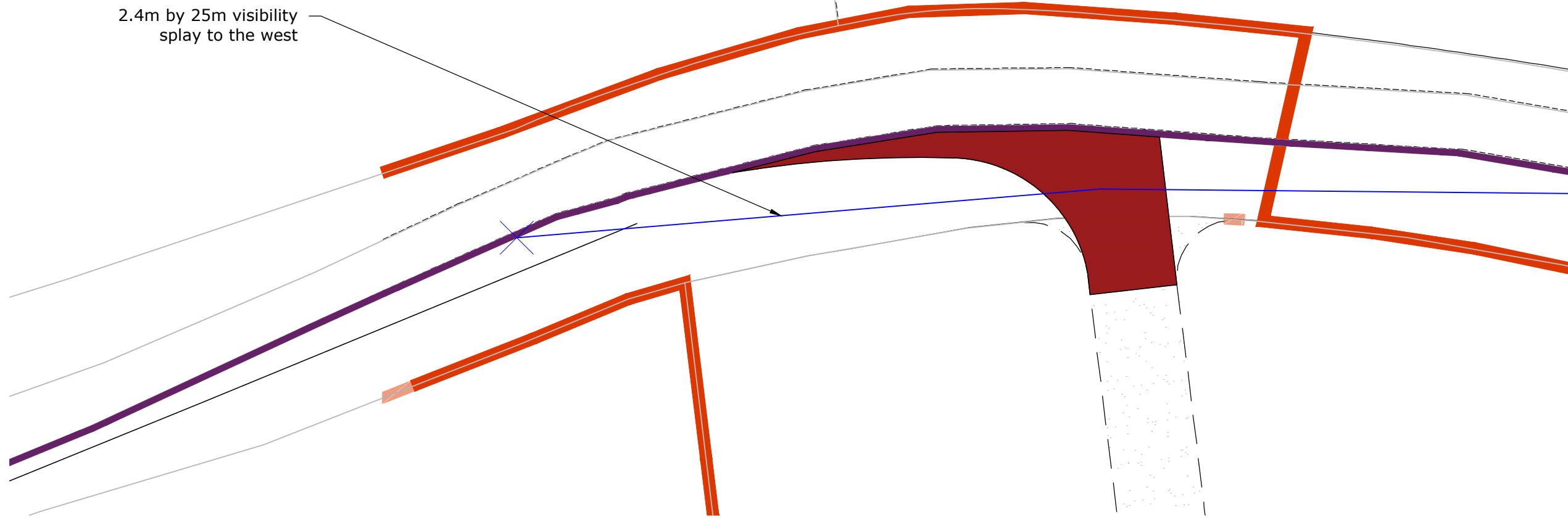
Visibility Splays: Chobham Site

# BROADFORD



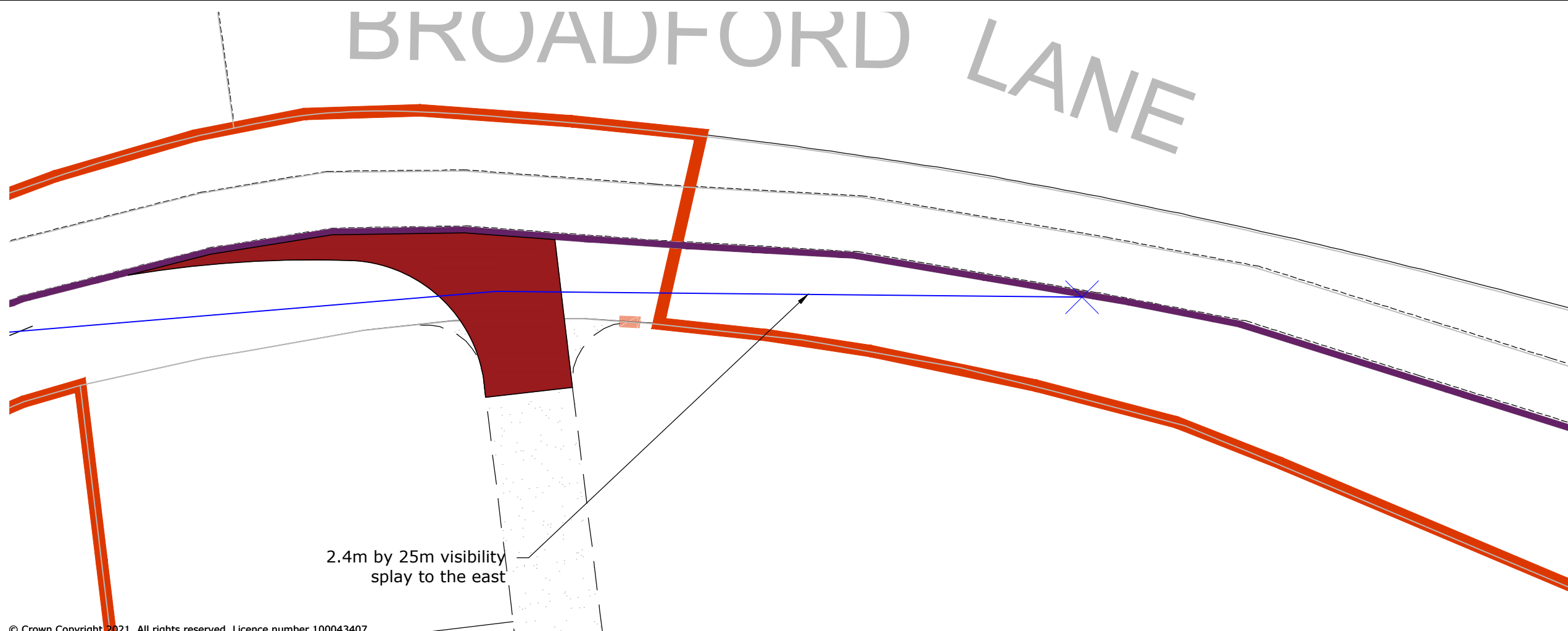
Rev: Description: Date: Rev By: Chk'd:

2.4m by 25m visibility splay to the west



# BROADFORD LANE

2.4m by 25m visibility splay to the east



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**Visibility Splays**

Client:  
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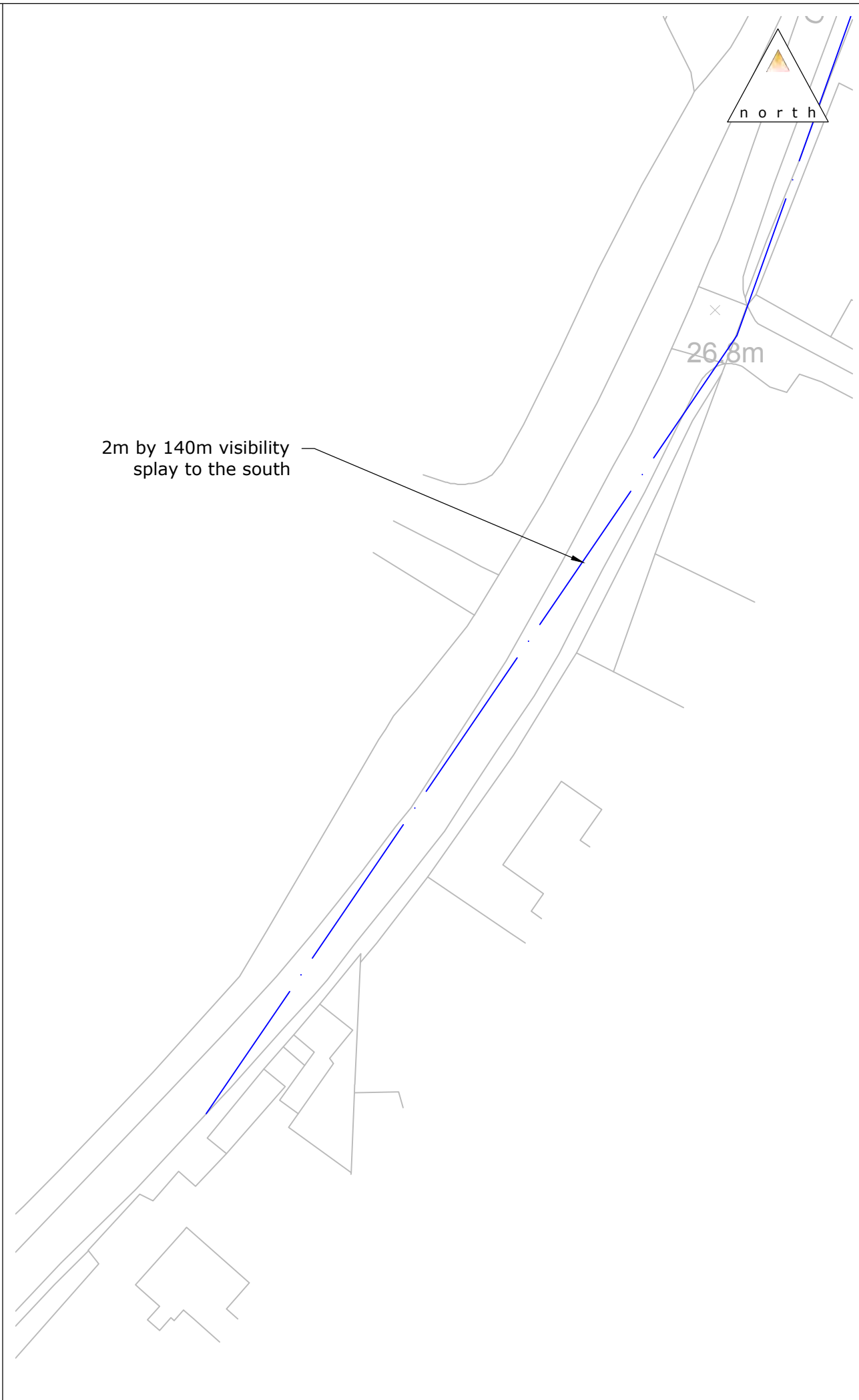
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Drawn: CH Checked: JNR Approved: JNR

Drawing: **2211070-03** Revision: **A**

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C:\Users\charlie\Documents\Projects\Surrey Heath\2211070-02\Drawings\2211070-02\A-1-660\visibility\_splays.dwg



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Title:  
**Visibility Splays  
Castle Grove Rd / Broadford Ln**

Client:  
**ET Planning**

Drawing Status:

Scale: 1:750 (@ A3) Date:09/02/2023

Drawn: CH Checked: JNR Approved: JNR

Drawing: **2211070-02** Revision: **A**

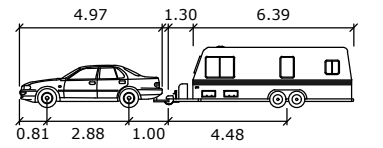
## **Appendix H**

Broadford Lane Passing Places Area of Search

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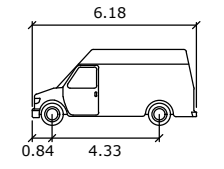


Rev: Description: Date: Rev By: Chk'd:



**4x4 with caravan**

	metres
Car Width	: 2.03
Trailer Width	: 2.48
Car Track	: 1.88
Trailer Track	: 2.33
Lock to Lock Time	: 6.0
Steering Angle	: 35.9
Articulating Angle	: 70.0



**VEHICULE UTILITAIRE**

	metres
Width	: 2.07
Track	: 1.99
Lock to Lock Time	: 6.0
Steering Angle	: 39.8

Road width measured on-site



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Title:  
**Passing Places - Swept Path  
4x4 Towing Standard Caravan**

Client:  
**ET Planning**

Drawing Status:

Scale: 1:200 (@ A3) Date:21/02/2023

Drawn: CH Checked: JNR Approved: JNR

Drawing: **2211070-TK03** Revision: **C**

Appendix I  
TRICS Reports



Motion High Street Guildford

Licence No: 734001

Site reference: HC-16-A-01 Survey date: 05/01/89 Day of week: Thursday

Survey type: Manual Count

AM weather:

PM weather:

Initial car park occupancy:

Final car park occupancy:

BRACKETED ACCUMULATION FIGURES ARE NOT ABSOLUTE

Parking Capacity

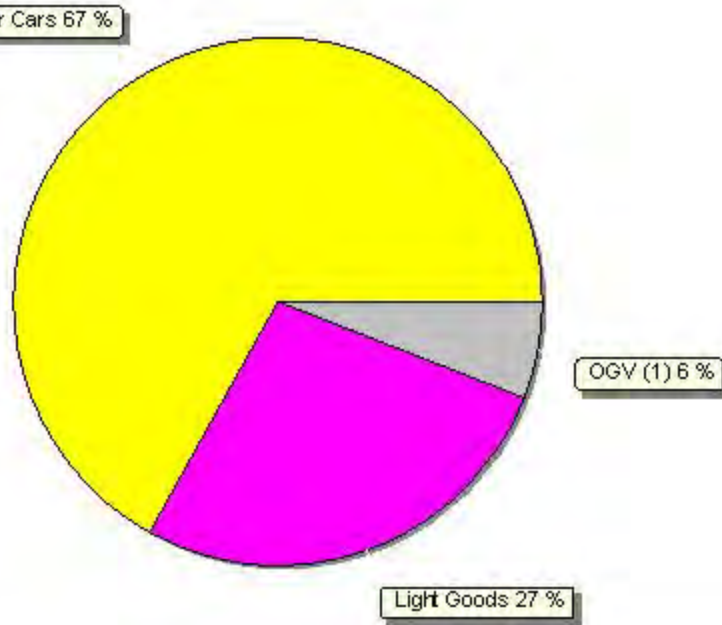
Data proportions in %

Motor cars	67	Motor cycles	0	Public service	0
Light goods	27	OGV (1)	6	OGV (2)	0
Servicing Vehicles count recorded	No				

Taxis are included as cars in this survey

Time	Arr 91	Dep 94	Totals 185	Parking Accum
00:00-01:00				
01:00-02:00				
02:00-03:00				
03:00-04:00				
04:00-05:00				
05:00-06:00				
06:00-07:00				
07:00-08:00	2	2	4	(0)
08:00-09:00	3	4	7	(-1)
09:00-10:00	7	9	16	(-3)
10:00-11:00	4	10	14	(-9)
11:00-12:00	10	10	20	(-9)
12:00-13:00	9	8	17	(-8)
13:00-14:00	10	6	16	(-4)
14:00-15:00	12	9	21	(-1)
15:00-16:00	16	16	32	(-1)
16:00-17:00	5	7	12	(-3)
17:00-18:00	6	8	14	(-5)
18:00-19:00	7	5	12	(-3)
19:00-20:00				
20:00-21:00				
21:00-22:00				
22:00-23:00				
23:00-24:00				

Vehicle Percentages for HC-16-A-01 Surveyed: 05/01/89 Thursday



Motion High Street Guildford

Licence No: 734001

Site reference: SC-16-A-01 Survey date: 04/02/10 Day of week: Thursday  
 Multi-Modal survey site  
 Vehicles surveyed: Total vehicles  
 Survey type: Manual Count  
 AM weather: Cold and Light Rain  
 PM weather: Cold and Light Rain

Initial car park occupancy: Final car park occupancy:  
 Total People to Total Vehicles ratio (all time periods and directions): 1.58

BRACKETED ACCUMULATION FIGURES ARE NOT ABSOLUTE

Parking Capacity

Data proportions in %

Motor cars	67	Motor cycles	0	Public service	0
Light goods	25	OGV (1)	4	OGV (2)	0
				Taxis	4

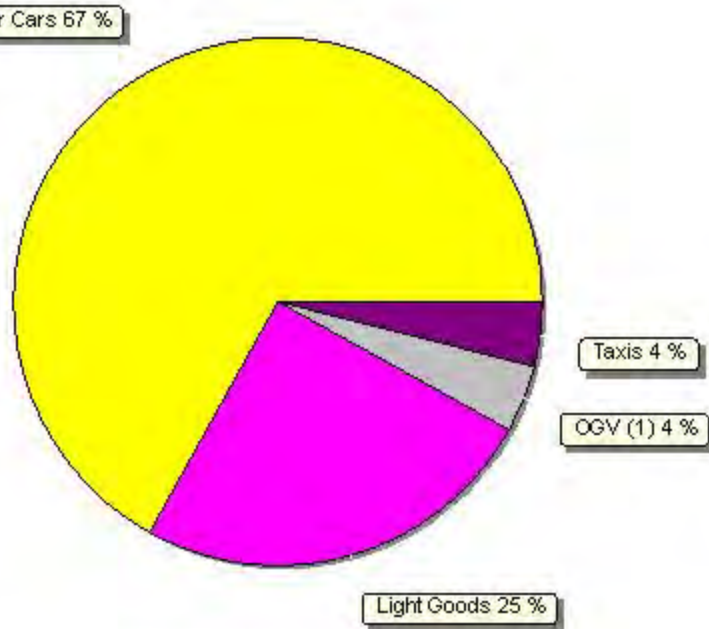
Servicing Vehicles count recorded No

Time	Arr 46	Dep 46	Totals 92	Parking Accum
00:00-01:00				
01:00-02:00				
02:00-03:00				
03:00-04:00				
04:00-05:00				
05:00-06:00				
06:00-07:00				
07:00-08:00	3	5	8	(-2)
08:00-09:00	5	8	13	(-5)
09:00-10:00	3	3	6	(-5)
10:00-11:00	1	4	5	(-8)
11:00-12:00	7	6	13	(-7)
12:00-13:00	6	2	8	(-3)
13:00-14:00	6	4	10	(-1)
14:00-15:00	2	5	7	(-4)
15:00-16:00	6	5	11	(-3)
16:00-17:00	4	3	7	(-2)
17:00-18:00	3	1	4	(0)
18:00-19:00				
19:00-20:00				
20:00-21:00				
21:00-22:00				
22:00-23:00				
23:00-24:00				

Comments

No PSV's, cycles, pedestrians or public transport users entered or exited the site during the survey.  
 It was not possible to obtain initial and final car park occupancy figures as access could not be gained to the on-site parking.

Vehicle Percentages for SC-16-A-01 Surveyed: 04/02/10 Thursday



Motion High Street Guildford

Licence No: 734001

Site Reference: HC-16-A-01  
Latitude/Longitude: 51.32023, -0.87850  
Land Use Type: 16 - MIXED/A - MISCELLANEOUS  
Region/Area: SOUTH EAST/HAMPSHIRE

Description: PERMANENT GYPSY SITE  
Street: B3016  
District: STAR HILL  
Town: HARTFORDBRIDGE  
Post Code:  
Planning Authority:

Location: Free Standing (PPS6 Out of Town)  
Location Sub Category: Out of Town  
Use Class: C3

Population within 500m:  
Population within 1 Mile: 1,001 to 5,000  
Population within 5 Miles: 25,001 to 50,000  
Car ownership within 5 Miles: 1.1 to 1.5  
Buses/Trains per day (both directions): 0  
Is site associated with a travel plan:  
Is the location of the site hilly or flat:  
Urban Regeneration:

No. of developments for this Site: 1  
No. of survey Days for this Site: 1

Site reference: HC-16-A-01  
Trade name: PERMANENT GYPSY SITE

Site area (h/a): 1.40

Open since 1975

Total Employees  
Full Time Employees  
Part Time Employees

Name of nearest site  
Distance to nearest similar site 4.0 Km

OPENING TIMES (24 Hour format)

Mon to Thurs	00:00	to	00:00
Friday	00:00	to	00:00
Saturday	00:00	to	00:00
Sunday	00:00	to	00:00

Total no. of parking spaces

Visitor/Customer spaces	0
Employee spaces	0
Disabled spaces	0
Cycle racks	0
OGV loading bays	0
OGV parking spaces	0
Parent & Toddler spaces	0

Parking charges	No
Surface parking	No

Comments

There are 20 pitches with a total of 82 people resident at this site. Each pitch has its own toilet, and there is a bath/shower block attached.

There is also a wardens bungalow on the site.

This site was originally opened temporarily, but was upgraded to become permanent in 1979.



Site Reference: SC-16-A-01 Multi-Modal Site  
 Created: Version: 2010(a)v6.5.2 09/02/10  
 Latitude/Longitude: 51.28460, -0.33380  
 Land Use Type: 16 - MIXED/A - MISCELLANEOUS  
 Region/Area: SOUTH EAST/SURREY

Description: TRAVELLERS SITE  
 Street: YOUNG STREET  
 District: FETCHAM  
 Town: LEATHERHEAD  
 Post Code: KT22 9BS  
 Planning Authority:

Location: Free Standing (PPS6 Out of Town)  
 Location Sub Category: Out of Town  
 Use Class: C3

Population within 500m: 41  
 Population within 1 Mile: 5,001 to 10,000  
 Population within 5 Miles: 125,001 to 250,000  
 Car ownership within 5 Miles: 2.1 to 2.5  
 Reason for blank public transport table: No local PT

Is site associated with a travel plan: No  
 If not, are there any plans to implement a Travel Plan in the future? No  
 Is survey data available before the implementation of the Travel Plan?  
 Is the location of the site hilly or flat: Flat  
 Urban Regeneration: No

No. of developments for this Site: 1  
 No. of survey Days for this Site: 1

Comments

This site is located just off Young Street on the southern outskirts of Leatherhead. Young Street runs south-west into Epsom Road towards Guildford, and east to the Leatherhead Bypass Road which connects to the M25. The site is surrounded by fields. The site has 1 access point.

Design features encouraging non-car modes

12. Pedestrians  
 None

13. Pedal cycles  
 None

14. Public transport  
 None

Design features encouraging non-car modes

Road Network Distance to Local Developments	
Year of Analysis	2010
Nearest Primary School	1.5 kilometres
Nearest Secondary School	2.4 kilometres
Nearest Local Shop/Corner Shop	0.7 kilometres
Nearest Main Supermarket	1.3 kilometres
Nearest Doctors Surgery	1.5 kilometres
Nearest Hospital with Minor Injuries/A & E	6.2 kilometres
Nearest Sports/Leisure Centre	1.3 kilometres

Census Data	
Year of Census	2001
Census Output Area/Data Zone	43UEGS0010
Number of people employed within Census Output Area	144
Number of households within Census Output Area	131
Number of people living within Census Output Area	363
Area of Census Output Area (hectares)	149.00
Population density within Census Output Area (per hectare)	2.44

Motion High Street Guildford

Licence No: 734001

Site reference: SC-16-A-01 Multi-Modal survey site  
Trade name: SALVATION PLACE  
Site area (h/a): 0.56  
Open since 1984  
Total Employees  
Full Time Employees  
Part Time Employees  
Approximate % of total employees working  
standard 9-5 hours or similar %  
Name of nearest site RIVER PLACE  
Distance to nearest similar site 4.0 Km

OPENING TIMES (24 Hour format)

Mon to Thurs	00:00	to	24:00
Friday	00:00	to	24:00
Saturday	00:00	to	24:00
Sunday	00:00	to	24:00

Comments

There are 10 static caravans at this site and 2 permanent buildings.

Multi-Modal survey site

On-Site parking

Total no. of parking spaces 45

Number of spaces

Employee 0  
Disabled 0  
Visitor/Customer 45  
OGV parking bays 0  
Cycle racks 0  
OGV loading bays 0  
Parent & Toddler 0  
Motorcycle spaces 0

Parking charges No

Comments about the management of the site car park, along with enforcement measures

No management or enforcement measures were observed during the survey.

Site parking surface or non-surface (multi-storey/underground)

Surface

General Comments on Parking

The number of parking spaces has been estimated using Google Earth as access to the parking could not be obtained. All spaces appear to be unmarked.

The off-street parking consists of a National Trust car park nearby.

Off-Site parking details

Is there off-site parking available

Yes

Off-Site parking included in the counts

Yes

Free On-Street parking available nearby

No

If prepared to pay, easy to find somewhere to park off-site all day

No

Parking restrictions

Area subject to parking restrictions (controlled parking zone - CPZ)

No

Off-Street parking

Off-Street parking available Yes, Public Off-Street Parking is Available

Approx. available spaces 45

Parking located within a control parking zone (CPZ)

No

Charges for this Off-Street parking

No

Park & Ride

Park & Ride Type Facility providing relevant means of accessing the site

No

### 3. Technical Note from Motion– January 2024

## Broadford Lane Survey Technical Note

Site: Land South of Broadford Lane, Surrey heath  
Prepared by: JNR  
Approved by: JNR  
Date: 31/01/2024

**motion**

232 High Street  
Guildford  
Surrey  
GU1 3JF

Tel: 01483 531000  
<http://www.motion-uk.co.uk>

### Preamble

- 1.1 This technical note is prepared in relation to assessing the suitability of allocating land south of Broadford Lane, Chobham (the "Chobham Site") for use as a traveller and gypsy settlement and presents the results of non-motorised user (NMU) surveys undertaken on Broadford Lane. The Chobham Site would constitute a new site, with the potential for up to 16 pitches.
- 1.2 This technical note supplements a more comprehensive transport appraisal of the Chobham Site which is set out in the Motion Report entitled "Potential Traveller Sites, Surrey Heath, transport Appraisal" dated February 2023.

### Survey Methodology

- 1.3 Surveys were undertaken over a 4-day period between Friday 11<sup>th</sup> August and Monday 14<sup>th</sup> August 2023. The survey period was agreed in advance with highways officers of Surrey County Council (SCC) and specifically included a weekend during the summer when NMU traffic might be expected to be higher on the lane. The location of the survey counter is shown by the number 1 in the below image. The letter A represents the movements from Castle Grove Road towards the direction of the Site and the letter B represents movements from the direction of the Site towards Castle Grove Road.



- 1.4 Movements were recorded using camera surveys to ensure that all users, by whatever mode, were recorded. The survey duration was 24-hours each day.

### Survey results

- 1.5 The results of this survey are summarised in Table 1 below and the full data is included at **Appendix A**.

	Two-way movements								
	Car	LGV	OGV1	OGV2	M/B	Peds	Cycle	E Scooter	Horse
<b>Friday</b>	55	26	6	4	2	21	9	0	4
<b>Saturday</b>	21	6	0	0	0	10	4	0	0
<b>Sunday</b>	1	2	0	0	2	15	5	0	0
<b>Monday</b>	45	40	7	12	0	23	0	0	0
<b>Average per Day</b>	31	19	3	4	1	17	5	0	1

Table 1 – Traffic Survey Results

1.6 The table above demonstrates that during the 96 hours of surveys undertaken, the following movements were observed on the lane:

- ▶ an average of 17 pedestrians per day.
- ▶ an average of 1 equestrian per day.
- ▶ an average of 5 cyclists per day.
- ▶ an average of 50 cars / vans per day.
- ▶ An average of 7 lorries per day – which were observed to be primarily related to maintenance work that appeared to be being undertaken at the sewage treatment works.

1.7 Movements of the above magnitude indicate that it would be unusual to meet another user on the lane, travelling by whatever mode, rather than the norm.

### Conclusion

1.8 Having regard to the itinerant working characteristics of many gypsies and travellers that may result in residents working away from the site either for extended periods of time or on a week-by-week basis, it can be expected that overall vehicle trip volumes would be lower than those of the settled community who are working in a single location.

1.9 This characteristic of gypsy and traveller sites combined with the low recorded volumes of users of Broadford Lane – including pedestrians, cyclists and equestrians – means that the risk of two users meeting on the Lane is low.

1.10 Based on the above, it is concluded that use of the Chobham Site for up to 16 gypsy and traveller pitches would not lead to either an unacceptable impact on highway safety or severe residual cumulative impacts on the road network.

1.11 With reference to paragraph 115 of the NPPF, Motion do not consider that there are any transport or highway reasons identified why a future planning application should be withheld or refused.



## **Appendix A**

Survey Results



ADVANCED  
TRANSPORT  
RESEARCH

*Job Number & Name:* 35817 Woking

*Site Number/Name:* Broadford Lane

*Client:* Motion

*Date:* 11th to 14th August 2023

Advanced Transport Research

Job Number & Name: 35817 Woking

Broadford Lane

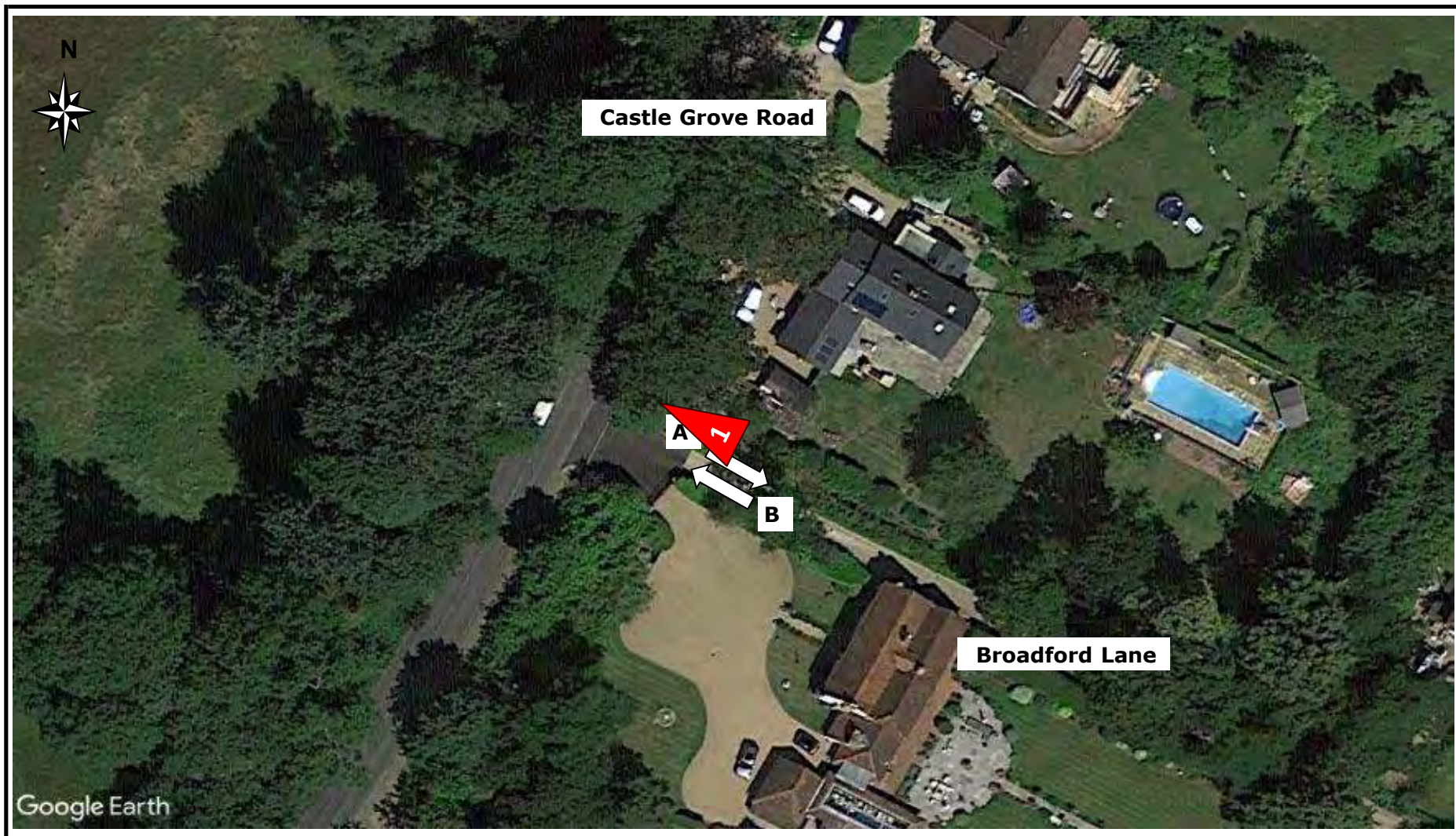
Date: 11th to 14th August 2023

Job Type: Pedestrian & Cyclist Count

Co-ordinates: 51° 20' 32.28"N, 0° 36' 21.17"W

Postcode: GU24 8EF

Times: 24hrs



Times	Movement A										Movement B									
	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse
00:00 - 00:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:15 - 00:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:30 - 00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:45 - 01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 - 01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 - 01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 - 01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 - 02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 - 02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 - 02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 - 02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 - 03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 - 03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 - 03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 - 03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 - 04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 - 04:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 - 04:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 - 04:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 - 05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 - 05:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 - 05:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 - 05:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 - 06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 - 06:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
06:15 - 06:30	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 - 06:45	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 - 07:00	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 - 07:15	3	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
07:15 - 07:30	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 - 07:45	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 - 08:00	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
08:00 - 08:15	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
08:15 - 08:30	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0
08:30 - 08:45	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
08:45 - 09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 - 09:15	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0	0	0	0	0	0
09:15 - 09:30	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
09:30 - 09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:45 - 10:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	1	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
11:15 - 11:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	1	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	2
11:45 - 12:00	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
13:00 - 13:15	1	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
13:45 - 14:00	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
14:00 - 14:15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15 - 14:30	0	1	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0

Times	Movement A										Movement B									
	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse
15:00 - 15:15	2	0	0	0	0	1	0	0	0	0	5	1	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	1	0	0
15:30 - 15:45	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
16:00 - 16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15 - 16:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30 - 16:45	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45 - 17:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
17:00 - 17:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
17:15 - 17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30 - 17:45	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
17:45 - 18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00 - 18:15	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15 - 18:30	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30 - 18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45 - 19:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00 - 19:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	0
19:15 - 19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:30 - 19:45	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
19:45 - 20:00	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
20:00 - 20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:15 - 20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:30 - 20:45	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:45 - 21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00 - 21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:15 - 21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:30 - 21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:45 - 22:00	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
22:00 - 22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:15 - 22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30 - 22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:45 - 23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00 - 23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:15 - 23:30	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
23:30 - 23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:45 - 00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>28</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>15</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>27</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>6</b>	<b>6</b>	<b>0</b>	<b>2</b>
	<b>67</b>										<b>60</b>									

Times	Movement A										Movement B									
	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse
00:00 - 00:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
00:15 - 00:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:30 - 00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:45 - 01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 - 01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 - 01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 - 01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 - 02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 - 02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 - 02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 - 02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 - 03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 - 03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 - 03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 - 03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 - 04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 - 04:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 - 04:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 - 04:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 - 05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 - 05:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 - 05:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 - 05:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 - 06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 - 06:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 - 06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 - 06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 - 07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 - 07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 - 07:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
07:30 - 07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 - 08:00	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
08:00 - 08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 - 08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 - 08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 - 09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 - 09:15	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
09:15 - 09:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
09:30 - 09:45	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0
09:45 - 10:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
10:45 - 11:00	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
11:15 - 11:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15 - 13:30	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
13:45 - 14:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00 - 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
14:15 - 14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45 - 15:00	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0



Times	Movement A										Movement B									
	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse
15:00 - 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30 - 15:45	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00 - 16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15 - 16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30 - 16:45	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45 - 17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00 - 17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
17:15 - 17:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
17:30 - 17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45 - 18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00 - 18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15 - 18:30	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
18:30 - 18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45 - 19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00 - 19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:15 - 19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:30 - 19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:45 - 20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00 - 20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:15 - 20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:30 - 20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:45 - 21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00 - 21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:15 - 21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:30 - 21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:45 - 22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:00 - 22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:15 - 22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30 - 22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:45 - 23:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
23:00 - 23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:15 - 23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30 - 23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:45 - 00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>10</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>
	21										20									

Times	Movement A										Movement B									
	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse
00:00 - 00:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:15 - 00:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:30 - 00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:45 - 01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 - 01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 - 01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 - 01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 - 02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 - 02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 - 02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 - 02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 - 03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 - 03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 - 03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 - 03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 - 04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 - 04:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 - 04:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 - 04:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 - 05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 - 05:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 - 05:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 - 05:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 - 06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 - 06:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 - 06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 - 06:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 - 07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 - 07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 - 07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 - 07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 - 08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 - 08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 - 08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 - 08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 - 09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 - 09:15	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15 - 09:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30 - 09:45	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
09:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45 - 14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00 - 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15 - 14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
14:45 - 15:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0

Times	Movement A										Movement B									
	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse
15:00 - 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00 - 16:15	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15 - 16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30 - 16:45	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45 - 17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
17:00 - 17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15 - 17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30 - 17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45 - 18:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00 - 18:15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15 - 18:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30 - 18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45 - 19:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:00 - 19:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
19:15 - 19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:30 - 19:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19:45 - 20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:00 - 20:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:15 - 20:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:30 - 20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20:45 - 21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:00 - 21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:15 - 21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:30 - 21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21:45 - 22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
22:00 - 22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:15 - 22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:30 - 22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22:45 - 23:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
23:00 - 23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
23:15 - 23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:30 - 23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23:45 - 00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>8</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>7</b>	<b>2</b>	<b>0</b>	<b>0</b>
	<b>14</b>										<b>11</b>									

Times	Movement A										Movement B									
	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse
00:00 - 00:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:15 - 00:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:30 - 00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
00:45 - 01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00 - 01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:15 - 01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:30 - 01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:45 - 02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:00 - 02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:15 - 02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 - 02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 - 03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 - 03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 - 03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 - 03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 - 04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 - 04:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 - 04:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 - 04:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 - 05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 - 05:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 - 05:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 - 05:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 - 06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 - 06:15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:15 - 06:30	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:30 - 06:45	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
06:45 - 07:00	5	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 - 07:15	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 - 07:30	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	0	0	0
07:30 - 07:45	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 - 08:00	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 - 08:15	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 - 08:30	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
08:30 - 08:45	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 - 09:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:00 - 09:15	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
09:15 - 09:30	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	2	0	0	0	0
09:30 - 09:45	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
09:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
10:30 - 10:45	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	1	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
11:15 - 11:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
12:00 - 12:15	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
12:30 - 12:45	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
12:45 - 13:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
13:30 - 13:45	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45 - 14:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
14:00 - 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
14:15 - 14:30	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0

Times	Movement A										Movement B									
	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse	Car	LGV	OGV1	OGV2	PSV	M/B	Peds	Cyc	E Scooter	Horse
15:00 - 15:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0
15:30 - 15:45	0	1	0	1	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	
15:45 - 16:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	
16:00 - 16:15	0	0	0	0	0	0	1	0	0	0	2	1	0	0	0	0	0	0	0	
16:15 - 16:30	0	0	0	0	0	0	0	0	0	0	5	1	1	0	0	0	0	0	0	
16:30 - 16:45	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	
16:45 - 17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:00 - 17:15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:15 - 17:30	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	
17:30 - 17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:45 - 18:00	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	
18:00 - 18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
18:15 - 18:30	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	
18:30 - 18:45	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
18:45 - 19:00	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
19:00 - 19:15	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	
19:15 - 19:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
19:30 - 19:45	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
19:45 - 20:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20:00 - 20:15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20:15 - 20:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
20:30 - 20:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20:45 - 21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21:00 - 21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21:15 - 21:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21:30 - 21:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21:45 - 22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22:00 - 22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22:15 - 22:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
22:30 - 22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
22:45 - 23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23:00 - 23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23:15 - 23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23:30 - 23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23:45 - 00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Total</b>	<b>23</b>	<b>20</b>	<b>4</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>22</b>	<b>20</b>	<b>3</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>0</b>	
	<b>68</b>										<b>59</b>									

#### 4. Phase I and II Geo-Environmental Assessment for Swift Lane – December 2022 from EPS





## PHASE I AND II GEO-ENVIRONMENTAL ASSESSMENT

SWIFT LANE, BAGSHOT GU19 5NJ

REFERENCE: P1056/R1/V1

REPORT PREPARED FOR: SURREY HEATH BOROUGH COUNCIL

REPORT PREPARED BY: ENVIRONMENTAL PLANNING SOLUTIONS (EPS)

DECEMBER 2022





## QUALITY ASSURANCE

Issue/revision	Issue 1	Revision 1	Revision 2
Remarks	Final		
Author	TC		
Job Title	Director		
Authorised by	SP		
Job title	Director		
Project number	P1056/R1/V1		





EXECUTIVE SUMMARY	
Site Address	Swift Lane, Bagshot, GU19 5NJ
National Grid Reference	SU922631
Site Area	0.45ha.
Current Site Use	Vacant open land.
Proposed Development	Additional gypsy / traveller provision including five pitches, and a recreation area.
Site History	<p>The site was undeveloped until c. 1978 when it appears to form part of a refuse tip.</p> <p>Nearby historical land uses included a 'Scavenging Depot' (later 'Depot'), 'Household Waste Site' and 'Caravan Site', all to the west. Areas to the north, east and south of the site have all historically been used for agriculture / nurseries.</p>
Environmental Setting	<p><b>Geology</b></p> <ul style="list-style-type: none"> <li>▶ Superficial: Peat (unproductive).</li> <li>▶ Bedrock: Windlesham Formation (Sand) designated as a Secondary A Aquifer.</li> </ul> <p><b>Groundwater</b></p> <ul style="list-style-type: none"> <li>▶ Secondary A Aquifer contained within bedrock.</li> <li>▶ Not located within a groundwater Source Protection Zone (SPZ).</li> <li>▶ No potable groundwater abstractions nearby.</li> </ul> <p><b>Surface Waters</b></p> <ul style="list-style-type: none"> <li>▶ Windle Brook adjacent to the north.</li> </ul>
Conceptual Site Model (CSM)	<p><b>Potential "Active" Sources</b></p> <ul style="list-style-type: none"> <li>▶ <b>Historic Landfilling</b> on site; and</li> <li>▶ <b>Depot</b> then <b>works</b> and now <b>vehicle maintenance and repair facility</b> adjacent west.</li> </ul> <p><b>Pathways</b></p> <ul style="list-style-type: none"> <li>▶ Migration of mobile contaminants on or off site via services, sewers and manmade conduits;</li> <li>▶ Direct contact, ingestion and inhalation of contaminants on site;</li> <li>▶ Migration of mobile contaminants into controlled waters; and</li> <li>▶ Migration of hazardous gases through permeable soils.</li> </ul> <p><b>Human Receptors</b></p> <ul style="list-style-type: none"> <li>▶ <b>Future site users</b> (residents); and</li> <li>▶ <b>Residents of the adjacent existing gypsy/traveller site.</b></li> </ul> <p><b>Controlled Water Receptors</b></p> <ul style="list-style-type: none"> <li>▶ <b>Secondary A aquifer</b> contained within the underlying Windlesham Formation bedrock; and</li> <li>▶ <b>Windle Brook</b> adjacent to the northern boundary of the site.</li> </ul>



<b>Ground Investigation Works</b>	<ul style="list-style-type: none"><li>▶ Four window sample boreholes across the site;</li><li>▶ Installation of ground gas and groundwater monitoring wells within three locations and two return monitoring visits;</li><li>▶ Chemical laboratory analysis of soil and groundwater samples.</li></ul>
<b>Summary of Ground Conditions</b>	<ul style="list-style-type: none"><li>▶ Made Ground of between 1.80m and 2.60m in thickness;</li><li>▶ Windlesham Formation to the full depth of the investigation (5.0mbgl); and</li><li>▶ Groundwater seepages / strikes at between 0.60m and 2.00mbgl.</li></ul>
<b>Identified Contamination</b>	<ul style="list-style-type: none"><li>▶ Hydrocarbon odour was noted within the Made Ground within WS104;</li><li>▶ Heavy metals and PAH have been identified within Made Ground soils at concentrations above the relevant human health assessment criteria within two locations;</li><li>▶ Peak concentrations of carbon dioxide encountered during return monitoring visits indicate that the ground gas regime can be classified as Characteristic Situation 2 (CS2); and</li><li>▶ Concentrations of some heavy metal and PAH species within samples of perched water collected exceed the environmental quality standards (EQS) and drinking water standards (DWS).</li></ul>
<b>Conclusions</b>	<ul style="list-style-type: none"><li>▶ The proposed presence of hard standing across the majority of the site will break the pollutant pathway between identified soil contamination and future site users;</li><li>▶ Should any vegetated borders be proposed, it is assumed that a nominal thickness of clean imported soil will be required to act as a suitable growing medium and this would also act as a barrier preventing human health exposure;</li><li>▶ Basic gas mitigation measures will be required for any enclosed living spaces constructed directly onto the ground. However where enclosed living spaces are raised above the ground allowing ground gases to freely disperse no significant risk will be present;</li><li>▶ It is not considered that a significant risk to drinking water is present given that the site is not located within a groundwater SPZ and there are no potable groundwater abstractions within influencing distance of the site; and</li><li>▶ Should a pathway be present for perched water underlying the site to reach the nearby Windle Brook it is considered likely that the following dilution with river water the concentrations would fall below the EQS.</li></ul>





**Recommendations**

Should the development be progressed beyond the feasibility stage it is recommended that:

- ▶ Further assessment is undertaken in order to confirm that Windle Brook is not significantly affected by contaminants identified within the perched water underlying the site. This could include sampling of river water upstream and downstream of the site;
- ▶ Further ground gas monitoring is undertaken to expand the existing data set and confirm the initial ground gas assessment;
- ▶ Following the above, a remediation strategy and verification plan is prepared for approval by the regulators prior to commencement of development works; and
- ▶ The design of any proposed foundations or roadways should take into consideration the significant thickness of heterogenous Made Ground beneath the site and the potential for chemicals to be present within the ground which could adversely affect concrete structures installed within.



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## APPENDICES

<b>Appendix I</b>	Drawings
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	P1056-002 Site Investigation Layout Plan
	P1056-003 Proposed Development Plan
<b>Appendix II</b>	Limitations
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<b>Appendix V</b>	Engineering Logs
<b>Appendix VI</b>	Chemical Testing Results
<b>Appendix VII</b>	Ground Gas and Groundwater Monitoring Results







## 1.0 INTRODUCTION

### 1.1 Background

Environmental Planning Solution (EPS) Ltd has been commissioned by ET Planning on behalf of Surrey Heath Borough Council (“the Client”) to undertake a Phase I and II Geo-Environmental Assessment at the site known as Swift Lane, Bagshot, Surrey GU19 5NJ. A Site Location Plan is presented in Appendix I, Figure 1.

### 1.2 Proposed Development

EPS understands that the Client is in the process of determining the feasibility of providing additional allocation for Gypsy, Traveller and Travelling Showpeople at the site. The provisional proposed development plan provided (ref. 2022-52-501, dated 02/11/2022) five additional pitches. Each pitch is indicated to comprise a mobile home, a touring caravan, parking for 1-2 vehicles, waste recycling/storage, an amenity block comprising bath/shower room/ W.C and kitchen/amenity area. This drawing has been presented as drawing P1056-003 within Appendix I.

### 1.3 Objectives

This Phase I and II Geo-environmental Assessment Report has been commissioned in order to assist with determining the feasibility of developing the site from a contaminated land perspective.

This report has been compiled in accordance with Land Contamination Risk Management (LCRM) guidance produced by the Environment Agency dated October 2020 (updated April 2021).

### 1.4 Sources of Information

Background information was sought from the following sources:

- ▶ Surrey Heath Local Plan: Preferred Options (2019 – 2038) – Further Gypsy and Traveller and Travelling Showpeople Allocations Regulation 18, dated August 2022;
- ▶ Apple Environmental: Environmental Report – Intrusive Contaminated Land Investigation, ref CL/2244/SH and dated July 2017;
- ▶ Martin Peacock Architectural Services Ltd: Site Layout As Proposed (ref. 2022-52-501 and dated 2<sup>nd</sup> November 2022);
- ▶ Database Search (report reference: GS-8177802 and GS-8177803), dated 4<sup>th</sup> November 2022);
- ▶ Historical mapping dated 1870 to 2022. A selection of historical maps pertinent to this report are reproduced in Section 3.1;
- ▶ Online planning records held by the Client;
- ▶ Radon: Guidance on protective measures for new buildings (BRE Document BR 211, 2015)





- and HPA Indicative Radon Atlas for England and Wales); and
- ▶ British Geological Survey Online GeoIndex tool; and
  - ▶ Online bomb risk maps provided by Zetica (<https://zeticauxo.com/downloads-and-resources/risk-maps>)

### **1.5 Confidentiality**

EPS has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from EPS. A charge may be levied against such approval.

### **1.6 Limitations**

The full limitations of this report are presented in Appendix II.





## 2.0 SITE SETTING

### 2.1 Site Details

The site is located adjacent to the east of the existing gypsy / traveller site at Swift Lane, Bagshot. The site is c. 0.45ha in area and located at approximate National Grid Reference SU922631.

### 2.2 Current Site Use

A site walkover was undertaken by EPS on Monday 17<sup>th</sup> November 2022. A selection of site photographs is presented in Appendix IV.

At the time of the site walkover the site comprised a vacant area of land. The topography of the site was relatively level, however a raised vegetated bund was present along the northern boundary of the site. This prevented access to Windle Brook shown on mapping to run adjacent to the northern boundary..

The majority of the site was surfaced with Made Ground, however patches of asphalt hardstanding were noted within the south of the site. Light vegetation was present across much of the site, particularly within the north-east. Localised small scale fly tipping and evidence of burning was observed. Plastic ducting containing a loose electrical cable was observed within the east of the site with further loose electrical cables observed at surface elsewhere.

A wooden fence separated the site from the adjacent gypsy / traveller site, however within two areas the fence line extended onto site, with the areas beyond the fence inaccessible for inspection.

The land immediately to the east of the site also comprises vacant land with light vegetation, with the eastern boundary not clearly marked.

The southern boundary of the site is marked by the presence of a drainage ditch. At the time of the site walkover the ditch was dry with evidence of fly tipping.

The south-western boundary of the site is marked by the presence of concrete blocks, separating the site from the vehicle maintenance and repair facility to the west.

#### **Hazardous Materials Storage**

Two partially intermediate bulk containers (IBC) were stored on top of the concrete blocks demarcating the western boundary of the site (see Photograph 6). Whilst the contents could not be identified, residues indicated the possibility of liquid waste associated with the vehicle maintenance facility.





## 2.3 Surrounding Area

Surrounding land uses are summarised overleaf in Table 2.1.

**Table 2.1 Summary of Surrounding Land Uses**

Direction	Land Use
North	Existing gypsy/traveller pitches (west) and Windle Brook with woodland beyond (east).
East	Open land.
South	Drainage ditch with open fields beyond.
West	Vehicle maintenance and repair facility (south) and existing gypsy/traveller pitches (north)





### 3.0 SITE HISTORY

#### 3.1 On-Site Historical Development

A review of historical maps pertinent to the site are summarised below in Table 3.1 below. The site boundary is represented by the blue polygon.

**Table 3.1 Summary of Historical Land Uses**

Map Edition	Historical Land Use	Map Extract
1870 (Scale 1:2,500)	<p>The site is undeveloped.</p> <p>Windle Brook is shown running along the northern boundary of the site and a track is shown running along the southern and eastern boundaries of the site.</p> <p>The surrounding areas are open land and forestry.</p>	
1915 (Scale 1:2,500)	<p>The site remains undeveloped.</p> <p>A 'Scavenging Depot' is shown c. 50m west of the site.</p> <p>The remaining surrounding areas appear to be open land.</p>	
1978 – 1979 (Scale 1:2,500)	<p>The site appears to form part of a wider 'Refuse Tip'.</p> <p>A track (Swift Lane) is shown running along the southern and eastern boundaries of the site.</p> <p>The 'Scavenging Depot' to the west has expanded and is now labelled as a 'Depot'.</p>	





Map Edition	Historical Land Use	Map Extract
1992 (1:2,500)	<p>Mapping indicates that an elongated mound is present across the majority of the site and the area to the north-west.</p> <p>A 'Caravan Site' with a 'Household Waste Site' beyond are shown to the west of the site, broadly matching the current configuration.</p> <p>The 'Depot' to the south-west of the site is now labelled as a 'Works'.</p>	

### 3.2 Off-Site Historical Development

A review of potentially contaminative land uses identified on historical Ordnance Survey maps and within the environmental database within a 500m radius of the site are summarised below as Table 3.2.

**Table 3.2 Summary of Potentially Contaminative Off-Site Historical Land Uses within 500m**

Surrounding Feature	Distance (m)	Dates	Direction
Scavenging Depot <i>later</i> Depot <i>later</i> Works	Adjacent	1915 - Present	South-west
Nurseries	Adjacent	1982 - 1991	South
Household Waste Site	80	1985 - Present	West
Fire Station	475	1934 - 1961	West

### 3.3 Planning History

EPS has undertaken a review of online planning records held by the Surrey Heath Borough Council. No relevant records relating to contaminated land aspects were found.





## 4.0 ENVIRONMENTAL SETTING

### 4.1 Geology & Hydrogeology

The British Geological Survey (BGS) memoirs and geological maps with respect to the area indicates the site to be underlain by the following geological sequence:

**Table 4.1 Summary of Geological and Hydrogeological Data**

Geological Unit	Classification	Description	Aquifer Classification	Permeability	Vulnerability
Peat	Superficial	Peat	Unproductive	Low	N/A
Windlesham Formation	Bedrock	Sand	Secondary A	Medium	Medium

Geological records note that the site is underlain by superficial Peat overlying bedrock of Windlesham Formation.

The nearest historic BGS borehole (ref. SU96SW130) located c. 200m north-west of the site indicates the presence of 0.2m thickness of topsoil, overlying yellow and grey silty clay to a depth of 0.85mbgl, overlying pale green silty sand with stones to in excess of 1.15mbgl.

The nearest groundwater abstraction to the site is a historical abstraction for spray irrigation purposes located c. 1.4km south-west of the site. There are no records of potable groundwater abstractions within 2km of the site and the site is not located within a groundwater Source Protection Zone (SPZ).

The underlying groundwater body of the Chobham Bagshot Beds (Water Body ID: GB40602G601400) is indicated to have an overall rating of poor, a chemical rating of poor and a quantitative rating of good based on data from 2019.

### 4.2 Ground Stability

Geotechnical data presented within the environmental data search identifies the following risks on site.





**Table 4.3 Summary of Data Search Information**

Hazard	Designation	Comments
Shrink-Swell Clay	Very Low	Ground conditions have been categorised as very low risk based on the published geology of peat overlying sand of the Windlesham Formation.
Running Sand	Very Low	Running sand conditions are considered unlikely and this is not considered to pose a significant constraint to the development.
Compressible Deposits	High	The conditions have been categorised as high based on the published superficial peat geology.
Collapsible Deposits	Negligible	Deposits with potential to collapse when loaded and saturated are believed not to be present.
Landslides	Very Low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
Ground Dissolution	Negligible	Dissolution features are unlikely to be present.

A refuse heap and unspecified disused tip are recorded on site, indicating the presence of made ground.

The site is not indicated to be affected by underground workings or mining.

It should be noted that the above is qualitative and based on anticipated ground conditions only.

#### 4.3 Mining and Ground Workings

Surface works are indicated to have occurred on site in relation to the use as a refuse heap and unspecified disused tip. Cuttings are also indicated to have occurred c. 220m south of the site, relating to the construction of the M3 motorway. No further records of surface or underground ground workings, natural cavities, or mining are indicated within area.

#### 4.4 Hydrology

Windle Brook, part of the Hole/Mill Bourne Water Body (Water Body ID: GB106039017930), runs along the northern boundary of the site. It has an overall rating of moderate, a chemical rating of fail (due to concentrations of Polybrominated diphenyl ethers (PBDE)), and an ecological rating of moderate, based on data from 2019.

A drainage ditch runs along the southern boundary of the site.





#### 4.5 Flooding

The majority of the site is designated as low risk of river and coastal flooding and is within flood zone 2. However, the far north of the site adjacent to Windle Brook is designated as medium and high and is in flood zone 3. The site is designated as having negligible risk of groundwater flooding.

There is a record of a flood event in September 1968 where the channel capacity was exceeded.

#### 4.6 Radon Risk Potential

The UK radon website indicates the site is situated in an area it is estimated that less than 1% of properties exceed the Radon Action Level and therefore no radon protective measures are necessary.

#### 4.7 Unexploded Ordnance

A review of freely available online unexploded ordnance (UXO) risk maps provided by Zetica indicate that the site is located within an area of low bomb risk.

#### 4.8 Sensitive Land Uses

Residential properties (existing gypsy/traveller pitches) are located adjacent to the west of the site.

The site is located within Green Belt. Deciduous woodland designated as a Priority Habitat Inventory is indicated to the north and east of the site. The site is located within a SSSI Impact Risk Zone relating to Colony Bog and Bagshot Heath located c. 900m south-west of the site.

#### 4.9 Site Sensitivity Assessment

The site is considered to be located within a **low-moderate** sensitivity setting for the following reasons:

- ▶ A secondary A aquifer is contained within the underlying Windlesham Formation bedrock;
- ▶ No active groundwater abstractions are located in close proximity to the site and the site is not located within a groundwater SPZ;
- ▶ Windlesham Brook is located adjacent to the north of the site;
- ▶ Residential properties are located adjacent to the site;
- ▶ Deciduous woodland designated as a Priority Habitat Inventory is indicated to the north and east of the site; and
- ▶ The site is located in Green Belt.





## 5.0 CONSULTATIONS

### 5.1 Landfill Sites and Waste Treatment Sites

Records indicate that a historic landfill relating to 'Commercial Environmental Permitting Regulations' was first recorded on site in 1925. Historical mapping indicates that the site was used as a refuse tip from c. 1969 to c. 1985.

A Household, Commercial & Industrial Waste Station site, first licensed in 1992, is present c. 80m to the west of the site.

### 5.2 Regulatory Database

The following information has been obtained from a commercially available environmental database. The summary table below includes records not otherwise detailed in this report.

**Table 5.1 Summary of Data**

Activity	Distance from site (m)		Details
	0-249	250-500	
Licensed Discharges to Controlled Waters	1	1	Site drainage from Swift Lane Household Waste Recycling Centre discharges into Windle Brook c. 90m west of the site.  Process effluent from M3 Junction 2 – 4A site compound was discharged into a tributary of Windle Brook c. 420m north-east of the site between 2016 and 2021.
Pollution Incidents	3	6	The closest, c.10m east of the site in 2006, included significant impact to water. All other incidents included no impact or minor impact to water and land.





## 6.0 CONCEPTUAL SITE MODEL (CSM)

### 6.1 Initial CSM

In accordance with Environment Agency, LCRM Published 8<sup>th</sup> October 2020 (updated April 2021) and BSI 10175 (Code of Practice for Investigation of Potentially Contaminated Land), EPS has developed an initial CSM to identify potential contamination sources, migration pathways and receptors within the study area.

### 6.2 Contaminant Sources

Based on the information presented in the above sections, the following on and off-site sources of potential contamination have been identified.

#### On site

Potential sources of contamination identified on site include:

- ▶ **Historic Landfilling** – first recorded in 1925 and historical mapping indicates use of site as refuse tip from c. 1969 to c. 1985; and
- ▶ **Historic use as Nursery** – given that no historic structures are indicated on historic maps it is considered unlikely that any bulk storage of herbicides and pesticides has taken place on site and as such this is not considered to be an active source.

#### Off site

- ▶ **Depot then works now vehicle maintenance and repair facility** – adjacent west;
- ▶ **Household Waste Site** – c. 80m west. Given the nature of the waste and the anticipated controls this is not considered to be a credible source which may affect the site;
- ▶ **Refrigerator servicing and repair** – c. 50m west. Given the assumed control measures and lack of bulk storage, and the distance from the site this is not considered to be a credible source which may affect the site;
- ▶ **Pollution incident** with significant impact to water c. 10m east of the site in 2006. Given the level of impact and time passed since the incident this is not considered to be a credible source and as such has not been included within the CSM;
- ▶ **Historic Fire Station** – 475m west. Given the distance from the site the pathway is not considered to be active; and
- ▶ **Historic Nurseries** – adjacent south. Given that no historic structures are indicated on historic maps it is considered unlikely that any bulk storage of herbicides and pesticides has taken place as such this is not considered to be an active source.





### 6.3 Potential Pathways

Receptors may be potentially at risk from the identified potential sources of contamination via the following pathways:

- ▶ Migration of mobile contaminants on or off site via services, sewers and manmade conduits;
- ▶ Direct contact, ingestion and inhalation of contaminants on site;
- ▶ Migration of mobile contaminants into groundwater / transport into surface waters; and
- ▶ Migration of hazardous gases through permeable soils.

### 6.4 Potential Receptors

#### Human Receptors

- ▶ **Future site users** (residents); and
- ▶ **Residents of the adjacent existing gypsy/traveller site.**

Construction workers are not considered to be a plausible receptor as exposure will be managed through the use of appropriate PPE and hygienic working practices, as required under HSE/ CDM regulations. Furthermore, potential exposure to possible contaminants is not expected to be over prolonged work duration thereby limiting any impact to ground workers.

#### Controlled Waters

- ▶ **Secondary A aquifer** contained within the underlying Windlesham Formation bedrock; and
- ▶ **Windle Brook** adjacent to the northern boundary of the site.

### 6.5 Risk Assessment

CIRIA 552: Contaminated Land Risk Assessment 'A Guide to Good Practice' provides guidance on risk assessment taking into account factors such as severity of the potential harm that may arise from a successful pollutant linkage, potential magnitude of the hazard, and the sensitivity of the target receptor. Risk assessment is initially assessed by determining the severity of the potential hazard, which takes into account receptor sensitivity and the magnitude of the potential impact as detailed in Tables 6.1 and 6.2 below.





### 6.5.1 Severity

**Table 6.1 Receptor Sensitivity**

Category	Human sensitivity	Environmental sensitivity
Very Low	Ground workers	Non-sensitive water course
Low	Commercial / Industrial	Secondary Aquifer
Medium	Residential without plant uptake	Principal Aquifer / Sensitive Watercourse
High	Residential with plant uptake	Groundwater Source Protection Zone

**Table 6.2 Magnitude of Impact**

Category	Example
No Impact	No identified or potential pollutants present
Slight Impact	Minor leaks and spills from fuel infrastructure, inert landfills / Made Ground
Moderate Impact	Major leaks and spills from fuel infrastructure
Gross Impact	Heavily contaminated industrial sites, hazardous landfills

Severity is subsequently assessed considering the potential receptor and magnitude of impact as outlined within Table 6.3 below.

**Table 6.3 Determination of Level of Severity for Potential Hazards**

	Receptor Sensitivity			
	Very Low	Low	Medium	High
No Impact	Minor	Minor	Minor	Minor
Slight Impact	Minor	Minor	Minor	Mild
Moderate Impact	Minor	Minor	Mild	Medium
Gross Impact	Minor	Mild	Medium	Severe

### 6.5.2 Likelihood

The likelihood of an event is assessed while considering the potential for presence of a contaminant, presence of receptor, and the substantiality of the pollutant pathway. Likelihood is broken down into four separate categories within the CSM as shown in Table 6.4 below:

**Table 6.4 Definitions of Likelihood Categories**

Category	Definition
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable.
Low Likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term.
High Likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor.





### 6.5.3 Risk Rating

Table 6.5 demonstrates the methodology used to provide an overall risk rating within the preliminary CSM with respect to any potential sources of contamination that may affect the site. An overall risk rating is assigned to each potential contaminant considering the assessed likelihood and severity as determined using the methodologies within Tables 6.1 to 6.4:

**Table 6.5 Level of Risk Rating for Hazard Definition**

Likelihood	Severity			
	Minor	Mild	Medium	Severe
Unlikely	Very Low	Very Low	Low	Low / Moderate
Low Likelihood	Very Low	Low	Low / Moderate	Moderate
Likely	Low	Low / Moderate	Moderate	High
High Likelihood	Low / Moderate	Moderate	High	Very High

### 6.6 Conceptual Site Model

A site specific CSM has therefore been created using the above information and is provided on the following page.







Table 6.6 Conceptual Site Model

Source	Contaminant	Potential migration pathway	Potential Receptors	Likelihood of Occurrence	Severity	Overall Risk Rating	Active / Inactive
<b>On-Site</b>							
Made Ground present as a result of historic landfilling	Asbestos; Heavy Metals & Metalloids; Total Petroleum Hydrocarbons (TPHs); and Polycyclic Aromatic Hydrocarbons (PAHs)	Ingestion of soils Dermal contact with soils Build up and inhalation of vapours	Future site users Adjacent residents	<b>Low</b>	<b>Minor</b>	<b>Very low</b>	<b>Potentially Active</b> – It is recommended that investigation is undertaken to assess the risk.
		Vertical and Lateral Migration	Secondary A Aquifer	<b>Low</b>	<b>Minor</b>	<b>Very Low</b>	<b>Potentially Active</b> – It is recommended that investigation is undertaken to assess the risk.
			Windle Brook	<b>Low</b>	<b>Minor</b>	<b>Very Low</b>	<b>Potentially Active</b> – It is recommended that investigation is undertaken to assess the risk.
	Ground gas generation (CH <sub>4</sub> and CO <sub>2</sub> ) should a significant thickness of Made Ground be present	Build up and inhalation of ground gases	Future Site Users	<b>Likely</b>	<b>Minor</b>	<b>Low</b>	<b>Potentially Active</b> – It is recommended that ground gas monitoring is undertaken to assess the risk.



Source	Contaminant	Potential migration pathway	Potential Receptors	Likelihood of Occurrence	Severity	Overall Risk Rating	Active / Inactive
<b>Off-Site</b>							
Depot then Works then Vehicle Maintenance and Repair Facility	Metals TPH PAH	Lateral Migration within Groundwater	Future site users	<b>Low</b>	<b>Mild</b>	<b>Low / Moderate</b>	<b>Potentially Active</b> – It is recommended that investigation is undertaken to assess the risk.
Vehicle repair, testing and servicing	Metals TPH PAH	Lateral Migration within Groundwater	Future site users	<b>Low</b>	<b>Minor</b>	<b>Very low</b>	<b>Potentially Active</b> – It is recommended that investigation is undertaken to assess the risk.



EPS has utilised the available data to classify the site on the basis of its likely contaminated land liability in relation to the property development. The risk classification definitions are summarised below:

**Table 6.7 Risk Classification**

Risk	Definition
Very Low	Low likelihood that harm could arise to a receptor. Such harm is unlikely to be any worse than mild.
Low	There are unlikely to be significant contaminated land liabilities associated with the property. Such harm, at worst, would normally be relatively mild. Some limited site investigation maybe required.
Low-Moderate	There are unlikely to be significant contaminated land liabilities associated with the property with regard to the proposed use. However, issues may require further consideration via site investigation in the event of a future redevelopment of the site etc. Remediation works (if required) are likely to be limited in extent.
Moderate	Some potential contaminated land liabilities are likely to affect the property as a result of historical and/or current activities. The risks identified are unlikely to pose an immediate significant issue but the purchaser/developer may wish to make further enquiries of the vendor or undertake further environmental improvements. Redevelopment of the site will likely require further site investigation. Some remedial works maybe required in the long term.
High	Significant potential contaminated land liabilities have been identified at the property. Further assessment including intrusive ground investigation will be required to determine to level of risk and associated liability. Remediation works may be required in the short-term, but likely required in the long term.
Very High	Severe harm to a receptor may already be occurring, or a high likelihood severe harm will arise to a receptor, unless immediate remedial works / mitigation measures are undertaken. The risk if realised is likely to result in substantial liability. Urgent investigation required.

### Overall Environmental Risk Assessment

Overall, the preliminary risk classification of the site in relation to the proposed redevelopment is considered to be **very low to moderate**. As such, some limited site investigation work is recommended.





## 7.0 SITE INVESTIGATION

### 7.1 Summary of Fieldwork

Ground investigation works were completed on 14<sup>th</sup> November 2022 and comprised the following scope:

**Table 7.1 Summary of Fieldwork**

Hole Location	Rationale	Maximum Depth (mbgl)	Monitoring Well Response Zone (mbgl)
WS101	To obtain information on shallow ground conditions, obtain samples for subsequent chemical laboratory analysis, and to install a ground gas and groundwater monitoring well.	3.80	1.00 – 3.00
WS103	To obtain information on shallow ground conditions and obtain samples for subsequent chemical laboratory analysis.	4.00	-
WS104	To obtain information on shallow ground conditions, obtain samples for subsequent chemical laboratory analysis, and to install a ground gas and groundwater monitoring well.	4.00	1.00 – 2.00
WS106	To target potential contamination from the adjacent site, obtain information on shallow ground conditions, obtain samples for subsequent chemical laboratory analysis, and to install a ground gas and groundwater monitoring well.	5.00	1.00 – 3.00

**Notes:** m bgl – metres below ground level. WS – Window Sample

All samples were collected using appropriate PPE and sampling equipment that was cleaned at each sampling location. A detailed copy of sampling methodology, QA procedures and laboratory chain of custody forms can be provided upon request.

### 7.2 Site Investigation Standards

All exploratory works, associated sampling, in-situ testing and logging were carried out broadly in accordance with techniques outlined in BS5930:2015 (BS5930: 'Code of Practice for Site Investigation', 2015), BS EN ISO 14688-1, Identification of soil, BS EN ISO 14688-2 classification of soil, BS EN ISO 22475, Sampling methods and groundwater measurements and BS EN ISO 22476 – Field Testing, as appropriate, at positions as near as practicable to those supplied by the client.





## 8.0 LABORATORY ANALYSIS

### 8.1 Chemical Laboratory Analysis

Chemical laboratory testing was carried out by Chemtest part of the Eurofins Group who are a UKAS and MCERTS accredited laboratory.

A total of six soil samples were scheduled for the following analyses:

- ▶ Asbestos screen / identification;
- ▶ Heavy metals;
- ▶ Cyanide (total);
- ▶ Organic matter;
- ▶ Total Organic Carbon;
- ▶ TPH Criteria Working Group (CWG);
- ▶ BTEX and MTBE;
- ▶ Speciated PAH; and
- ▶ Phenols.

Three groundwater samples were also scheduled for the following analysis:

- ▶ pH;
- ▶ Heavy metals;
- ▶ Cyanide;
- ▶ Total hardness;
- ▶ TPH Criteria Working Group (CWG);
- ▶ BTEX and MTBE;
- ▶ Speciated PAH; and
- ▶ Phenols.

Chemical test certificates are presented in Appendix VI and the results are discussed in Section 10.





## 9.0 GROUND AND GROUNDWATER CONDITIONS

### 9.1 Ground Conditions Encountered

The following ground conditions were encountered:

#### 9.1.1 Made Ground

Made Ground was encountered within all exploratory hole locations and varied between 1.80m and 2.60m in thickness. The soils were highly variable, containing both predominantly fine-grained and predominantly coarse-grained soils with varying quantities of secondary constituents. Gravels comprised flint, brick, timber, glass, ceramic, charcoal, plastic, concrete, and combustion products.

A layer of peat with a hydrocarbon odour was present between 0.30m and 0.60m within WS104. A hydrocarbon odour was also noted within the underlying Made Ground gravel layer. Combustion products were also noted within Made Ground within WS106.

No further visual or olfactory evidence of contamination was recorded within Made Ground soils.

#### 9.1.2 Windlesham Formation

Given the absence of natural superficial peat underlying the Made Ground soils, the underlying natural soils have been interpreted as bedrock of the Windlesham Formation, indicated by geological maps to underlie the site.

The Windlesham Formation was highly variable comprising both predominantly fine-grained and predominantly coarse-grained soils with varying quantities of secondary components. Predominantly fine-grained soils were encountered directly underlying the Made Ground within the south (WS104) and west (WS106) of the site with consistency varying between soft and firm, with firm to very stiff CLAY also encountered at the base of the holes within these locations.

Stiff to very stiff light grey slightly sandy slightly gravelly CLAY was encountered at the base of WS104 and

Exploratory hole logs are included in Appendix V.





## 9.2 Groundwater

Groundwater details are presented in Table 9.1 below:

**Table 9.1 Summary of Groundwater Strikes**

Location	Depth to Water Strike (mbgl)	Stratum	In flow Rate
WS101	0.60	Made Ground	Slow - seepage
WS104	1.20	Made Ground	Fast - strike
WS106	2.00	Windlesham Formation	Strike

Groundwater levels recorded during return monitoring visits varied between 0.74m and 1.88m bgl. The results of the groundwater level monitoring are presented within Appendix VII.

## 9.3 In-situ Testing

In-situ Standard Penetration Testing (SPT) was undertaken at regular intervals within natural strata. The results of the in-situ testing are presented on the exploratory hole logs included within Appendix V.

## 9.4 Land Gas and Groundwater Monitoring

Two initial return monitoring visits were carried out on 22<sup>nd</sup> and 29<sup>th</sup> November 2022. During each visit gas flow and gas concentrations of methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide was recorded using an infrared gas analyser. Depth to groundwater and base of borehole were recorded using a water level dip meter. The results of the ground gas and groundwater monitoring are presented in Appendix VII.

During the first round of monitoring carried out on 22<sup>nd</sup> November 2022, each monitoring standpipe was purged by three well volumes and a groundwater sample was collected using a disposable bailer.







## 10.0 TIER II GENERIC QUANTITATIVE CONTAMINATED LAND RISK ASSESSMENT

### 10.1 Human Health

The long term (chronic) toxicity risk to human health is assessed by utilising appropriate and conservative generic assessment criteria (GAC) to determine whether potentially unacceptable risks may be present.

To undertake the Tier II assessment within the context of the development proposal, EPS has determined that the most appropriate GAC values available will be those based upon a residential end use with plant uptake.

Soil Organic Matter varied between 2.3% and 54% with an average of 15.9%. In order to provide a conservative assessment, GAC based on 2.5% soil organic matter have been utilised where applicable.

The following assessment, summarised in Table 10.1, has primarily adopted the S4UL (Suitable for Use Levels) reference values published by LQM/CIEH in 2015, however for determinants where no S4UL GAC is available, generally either GAC published by EIC/AGS/CL:AIRE or Atkins ATRISK<sup>soil</sup> soil screening value (SSV) has been used. Due to the absence of a published lead GAC for direct use within the planning regime, the 2014 Defra C4SL (Category 4 Screening Level) has been used as this value is considered to incorporate the latest toxicological, bio-accessibility and exposure modelling research to date.

**Table 10.1 Summary of Generic Human Health Toxicity Assessment for Residential End Use (with plant uptake)**

Determinand	Units	GAC	GAC Source	No.	[mc]	Location / Stratum	Primary Pathways	Assessment
<b>Inorganics</b>								
Antimony	mg/kg	550	(ii)	6	3.3	N/A	1, 2, 3	No Further Action
<b>Arsenic</b>	<b>mg/kg</b>	<b>40</b>	<b>(i)</b>	<b>6</b>	<b>70</b>	<b>MG in WS103</b>	<b>1</b>	<b>See discussion</b>
Barium	mg/kg	1,300	(ii)	6	150	N/A	1, 2	No further action
Cadmium	mg/kg	85	(i)	6	0.46		1, 2	
Chromium	mg/kg	910	(i)	6	60		1, 2, 3	
Chromium (VI)	mg/kg	6	(i)	6	<0.50		1, 2, 3	
Copper	mg/kg	7,100	(i)	6	110		1, 2	
Lead	mg/kg	310	(iv)	6	170		1, 2	
Mercury [Inorganic]	mg/kg	56	(i)	6	0.52		1, 2	
Nickel	mg/kg	180	(i)	6	52		1	
Selenium	mg/kg	430	(i)	6	0.61		1, 2	
Vanadium	mg/kg	1,200	(i)	6	30		1, 2	
Zinc	mg/kg	40,000	(i)	6	340		1, 2	
Cyanide (Total)	mg/kg	34	(iii)	6	6.1		1	
Asbestos	-	D.	-	6	N.D		3	



Organics – PAHs and Phenol								
Phenols	mg/kg	690	(i)	6	<0.10	N/A	2	No Further Action
Acenaphthene	mg/kg	4,700	(i)	6	0.31		2	
Acenaphthylene	mg/kg	4,600	(i)	6	0.31		2	
Anthracene	mg/kg	35,000	(i)	6	0.84		2	
Benzo(a) Anthracene	mg/kg	14	(i)	6	2.40		1	
<b>Benzo(a)Pyrene</b>	<b>mg/kg</b>	<b>3.20</b>	<b>(i)</b>	<b>6</b>	<b>3.8</b>	<b>MG within WS103, WS104 and WS106.</b>	<b>1</b>	<b>See discussion</b>
Benzo(b) Fluoranthene	mg/kg	4.0	(i)	6	1.4	N/A	1	No Further Action
Benzo(ghi) Perylene	mg/kg	360	(i)	6	3.2		1	
Benzo(k) Fluoranthene	mg/kg	110	(i)	6	1.4		1	
Chrysene	mg/kg	31	(i)	6	2.3		1	
Dibenzo(a,h) Anthracene	mg/kg	0.32	(i)	6	<0.10		1	
Fluoranthene	mg/kg	1,600	(i)	6	5.1		1, 2	
Fluorene	mg/kg	3,800	(i)	6	0.36		2	
Indeno (123-cd)Pyrene	mg/kg	46	(i)	6	2.9		1	
Naphthalene	mg/kg	2.3	(i)	6	1.3		4	
Phenanthrene	mg/kg	1,500	(i)	6	2.0		2	
Pyrene	mg/kg	3,800	(i)	6	5.0	1, 2		
BTEX								
Benzene	ug/kg	700	(i)	6	<1.0	N/A	1	No Further Action
Toluene	ug/kg	1,900,000	(i)	6	<1.0		1	
EthylBenzene	ug/kg	190,000	(i)	6	<1.0		1	
M-Xylene	ug/kg	190,000	(i)	6	<1.0		1	
P-Xylene	ug/kg	180,000	(i)	6	<1.0		1	
O-Xylene	ug/kg	210,000	(i)	6	<1.0		1	
Methyl tert-Butyl Ether	ug/kg	120,000	(ii)	6	<1.0		1	
TPH								
Aliphatic C5-C6	mg/kg	78	(i)	6	<1.0	N/A	4	No Further Action
Aliphatic C6-C8	mg/kg	230	(i)	6	<1.0		4	
Aliphatic C8-C10	mg/kg	65	(i)	6	<1.0		4	
Aliphatic C10-C12	mg/kg	330	(i)	6	19		4	
Aliphatic C12-C16	mg/kg	2,400	(i)	6	290		1,4	
Aliphatic C16-C35	mg/kg	9,200	(i)	6	1,430		1	
Aliphatic C35-C44	mg/kg	92,000	(i)	6	<1.0		1	
Aromatic C5-C7	mg/kg	690	(i)	6	<1.0		4	
Aromatic C7-C8	mg/kg	1,800	(i)	6	<1.0		4	
Aromatic C8-C10	mg/kg	110	(i)	6	<1.0		4	
Aromatic C10-C12	mg/kg	590	(i)	6	22		4	
Aromatic C12-C16	mg/kg	2,300	(i)	6	310		1,4	
Aromatic C16-C21	mg/kg	1,900	(i)	6	67		1	
Aromatic C21-C35	mg/kg	1,900	(i)	6	1,100		1	
Aromatic C35-C44	mg/kg	1,900	(i)	6	15		1	

**Key**

MG	Made Ground
[mc]	Maximum Concentration Recorded
D.	Detected
N.D.	None Detected (Limit of Detection = <0.0001%)

**Primary Pathways**

- 1 Ingestion of soil and indoor dust and / or oral background exposure;
- 2 Consumption of home-grown produce and attached soil;
- 3 Inhalation of dust (background and indoor);
- 4 Inhalation of vapour (background and indoor).

**Generic Assessment Criteria (GAC) Source**

- (i) LQM/CIEH Suitable For Use Level (S4UL) (2015);
- (ii) EIC/AGS/CL:AIRE;
- (iii) Atkins ATRISK<sup>soil</sup> soil screening value (SSV);
- (iv) Defra Category 4 Screening Level (2014);

The following exceedances to the relevant GAC have been identified:

- ▶ **Arsenic** – within a sample of Made Ground collected from WS103 at 0.30 – 0.50m bgl; and
- ▶ **Benzo(a)Pyrene** – within samples of Made Ground collected from WS103 at 0.30 – 0.50m bgl, from WS104 at 0.30 – 0.50m bgl, and from WS106 at 0.40 – 0.60mbgl.

Whilst exceedances have been identified in only two locations, given the limited number of sample locations and the inherent heterogenous nature of Made Ground soils, it is considered likely that further exceedances will be present within locations not yet investigated. As such, it is considered that the Made Ground soils across the site may pose a risk to human health.

The primary pathway for both arsenic and benzo(a)pyrene is via ingestion of soil and indoor dust and / or oral background exposure. Within areas of proposed hard standing, understood to occupy the vast majority of the site based on current proposals, the pathway will be effectively broken and no significant risk will be posed to future site users.

Should any vegetated borders be proposed, it is assumed that a nominal thickness of clean imported soil will be required to act as a suitable growing medium. This would also act as a barrier breaking the contamination pathway to future site users. It is also suggested that a no dig membrane is placed between any clean imported soil and underlying Made Ground to prevent accidental exposure in the event of unauthorised alterations. This is understood to be of increased likelihood given the proposed use of the site.

## 10.2 Controlled Waters

The results of groundwater analysis carried out on samples collected from WS101, WS104 and WS106 have been compared with freshwater Environmental Quality Standards (EQS), UK Drinking Water Standards (DWS) and the World Health Organization (WHO) DWS, as summarised within Table 10.2, overleaf:





**Table 10.2 Groundwater Analysis Results and Comparison with Generic Assessment Values**

Determinand	Units	Environmental Quality Standard	UK DWS	WHO DWS	WS101	WS104	WS106
Arsenic	µg/l	50	10	10	0.99	2.0	0.56
<b>Boron</b>	µg/l	2,000	<b>1,000</b>	1,000	<b>1900</b>	<b>1400</b>	270
Cadmium	µg/l	0.08	5	3	< 0.08	< 0.08	< 0.08
Chromium VI	µg/l	3.4	50	50	< 20	< 20	< 20
Chromium III	µg/l	4.7	50	50	< 0.50	< 0.50	< 0.50
<b>Copper</b>	µg/l	<b>1</b>	2,000	2000	<b>1.3</b>	<b>1.7</b>	< 0.50
Lead	µg/l	1.2	10	10	< 0.50	< 0.50	< 0.50
Mercury	µg/l	0.07	1	6	< 0.05	< 0.05	< 0.05
<b>Nickel</b>	µg/l	<b>4</b>	<b>20</b>	70	<b>10</b>	<b>73</b>	<b>48</b>
Vanadium	µg/l	20	-	-	0.79	< 0.50	< 0.50
<b>Zinc</b>	µg/l	<b>10.9</b>	-	-	< 2.5	<b>150</b>	9.1
Cyanide (Total)	µg/l	1	50	-	< 0.050	< 0.050	< 0.050
Phenol	µg/l	7.7	-	-	< 0.030	< 0.030	< 0.030
<b>Anthracene</b>	µg/l	<b>0.1</b>	-	<b>0.05</b>	< 0.10	< 0.10	<b>0.74</b>
Naphthalene	µg/l	2	-	-	< 0.10	< 0.10	< 0.10
Benzo(a)Pyrene	µg/l	0.27	0.010	0.7	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	µg/l	0.017	-	-	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	µg/l	0.017	-	-	< 0.10	< 0.10	< 0.10
<b>Benzo(ghi)perylene</b>	µg/l	<b>0.0082</b>	-	-	< 0.10	< 0.10	<b>1.2</b>
<b>Fluoranthene</b>	µg/l	<b>0.0063</b>	-	-	< 0.10	< 0.10	<b>3.9</b>
TPH Ali (C5-C6)	µg/l	-	-	1	< 0.10	< 0.10	< 0.10
TPH Ali (C6-C8)	µg/l	-	-	1	< 0.10	< 0.10	< 0.10
TPH Ali (C8-C10)	µg/l	-	-	300	< 0.10	< 0.10	< 0.10
TPH Ali (C10-C12)	µg/l	-	-	90	< 0.10	< 0.10	< 0.10
TPH Ali (C12-C16)	µg/l	-	-	90	< 0.10	< 0.10	< 0.10
TPH Ali (C16-C21)	µg/l	-	-	90	< 0.10	< 0.10	< 0.10
TPH Ali (C21-C35)	µg/l	-	-	90	< 0.10	< 0.10	< 0.10
TPH Aro (C5-C7)	µg/l	-	-	1	< 0.10	< 0.10	< 0.10
TPH Aro (C7-C8)	µg/l	-	-	1	< 0.10	< 0.10	< 0.10
TPH Aro (C8-C10)	µg/l	-	-	300	< 0.10	< 0.10	< 0.10
TPH Aro (C10-C12)	µg/l	-	-	90	< 0.10	< 0.10	< 0.10
TPH Aro (C12-C16)	µg/l	-	-	90	< 0.10	< 0.10	< 0.10
TPH Aro (C16-C21)	µg/l	-	-	90	< 0.10	< 0.10	< 0.10
TPH Aro (C21-C35)	µg/l	-	-	90	< 0.10	< 0.10	< 0.10

In cases where the concentration is below the limit of detection (LOD) however the LOD is greater than the screening criteria this has not been considered as an exceedance.

The results of this direct comparison indicates that the screening criteria have been exceeded for the following determinants:





- ▶ **Boron** – UK / WHO DWS exceeded for within all locations;
- ▶ **Copper** – EQS exceeded within WS101 and WS104;
- ▶ **Nickel** – EQS and UKDWS exceeded within all locations;
- ▶ **Zinc** – EQS exceeded within WS104;
- ▶ **Anthracene** – EQS and WHO DWS exceeded within WS106;
- ▶ **Benzo(ghi)perylene** – EQS exceeded within WS106; and
- ▶ **Fluoranthene** - EQS exceeded within WS106.

Whilst the UK/WHO DWS have been exceeded for boron, nickel and anthracene, given that the site is not located within a groundwater SPZ and that no drinking water abstractions are present within 2km of the site, this is not considered to pose a significant risk to drinking water.

The freshwater EQS have been exceeded for several metals and PAH, however these concentrations are considered to be largely representative of perched water within the Made Ground which is likely to be somewhat locally confined.

In the event that an active pathway to the nearby Hale/Mill Bourne (referred to as Windle Brook within this location) is present, it is considered that the concentrations of identified contaminants would be significantly diluted prior to and upon reaching the identified surface water receptor. As such, it is considered that concentrations of identified contaminants within the surface watercourse are not likely to be of significant concern, particularly given that the watercourse is indicated to have a chemical rating of fail. Additionally, it is not considered that the proposed development would introduce any additional pathways or cause any increase the risk.

### 10.3 Ground Gas

In accordance with BS8485:2015+A1:2019, the worst-case hazardous gas flow rates ( $Q_{hg}$ ) of 0.0094l/h has been calculated by multiplying the maximum recorded stabilised flow (0.1l/h) in any standpipe in a stratum with the maximum peak gas concentration (9.4%) in any other standpipe in that stratum. This would indicate that the ground gas regime could be classified as Characteristic Situation 1 (CS1).

However, given that steady concentrations of carbon dioxide of greater than 5% have been consistently encountered within the two boreholes with unsaturated response zones it is considered that classification of Characteristic Situation 2 (CS2) with **low** hazard potential is more appropriate. This classification should be confirmed via undertaking of further gas monitoring prior to determining appropriate mitigation measures for the proposed development.

It is understood that the majority of proposed enclosed living spaces are likely to be raised above ground such that any ground gas emanating from the soils beneath (eg. touring caravans and mobile homes) would take the path of least resistance and naturally disperse laterally rather than migrate into the structures above. However, for any enclosed living spaces constructed directly onto the ground, the risk will need to be mitigated by the incorporation of suitable gas mitigation measures.





## 10.4 Developed Conceptual Site Model

EPS has utilised the above investigation findings to develop the site Conceptual Site Model (CSM) and identify unacceptable risks to receptors within the study area as detailed in Table 10.3 below:

**Table 10.3 Developed Conceptual Site Model**

Source	Containment	Receptors	Migration Pathway	Risk
Heavy metal and PAH contamination within Made Ground	On-site	Future Site Users	Ingestion of soils Dermal contact with soils	In areas of proposed hardstanding the pathway will be broken. Should any vegetated borders be proposed, it is assumed that a nominal thickness of clean imported soil will be required to act as a suitable growing medium and this would also act as a barrier preventing human health expose.
Ground gases	On-site	Future site users	Build up and inhalation of gases within enclosed living spaces	No risk is present where structures are raised allowing free dispersal of ground gas beneath. Where structures are constructed directly onto the ground gas mitigation measures will be required.
Heavy metal and PAH within perched water	On-site	Windle Brook	Lateral migration	The relatively low concentrations identified within perched water are likely to significantly reduce following dilution and as such are unlikely to pose a significant risk.
		Secondary Aquifer	Vertical and lateral migration	Given that the site is not located within a groundwater SPZ and that no drinking water abstractions are present within 2km of the site, this is not considered to pose a significant risk to drinking water.



## 11.0 CONCLUSIONS AND RECOMMENDATIONS

### 11.1 Conclusions

Based on the findings of this report, the following conclusions have been made:

- ▶ The proposed presence of hard standing across the majority of the site will break the pollutant pathway between identified soil contamination and future site users;
- ▶ Should any vegetated borders be proposed, it is assumed that a nominal thickness of clean imported soil will be required to act as a suitable growing medium and this would also act as a barrier preventing human health exposure;
- ▶ Basic gas mitigation measures will be required for any enclosed living spaces constructed directly onto the ground. However, where enclosed living spaces are raised above the ground allowing ground gases to freely disperse no significant risk will be present;
- ▶ It is not considered that a significant risk to drinking water is present given that the site is not located within a groundwater SPZ and there are no potable groundwater abstractions within influencing distance of the site; and
- ▶ Should a pathway be present for perched water underlying the site to reach the nearby Windle Brook it is considered likely that the following dilution with river water the concentrations would fall below the EQS.

### 11.1 Recommendations

Should the development be progressed beyond the feasibility stage it is recommended that:

- ▶ Further assessment is undertaken in order to confirm that Windle Brook is not significantly affected by contaminants identified within the perched water underlying the site. This could include sampling of river water upstream and downstream of the site;
- ▶ Further ground gas monitoring is undertaken in accordance with published guidance to expand the existing data set and confirm the initial ground gas assessment;
- ▶ Following the above, a remediation strategy and verification plan is prepared for approval by the regulators prior to commencement of development works; and
- ▶ The design of any proposed foundations or roadways should take into consideration the significant thickness of heterogenous Made Ground beneath the site and the potential for chemicals to be present within the ground which could adversely affect concrete structures installed within.

**END OF REPORT**







**APPENDIX I**

**DRAWINGS**





## APPENDIX II – LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between EPS and the Client.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not be made known or accessible.
5. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
6. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
7. EPS cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by EPS is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by EPS in this connection without their explicit written agreement there to by EPS.
8. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.





## APPENDIX III – GLOSSARY

### TERMS

AST	Above Ground Storage Tank
BGS	British Geological Survey
BSI	British Standards Institute
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research Association
CLEA	Contaminated Land Exposure Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)
DWS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	General Assessment Criteria
GL	Ground Level
GSV	Gas Screening Value
HCV	Health Criteria Value
ICSM	Initial Conceptual Site Model
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene)
ND	Not Detected
LMRL	Lower Method Reporting Limit
NR	Not Recorded
PAH	Poly Aromatic Hydrocarbon
PCB	Poly-Chlorinated Biphenyl
PID	Photo Ionisation Detector
QA	Quality Assurance
SGV	Soil Guideline Value
SPH	Separate Phase Hydrocarbon
Sp.TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
SPT	Standard Penetration Test
SVOC	Semi Volatile Organic Compound
UST	Underground Storage Tank
VCCs	Vibro Concrete Columns
VOC	Volatile Organic Compound
WTE	Water Table Elevation





**APPENDIX IV**

**PHOTOGRAPHS**







**Photograph 1** – View towards western boundary of site.



**Photograph 2** – Centre of site looking north.







**Photograph 3 – Evidence of burning within north of site.**



**Photograph 4 – View south-west from north-east corner of site**







**Photograph 5** – Looking west (off-site) from south of site.



**Photograph 6** – IBC containing unknown liquids stored on concrete blocks forming western boundary of site.







**Photograph 7** – Window sample run between 1.2m and 2.0m bgl within WS106.



**Photograph 8** – Window sample run between 2.0m and 3.0m bgl within WS106.





**APPENDIX V**

**ENGINEERING LOGS**







Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 51.36	Client Surrey Heath Borough Council	Job Number P1056
	Location (dGPS) Noth-east of site	Dates 14/11/2022	Engineer Tim Conibear	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.40-0.60	ES1		Slow. (1) at 0.60m.		(1.00)	Firm dark brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is very angular to subrounded fine to coarse flint, brick, concrete, charcoal, plastic, glass, cermaic and metal. Cobbles are subangular brick and concrete. (MADE GROUND)  ...at 0.60mbgl: seepage of perched water. Below recovered as slightly clayey sandy gravel with slight organic odour.		∇1	
				50.36	1.00 (0.50)	Soft to firm greyish brown to yellowish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint. (MADE GROUND)			
				49.86	1.50 (1.10)	Dark grey clayey sandy GRAVEL with pockets of silty clay. Sand is fine to coarse. Gravel is very angular to subrounded flint, brick, glass, and charcoal. (MADE GROUND)  ...between 2.00m and 2.20mbgl: pocket of brown fine to medium sand.			
2.80-3.00	ES2			48.76	2.60 (0.60)	Dark grey fine to medium silty SAND. (WINDLESHAM FORMATION)			
3.00-3.45	SPT(C) N=25		4,3/3,5,6,11						
				48.16	3.20 (0.60)	Medium dense greenish grey slightly gravelly fine to medium SAND. Gravel is subangular to subrounded fine to medium flint. (WINDLESHAM FORMATION)			
3.80-3.99	SPT(C) 25*/90 50/100		15,10/40,10	47.56	3.80	Complete at 3.80m			

<b>Remarks</b> HDPE standpipe (50mm internal diameter) installed to 3.00mbgl; plain pipe from ground level to 1.00mbgl and slotted pipe from 1.00m to 3.00mbgl. Hole collapsed to 3.00mbgl following completion of drilling. Hole terminated due to refusal at 3.80mbgl. Seepage of perched water at 0.60mbgl.	Scale (approx)	Logged By
	1:25	TC
	<b>Figure No.</b> P1056.WS101	



<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 51.28	<b>Client</b> Surrey Heath Borough Council	<b>Job Number</b> P1056
	<b>Location</b> North-east of site.	<b>Dates</b> 14/11/2022	<b>Engineer</b> Tim Conibear	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.30-0.50	ES1				(1.10)	Brown clayey SAND and GRAVEL with low cobble content. Sand is fine to coarse. Gravel is very angular to rounded fine to coarse flint, brick, timber, glass, plastic, ceramic and charcoal. Cobbles are subrounded brick and concrete. (MADE GROUND)				
1.30-1.50	ES2			50.18	1.10	Firm greenish grey slightly sandy slightly gravelly CLAY with rare glass cobble. Sand is fine to coarse. Gravel is very angular to subangular fine to coarse glass, flint, brick, ceramic and plastic. (MADE GROUND)				
				49.68	1.60	Dark brown silty sandy GRAVEL. Sand is fine to coarse. Gravel is very angular to subrounded fine to coarse glass, flint, brick, ceramic, timber and charcoal. (MADE GROUND)				
				49.28	2.00	No recovery.				
4.00-4.43	SPT(C) 37/280		11,13/13,13,11		(1.00)					
					48.28	3.00	Light greenish grey silty fine to medium SAND with frequent organic matter and organic odour. (WINDLESHAM FORMATION)			
					47.58	3.70	Light grey sandy GRAVEL with occasional organic matter. Gravel is angular to well rounded fine to coarse flint. (WINDLESHAM FORMATION)			
				47.28	4.00	Complete at 4.00m				

<b>Remarks</b> No groundwater encountered. Hole backfilled with arisings.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:25	TC
	<b>Figure No.</b> P1056.WS103	



Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 50.98	Client Surrey Heath Borough Council	Job Number P1056
	Location Centre of site	Dates 14/11/2022	Engineer Tim Conibear	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.30-0.50	ES1			50.68	0.30	Dark grey slightly silty sandy GRAVEL with medium cobble content. Sand is fine to coarse. Gravel is very angular to subrounded fine to coarse flint, brick, glass, ceramic, metal, wood, plastic, and charcoal. Cobbles are subangular concrete and brick. (MADE GROUND)			
				50.38	0.60	Dark reddish brown slightly sandy slightly gravelly psuedofibrous compressible PEAT with hydrocarbon odour. Sand is fine to coarse. Gravel is very angular to subrounded fine to coarse flint, wood and glass. (MADE GROUND)			
1.00-3.45	SPT(C) N=30		12,16/11,9,6,4 Fast.(1) at 1.20m.		(1.10)	Dark grey slightly clayey slightly sandy GRAVEL with medium cobble content, pockets of clay and hydrocarbon odour. Sand is fine to coarse. Gravel is very angular to subrounded fine to coarse flint, wood, brick, glass, charcoal and concrete. Cobbles are subangular to subrounded brick. (MADE GROUND)		▽1	
				49.28	1.70	Reddish brown slightly silty SAND and GRAVEL. Sand is fine to medium. Gravel is very angular to rounded fine to coarse flint, brick and glass. (MADE GROUND)			
				48.98	2.00	Soft grey slightly sandy slightly gravelly slightly organic SILT with occasional relic rootlets. Sand is fine to medium. Gravel is subangular to subrounded fine to medium flint. (WINDLESHAM FORMATION) ...below 2.30mbgl: light greenish grey mottled brown and sandy.			
3.00-3.45	SPT(C) N=28		5,7/7,7,7,7		(0.40)	Medium dense light greenish grey slightly silty slightly gravelly fine to medium SAND. Gravel is subangular to subrounded fine to coarse flint. (WINDLESHAM FORMATION)			
				47.78	3.20	Grey silty sandy GRAVEL. Sand is fine to coarse. Gravel is angular to well rounded fine to coarse flint. (WINDLESHAM FORMATION)			
4.00-4.45	SPT(C) N=50		6,9/11,13,13,13	47.08	3.90	Stiff to very stiff light grey slightly sandy slightly gravelly silty CLAY. Sand is fine to medium. Gravel is subangular to rounded fine to coarse flint. (WINDLESHAM FORMATION)  Complete at 4.00m			
				46.98	4.00				

<b>Remarks</b> Groundwater strike at 1.20mbgl. HDPE standpipe (50mm internal diameter) installed to 2.00mbg; plain pipe from ground level to 1.00mbgl and slotted pipe from 1.00m to 2.00mbgl. Finished with a flush fitting cover.	Scale (approx)	Logged By
	1:25	TC
	Figure No. P1056.WS104	



Excavation Method Drive-in Windowless Sampler	Dimensions	Ground Level (mOD) 51.00	Client Surrey Heath Borough Council	Job Number P1056
	Location South-west of site.	Dates 14/11/2022	Engineer Tim Conibear	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.40-0.60	ES1				(1.40)	Dark brown slightly clayey sandy GRAVEL with low cobble content. Sand is fine to coarse. Gravel is very angular to well rounded fine to coarse flint, concrete, brick, ceramic, plastic, charcoal and combustion products. Cobbles are subangular concrete and brick. (MADE GROUND)			
1.20-1.30	ES2			49.60	1.40	Soft greenish grey to dark grey slightly sandy slightly gravelly silty CLAY with frequent organic matter and relic rootlets, Sand is fine to medium. Gravel is very angular to subrounded fine to coarse flint, glass, and combustion products. (MADE GROUND)			
				49.20	1.80	Soft to firm greenish grey mottled brown slightly sandy slightly gavelly silty CLAY with occasional relic rootlets. Sand is fine to medium. Gravel is subangular to subrounded fine to coarse flint. (WINDLESHAM FORMATION)			
				48.70	2.30	...at 2.00mbgl: cobble sized fragment of wood encountered. Possible tree root. Very sandy below.			
3.00-3.45	SPT(C) N=5	1,2/2,1,1,1			(1.50)	Loose greenish grey slightly silty fine to medium SAND with occasional organic matter. (WINDLESHAM FORMATION)			
4.00-4.45	SPT(C) N=11	1,2/3,3,3,2		47.20	3.80	Firm light grey CLAY with frequent partings of fine to medium sand. (WINDLESHAM FORMATION)			
				47.00	4.00	No recovery.			
					(1.00)				
5.00-5.45	SPT(C) N=22	4,4/5,6,5,6		46.00	5.00				

<b>Remarks</b> Groundwater strike at 2.00mbgl. HDPE standpipe (50mm internal diameter) installed to 3.00mbgl; plain pipe from ground level to 1.00mbgl and slotted pipe from 1.00m to 3.00mbgl.	Scale (approx)	Logged By
	1:25	TC
	Figure No. P1056.WS106	



## **APPENDIX VI**

### **CHEMICAL TESTING RESULTS**







# Final Report

---

**Report No.:** 22-44321-1  
**Initial Date of Issue:** 15-Dec-2022  
**Client:** Environmental Planning Solutions (eps)  
**Client Address:** 39 East Drive  
Garshalton  
SM5 4PA  
**Contact(s):** Stuart Phillips  
Tim Conibear  
**Project:** EPS Project Number (P1056)  
**Quotation No.:** Q22-27382 **Date Received:** 18-Nov-2022  
**Order No.:** P1056-05-EC-SwiftLane **Date Instructed:** 18-Nov-2022  
**No. of Samples:** 6  
**Turnaround (Wkdays):** 10 **Results Due:** 01-Dec-2022  
**Date Approved:** 15-Dec-2022

**Approved By:**

**Details:** Stuart Henderson, Technical  
Manager

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## Results - Soil

**Project: EPS Project Number (P1056)**

Client: Environmental Planning Solutions (eps)		Chemtest Job No.:		22-44321	22-44321	22-44321	22-44321	22-44321	22-44321	
Quotation No.: Q22-27382		Chemtest Sample ID.:		1548229	1548230	1548231	1548232	1548233	1548234	
		Client Sample ID.:		ES1	ES2	ES1	ES2	ES1	ES1	
		Sample Location:		WS101	WS101	WS103	WS103	WS104	WS106	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		0.40	2.80	0.30	1.30	0.30	0.40	
		Bottom Depth (m):		0.60	3.00	0.50	1.50	0.50	0.60	
		Date Sampled:		14-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022	
		Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	
Determinand	Accred.	SOP	Units	LOD						
ACM Type	U	2192		N/A	-	-	-	-	-	
Asbestos Identification	U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	
Moisture	N	2030	%	0.020	18	21	16	20	49	18
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	2.8	4.1	2.2	4.6	3.9	1.6
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	6.1
Arsenic	U	2455	mg/kg	0.5	13	6.2	70	15	4.8	11
Barium	U	2455	mg/kg	0	150	38	130	96	42	100
Beryllium	U	2455	mg/kg	0.5	0.6	< 0.5	0.7	0.5	< 0.5	< 0.5
Cadmium	U	2455	mg/kg	0.10	0.46	< 0.10	0.24	0.41	0.11	0.36
Chromium	U	2455	mg/kg	0.5	19	12	60	20	9.5	20
Antimony	N	2455	mg/kg	2.0	3.3	< 2.0	2.8	2.4	2.2	4.0
Copper	U	2455	mg/kg	0.50	50	9.0	110	42	15	80
Mercury	U	2455	mg/kg	0.05	0.52	0.12	0.24	0.17	0.06	0.15
Nickel	U	2455	mg/kg	0.50	16	4.3	15	12	52	14
Lead	U	2455	mg/kg	0.50	170	49	140	110	26	110
Selenium	U	2455	mg/kg	0.25	0.61	0.55	0.55	0.44	0.30	0.52
Vanadium	U	2455	mg/kg	0.5	29	19	30	28	12	22
Zinc	U	2455	mg/kg	0.50	340	29	160	210	52	220
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	5.8	2.3	3.7	23	54	9.0
Total Organic Carbon	U	2625	%	0.20	3.4	1.4	2.2	14	32	5.2
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	19	< 1.0
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	290	< 1.0
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	790	< 1.0
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	640	120
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	1700	120
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	22	< 1.0
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	310	< 1.0

## Results - Soil

**Project: EPS Project Number (P1056)**

Client: Environmental Planning Solutions (eps)		Chemtest Job No.:		22-44321	22-44321	22-44321	22-44321	22-44321	22-44321	
Quotation No.: Q22-27382		Chemtest Sample ID.:		1548229	1548230	1548231	1548232	1548233	1548234	
		Client Sample ID.:		ES1	ES2	ES1	ES2	ES1	ES1	
		Sample Location:		WS101	WS101	WS103	WS103	WS104	WS106	
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	
		Top Depth (m):		0.40	2.80	0.30	1.30	0.30	0.40	
		Bottom Depth (m):		0.60	3.00	0.50	1.50	0.50	0.60	
		Date Sampled:		14-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022	14-Nov-2022	
		Asbestos Lab:		DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	
Determinand	Accred.	SOP	Units	LOD						
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	67	< 1.0
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	< 1.0	< 1.0	220	< 1.0	1100	1100
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	15
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	220	< 5.0	1500	1200
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	220	< 10	3300	1300
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	U	2800	mg/kg	0.10	1.3	1.1	0.87	0.64	0.59	0.69
Acenaphthylene	N	2800	mg/kg	0.10	0.23	< 0.10	0.23	< 0.10	0.30	0.31
Acenaphthene	U	2800	mg/kg	0.10	0.31	< 0.10	< 0.10	< 0.10	0.13	0.21
Fluorene	U	2800	mg/kg	0.10	0.36	< 0.10	< 0.10	< 0.10	0.22	0.22
Phenanthrene	U	2800	mg/kg	0.10	1.9	< 0.10	0.94	1.0	1.2	2.0
Anthracene	U	2800	mg/kg	0.10	0.35	< 0.10	0.34	0.28	0.84	0.71
Fluoranthene	U	2800	mg/kg	0.10	3.5	< 0.10	3.5	2.2	4.3	5.1
Pyrene	U	2800	mg/kg	0.10	3.1	< 0.10	3.1	1.8	5.0	4.6
Benzo[a]anthracene	U	2800	mg/kg	0.10	2.2	< 0.10	2.0	0.91	2.4	2.4
Chrysene	U	2800	mg/kg	0.10	1.8	< 0.10	1.8	0.86	1.8	2.3
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	3.3	< 0.10	2.2	1.3	4.3	3.8
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	1.0	< 0.10	1.4	0.34	1.3	1.2
Benzo[a]pyrene	U	2800	mg/kg	0.10	2.6	< 0.10	3.5	1.1	3.8	3.2
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	1.6	< 0.10	2.9	0.55	2.5	2.3
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	1.5	< 0.10	3.2	< 0.10	1.2	2.0
Total Of 16 PAH's	N	2800	mg/kg	2.0	25	< 2.0	26	11	30	31
Total Phenols	U	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

## Test Methods

SOP	Title	Parameters included	Method summary
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'AquaKem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5-C6, >C6-C8,>C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35- C44Aromatics: >C5-C7, >C7-C8, >C8- C10, >C10-C12, >C12-C16, >C16- C21, >C21- C35, >C35- C44	Dichloromethane extraction / GCxGC FID detection
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

## **Report Information**

### **Key**

---

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
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<	"less than"
>	"greater than"
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Comments or interpretations are beyond the scope of UKAS accreditation

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Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

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Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

### **Sample Deviation Codes**

---

A - Date of sampling not supplied

B - Sample age exceeds stability time (sampling to extraction)

C - Sample not received in appropriate containers

D - Broken Container

E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

### **Sample Retention and Disposal**

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All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

[customerservices@chemtest.com](mailto:customerservices@chemtest.com)



# Final Report

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**Report No.:** 22-45293-1

**Initial Date of Issue:** 06-Dec-2022

**Client:** Environmental Planning Solutions (eps)

**Client Address:** 39 East Drive  
Garshalton  
SM5 4PA

**Contact(s):** Stuart Phillips  
Tim Conibear

**Project:** EPS Project Number (P1056) Swift Lane

<b>Quotation No.:</b> Q22-29573	<b>Date Received:</b> 24-Nov-2022
<b>Order No.:</b> P1058-08-EC-SwiftLane	<b>Date Instructed:</b> 24-Nov-2022
<b>No. of Samples:</b> 3	
<b>Turnaround (Wkdays):</b> 10	<b>Results Due:</b> 07-Dec-2022
<b>Date Approved:</b> 06-Dec-2022	

**Approved By:**

**Details:** Stuart Henderson, Technical Manager

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## Results - Water

**Project: EPS Project Number (P1056) Swift Lane**

Client: Environmental Planning Solutions (eps)		Chemtest Job No.:					
		22-45293	22-45293	22-45293			
Quotation No.: Q22-29573		Chemtest Sample ID.:					
		1552209	1552210	1552211			
		Sample Location:					
		WS101	WS103	WS106			
		Sample Type:					
		WATER	WATER	WATER			
		Date Sampled:					
		22-Nov-2022	22-Nov-2022	22-Nov-2022			
Determinand	Accred.	SOP	Units	LOD			
pH	U	1010		N/A	7.1	7.0	7.0
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Total Hardness as CaCO3	U	1270	mg/l	15	1700	930	510
Arsenic (Dissolved)	U	1455	µg/l	0.20	0.99	2.0	0.56
Boron (Dissolved)	U	1455	µg/l	10.0	1900	1400	270
Barium (Dissolved)	U	1455	µg/l	5.00	69	23	64
Beryllium (Dissolved)	U	1455	µg/l	1.00	< 1.0	< 1.0	< 1.0
Chromium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Copper (Dissolved)	U	1455	µg/l	0.50	1.3	1.7	< 0.50
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	µg/l	0.50	10	73	48
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Antimony (Dissolved)	U	1455	µg/l	0.50	2.6	5.8	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	2.5	1.8	0.89
Vanadium (Dissolved)	U	1455	µg/l	0.50	0.79	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	µg/l	2.5	< 2.5	150	9.1
Cadmium (Dissolved)	N	1455	µg/l	0.08	< 0.08	< 0.08	< 0.08
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0

## Results - Water

**Project: EPS Project Number (P1056) Swift Lane**

Client: Environmental Planning Solutions (eps)		Chemtest Job No.:		22-45293	22-45293	22-45293
Quotation No.: Q22-29573		Chemtest Sample ID.:		1552209	1552210	1552211
		Sample Location:		WS101	WS103	WS106
		Sample Type:		WATER	WATER	WATER
		Date Sampled:		22-Nov-2022	22-Nov-2022	22-Nov-2022
Determinand	Accred.	SOP	Units	LOD		
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0
Naphthalene	U	1800	µg/l	0.10	< 0.10	< 0.10
Acenaphthylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.10	< 0.10	< 0.10
Phenanthrene	U	1800	µg/l	0.10	< 0.10	1.8
Anthracene	U	1800	µg/l	0.10	< 0.10	0.74
Fluoranthene	U	1800	µg/l	0.10	< 0.10	3.9
Pyrene	U	1800	µg/l	0.10	< 0.10	3.9
Benzo[a]anthracene	U	1800	µg/l	0.10	< 0.10	0.61
Chrysene	U	1800	µg/l	0.10	< 0.10	0.52
Benzo[b]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	< 0.10	1.2
Total Of 16 PAH's	U	1800	µg/l	2.0	< 2.0	13
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030

## Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO <sub>3</sub> equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5-C6, >C6-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35-C44 Aromatics: >C5-C7, >C7-C8, >C8-C10, >C10-C12, >C12-C16, >C16-C21, >C21-C35, >C35-C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

## **Report Information**

### **Key**

---

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---

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## **APPENDIX VII**

### **GROUND GAS AND GROUNDWATER MONITORING RESULTS**



Project no: P1056

Project: Swift Lane

Client: Surrey Heath Borough Council

Monitored by: Tim Conibear



Date	Time	Hole Location	Response zone (m)	Depth m		Relative Pressure (mbar)	Flow Rate (l/h)		Methane CH <sub>4</sub> (% v/v)		Carbon dioxide CO <sub>2</sub> (% v/v)		Oxygen % v/v (Low)	Carbon monoxide CO ppm (Peak)	Hydrogen sulphide H <sub>2</sub> S ppm (Peak)	Comments
				Water	Base		Initial	Steady	Peak	Steady	Peak	Steady				
22/11/2022	10:45am	WS101	1.00 - 3.00	1.24	2.79	-	<0.1	<0.1	0.3	0.3	8.4	8.4	4.4	<1	<1	Silty at base.
22/11/2022	10:20am	WS104	1.00 - 2.00	1.78	2.08	-	<0.1	<0.1	0.2	0.2	7.7	7.7	0.3	<1	<1	
22/11/2022	11:10am	WS106	1.00 - 3.00	0.74	2.50	-	-9.0	-9.0	<0.1	<0.1	2.8	2.8	19.9	4	<1	Discount gas readings as response zone flooded.
29/11/2022	10:00am	WS101	1.00 - 3.00	1.57	2.86	-0.02	0.1	<0.1	0.1	0.1	9.4	9.4	0.8	<1	<1	
29/11/2022	10:20am	WS104	1.00 - 2.00	1.88	2.11	0.07	0.1	-0.1	<0.1	<0.1	7.1	7.1	2.2	<1	<1	
29/11/2022	10:35am	WS106	1.00 - 3.00	0.77	2.47	-1.12	-7.7	-7.2	<0.1	<0.1	2.9	2.9	20.3	4	<1	Discount gas readings as response zone flooded.

## 5. Tier 2 Contaminated Land Generic Quantitative Risk Assessment for Land South of Broadford Lane, Chobam – September 2023 from EPS





## TIER 2 CONTAMINATED LAND GENERIC QUANTITATIVE RISK ASSESSMENT

LAND SOUTH OF BROADFORD LANE, CHOBHAM, GU24 8EL

REFERENCE: P1057/R1/V2

REPORT PREPARED FOR: SURREY HEATH BOROUGH COUNCIL

REPORT PREPARED BY: EPS CONSULTING

SEPTEMBER 2023



PLANNING | DUE DILIGENCE | CONSTRUCTION



## QUALITY ASSURANCE

Issue/revision	Version 1 – September 2023	Version 2 – April 2024
Author	Stuart Phillips	Stuart Phillips
Job Title	Director	Director
Authorised by	Tim Conibear	Tim Conibear
Job title	Director	Director
Project number	P1057/R1/V1	P1057/R1/V2

## CONTACT DETAILS

Head Office:

**Environment House**

39 East Drive

Carshalton Beeches

SM5 4PA

London Office:

**Build Studios**

203 Westminster Bridge Road

London

SE1 7FR

[www.epsconsulting.co.uk](http://www.epsconsulting.co.uk)





EXECUTIVE SUMMARY	
Site Address	Land South of Broadford Lane, Chobham, GU24 8EL
National Grid Reference	SU9750361159
Site Area	c. 1.80ha
Current Site Use	Vacant open land. The west of the site is used for grazing.
Proposed Development	Additional gypsy / traveller provision with two possible options for the development ranging between 10 and 13 pitches.
Previous works	<p>Environmental Desk Study and Preliminary Risk Assessment produced by Apple Environmental in May 2022 (ref. CL/3326/SH) which covered this and the wider site area for a proposed residential end use. The scope of the site investigation was based on the recommendations contained within the report.</p> <p>Ground gas and groundwater monitoring undertaken on the site by Surrey County Council between 2018 and 2023.</p>
Site History	<p>Excavations noted in the 1930's on the eastern part of the site. The site was relatively undeveloped until it formed part of a large refuse tip between the 1950's and 1970's.</p> <p>The adjacent sewage treatment works were constructed in the c. 1970's.</p>
Environmental Setting	<p><b>Geology</b></p> <ul style="list-style-type: none"> <li>▶ Superficial: None, although Alluvium noted to the north; and</li> <li>▶ Bedrock: Windlesham Formation (Sand, Silt and Clay) and Bagshot Formation (Sand).</li> </ul> <p><b>Groundwater</b></p> <ul style="list-style-type: none"> <li>▶ Secondary A Aquifer contained within bedrock;</li> <li>▶ Not located within a groundwater Source Protection Zone (SPZ); and</li> <li>▶ No potable groundwater abstractions nearby.</li> </ul> <p><b>Surface Waters</b></p> <ul style="list-style-type: none"> <li>▶ Narrow drain located c. 33m to the north of the site which runs into the River Bourne situated c. 175m north of the site.</li> </ul>



<p><b>Conceptual Site Model (CSM)</b></p>	<p><b>Potential “Active” Sources</b></p> <p><b>On-site</b></p> <ul style="list-style-type: none"> <li>▶ <b>Historic Landfilling</b></li> </ul> <p><b>Off site</b></p> <ul style="list-style-type: none"> <li>▶ <b>Historic Landfilling</b> at Broadford Farm and large area to the south of the site as part of the same former refuse tip; and</li> <li>▶ <b>Historic Sludge Beds</b> on south-western boundary.</li> </ul> <p><b>Pathways</b></p> <ul style="list-style-type: none"> <li>▶ Migration of mobile contaminants on or off site via services, sewers and manmade conduits;</li> <li>▶ Direct contact, ingestion and inhalation of contaminants on site;</li> <li>▶ Migration of mobile contaminants into controlled waters;</li> <li>▶ Migration of hazardous gases through permeable soils;</li> <li>▶ Permeation of potable water supply pipes.</li> </ul> <p><b>Human Receptors</b></p> <ul style="list-style-type: none"> <li>▶ <b>Future site users</b> (residents)</li> </ul> <p><b>Controlled Water Receptors</b></p> <ul style="list-style-type: none"> <li>▶ <b>Secondary A aquifer</b> contained within the underlying Windlesham Formation and Bagshot Formation bedrock; and</li> <li>▶ <b>Drain and River Bourne</b> to the north of the site.</li> </ul>
<p><b>Ground Investigation Works</b></p>	<ul style="list-style-type: none"> <li>▶ Four window sample boreholes across the site;</li> <li>▶ Installation of ground gas and groundwater monitoring wells within three locations and a single return monitoring visit; and</li> <li>▶ Chemical laboratory analysis of soil and groundwater samples.</li> </ul>
<p><b>Summary of Ground Conditions</b></p>	<ul style="list-style-type: none"> <li>▶ Made Ground of between 0.80 and 1.00mbgl within western and central areas;</li> <li>▶ Made Ground of &gt;3.0mbgl in eastern areas;</li> <li>▶ Alluvium below Made Ground in WS101 and WS102 in western areas only to depths of 2.40mbgl;</li> <li>▶ Windlesham Formation below the Made Ground and / or Alluvium at 1.00 to 2.40mbgl persisting to the full depth of the investigation (3.0mbgl); and</li> <li>▶ Groundwater strike at 2.60mbgl in WS104 only.</li> </ul>





<p><b>Identified Contamination</b></p>	<ul style="list-style-type: none"> <li>▶ Hydrocarbon odour was noted within the Made Ground within WS104;</li> <li>▶ Heavy metals and PAH's have been identified within Made Ground soils at concentrations above the relevant human health assessment criteria within a single location (WS104);</li> <li>▶ Fragment of chrysotile asbestos cement identified in WS103;</li> <li>▶ Peak concentrations of carbon dioxide encountered during a single return monitoring visit and historical data provided indicate that the ground gas regime can be classified as Characteristic Situation 2 (CS2); and</li> <li>▶ Concentrations of some heavy metal and PAH species within samples of perched water collected from WS104 exceed the environmental quality standards (EQS).</li> </ul>
<p><b>Conclusions</b></p>	<ul style="list-style-type: none"> <li>▶ From the limited data set obtained, historical landfilling appears to be of greater thickness in the eastern areas of the site (&gt;3.0mbgl), compared to the western and central areas (0.80 to 1.00mbgl);</li> <li>▶ Should the eastern sector of the site be developed, then it is likely that significant cut and filling maybe required in order to provide a suitable development platform. It is likely that these near surface soils would predominantly comprise Made Ground relating to historical landfilling. Less cut and filling is likely to required within the western area;</li> <li>▶ The proposed presence of hard standing across the majority of the site will break the pollutant pathway between identified soil contamination and future site users;</li> <li>▶ Should any vegetated borders be proposed, it is assumed that a nominal thickness of clean imported soil will be required to act as a suitable growing medium and this would also act as a barrier preventing human health exposure;</li> <li>▶ Basic gas mitigation measures will be required for any enclosed living spaces constructed directly onto the ground. However, where enclosed living spaces are raised above the ground allowing ground gases to freely disperse no significant risk will be present;</li> <li>▶ In the absence of targeted analysis of soils along the route of any proposed water supply, it would be prudent to install barrier pipe to ensure drinking water supply for the proposed properties is not adversely affected;</li> <li>▶ It is not considered that a significant risk to drinking water is present given that the site is not located within a groundwater SPZ and there are no potable groundwater abstractions within influencing distance of the site; and</li> <li>▶ Should a pathway be present for perched water underlying the site to reach the nearby drain and River Bourne, it is considered likely that the following dilution with river water the concentrations would fall below the EQS.</li> </ul>



**Recommendations**

Should the development be progressed beyond the feasibility stage it is recommended that:

- ▶ Given the size of the site, further site investigation works is undertaken to increase the data set, especially in areas where a significant thickness of Made Ground is expected;
- ▶ Further assessment is undertaken in order to confirm that the drain and River Bourne are not significantly affected by contaminants identified within the perched water underlying the site. This could include sampling of river water upstream and downstream of the site. However, potential impacts from the adjacent Waste Water Treatment Works would also need to be considered;
- ▶ Further ground gas monitoring is undertaken in accordance with published guidance to expand the existing data set and confirm the initial ground gas assessment;
- ▶ Following the above, a remediation strategy and verification plan is prepared for approval by the regulators prior to commencement of development works; and
- ▶ The design of any proposed foundations or roadways should take into consideration the significant thickness of heterogenous Made Ground beneath the site and the potential for chemicals to be present within the ground which could adversely affect concrete structures installed within. Soft alluvial soils were also encountered within the eastern areas.





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**APPENDICES**

<b>Appendix I</b>	Drawings
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## 1.0 INTRODUCTION

### 1.1 Background

Environmental Planning Solution (EPS) Ltd has been commissioned by ET Planning on behalf of Surrey Heath Borough Council (“the Client”) to undertake a Tier 2 Contaminated Land Generic Quantitative Risk Assessment at the site known as Land South of Broadford Lane, Chobham, GU24 8EL. A Site Location Plan is presented as Figure 1 within Appendix I.

### 1.2 Proposed Development

EPS understands that the Client is in the process of determining the feasibility of providing additional allocation for Gypsy, Traveller and Travelling Showpeople at the site. The provisional indicative proposed development plans provided (ref. 2022-51-510 C Site Layout As Proposed – West Site and 2022-51-511 C Site Layout As Proposed - East Site, both dated 02/11/2022) show two possible options for the development of the site ranging between 10 and 13 pitches.

Each pitch is indicated to comprise a mobile home, a touring caravan, parking for 1-2 vehicles, waste recycling/storage, an amenity block comprising bath/shower room/ W.C and kitchen/amenity area. These drawings have been presented as drawing Figure 3 and Figure 4 within Appendix I.

### 1.3 Objectives

This Tier 2 Contaminated Land Generic Quantitative Risk Assessment Report has been commissioned in order to assist with determining the initial feasibility of developing the site from a contaminated land perspective and to determine any key constraints pertaining to the scheme. The layout of the site investigation was limited due to the following:

- ▶ Accessible areas which did not require significant vegetation clearance;
- ▶ The presence of active badger setts which required a ‘no drill’ easement of c. 30m; and
- ▶ Thames water sewage utilities which crossed the site.

This report has been compiled in accordance with Land Contamination Risk Management (LCRM) guidance produced by the Environment Agency dated October 2020 (updated 2023).

### 1.4 Sources of Information

Background information provided by the Client in relation to the scheme is detailed below:

- ▶ Martin Peacock Architectural Services Limited: 2022-51 Proposed Traveller Site to Land off Broadford Lane (ref. 2022-51): Location Plans (ref. 400 revA and revB), Site Layout as Existing (ref. 500revA and revB), and Site Layout as Proposed (ref. 510revA and revB) Existing Site, all dated November 2022;
- ▶ Apple Environmental Limited: Environmental Desk Study and Preliminary Risk Assessment (ref. CL/3326/SH, dated May 2022) which covered this and a wider site area for a proposed





residential end use;

- ▶ aLyne Ecology Limited: Broadford Lane, Chobham Badger Sett Monitoring Report (version 001, dated April 2023); and
- ▶ Historical Ground Gas Monitoring Results dated February 2018 to June 2023 inclusive and Ground Gas Monitoring Location Plan dated 7<sup>th</sup> November 2018 (unreferenced).

## **1.5 Confidentiality**

EPS has prepared this report solely for the use of the client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from EPS. A charge may be levied against such approval.

## **1.6 Limitations**

The full limitations of this report are presented in Appendix II.





## 2.0 SITE SETTING

### 2.1 Site Details

The site is located at National Grid Reference (NGR) is SU9750361159. Reduced levels of exploratory hole locations surveyed on site ranged between c. 25 and 29mAOD.

The site is accessed via a gate off Broadford Lane and along a lane surfaced with concrete which runs from north to south. The site is divided into two distinct areas; east of the lane and west of the lane. Land to the west of the concrete lane was at a similar grade to Broadford Lane, with land to the east generally situated at a higher elevation compared to the adjacent road.

Given the site's former use as a refuse tip between c. 1950 and 1977, ground surface is undulating. A number of historical boreholes with monitoring installation wells were noted. From information provided by the Closed Landfill Manager at Surrey County Council, the site has been monitored for ground gas since c. 2013 as part of the landowner's responsibilities. This information was not included in the Environmental Desk Study undertaken by Apple Environmental in May 2022.

A sewage works is present to the immediate southeast of the site. Some organic odours were noted on the eastern portion of the site during the site investigation works.

Ground cover comprised a mixture of grass, vegetation and trees. Badger setts were present on the eastern sector with 'no dig' exclusions zones placed around them by the Client's ecology consultants (A-Lyne Ecology). A-Lyne ecology also provided a 'watching brief' during the site investigation works.

### 2.2 Initial Conceptual Site Model

The initial CSM was developed within the Environmental Desk Study prepared by Apple Environmental as summarised below, albeit for a much larger site area (4.71ha). With regards to risk to controlled waters their initial CSM has been updated based on the historical groundwater monitoring data provided by Surrey County Council which shows potential shallow groundwater on site.

#### Potential "Active" Sources

##### On-site

- ▶ **Historic Landfilling** - Potential for contaminated soils and ground gases associated with deposition of commercial and industrial waste within the historical landfill between c. 1950's and 1970's.

##### Off-site

- ▶ **Historic Landfilling** - Potential for contaminated soils and ground gases associated with deposition of inert waste within a historical landfill at Broadford Farm c. 12m to the north of the site in c. 1986. However, it is recorded that this could have been used for ground engineering purposes given the short duration of the waste license (April 1986 to December 1986);
- ▶ **Historical sludge beds** - adjacent to the south-western boundary of the site between the 1930's and 1950's.





Given the low potential of these off-sites sources to pose a significant risk, compared to the former refuse tip historically located on site, they have not been taken forward within the contaminated land assessment.

With regards to the potential for contaminated soils and ground gases associated with deposition of commercial and industrial waste within the wider historical landfill to the south of the site between c. 1950 and 1977, it has been assumed that this poses no more or a risk than on-site sources and as such has not been taken forward within this assessment.

### Pathways

- ▶ Migration of mobile contaminants on or off site via services, sewers and manmade conduits;
- ▶ Direct contact, ingestion and inhalation of contaminants on site;
- ▶ Migration of mobile contaminants into groundwater / transport into surface waters;
- ▶ Migration of hazardous gases through permeable soils; and
- ▶ Permeation of potable water supply pipes.

### Human Health Receptors

- ▶ **Future site users** (residents).

Construction workers are not considered to be a plausible receptor as exposure will be managed through the use of appropriate PPE and hygienic working practices, as required under HSE/ CDM regulations. Furthermore, potential exposure to possible contaminants is not expected to be over prolonged work duration thereby limiting any impact to ground workers.

### Controlled Water Receptors

- ▶ **Secondary A aquifer** contained within the underlying Windlesham Formation and Bagshot Formation bedrock; and
- ▶ **Narrow drain located c. 33m** to the north of the site which runs into the River Bourne situated c. 175m north of the site.





### 3.0 SITE INVESTIGATION

#### 3.1 Summary of Fieldwork

Site investigation works were carried out on 27<sup>th</sup> July 2023 and comprised the following scope:

**Table 3.1 Summary of Fieldwork**

Hole Reference	Rationale	Depth (mbgl)
WS101	Tracked window samples to determine ground conditions and obtain soil samples for subsequent chemical laboratory analysis.	2.00
WS102		3.00
WS103	Installation of ground gas and groundwater monitoring locations within WS101, WS102 and WS104.	2.00
WS104		3.00

**Notes:** mbgl – metres below ground level. WS – Window sample

An Exploratory Hole Location Plan is presented as Figure 2 within Appendix I and a selection of photographs is presented within Appendix V.

All samples were collected using appropriate PPE and sampling equipment that was cleaned at each sampling location. A detailed copy of sampling methodology, QA procedures and laboratory chain of custody forms can be provided upon request.

#### 3.2 Site Investigation Standards

All exploratory works, associated sampling, in-situ testing, and logging were carried out broadly in accordance with techniques outlined in:

- ▶ BS5930:2015+A1:2020 Code of Practice for Ground Investigations;
- ▶ BS EN ISO 14688-1 Identification of Soil;
- ▶ BS EN ISO 14688-2 Classification of Soil;
- ▶ BS EN ISO 22475 Sampling methods and groundwater measurements; and
- ▶ BS EN ISO 22476 Field Testing, as appropriate.





## 4.0 LABORATORY ANALYSIS

### 4.1 Chemical Laboratory Analysis

Chemical laboratory testing was carried out by I2 Analytical based in Watford who are a UKAS and MCERTS accredited laboratory.

The number of tests scheduled are listed in Table 4.1 below:

**Table 4.1 Summary of Chemical Analysis of Soil Samples**

Test Type and Determinands	No. Scheduled	Remarks
EPS Standard Soil Suite (organic matter, asbestos in soil, heavy metals, PAH's, TPH CWG, BTEX, MTBE, cyanide and phenols)	6	Chemical test certificates presented in Appendix VI. Results discussed in Section 6.
Asbestos Identification	1	

A single groundwater sample was scheduled for the following analysis:

- ▶ pH;
- ▶ Heavy metals;
- ▶ Cyanide;
- ▶ Total hardness;
- ▶ TPH Criteria Working Group (CWG);
- ▶ BTEX and MTBE;
- ▶ Speciated PAH; and
- ▶ Phenols.

Chemical test certificates are presented in Appendix VI and the results are discussed in Section 6.







## 5.0 GROUND AND GROUNDWATER CONDITIONS

### 5.1 Summary of Ground Conditions

Ground conditions encountered generally comprised Made Ground relating to the historical waste tip recorded on site, overlying superficial deposits of Alluvium overlying bedrock geology of Windlesham Formation. Further details are provided below with exploratory hole logs presented in Appendix IV.

#### **Made Ground**

##### Western and Central Areas

Made Ground within the western and central areas of the site (exploratory hole locations WS101 to WS103 inclusive), was encountered at ground level and persisted to depths ranging between 0.80 and 1.00mbgl. Soils comprised very sandy clay with varying quantities of secondary constituents such as polythene, iron, timber, flint, brick and concrete. Some cobbles of brick were also noted. Possible combustion waste material and a fragment of asbestos cement (later confirmed to contain chrysotile asbestos) was encountered within WS103.

No further visual or olfactory evidence of contamination was recorded within the Made Ground within exploratory holes WS101 to WS103 inclusive.

##### Eastern Area

Made ground within exploratory hole location WS104, undertaken within the eastern sector of the site, was also encountered at ground level but persisted to depths >3.0mbgl. The soils encountered within this exploratory hole were more typical of landfill type waste comprising brown and black slightly sandy clay with secondary constituents of flint, brick, paper (remnants of a cigarette packet), ceramic, plastic, metal, rubber and fabric. A hydrocarbon and organic odour was encountered at a depth of 1.50mbgl where soils were noted to be stained black.

#### **Superficial Deposits – Alluvium**

Soil that have been assumed to be Alluvium was encountered directly below the Made Ground in exploratory holes WS101 and WS102 within the western area and persisted to depths ranging between 1.10 and 2.40mbgl. This stratum was generally uniform in composition comprising very soft light grey very sandy CLAY with occasional rootlets and semi decomposed plant matter.

Alluvium was not encountered in exploratory holes WS103 and WS104.

No visual or olfactory evidence of contamination was recorded within this stratum.





## Bedrock Geology - Windlesham Formation

Soils resembling those of the Windlesham Formation (predominantly clay opposed to sand) were encountered in exploratory holes WS101 to WS103 at depths varying between 1.00 and 2.40mbgl persisting to the full depth of the investigation (>3.0mbgl). This stratum was generally uniform in composition comprising brown, orangish brown, mottled black and light grey slightly sandy CLAY. Slight organic odours were noted.

No visual or olfactory evidence of contamination was recorded within this stratum.

## 5.2 Groundwater

Groundwater was encountered in a single exploratory hole location (WS104) as detailed further below:

**Table 9.1 Summary of Groundwater Strikes**

Location	Depth to Water Strike (mbgl)	Stratum	In flow Rate
WS104	2.60	Made Ground	Strike

Groundwater was encountered in the same exploratory hole location (WS104) at a depth of 2.55mbgl during a single return monitoring visit. All remaining monitoring installations were recorded as dry. The results of groundwater level monitoring are presented within Appendix VII.

## 5.3 In-situ Testing

In-situ hand shear vane testing (HSV) was undertaken at regular intervals during window sampling. The results of the in-situ testing are presented on the exploratory hole logs included within Appendix IV.

Volatile Organic Compound (VOC) vapour monitoring was undertaken using a MiniRAE photoionisation detector (PID) in order to determine the presence / absence of any potential hazardous vapours. Soil samples were placed inside an air-tight bag and then the resulting headspace monitored after a period of 30 minutes. Results are summarised within Table 5.1 overleaf:

**Table 5.1 Volatile Organic Compounds (VOCs) Vapour Monitoring**

Hole Reference	Depth (mbgl)	VOC Readings (ppm)
WS101	0.40 to 0.60	<0.1
WS102	0.40 to 0.60	<0.1
WS103	0.30 to 0.50	<0.1
WS104	0.40 to 0.60	<0.1
	1.70 to 1.80	<0.1
	2.70 to 2.90	<0.1



#### **5.4 Ground Gas and Groundwater Monitoring**

A single return monitoring visit was carried out on 9<sup>th</sup> August 2023. During the visit gas flow and gas concentrations of methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide were recorded using an infrared gas analyser. Depth to groundwater and base of borehole were recorded using a water level dip meter. The results of the ground gas and groundwater monitoring are presented in Appendix VII.

During this round of monitoring, groundwater encountered within the installation of WS104 was purged by three well volumes and a groundwater sample was collected using a disposable bailer. Chemical Laboratory Analysis is presented in Appendix VI.





## 6.0 TIER II GENERIC QUANTITATIVE CONTAMINATED LAND RISK ASSESSMENT

### 6.1 Human Health

The long term (chronic) toxicity risk to human health is assessed by utilising appropriate and conservative generic assessment criteria (GAC) to determine whether potentially unacceptable risks may be present.

To undertake the Tier 2 assessment within the context of the development proposal, EPS has determined that the most appropriate GAC values available will be those based upon a residential end use without plant uptake.

Soil Organic Matter varied between 1.50% and 10% with an average of 3.70%. In order to provide a conservative assessment, GAC based on 2.5% soil organic matter have been utilised where applicable.

The following assessment, summarised in Table 6.1, has primarily adopted the S4UL (Suitable for Use Levels) reference values published by LQM/CIEH in 2015, however for determinants where no S4UL GAC is available, generally either GAC published by EIC/AGS/CL:AIRE or Atkins ATRISK<sup>soil</sup> soil screening value (SSV) has been used. Due to the absence of a published lead GAC for direct use within the planning regime, the 2014 Defra C4SL (Category 4 Screening Level) has been used as this value is considered to incorporate the latest toxicological, bio-accessibility and exposure modelling research to date.

**Table 6.1 Summary of Generic Human Health Toxicity Assessment for Residential End Use (without plant uptake)**

Determinand	Units	GAC	GAC Source	No.	[mc]	Location / Stratum	Primary Pathways	Assessment
<b>Inorganics</b>								
Arsenic	mg/kg	40	(i)	6	22		1	
Cadmium	mg/kg	85	(i)	6	1.70		1, 2	
Chromium	mg/kg	910	(i)	6	39		1, 2, 3	
Chromium (VI)	mg/kg	6	(i)	6	2.5		1, 2, 3	
Copper	mg/kg	7,100	(i)	6	110		1, 2	
<b>Lead</b>	<b>mg/kg</b>	<b>310</b>	<b>(iv)</b>	<b>6</b>	<b>470</b>	<b>WS104 @ 1.70 - 1.80</b>	<b>1, 2</b>	<b>See discussion</b>
Mercury [Inorganic]	mg/kg	56	(i)	6	1		1, 2	
Nickel	mg/kg	180	(i)	6	33		1	
Selenium	mg/kg	430	(i)	6	<1.0		1, 2	
Zinc	mg/kg	40,000	(i)	6	570		1, 2	
<b>Cyanide (Total)</b>	<b>mg/kg</b>	<b>34</b>	<b>(iii)</b>	<b>6</b>	<b>40</b>	<b>WS104 @ 1.70 - 1.80</b>	<b>1</b>	<b>See discussion</b>
<b>Asbestos</b>	<b>-</b>	<b>D.</b>	<b>-</b>	<b>6</b>	<b>D</b>	<b>WS103 @ 0.70</b>	<b>3</b>	





Organics – PAHs and Phenol								
Phenols	mg/kg	690	(i)	6	<1	N/A	2	No Further Action
Acenaphthene	mg/kg	4,700	(i)	6	1.60		2	
Acenaphthylene	mg/kg	4,600	(i)	6	0.11		2	
Anthracene	mg/kg	35,000	(i)	6	0.78		2	
Benzo(a) Anthracene	mg/kg	14	(i)	6	1.10		1	
Benzo(a)Pyrene	mg/kg	3.20	(i)	6	0.98		1	
Benzo(b) Fluoranthene	mg/kg	4.0	(i)	6	1.4		1	
Benzo(ghi) Perylene	mg/kg	360	(i)	6	0.62		1	
Benzo(k) Fluoranthene	mg/kg	110	(i)	6	0.55		1	
Chrysene	mg/kg	31	(i)	6	1.20		1	
Dibenzo(a,h) Anthracene	mg/kg	0.32	(i)	6	0.14		1	
Fluoranthene	mg/kg	1,600	(i)	6	3.80		1, 2	
Fluorene	mg/kg	3,800	(i)	6	1.60		2	
Indeno (123-cd)Pyrene	mg/kg	46	(i)	6	0.54		1	
Naphthalene	mg/kg	5.6	(i)	6	0.68		4	
Phenanthrene	mg/kg	1,500	(i)	6	3.80		2	
Pyrene	mg/kg	3,800	(i)	6	3.30	1, 2		
BTEX								
Benzene	ug/kg	700	(i)	6	<5.0	N/A	1	No Further Action
Toluene	ug/kg	1,900,000	(i)	6	<5.0		1	
EthylBenzene	ug/kg	190,000	(i)	6	<5.0		1	
M-Xylene	ug/kg	190,000	(i)	6	<5.0		1	
P-Xylene	ug/kg	180,000	(i)	6	<5.0		1	
O-Xylene	ug/kg	210,000	(i)	6	<5.0		1	
Methyl tert-Butyl Ether	ug/kg	120,000	(ii)	6	<5.0		1	
TPH								
Aliphatic C5-C6	mg/kg	78	(i)	6	<0.10	N/A	4	No Further Action
Aliphatic C6-C8	mg/kg	230	(i)	6	<0.10		4	
Aliphatic C8-C10	mg/kg	65	(i)	6	<0.10		4	
Aliphatic C10-C12	mg/kg	330	(i)	6	9		4	
Aliphatic C12-C16	mg/kg	2,400	(i)	6	83		1,4	
Aliphatic C16-C35	mg/kg	92,000	(i)	6	1,120		1	
Aromatic C5-C7	mg/kg	690	(i)	6	<0.10		4	
Aromatic C7-C8	mg/kg	1,800	(i)	6	<0.10		4	
Aromatic C8-C10	mg/kg	110	(i)	6	<0.10		4	
Aromatic C10-C12	mg/kg	590	(i)	6	4		4	
Aromatic C12-C16	mg/kg	2,300	(i)	6	43		1,4	
Aromatic C16-C21	mg/kg	1,900	(i)	6	180		1	
Aromatic C21-C35	mg/kg	1,900	(i)	6	730		1	
<b>Key</b>								
MG	Made Ground							
[mc]	Maximum Concentration Recorded							
D.	Detected							
N.D.	None Detected (Limit of Detection = <0.0001%)							
<b>Primary Pathways</b>								
1	Ingestion of soil and indoor dust and / or oral background exposure;							
2	Consumption of home-grown produce and attached soil;							



3	Inhalation of dust (background and indoor);
4	Inhalation of vapour (background and indoor).
<b>Generic Assessment Criteria (GAC) Source</b>	
(i)	LQM/CIEH Suitable For Use Level (S4UL) (2015);
(ii)	EIC/AGS/CL:AIRE;
(iii)	Atkins ATRISK <sup>soil</sup> soil screening value (SSV);
(iv)	Defra Category 4 Screening Level (2014);

The following exceedances to the relevant GAC have been identified:

- ▶ **Lead and Cyanide** – within a sample of Made Ground collected from WS104 at 1.70 – 1.80 bgl; and
- ▶ **Asbestos** – identified to be Chrysotile Cement from WS103 at 0.70mbgl.

Whilst exceedances have been identified in only two locations, given the limited number of sample locations and the inherent heterogenous nature of Made Ground soils, it is considered likely that further exceedances will be present within locations not yet investigated. As such, it is considered that the Made Ground soils across the site may pose a risk to human health.

The primary pathway for Lead is ingestion of soil and indoor dust and / or oral background exposure.

The primary pathway for Cyanide is ingestion of soil and indoor dust.

The primary pathway for asbestos is inhalation of dust (background and indoor), albeit the material was recorded as being cement bound.

Within areas of proposed hardstanding, understood to occupy the vast majority of the site based on current proposals, the pathway will be effectively broken and no significant risk will be posed to future site users.

However, should any vegetated borders be proposed, it is assumed that a nominal thickness of clean imported soil will be required to act as a suitable growing medium. This would also act as a barrier breaking the contamination pathway to future site users. It is also suggested that a no dig membrane is placed between any clean imported soil and underlying Made Ground to prevent accidental exposure in the event of unauthorised alterations. This is understood to be of increased likelihood given the proposed use of the site.





## 6.2 Controlled Waters

The results of groundwater analysis carried out on samples collected from WS104 have been compared with freshwater Environmental Quality Standards (EQS), UK Drinking Water Standards (DWS) and the World Health Organization (WHO) DWS), as summarised within Table 6.2 below:

**Table 6.2 Groundwater Analysis Results and Comparison with Generic Assessment Values**

Determinand	Units	Environmental Quality Standard	UK DWS	WHO DWS	WS104
Arsenic	µg/l	50	10	10	2.07
Cadmium	µg/l	0.08	5	3	0.02
Chromium III	µg/l	4.7	50	50	2.7
<b>Copper</b>	<b>µg/l</b>	<b>1</b>	2,000	2000	<b>1.20</b>
Lead	µg/l	1.2	10	10	0.70
Mercury	µg/l	0.07	1	6	<0.05
<b>Nickel</b>	<b>µg/l</b>	<b>4</b>	20	70	<b>13</b>
Zinc	µg/l	10.9	-	-	4.6
<b>Cyanide (Total)</b>	<b>µg/l</b>	<b>1</b>	50	-	<b>1.40</b>
Phenol	µg/l	7.7	-	-	1.20
<b>Anthracene</b>	<b>µg/l</b>	<b>0.1</b>	-	<b>0.05</b>	<b>0.28</b>
Naphthalene	µg/l	2	-	-	0.21
Benzo(a)Pyrene	µg/l	0.27	0.010	0.7	<0.01
Benzo[b] fluoranthene	µg/l	0.017	-	-	<0.01
Benzo[k] fluoranthene	µg/l	0.017	-	-	<0.01
Benzo(ghi)perylene	µg/l	0.0082	-	-	<0.01
<b>Fluoranthene</b>	<b>µg/l</b>	<b>0.0063</b>	-	-	<b>0.88</b>
TPH Ali (C5-C6)	µg/l	-	-	1	<1.0
TPH Ali (C6-C8)	µg/l	-	-	1	<1.0
TPH Ali (C8-C10)	µg/l	-	-	300	<1.0
TPH Ali (C10-C12)	µg/l	-	-	90	<1.0
TPH Ali (C12-C16)	µg/l	-	-	90	<1.0
TPH Ali (C16-C21)	µg/l	-	-	90	<1.0
TPH Ali (C21-C35)	µg/l	-	-	90	<1.0
TPH Aro (C5-C7)	µg/l	-	-	1	<1.0
TPH Aro (C7-C8)	µg/l	-	-	1	<1.0
TPH Aro (C8-C10)	µg/l	-	-	300	<1.0
TPH Aro (C10-C12)	µg/l	-	-	90	15
TPH Aro (C12-C16)	µg/l	-	-	90	60
TPH Aro (C16-C21)	µg/l	-	-	90	70
TPH Aro (C21-C35)	µg/l	-	-	90	35

In cases where the concentration is below the limit of detection (LOD) however the LOD is greater than the screening criteria this has not been considered as an exceedance.

The results of this direct comparison indicates that the screening criteria have been exceeded for the following determinants:

- ▶ **Copper** – EQS exceeded;
- ▶ **Nickel** – EQS exceeded;
- ▶ **Total Cyanide** – EQS exceeded;
- ▶ **Anthracene** – EQS and WHO DWS exceeded; and





- ▶ **Fluoranthene** - EQS exceeded.

No significant risk is posed to drinking water due to the following:

- ▶ The UK DWS have not been exceeded for any determinants based on the limited data set;
- ▶ The site is not located within a groundwater source protection zone (SPZ);
- ▶ No drinking water abstractions are present within 2km of the site; and
- ▶ The fine grained clay deposits of the Windlesham Formation are likely to be of low permeability thus limiting vertical and lateral migration of contaminants.

No significant risk is posed to surface waters due to the following:

- ▶ Although the freshwater EQS have been exceeded for heavy metals and PAH's, these concentrations are considered to be largely representative of perched water within the Made Ground / former refuse tip which is likely to be somewhat locally confined; and
- ▶ In the event that an active pathway to the nearby drain and then into the River Bourne situated c. 175m north of the site is present, it is considered that the concentrations of identified contaminants would be significantly diluted prior to and upon reaching the identified surface water receptor. As such, it is considered that concentrations of identified contaminants within the surface watercourse are not likely to be of significant concern, particularly given that the River Bourne is indicated to have a chemical rating of fail. Additionally, it is not considered that the proposed development would introduce any additional pathways or cause any increase the risk.

### 6.3 Ground Gas

In accordance with BS8485:2015+A1:2019 and as presented in Table 6.3 below. The worst-case hazardous gas flow rates ( $Q_{hg}$ ) have been calculated for the single monitoring visit undertaken in addition to the historical information provided by SCC. These results have been calculated by multiplying the maximum recorded stabilised flow (0.1l/h) in any standpipe in a stratum with the maximum peak gas concentration in any other standpipe in that stratum.

**Table 6.3 Summary of Ground Gas Monitoring Results**

Source of Monitoring Data	Ground Gas	Worst case Gas Flow Rate (l/hr)	Maximum Peak Steady Concentration (% by vol)	Hazardous Gas Flow Rates ( $Q_{hg}$ )	Indicated Ground Gas Regime
2023 eps site investigation	Methane	<0.1	0.2	0.0002	Characteristic Situation 2 (CS-2)
	Carbon Dioxide	<0.1	12.0	0.012	
SCC Historical Monitoring Data (2018 to 2023)	Methane	0.2	6.60*	0.0132	
	Carbon Dioxide	0.2	16.1*	0.0322	

Key: \*assumed to be steady peak concentrations.

The hazardous flow rates in the table above would indicate that the ground gas regime for the site could be classified as Characteristic Situation 1 (CS1). However, given that steady concentrations of





carbon dioxide of greater than 5% have been consistently encountered with monitoring wells installed during the recent site investigation within unsaturated response zones, plus within historical boreholes, it is considered that classification of **Characteristic Situation 2 (CS2)** with **low** hazard potential is more appropriate. This classification should be confirmed via undertaking of further gas monitoring prior to determining appropriate mitigation measures for the proposed development.

It is understood that the majority of proposed enclosed living spaces are likely to be raised above ground such that any ground gas emanating from the soils beneath (eg. touring caravans and mobile homes) would take the path of least resistance and naturally disperse laterally rather than migrate into the structures above. However, for any enclosed living spaces constructed directly onto the ground, the risk will need to be mitigated by the incorporation of suitable gas mitigation measures.





## 6.4 Developed Conceptual Side Model

EPS has utilised the above investigation findings to develop the site Conceptual Site Model (CSM) and identify unacceptable risks to receptors within the study area as detailed in Table 10.3 below:

**Table 10.3** Developed Conceptual Site Model

Source	Containment	Receptors	Migration Pathway	Risk
Heavy metal and Asbestos contamination within Made Ground	On-site	Future Site Users	Ingestion of soils Dermal contact with soils	In areas of proposed hardstanding the pathway will be broken.  Should any vegetated borders be proposed, it is assumed that a nominal thickness of clean imported soil will be required to act as a suitable growing medium and this would also act as a barrier preventing human health exposure.
			Permeation of potable water supply pipes	In the absence of targeted analysis of soils along the route of any proposed water supply, it would be prudent to install barrier pipe to ensure drinking water supply for the proposed properties is not adversely affected.
Ground gases	On-site	Future site users	Build up and inhalation of gases within enclosed living spaces	No risk is present where structures are raised allowing free dispersal of ground gas beneath.  Where structures are constructed directly onto the ground gas mitigation measures will be required.
Heavy metal and PAH within perched water	On-site	Narrow drain / River Bourne	Lateral migration	The relatively low concentrations identified within perched water are likely to significantly reduce following dilution and as such are unlikely to pose a significant risk.
		Secondary Aquifer	Vertical and lateral migration	Given that the site is not located within a groundwater SPZ and that no drinking water abstractions are present within 2km of the site, this is not considered to pose a significant risk to drinking water.  Fine grained clay deposits of the Windlesham Formation are likely to be of low permeability thus limiting vertical and lateral migration of contaminants.





## 7.0 CONCLUSIONS AND RECOMMENDATIONS

### 7.1 Conclusions

Based on the findings of this report, the following conclusions have been made:

- ▶ From the limited data set obtained, historical landfilling appears to be of greater thickness in the eastern areas of the site (>3.0mbgl), compared to the western and central areas (0.80 to 1.00mbgl);
- ▶ Should the eastern sector of the site be developed, then it is likely that significant cut and filling maybe required in order to provide a suitable development platform. It is likely that these near surface soils would predominantly comprise Made Ground relating to historical landfilling. Less cut and filling would be required for the western area;
- ▶ The proposed presence of hard standing across the majority of the site will break the pollutant pathway between identified soil contamination and future site users;
- ▶ Should any vegetated borders be proposed, it is assumed that a nominal thickness of clean imported soil will be required to act as a suitable growing medium and this would also act as a barrier preventing human health exposure;
- ▶ Basic gas mitigation measures will be required for any enclosed living spaces constructed directly onto the ground. However, where enclosed living spaces are raised above the ground allowing ground gases to freely disperse no significant risk will be present;
- ▶ In the absence of targeted analysis of soils along the route of any proposed water supply, it would be prudent to install barrier pipe to ensure drinking water supply for the proposed properties is not adversely affected;
- ▶ It is not considered that a significant risk to drinking water is present given that the site is not located within a groundwater SPZ and there are no potable groundwater abstractions within influencing distance of the site; and
- ▶ Should a pathway be present for perched water underlying the site to reach the nearby drain and River Bourne, it is considered likely that the following dilution with river water the concentrations would fall below the EQS.

### 7.2 Recommendations

Should the development be progressed beyond the feasibility stage it is recommended that:

- ▶ Given the size of the site, further site investigation works is required to increase the data set, especially in areas where a significant thickness of Made Ground is expected;
- ▶ Further assessment is undertaken in order to confirm that the drain and River Bourne are not significantly affected by contaminants identified within the perched water underlying the site. This could include sampling of river water upstream and downstream of the site. However, potential impacts from the adjacent Waste Water Treatment Works would also need to be considered;
- ▶ Further ground gas monitoring is undertaken in accordance with published guidance to expand the existing data set and confirm the initial ground gas assessment;
- ▶ Following the above, a remediation strategy and verification plan is prepared for approval by





the regulators prior to commencement of development works; and

- ▶ The design of any proposed foundations or roadways should take into consideration the significant thickness of heterogenous Made Ground beneath the site and the potential for chemicals to be present within the ground which could adversely affect concrete structures installed within. Soft alluvial soils were also encountered within the eastern areas.

***END OF REPORT***



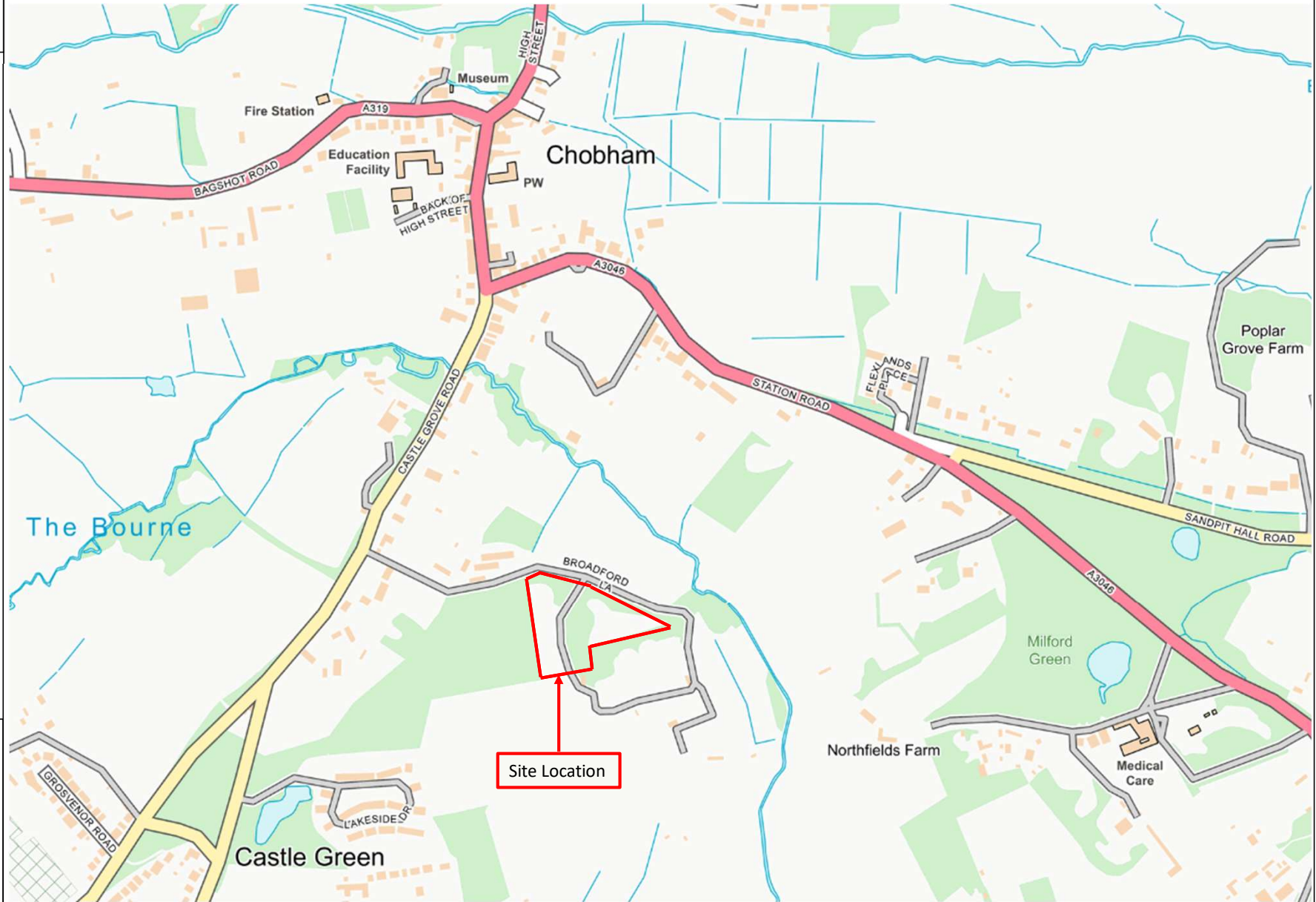


**APPENDIX I**

**DRAWINGS**



KEY:



The client must not amend any drawing, design or other intellectual property produced by EPS Ltd, without permission in writing from EPS Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, EPS Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or other intellectual property.



Job No. & Title:

P1057  
Land South of  
Broadford Lane

Client:

Surrey Heath  
Borough Council

Drawn by: TC

Approved by: SP

Date: September 2023

Notes:

**NOT DRAWN TO SCALE**

Drawing Title:

Figure 1  
Site Location Plan

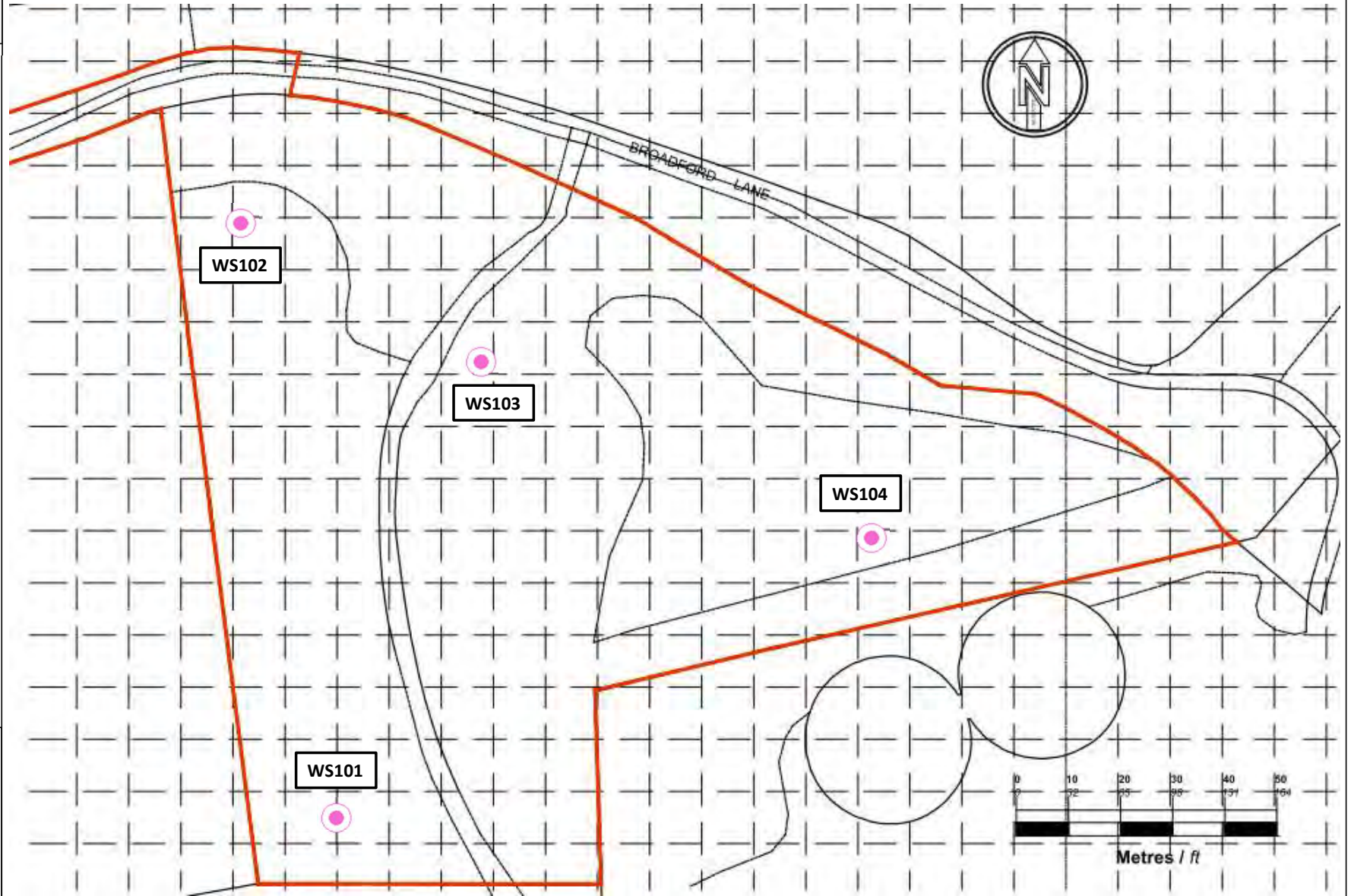


KEY:



 Window Sample

The client must not amend any drawing, design or other intellectual property produced by EPS Ltd, without permission in writing from EPS Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, EPS Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or other intellectual property.



Job No. & Title:

P1057  
Land South of  
Bradford Lane

Client:

Surrey Heath  
Borough Council

Drawn by: TC

Approved by: SP

Date: September 2023

Notes:

**NOT DRAWN TO SCALE**

Drawing Title:

Figure 2  
Exploratory Hole  
Location Plan

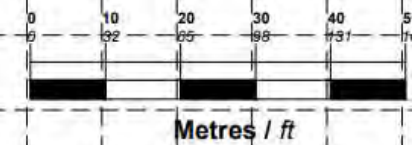
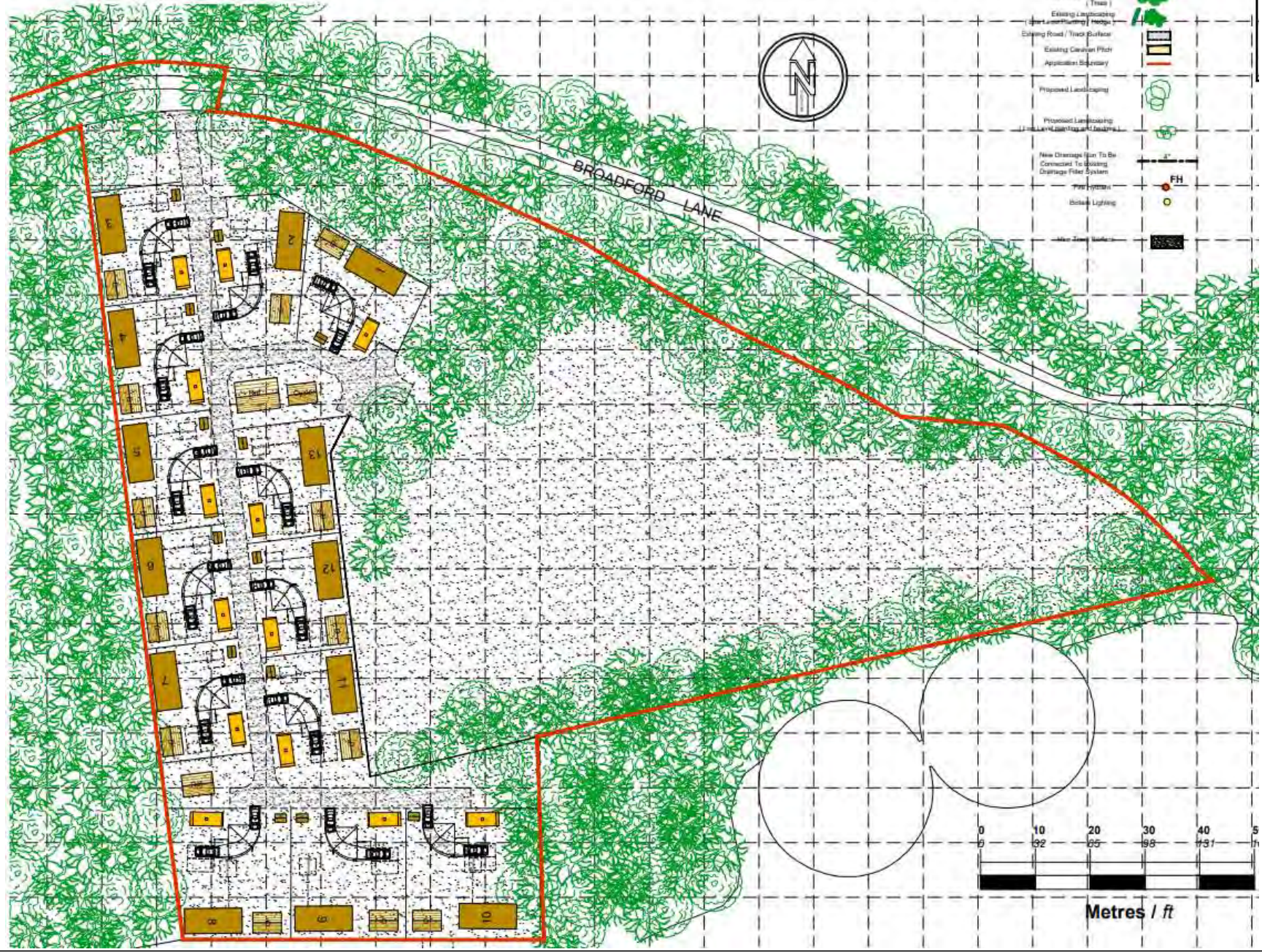


KEY:



**Key**

- Existing Landscaping (Trees)
- Existing Landscaping (Shrub Planting)
- Existing Road / Track Surface
- Existing Curbs / Fitch Application Boundary
- Proposed Landscaping
- Proposed Landscaping (Low Level Planting)
- New Drainage (can To Be Connected To Existing Drainage Filter System)
- Fire System
- Public Lighting
- Other



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Job No. & Title:

P1057  
Land South of  
Broadford Lane

Client:

Surrey Heath  
Borough Council

Drawn by: TC

Approved by: SP

Date: September 2023

Notes:

**NOT DRAWN TO SCALE**

Drawing Title:

Figure 3  
Proposed Development Plan  
(West Site)



KEY:



**Key**

- Existing Landscaping (Trees)
- Existing Landscaping (Hedges)
- Level-Planning
- Existing Road / Track Surface
- Existing Caravan Plot
- Application Boundary
- Proposed Landscaping
- Proposed Landscaping (Level-Planning)
- New Drainage Run To Be Connected To Existing Drainage Filter System
- New Track Surface



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Job No. & Title:

P1057  
Land South of  
Broadford Lane

Client:

Surrey Heath  
Borough Council

Drawn by: TC

Approved by: SP

Date: September 2023

Notes:

**NOT DRAWN TO SCALE**

Drawing Title:

Figure 4  
Proposed Development Plan  
(East Site)





## APPENDIX II – LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between EPS and the Client.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. Reasonable effort has been made to obtain an overview of the site conditions. However, during the site works no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not be made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. In addition to the above EPS note that when investigating, or developing, potentially contaminated land it is important to recognise that sub-surface conditions may vary spatially and also with time. The absence of certain ground, ground gas, and contamination or groundwater conditions at the positions tested is not a guarantee that such conditions do not exist anywhere across the site. Due to the presence of existing buildings and structures access could not be obtained to all areas. Different ground conditions may be identified following the removal of the buildings or hard standing.
7. Site sensitivity assessments (where applicable) have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
8. Where mention has been made (where applicable) to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
9. Where applicable, the executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
10. This report presents an interpretation of the geotechnical information established by excavation, observation and testing. Whilst every effort is made in interpretative reporting to assess the soil conditions over the Site it should be noted that natural strata vary from point to point and that man made deposits are subject to an even greater diversity. Groundwater conditions are dependent on seasonal and other factors. Consequently, there may be conditions present not revealed by this investigation.
11. EPS cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by EPS is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by EPS in this connection without their explicit written agreement there to by EPS.
12. Rather, this investigation has been undertaken to provide a preliminary characterisation of the existing sub-surface geotechnical characteristics and make up and the findings of this study are our best interpretation of the data collected, within the scope of work and agreed budget. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.
13. This investigation has been undertaken to reasonably characterise existing sub-surface conditions and the findings of this study are our best interpretation of the data collected, within the scope of work and agreed budget. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.





### APPENDIX III - GLOSSARY

#### TERMS

AST	Above Ground Storage Tank
BGS	British Geological Survey
BSI	British Standards Institute
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CIEH	Chartered Institute of Environmental Health
CIRIA	Construction Industry Research Association
CLEA	Contaminated Land Exposure Assessment
CSM	Conceptual Site Model
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)
DWS	Drinking Water Standard
EA	Environment Agency
EQS	Environmental Quality Standard
GAC	General Assessment Criteria
GL	Ground Level
GSV	Gas Screening Value
HCV	Health Criteria Value
ICSM	Initial Conceptual Site Model
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel, kerosene)
ND	Not Detected
LMRL	Lower Method Reporting Limit
NR	Not Recorded
PAH	Poly Aromatic Hydrocarbon
PCB	Poly-Chlorinated Biphenyl
PID	Photo Ionisation Detector
QA	Quality Assurance
SGV	Soil Guideline Value
SPH	Separate Phase Hydrocarbon
Sp.TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
SPT	Standard Penetration Test
SVOC	Semi Volatile Organic Compound
UST	Underground Storage Tank
VCCs	Vibro Concrete Columns
VOC	Volatile Organic Compound
WTE	Water Table Elevation





## **APPENDIX IV**

### **EXPLORATORY HOLE LOGS**





<b>Site</b> Land South of Broadford Lane	<b>Number</b> <b>WS101</b>
---	-------------------------------

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 29.35	<b>Client</b> Surrey Heath Borough Council	<b>Job Number</b> P1057
	<b>Location</b> 497450 E 161109 N	<b>Dates</b> 27/07/2023	<b>Engineer</b> Stuart Phillips	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.40-0.60	ES1		PID=0.0ppm		(1.00)	Grass over very dry and dessicated light brown very sandy CLAY with occasional roots and sunagular to subrounded gravel of flint, brick and concrete. (MADE GROUND)  ...at 0.50mbgl: polythene bag encountered. ...at 0.60mbgl: brick obstruction encountered.		
1.00-1.45	SPT(C) N=6		PID=0.0ppm 2,2/3,1,1,1	28.35 28.25	1.00 (0.10) 1.10	... at 0.90mbgl: section of cast iron pipework encountered.  Very soft light grey very sandy CLAY with occasional rootlets and angular to subrounded fine to medium flint gravel. (ALLUVIUM)		
2.00-2.45	SPT(C) N=14		2,2/3,4,4,3	27.35	2.00	Firm to stiff light brown and light grey slightly sandy CLAY with some black mottling and slight organic odour. (WINDLESHAM FORMATION)  Complete at 2.00m		

<b>Remarks</b> Specialist utility clearance survey carried out prior to commencement. No groundwater encountered. HDPE standpipe (50mm internal diameter) installed to 2.00mbgl; plain pipe from ground level to 1.00mbgl and slotted pipe from 1.00m to 2.00mbgl. Finished with an upstanding cover.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:20	SP
	<b>Figure No.</b> P1057.WS101	





<b>Site</b> Land South of Broadford Lane	<b>Number</b> <b>WS102</b>
---	-------------------------------

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 27.49	<b>Client</b> Surrey Heath Borough Council	<b>Job Number</b> P1057
	<b>Location</b> 497435 E 161218 N	<b>Dates</b> 27/07/2023	<b>Engineer</b> Stuart Phillips	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.40-0.60	ES1		PID=0.0ppm PID=0.0ppm		(0.85)	Grass over dessicated slightly silty very sandy CLAY with occasional roots, rootlets, and subangular to subrounded fine to coarse gravel of flint, brick and concrete. (MADE GROUND)  ...at 0.50mbgl: cobbles of brick encountered. ...at 0.60mbgl: brick obstruction encountered.		
1.00-1.45	SPT(C) N=4		1,1/1,1,1,1	26.64	0.85	Very soft to soft grey mottled black sandy CLAY with semi-decomposed plant matter throughout. (ALLUVIUM)  ...at 1.10mbgl: decomposed tree matter encountered.		
2.00-2.45	SPT(C) N=12		1,2/2,3,3,4	25.09	2.40	Soft to firm light brown and orangeish brown mottled light grey slightly sandy CLAY. (WINDLESHAM FORMATION)		
				24.49	3.00	Complete at 3.00m		

<b>Remarks</b> Specialist utility clearance survey carried out prior to commencement. No groundwater encountered. HDPE standpipe (50mm internal diameter) installed to 3.00mbgl; plain pipe from ground level to 1.00mbgl and slotted pipe from 1.00m to 3.00mbgl. Finished with an upstanding borehole cover.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:20	SP
	<b>Figure No.</b> P1057.WS102	



<b>Site</b> Land South of Broadford Lane	<b>Number</b> <b>WS103</b>
---	-------------------------------

<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 25.63	<b>Client</b> Surrey Heath Borough Council	<b>Job Number</b> P1057
	<b>Location</b> 497475 E 161202 N	<b>Dates</b> 27/07/2023	<b>Engineer</b> Stuart Phillips	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.30-0.50	ES1 PID=0.0		PID=0.0ppm		(1.00)	Light vegetation over dessicated light brown and dark brown sandy CLAY with occasional rootlets, timber fragments and subangular to subrounded fine to coarse gravel of flint, brick, furnace waste and concrete. (MADE GROUND)  ...at 0.30mbgl: cobbles of brick and furnace waste encountered.  ...at 0.70mbgl: fragment of chrysotile asbestos cement encountered.		
1.00-1.45	SPT(C) N=6		1,1/2,1,1,2	24.63	1.00	Soft to firm light brown and light grey mottled orangish brown slightly sandy CLAY with occasional rootlets. (WINDLESHAM FORMATION)		
1.10	HSV 40kPa		PID=0.0ppm 40,40,40/Av. 40.00	24.43	1.20	Soft to firm light grey mottled brown slightly sandy CLAY with organic odour. (WINDLESHAM FORMATION)		
				24.03	1.60	Firm light brown and orangish brown slightly sandy CLAY. (WINDLESHAM FORMATION)		
2.00	HSV 50kPa		50,50,50/Av. 50.00	23.63	2.00	Complete at 2.00m		

<b>Remarks</b> Specialist utility clearance survey undertaken prior to commencement. No groundwater encountered. Hole backfilled with arisings and made safe upon completion.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:20	SP
	<b>Figure No.</b> P1057.WS103	



<b>Excavation Method</b> Drive-in Windowless Sampler	<b>Dimensions</b>	<b>Ground Level (mOD)</b> 27.35	<b>Client</b> Surrey Heath Borough Council	<b>Job Number</b> P1057
	<b>Location</b> 497549 E 161168 N	<b>Dates</b> 27/07/2023	<b>Engineer</b> Stuart Phillips	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.40-0.60	ES1		PID=0.0ppm		(1.50)	Grass over dessicated light brown slightly sandy CLAY with occasional roots, rootlets and subangular to subrounded fine to coarse gravel of flint and brick. (MADE GROUND)		
1.00-1.45	SPT(C) N=8		2,3/2,3,2,1					
1.70-1.80	ES2		PID=0.0ppm	25.85	1.50 (0.50)	Very stiff black and dark grey slightly sandy CLAY with slight hydrocarbon odour and occasional gravel sized fragements of paper, brick, flint, ceramic, plastic, metal, rubber and fabric. (MADE GROUND)		
2.00-2.45	SPT(C) N=3		1,2/1,1,0,1	25.35	2.00 (1.00)	Very soft black, brown and bluish green slightly sandy CLAY with occasional rootlets and gravel sized fragments of metal, rubber, paper and cigarette packets. (MADE GROUND)		
2.70-2.90	ES3		Rapid.(1) at 2.60m.		3.00	Complete at 3.00m		∇1

<b>Remarks</b> Specialist utility clearance survey undertaken prior to commencement. Groundwater strike at 2.60mbgl. HDPE standpipe (50mm internal diameter) installed to 3.00mbgl; plain pipe from ground level to 1.00mbgl and slotted pipe from 1.00m to 3.00mbgl. Finished with an upstanding borehole cover.	<b>Scale (approx)</b>	<b>Logged By</b>
	1:20	SP
	<b>Figure No.</b> P1057.WS104	



**APPENDIX V**

**PHOTOGRAPHS**







**Photograph 1 – WS101 1.0m to 1.40m**



**Photograph 2 – WS101 1.4m to 2.0m**







**Photograph 3 – WS101 Inspection Pit Arisings**



**Photograph 4 – WS102 1.0 to 2.0m**







**Photograph 5 – WS102.0 to 3.0m**



**Photograph 6 – WS102 Inspection Pit Arisings**







**Photograph 7 – WS103 1.0 to 2.0m**



**Photograph 8 – WS103 Inspection Pit Arisings**







**Photograph 9** – WS104 2.0 to 3.0mbgl





## **APPENDIX VI**

### **CHEMICAL TESTING RESULTS**





**Stuart Phillips**  
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WD18 8YS

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f: 01923 237404  
e: reception@i2analytical.com

## **Analytical Report Number : 23-48032**

<b>Project / Site name:</b>	Broadford Lane	<b>Samples received on:</b>	28/07/2023
<b>Your job number:</b>	P1057	<b>Samples instructed on/ Analysis started on:</b>	31/07/2023
<b>Your order number:</b>	P1057-05-I2-BROADFORD LAN	<b>Analysis completed by:</b>	14/08/2023
<b>Report Issue Number:</b>	1	<b>Report issued on:</b>	14/08/2023
<b>Samples Analysed:</b>	1 bulk sample - 5 soil samples		

**Signed:**

Ashleigh Cunningham  
Customer Service Manager  
**For & on behalf of i2 Analytical Ltd.**

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-48032  
 Project / Site name: Broadford Lane  
 Your Order No: P1057-05-12-BROADFORD LAN

Lab Sample Number	2765562	2765563	2765564	2765566	2765567			
Sample Reference	WS101 ES1	WS102 ES1	WS103 ES1	WS104 ES2	WS104 ES3			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	0.40-0.60	0.40-0.60	0.30-0.50	1.70-1.80	2.70-2.90			
Date Sampled	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023			
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	4.7	9	8.6	41	23
Total mass of sample received	kg	0.001	NONE	1.8	1.8	1.2	0.8	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	WEM	WEM	WEM	WEM	WEM

#### General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	40	5.6
Organic Matter (automated)	%	0.1	MCERTS	2.4	1.5	1.7	10	2.9

#### Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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#### Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.68	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.05	0.11	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.05	0.07	0.05	1.6	0.07
Fluorene	mg/kg	0.05	MCERTS	0.05	0.08	0.07	1.6	0.09
Phenanthrene	mg/kg	0.05	MCERTS	0.66	1.2	0.87	3.8	0.44
Anthracene	mg/kg	0.05	MCERTS	0.18	0.29	0.21	0.78	0.11
Fluoranthene	mg/kg	0.05	MCERTS	1.6	2.2	2.1	3.8	1.1
Pyrene	mg/kg	0.05	MCERTS	1.6	1.9	1.8	3.3	0.94
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.77	0.85	0.96	1.1	0.46
Chrysene	mg/kg	0.05	MCERTS	0.86	0.84	1	1.2	0.44
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.1	1.2	1.4	1.4	0.57
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.55	0.32	0.42	0.36	0.27
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.95	0.81	0.98	0.82	0.42
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.46	0.42	0.54	0.46	0.22
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.12	0.1	< 0.05	0.14	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.56	0.45	0.62	0.53	0.23

#### Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	9.47	10.6	11.1	21.6	5.39
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#### Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.4	10	16	22	9.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	1.7	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	U/S**	2.5
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	22	33	29	39
Copper (aqua regia extractable)	mg/kg	1	MCERTS	48	19	61	110	32
Lead (aqua regia extractable)	mg/kg	1	MCERTS	40	170	140	470	69
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	1	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	7.7	11	24	33	19
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	41	92	480	570	220

#### Monoaromatics & Oxygenates

Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Analytical Report Number: 23-48032  
 Project / Site name: Broadford Lane  
 Your Order No: P1057-05-I2-BROADFORD LAN

Lab Sample Number	2765562	2765563	2765564	2765566	2765567			
Sample Reference	WS101 ES1	WS102 ES1	WS103 ES1	WS104 ES2	WS104 ES3			
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)	0.40-0.60	0.40-0.60	0.30-0.50	1.70-1.80	2.70-2.90			
Date Sampled	27/07/2023	27/07/2023	27/07/2023	27/07/2023	27/07/2023			
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
p & m-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

**Petroleum Hydrocarbons**

TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	9	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	83	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	120	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	11	1000	39
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10	14	1200	41

TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.1	NONE	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	4	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	43	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	180	13
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	10	< 10	12	730	60
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR	mg/kg	10	NONE	13	16	17	950	73

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected





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Analytical Report Number: 23-48032  
Project / Site name: Broadford Lane

Your Order No: P1057-05-12-BROADFORD LAN

Lab Sample Number	2765565		
Sample Reference	WS103 ASB1		
Sample Number	None Supplied		
Depth (m)	0.70		
Date Sampled	27/07/2023		
Time Taken	None Supplied		
Analytical Parameter (Bulk Analysis)	Units	Limit of detection	Accreditation Status

Asbestos Identification	Type	N/A	ISO 17025	Chrysotile-Asbestos Cement
Asbestos Analyst ID	N/A	N/A	N/A	WEM

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

**Analytical Report Number : 23-48032**  
**Project / Site name: Broadford Lane**

\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2765562	WS101 ES1	None Supplied	0.40-0.60	Brown sandy loam with vegetation and gravel
2765563	WS102 ES1	None Supplied	0.40-0.60	Brown loam and sand with brick and gravel
2765564	WS103 ES1	None Supplied	0.30-0.50	Brown loam and sand with vegetation and gravel.
2765566	WS104 ES2	None Supplied	1.70-1.80	Brown clay and sand with vegetation.
2765567	WS104 ES3	None Supplied	2.70-2.90	Brown clay and sand with gravel.

Analytical Report Number : 23-48032  
Project / Site name: Broadford Lane

**Water matrix abbreviations:**

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in Bulks	Asbestos Identification in bulk material with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	W	ISO 17025
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 °C)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

## Information in Support of Analytical Results

### List of HWOL Acronyms and Operators

Analytical Report Number : 23-48032  
 Project / Site name: Broadford Lane

**Water matrix abbreviations:**

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
<b>Acronym</b>	<b>Descriptions</b>				
HS	Headspace Analysis				
MS	Mass spectrometry				
FID	Flame Ionisation Detector				
GC	Gas Chromatography				
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))				
CU	Clean-up - e.g. by Florisil®, silica gel				
1D	GC - Single coil/column gas chromatography				
2D	GC-GC - Double coil/column gas chromatography				
Total	Aliphatics & Aromatics				
AL	Aliphatics				
AR	Aromatics				
#1	EH_2D_Total but with humics mathematically subtracted				
#2	EH_2D_Total but with fatty acids mathematically subtracted				
_	Operator - understore to separate acronyms (exception for +)				
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total				

\*\*U/S due to colour interferences.



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Environmental Science

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## **Analytical Report Number : 23-50517**

<b>Project / Site name:</b>	Broadford Lane	<b>Samples received on:</b>	11/08/2023
<b>Your job number:</b>	P1057	<b>Samples instructed on/ Analysis started on:</b>	11/08/2023
<b>Your order number:</b>	P-1057-06-I2-BROAD	<b>Analysis completed by:</b>	21/08/2023
<b>Report Issue Number:</b>	1	<b>Report issued on:</b>	21/08/2023
<b>Samples Analysed:</b>	1 water sample		

**Signed:**

Joanna Szwagrak  
Junior Reporting Specialist  
**For & on behalf of i2 Analytical Ltd.**

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting  
leachates - 2 weeks from reporting  
waters - 2 weeks from reporting  
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.



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Environmental Science

Analytical Report Number: 23-50517

Project / Site name: Broadford Lane

Your Order No: P-1057-06-12-BROAD

Lab Sample Number				2778722
Sample Reference				WS104
Sample Number				GW1
Depth (m)				2.55
Date Sampled				09/08/2023
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

**General Inorganics**

Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	1.4
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**Total Phenols**

Total Phenols (monohydric)	µg/l	1	ISO 17025	1.2
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**Speciated PAHs**

Naphthalene	µg/l	0.01	ISO 17025	0.21
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	1.29
Fluorene	µg/l	0.01	ISO 17025	1.08
Phenanthrene	µg/l	0.01	ISO 17025	1.73
Anthracene	µg/l	0.01	ISO 17025	0.28
Fluoranthene	µg/l	0.01	ISO 17025	0.88
Pyrene	µg/l	0.01	ISO 17025	0.68
Benzo(a)anthracene	µg/l	0.01	ISO 17025	0.17
Chrysene	µg/l	0.01	ISO 17025	0.16
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01

**Total PAH**

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	6.48
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**Heavy Metals / Metalloids**

Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0
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Arsenic (dissolved)	µg/l	0.15	ISO 17025	2.07
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.02
Chromium (dissolved)	µg/l	0.2	ISO 17025	2.7
Copper (dissolved)	µg/l	0.5	ISO 17025	1.2
Lead (dissolved)	µg/l	0.2	ISO 17025	0.7
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	13
Selenium (dissolved)	µg/l	0.6	ISO 17025	0.7
Zinc (dissolved)	µg/l	0.5	ISO 17025	4.6

**Monoaromatics & Oxygenates**

Benzene	µg/l	3	ISO 17025	< 3.0
Toluene	µg/l	3	ISO 17025	< 3.0
Ethylbenzene	µg/l	3	ISO 17025	< 3.0
p & m-xylene	µg/l	3	ISO 17025	< 3.0
o-xylene	µg/l	3	ISO 17025	< 3.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	3	ISO 17025	< 3.0





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Environmental Science

Analytical Report Number: 23-50517

Project / Site name: Broadford Lane

Your Order No: P-1057-06-12-BROAD

Lab Sample Number	2778722			
Sample Reference	WS104			
Sample Number	GW1			
Depth (m)	2.55			
Date Sampled	09/08/2023			
Time Taken	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

**Petroleum Hydrocarbons**

TPH-CWG - Aliphatic## >C5 - C6 <sub>HS_1D_AL</sub>	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic## >C6 - C8 <sub>HS_1D_AL</sub>	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic## >C8 - C10 <sub>HS_1D_AL</sub>	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C10 - C12 <sub>EH_1D_AL_MS</sub>	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C12 - C16 <sub>EH_1D_AL_MS</sub>	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C16 - C21 <sub>EH_1D_AL_MS</sub>	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C21 - C35 <sub>EH_1D_AL_MS</sub>	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic (C5 - C35) <sub>HS+EH_1D_AL_MS</sub>	µg/l	10	NONE	< 10

TPH-CWG - Aromatic >C5 - C7 <sub>HS_1D_AR</sub>	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C7 - C8 <sub>HS_1D_AR</sub>	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C8 - C10 <sub>HS_1D_AR</sub>	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C10 - C12 <sub>EH_1D_AR_MS</sub>	µg/l	10	NONE	15
TPH-CWG - Aromatic >C12 - C16 <sub>EH_1D_AR_MS</sub>	µg/l	10	NONE	60
TPH-CWG - Aromatic >C16 - C21 <sub>EH_1D_AR_MS</sub>	µg/l	10	NONE	70
TPH-CWG - Aromatic >C21 - C35 <sub>EH_1D_AR_MS</sub>	µg/l	10	NONE	35
TPH-CWG - Aromatic (C5 - C35) <sub>HS+EH_1D_AR_MS</sub>	µg/l	10	NONE	180

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



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Environmental Science

Analytical Report Number : 23-50517

Project / Site name: Broadford Lane

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Monohydric phenols in water - LOW LEVEL 1 ug/l	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Low level total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

## Information in Support of Analytical Results

### List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

## - Quality control parameter has a high recovery (outside of limit); however the associated result is below the reporting limit, other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and may be compromised.



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## **Analytical Report Number : 23-54964**

<b>Project / Site name:</b>	Broadford	<b>Samples received on:</b>	18/08/2023
<b>Your job number:</b>	P1057	<b>Samples instructed on/ Analysis started on:</b>	07/09/2023
<b>Your order number:</b>	P1057-07	<b>Analysis completed by:</b>	12/09/2023
<b>Report Issue Number:</b>	1	<b>Report issued on:</b>	12/09/2023
<b>Samples Analysed:</b>	1 soil sample		

**Signed:** \_\_\_\_\_

Anna Goc  
PL Head of Reporting Team  
**For & on behalf of i2 Analytical Ltd.**

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-54964  
 Project / Site name: Broadford  
 Your Order No: P1057-07

Lab Sample Number				2802683
Sample Reference				WS104 ES1
Sample Number				None Supplied
Depth (m)				0.40-0.60
Date Sampled				27/07/2023
Time Taken				1700
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	9.7
Total mass of sample received	kg	0.001	NONE	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	PDO

#### General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1.0
Organic Matter (automated)	%	0.1	MCERTS	3.2

#### Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0
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#### Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.22
Anthracene	mg/kg	0.05	MCERTS	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.5
Pyrene	mg/kg	0.05	MCERTS	0.45
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.22
Chrysene	mg/kg	0.05	MCERTS	0.25
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.29
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.13
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.25
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.14
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.16

#### Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	2.61
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#### Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.8
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15
Lead (aqua regia extractable)	mg/kg	1	MCERTS	42
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	5.5
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	51

Analytical Report Number: 23-54964  
 Project / Site name: Broadford  
 Your Order No: P1057-07

Lab Sample Number	2802683		
Sample Reference	WS104 ES1		
Sample Number	None Supplied		
Depth (m)	0.40-0.60		
Date Sampled	27/07/2023		
Time Taken	1700		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status

**Monoaromatics & Oxygenates**

Compound	Units	Limit of detection	Accreditation Status	Result
Benzene	µg/kg	5	MCERTS	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0
p & m-xylene	µg/kg	5	MCERTS	< 5.0
o-xylene	µg/kg	5	MCERTS	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0

**Petroleum Hydrocarbons**

TPH-CWG - Aliphatic > EC5 - EC6 <sub>HS,1D,AL</sub>	mg/kg	0.1	NONE	< 0.10
TPH-CWG - Aliphatic > EC6 - EC8 <sub>HS,1D,AL</sub>	mg/kg	0.1	NONE	< 0.10
TPH-CWG - Aliphatic > EC8 - EC10 <sub>HS,1D,AL</sub>	mg/kg	0.1	NONE	< 0.10
TPH-CWG - Aliphatic > EC10 - EC12 <sub>EH,CU,1D,AL</sub>	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aliphatic > EC12 - EC16 <sub>EH,CU,1D,AL</sub>	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aliphatic > EC16 - EC21 <sub>EH,CU,1D,AL</sub>	mg/kg	8	MCERTS	< 8.0
TPH-CWG - Aliphatic > EC21 - EC35 <sub>EH,CU,1D,AL</sub>	mg/kg	8	MCERTS	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) <sub>EH,CU+HS,1D,AL</sub>	mg/kg	10	NONE	< 10

TPH-CWG - Aromatic > EC5 - EC7 <sub>HS,1D,AR</sub>	mg/kg	0.1	NONE	< 0.10
TPH-CWG - Aromatic > EC7 - EC8 <sub>HS,1D,AR</sub>	mg/kg	0.1	NONE	< 0.10
TPH-CWG - Aromatic > EC8 - EC10 <sub>HS,1D,AR</sub>	mg/kg	0.1	NONE	< 0.10
TPH-CWG - Aromatic > EC10 - EC12 <sub>EH,CU,1D,AR</sub>	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aromatic > EC12 - EC16 <sub>EH,CU,1D,AR</sub>	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aromatic > EC16 - EC21 <sub>EH,CU,1D,AR</sub>	mg/kg	10	MCERTS	< 10
TPH-CWG - Aromatic > EC21 - EC35 <sub>EH,CU,1D,AR</sub>	mg/kg	10	MCERTS	< 10
TPH-CWG - Aromatic (EC5 - EC35) <sub>EH,CU+HS,1D,AR</sub>	mg/kg	10	NONE	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



**Analytical Report Number : 23-54964**  
**Project / Site name: Broadford**

\* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2802683	WS104 ES1	None Supplied	0.40-0.60	Brown loam and sand with gravel and vegetation.



Analytical Report Number : 23-54964  
Project / Site name: Broadford

**Water matrix abbreviations:**

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

**For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).**

**For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).**

**Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.**

### Information in Support of Analytical Results

#### List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics



Analytical Report Number : 23-54964  
 Project / Site name: Broadford

**Water matrix abbreviations:**

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
AL	Aliphatics				
AR	Aromatics				
#1	EH_2D_Total but with humics mathematically subtracted				
#2	EH_2D_Total but with fatty acids mathematically subtracted				
-	Operator - understore to separate acronyms (exception for +)				
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total				

## Sample Deviation Report



**Analytical Report Number : 23-54964**

**Project / Site name: Broadford**

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
WS104 ES1	None Supplied	S	2802683	c	Hexavalent chromium in soil	L080-PL	c
WS104 ES1	None Supplied	S	2802683	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
WS104 ES1	None Supplied	S	2802683	c	Monohydric phenols in soil	L080-PL	c
WS104 ES1	None Supplied	S	2802683	c	Organic matter (Automated) in soil	L009-PL	c
WS104 ES1	None Supplied	S	2802683	c	Speciated EPA-16 PAHs in soil	L064-PL	c
WS104 ES1	None Supplied	S	2802683	c	TPHCWG (Soil)	L088/76-PL	c
WS104 ES1	None Supplied	S	2802683	c	Total cyanide in soil	L080-PL	c



## **APPENDIX VII**

### **GROUND GAS AND GROUNDWATER MONITORING RESULTS**



Project no: P1057  
 Project: Land south of Broadford Lane  
 Client: Surrey Heath Borough Council

Monitored by: Tim Conibear / Stuart Phillips



Date	Time	Hole Location	Response zone (m)	Depth m		Relative Pressure (mbar)	Flow Rate (l/h)		Methane CH <sub>4</sub> (% v/v)		Carbon dioxide CO <sub>2</sub> (% v/v)		Oxygen % v/v (Low)	Carbon monoxide CO ppm (Peak)	Hydrogen sulphide H <sub>2</sub> S ppm (Peak)	Comments
				Water	Base		Initial	Steady	Peak	Steady	Peak	Steady				
09/08/2023	10:00am	WS101	1.00 - 2.00	Dry	2.00	1019	<0.1	<0.1	0.1	0.0	4.5	1.3	17.0	<1	<1	Damp at base
	10:30am	WS102	1.00 - 3.00	Dry	2.88	1017	<0.1	<0.1	0.2	0.2	12.0	12.0	7.4	5	<1	Damp at base
	11:00am	WS104	1.00 - 3.00	2.55	2.89	1018	<0.1	<0.1	0.1	0.1	8.7	8.7	11.9	6	<1	

Monitoring date	Atmospheric Pressure Trend
09/08/2022	1017 mbar rising to 1018 mbar

## 6. Air Quality Assessment, Broadford Lane – January 2024 from Redmore Environmental



**Air Quality Assessment**  
**Broadford Lane, Chobham**

**Client: Surrey Heath Borough Council**

**Reference: 5984r2**

**Date: 9<sup>th</sup> January 2024**



## Report Issue

Report Title: Air Quality Assessment - Broadford Lane, Chobham

Report Reference: 5984

Field	Report Version			
	1	2	3	4
Prepared by	Amelia Reed			
Position	Principal Air Quality Consultant			
Reviewed by	Jethro Redmore			
Position	Director			
Date of Issue	9 <sup>th</sup> January 2024			
Comments	-			

Serendipity Labs, Building 7, Exchange Quay, Salford, M5 3EP

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This report has been prepared by Redmore Environmental Ltd in accordance with the agreed terms and conditions of appointment. Redmore Environmental Ltd cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

## **Executive Summary**

Redmore Environmental Ltd was commissioned by eps consulting on behalf of Surrey Heath Borough Council ('the Client') to undertake an Air Quality Assessment for a parcel of land south of Broadford Lane, Chobham.

The Client is in the process of determining whether the site is suitable for allocation within the emerging Local Plan for up to 16 new pitches for Gypsy, Traveller and Travelling Showpeople. The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and consider potential effects as a result of the scheme.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of earthworks, construction and trackout activities. It is considered that the use of good practice control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the relevant screening criteria. Due to the low number of anticipated vehicle trips associated with the proposals, road traffic exhaust emission impacts were not predicted to be significant.

Based on the assessment results, it is concluded that air quality factors are not considered a constraint to the use of the site for Gypsy and Traveller accommodation.

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### Appendix

Appendix 1 - Curricula Vitae

## **1.0 INTRODUCTION**

### **1.1 Background**

- 1.1.1 Redmore Environmental Ltd was commissioned by eps consulting on behalf of Surrey Heath Borough Council ('the Client') to undertake an Air Quality Assessment for a parcel of land south of Broadford Lane, Chobham, which is being considered for allocation for Gypsy and Traveller use within the emerging Surrey Heath Local Plan.
- 1.1.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and consider potential effects as a result of the scheme.

### **1.2 Site Location and Context**

- 1.2.1 The site is located off Broadford Lane, Chobham, at approximate National Grid Reference (NGR): 497474, 161095. Reference should be made to Figure 1 for a site location plan.
- 1.2.2 The Client is in the process of determining whether the site is suitable for allocation for Gypsy and Traveller use within the emerging Surrey Heath Local Plan. The site was included within the Surrey Heath Local Plan: Preferred Options (2019 – 2038) – Further Gypsy and Traveller and Travelling Showpeople Allocations Regulation 18 consultation, which was undertaken between August – September 2022. Whilst the consultation identifies the site as having potential capacity for up to 16 pitches, the provisional indicative development plans prepared following the consultation show two possible options for the development ranging between 10 and 13 pitches.
- 1.2.3 The development has the potential to cause air quality impacts at sensitive locations. These may include fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the site during the operational phase. An Air Quality Assessment was therefore undertaken in order to determine baseline conditions and consider potential air quality effects as a result of the proposals. This is detailed in the following report.



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## **2.0 LEGISLATION AND POLICY**

### **2.1 Legislation**

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO<sub>2</sub>);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM<sub>10</sub>);
- Particulate matter with an aerodynamic diameter of less than 2.5µm (PM<sub>2.5</sub>);
- Benzene; and,
- Carbon monoxide.

2.1.2 Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for PM<sub>2.5</sub> stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published 28<sup>th</sup> April 2023<sup>1</sup>. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

2.1.4 The Environmental Improvement Plan 2023<sup>2</sup> was published in January 2023, providing long term and Interim Targets in order to reduce population exposure to PM<sub>2.5</sub>. The concentration target for 2040 was subsequently adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

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<sup>1</sup> The AQS: Framework for Local Authority Delivery, DEFRA, 2023.

<sup>2</sup> Environmental Improvement Plan 2023, DEFRA, 2023.

2.1.5 Table 1 presents the AQOs and Interim Target for pollutants considered within this assessment.

**Table 1 Air Quality Objectives/ Interim Target**

Pollutant	Air Quality Objective/ Interim Target	
	Concentration ( $\mu\text{g}/\text{m}^3$ )	Averaging Period
NO <sub>2</sub>	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM <sub>10</sub>	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
PM <sub>2.5</sub>	12 <sup>(a)</sup>	Annual mean

Note: (a) Interim Target to be achieved by end of January 2028.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance<sup>3</sup> on where the AQOs for pollutants considered within this report apply.

**Table 2 Examples of Where the Air Quality Objectives Apply**

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term

<sup>3</sup> Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
1-hour mean	<p>All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets)</p> <p>Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more</p> <p>Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer</p>	Kerbside sites where the public would not be expected to have regular access

## 2.2 Local Air Quality Management

2.2.1 Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

## 2.3 Dust

2.3.1 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

2.3.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of

the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

## **2.4 National Planning Policy**

2.4.1 The revised National Planning Policy Framework<sup>4</sup> (NPPF) was published in December 2023 and sets out the Government's planning policies for England and how these are expected to be applied.

2.4.2 The purpose of the planning system is to contribute to the achievements of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives including the following of relevance to air quality:

"c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.4.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

[...]

e) preventing new and existing development from contributing to, or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality [...]"

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<sup>4</sup> NPPF, Ministry of Housing, Communities and Local Government, 2023.

2.4.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

2.4.5 The implications of the NPPF have been considered throughout this assessment.

## **2.5 National Planning Practice Guidance**

2.5.1 The National Planning Practice Guidance<sup>5</sup> (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6<sup>th</sup> March 2014 and updated on 1<sup>st</sup> November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality be relevant to the planning development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

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<sup>5</sup> <https://www.gov.uk/guidance/air-quality--3>.

2.5.2 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

## **2.6 Local Planning Policy**

2.6.1 The Surrey Heath Local Plan currently consists of the Core Strategy and Development Management Policies 2011 - 2028<sup>6</sup>, which was adopted by Surrey Heath Borough Council (SHBC) on 1<sup>st</sup> February 2012, the Camberley Town Centre Area Action Plan 2011 – 2028<sup>7</sup>, adopted on 16<sup>th</sup> July 2014 and saved policies of the Surrey Heath Local Plan 2000<sup>8</sup>, which was adopted on 8<sup>th</sup> December 2000. Review of these documents did not reveal any planning policies of relevance to this assessment.

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<sup>6</sup> Core Strategy and Development Management Policies 2011 - 2028, SHBC, 2012.

<sup>7</sup> Camberley Town Centre Area Action Plan 2011 – 2028, SHBC 2014.

<sup>8</sup> Surrey Heath Local Plan 2000, SHBC, 2000.

### **3.0 METHODOLOGY**

#### **3.1 Introduction**

3.1.1 The proposed development has the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. These have been assessed in accordance with the following methodology.

#### **3.2 Construction Phase Assessment**

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V2.1'<sup>9</sup>.

3.2.2 Activities on the proposed construction site have been divided into three types to reflect their different potential impacts. These are:

- Earthworks;
- Construction; and,
- Trackout.

3.2.3 The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to PM<sub>10</sub>.

3.2.4 The assessment steps are detailed below.

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<sup>9</sup> Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.



## Step 1

- 3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 250m from the boundary or 50m from the construction vehicle route up to 250m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route up to 250m from the site entrance, then the assessment also proceeds to Step 2..
- 3.2.6 Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

## Step 2

- 3.2.7 Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on two factors:
- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and,
  - The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).
- 3.2.8 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.
- 3.2.9 Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 3.

**Table 3 Construction Dust - Magnitude of Emission**

Magnitude	Activity	Criteria
Large	Earthworks	<ul style="list-style-type: none"><li>• Total site area greater than 110,000m<sup>2</sup></li><li>• Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size)</li><li>• More than 10 heavy earth moving vehicles active at any one time</li><li>• Formation of bunds greater than 6m in height</li></ul>

Magnitude	Activity	Criteria
	Construction	<ul style="list-style-type: none"> <li>Total building volume greater than 75,000m<sup>3</sup></li> <li>On site concrete batching</li> <li>Sandblasting</li> </ul>
	Trackout	<ul style="list-style-type: none"> <li>More than 50 Heavy Duty Vehicle (HDV) trips per day</li> <li>Potentially dusty surface material (e.g. high clay content)</li> <li>Unpaved road length greater than 100m</li> </ul>
Medium	Earthworks	<ul style="list-style-type: none"> <li>Total site area 18,00m<sup>2</sup> to 110,000m<sup>2</sup></li> <li>Moderately dusty soil type (e.g. silt)</li> <li>5 to 10 heavy earth moving vehicles active at any one time</li> <li>Formation of bunds 3m to 6m in height</li> </ul>
	Construction	<ul style="list-style-type: none"> <li>Total building volume 12,000m<sup>3</sup> to 75,000m<sup>3</sup></li> <li>Potentially dusty construction material (e.g. concrete)</li> <li>On site concrete batching</li> </ul>
	Trackout	<ul style="list-style-type: none"> <li>20 to 50 HDV trips per day</li> <li>Moderately dusty surface material (e.g. high clay content)</li> <li>Unpaved road length 50m to 100m</li> </ul>
Small	Earthworks	<ul style="list-style-type: none"> <li>Total site area less than 18,000m<sup>2</sup></li> <li>Soil type with large grain size (e.g. sand)</li> <li>Less than 5 heavy earth moving vehicles active at any one time</li> <li>Formation of bunds less than 4m in height</li> </ul>
	Construction	<ul style="list-style-type: none"> <li>Total building volume less than 12,000m<sup>3</sup></li> <li>Construction material with low potential for dust release (e.g. metal cladding or timber)</li> </ul>
	Trackout	<ul style="list-style-type: none"> <li>Less than 20 HDV trips per day</li> <li>Surface material with low potential for dust release</li> <li>Unpaved road length less than 50m</li> </ul>

3.2.13 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 4.

**Table 4 Construction Dust - Examples of Factors Defining Sensitivity of an Area**

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	<ul style="list-style-type: none"> <li>• Users expect high levels of amenity</li> <li>• High aesthetic or value property</li> <li>• People expected to be present continuously for extended periods of time</li> <li>• Locations where members of the public are exposed over a time period relevant to the AQO for PM<sub>10</sub>. e.g. residential properties, hospitals, schools and residential care homes</li> </ul>	<ul style="list-style-type: none"> <li>• Internationally or nationally designated site e.g. Special Area of Conservation</li> </ul>
Medium	<ul style="list-style-type: none"> <li>• Users would expect to enjoy a reasonable level of amenity</li> <li>• Aesthetics or value of their property could be diminished by soiling</li> <li>• People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work</li> </ul>	<ul style="list-style-type: none"> <li>• Nationally designated site e.g. Sites of Special Scientific Interest</li> </ul>
Low	<ul style="list-style-type: none"> <li>• Enjoyment of amenity would not reasonably be expected</li> <li>• Property would not be expected to be diminished in appearance</li> <li>• Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, farmland, short term car parks and roads</li> </ul>	<ul style="list-style-type: none"> <li>• Locally designated site e.g. Local Nature Reserve</li> </ul>

3.2.14 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and,

- Any known specific receptor sensitivities which go beyond the classifications given in the document.

3.2.15 These factors were considered in the undertaking of this assessment.

3.2.16 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 5.

**Table 5 Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property**

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
High	More than 100	High	High	Low	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

3.2.17 Table 6 outlines the criteria for determining the sensitivity of the area to human health impacts.

**Table 6 Construction Dust - Sensitivity of the Area to Human Health Impacts**

Receptor Sensitivity	Background Annual Mean PM <sub>10</sub> Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m <sup>3</sup>	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m <sup>3</sup>	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low

Receptor Sensitivity	Background Annual Mean PM <sub>10</sub> Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
	24 - 28µg/m <sup>3</sup>	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m <sup>3</sup>	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	Greater than 32µg/m <sup>3</sup>	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28 - 32µg/m <sup>3</sup>	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m <sup>3</sup>	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m <sup>3</sup>	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low	Low

3.2.18 Table 7 outlines the criteria for determining the sensitivity of the area to ecological impacts.

**Table 7 Construction Dust - Sensitivity of the Area to Ecological Impacts**

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
High	Medium	Medium
Medium	Medium	Low

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
Low	Low	Low

3.2.19 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

3.2.20 Table 8 outlines the risk category from earthworks and construction activities.

**Table 8 Construction Dust - Dust Risk Category from Earthworks and Construction Activities**

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

3.2.21 Table 9 outlines the risk category from trackout activities.

**Table 9 Construction Dust - Dust Risk Category from Trackout Activities**

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Negligible
Low	Low	Low	Negligible

**Step 3**

3.2.22 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance<sup>10</sup> to reduce potential dust impacts based upon the relevant risk categories

<sup>10</sup> Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

#### **Step 4**

3.2.23 Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

3.2.24 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. The IAQM guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 1.

### **3.3 Operational Phase Assessment**

3.3.1 The development has the potential to increase concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. A screening assessment was therefore undertaken using the criteria contained within the IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'<sup>11</sup> guidance to determine the potential for trips generated by the development to affect local air quality.

3.3.2 The IAQM guidance<sup>12</sup> provides the following criteria to help establish when an assessment of potential impacts on the local area is likely to be considered necessary:

- A change of Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 AADT elsewhere;
- A change of HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;

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<sup>11</sup> Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

<sup>12</sup> Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

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- Realignment of roads where the change is 5m or more and the road is within an AQMA; or,
- Introduction of a new junction or removal of an existing junction near to relevant receptors.

3.3.3 Should these criteria not be met, then the IAQM guidance<sup>13</sup> considers air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

3.3.4 Should screening of the relevant data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the change in pollutant concentrations as a result of the proposed development. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the IAQM guidance<sup>14</sup>.

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<sup>13</sup> Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

<sup>14</sup> Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

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## **4.0 BASELINE**

### **4.1 Introduction**

4.1.1 Existing air quality conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following Sections.

### **4.2 Local Air Quality Management**

4.2.1 As required by the Environment Act (1995), as amended by the Environment Act (2021), SHBC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO<sub>2</sub> and 24-hour mean concentrations of PM<sub>10</sub> are above the AQOs within the borough. As such, one AQMA has been declared. This is described as follows:

"The strip of land from Frimley Road Camberley to Ravenswood Roundabout Camberley which embraces the M3 Motorway and the houses on both side of the motorway which border the highway."

4.2.2 The Surrey Heath AQMA is located approximately 8km west of the development. It is considered unlikely the proposals would cause air quality impacts over a distance of this magnitude. As such, the AQMA has not been considered further in the context of this assessment.

4.2.3 SHDC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

### **4.3 Air Quality Monitoring**

4.3.1 Monitoring of pollutant levels is undertaken by SHDC throughout their area of jurisdiction. Recent NO<sub>2</sub> concentrations recorded in the vicinity of the development are shown in Table 10.

**Table 10 Monitoring Results**

Monitoring Site		Monitored NO <sub>2</sub> Concentration (µg/m <sup>3</sup> )		
		2016	2017	2018
SH21	Benner Lane	21.4	21.4	21.9
SH24	High Street, Chobham	34.9	32.4	33.6

4.3.2 As shown in Table 10, annual mean NO<sub>2</sub> concentrations were below the AQO of 40µg/m<sup>3</sup> at the SH21 and SH24 monitors in recent years. Reference should be made to Figure 2 for a map of the survey positions.

4.3.3 SHBC do not undertake PM<sub>10</sub> or PM<sub>2.5</sub> monitoring within the vicinity of the site.

#### **4.4 Background Pollutant Concentrations**

4.4.1 Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 497500, 161500. Data for this location was downloaded from the DEFRA website<sup>15</sup> for the purpose of the assessment and is summarised in Table 11.

**Table 11 Background Pollutant Concentration Predictions**

Pollutant	Predicted 2023 Background Pollutant Concentration (µg/m <sup>3</sup> )
NO <sub>2</sub>	10.66
PM <sub>10</sub>	13.11
PM <sub>2.5</sub>	9.05

4.4.2 As shown in Table 11, predicted background NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are below the relevant AQOs and Interim Target at the development site.

<sup>15</sup> <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

## 4.5 Sensitive Receptors

4.5.1 A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. Receptors sensitive to potential dust impacts during earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 12.

**Table 12 Earthworks and Construction Dust Sensitive Receptors**

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors <sup>(a)</sup>
Up to 20	1 - 10	0
Up to 50	1 - 10	0
Up to 100	10 - 100	-
Up to 350	10 - 100	-

Note: (a) Ecological receptors are only considered within 50m of the site boundary.

4.5.2 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 13.

**Table 13 Trackout Dust Sensitive Receptors**

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 - 100	0
Up to 50	10 - 100	0

4.5.3 There are no ecological receptors within 50m of the development boundary or the access route within 500m of the site entrance. As such, ecological impacts have not been assessed further within this report.

4.5.4 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 14.

**Table 14 Additional Area Sensitivity Factors to Potential Dust Impacts**

Guidance	Comment
Whether there is any history of dust generating activities in the area	The baseline review did not indicate any dust generating activities in the local area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal indicated a number of applications have recently been submitted in the vicinity of the site. It is therefore possible that these schemes will result in concurrent dust generation should they be granted consent and the construction phases overlap with that of the proposal
Pre-existing screening between the source and the receptors	Trees and shrubs are located along the site boundary. These may act as a barrier between emission sources and receptors should they be retained during construction
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the south-west. As such, receptors to the north-east of the boundary are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is possible that it will extend over one year. The sensitivity of nearby receptors is unlikely to change during this time
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

4.5.5 Dust sensitive receptors within 350m of the development site include places of work and residential dwellings. These are considered to be of **medium** and **high** sensitivity, respectively. It should be noted that only receptors of **medium** sensitivity are present within 50m of the boundary.

4.5.6 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 15.

**Table 15 Sensitivity of the Surrounding Area to Potential Dust Impacts**

Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium
Human Health	Medium	Medium	High

#### 4.6 **Site Suitability**

- 4.6.1 The potential allocation would comprise residential land use. This is considered a location of relevant exposure to elevated pollutant concentrations in accordance with DEFRA guidance<sup>16</sup>. However, the site is not located within an AQMA and recent NO<sub>2</sub> monitoring results recorded in the vicinity of the site have indicated compliance with the relevant AQO. As such, exposure of future residents to exceedences of the relevant AQOs is not predicted and the location is considered suitable for the proposed end use.

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<sup>16</sup> Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

## 5.0 **ASSESSMENT**

### 5.1 **Introduction**

5.1.1 There is the potential for air quality impacts as a result of the construction and operation of the proposed development. These are assessed in the following Sections.

### 5.2 **Construction Phase Assessment**

#### **Step 1**

5.2.1 The undertaking of activities such as excavation, ground works, cutting, construction and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements on the local road network also have the potential to result in the re-suspension of dust from highway surfaces.

5.2.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

5.2.3 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

#### **Step 2**

##### Earthworks

5.2.4 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The area of the proposed development site is less than 18,000m<sup>2</sup>. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **small**.

5.2.5 Table 15 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for dust soiling as a result of earthworks.



5.2.6 Table 15 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for human health impacts as a result of earthworks.

#### Construction

5.2.7 Due to the size of the development, the total building volume will be between 12,000m<sup>3</sup> and 75,000m<sup>3</sup>. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **medium**.

5.2.8 Table 15 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 8, the development is considered to be a **medium** risk site for dust soiling as a result of construction activities.

5.2.9 Table 15 indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in Table 8, the development is considered to be a **medium** risk site for human health impacts as a result of construction activities.

#### Trackout

5.2.10 Based on the site area and existing hardstanding, it is anticipated that the unpaved road length will be between 50m and 100m. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **medium**.

5.2.11 Table 15 indicates the sensitivity of the area to dust soiling effects to people and property is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for dust soiling as a result of trackout activities.

5.2.12 Table 15 indicates the sensitivity of the area to human health impacts is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for human health impacts as a result of trackout activities.

#### Summary of the Risk of Dust Effects

5.2.13 A summary of the risk from each dust generating activity is provided in Table 16.

**Table 16 Summary of Potential Unmitigated Dust Risks During Construction**

Potential Impact	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Low	Medium	Medium
Human Health	Low	Medium	Medium

5.2.14 As indicated in Table 16, the potential risk of dust soiling is **medium** from construction and trackout and **low** from earthworks. The potential risk of human health impacts is **medium** from construction and trackout and **low** from earthworks.

5.2.15 It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

### Step 3

5.2.16 The IAQM guidance<sup>17</sup> provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 17. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan or similar if required by the LA.

<sup>17</sup> Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

**Table 17 Fugitive Dust Emission Mitigation Measures**

Issue	Control Measure
Communications	<ul style="list-style-type: none"> <li>• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.</li> <li>• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager</li> <li>• Display the head or regional office contact information</li> <li>• Develop and implement a Dust Management Plan (DMP) or similar, which may include measures to control other emissions, approved by the LA</li> </ul>
Site management	<ul style="list-style-type: none"> <li>• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken</li> <li>• Make the complaints log available to the LA upon request</li> <li>• Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book</li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>• Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the LA upon request</li> <li>• Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions</li> </ul>
Site preparation	<ul style="list-style-type: none"> <li>• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible</li> <li>• Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site</li> <li>• Fully enclose specific operations where there is a high potential for dust production and they are active for an extensive period</li> <li>• Avoid site runoff of water or mud</li> <li>• Keep site fencing, barriers and scaffolding clean using wet methods</li> <li>• Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used</li> <li>• Cover, seed or fence stockpiles to prevent wind whipping</li> </ul>
Operating vehicle/machinery and sustainable travel	<ul style="list-style-type: none"> <li>• Ensure all vehicles switch off engines when stationary - no idling vehicles</li> <li>• Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable</li> </ul>

Issue	Control Measure
Operations	<ul style="list-style-type: none"> <li>• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques</li> <li>• Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate</li> <li>• Use enclosed chutes and conveyors and covered skips</li> <li>• Minimise drop heights and use fine water sprays wherever appropriate</li> <li>• Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods</li> </ul>
Waste management	<ul style="list-style-type: none"> <li>• No bonfires and burning of waste materials</li> </ul>
Construction	<ul style="list-style-type: none"> <li>• Avoid scabbling (roughening of concrete surfaces), if possible</li> <li>• Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out</li> </ul>
Trackout	<ul style="list-style-type: none"> <li>• Use water-assisted dust sweeper on access and local roads, if required</li> <li>• Avoid dry sweeping of large areas</li> <li>• Ensure vehicles entering and leaving site are covered to prevent escape of materials</li> <li>• Implement a wheel washing system, if required</li> <li>• Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit</li> <li>• Access gates to be located at least 10m from receptors, where possible</li> </ul>

#### Step 4

5.2.17 Assuming the relevant mitigation measures outlined in Table 17 are implemented, the residual impact from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance<sup>18</sup>.

### 5.3 Operational Phase Assessment

5.3.1 Any vehicle movements associated with the proposals will generate exhaust emissions on the local and regional road networks. Information provided by Motion Consultants Limited, the Transport Consultants for the project, indicated that development is anticipated to generate a maximum 152 daily trips, five of which will be HDVs.

<sup>18</sup> Guidance on the Assessment of Dust from Demolition and Construction V2.1, IAQM, 2023.

5.3.2 Based on the information above, the development is not predicted to result in an increase in LDV flows of more than 500 AADT on any individual road link. Additionally, the proposals do not include significant highway realignment or the introduction of a junction and there will not be a requirement for than 100 HDV deliveries per day. As such, potential air quality impacts associated with the operational phase road vehicle exhaust emissions are predicted to be **not significant**, in accordance with the IAQM<sup>19</sup> criteria shown in Section 3.3.

---

<sup>19</sup> Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

---

## 6.0 CONCLUSION

- 6.1.1 Redmore Environmental Ltd was commissioned by eps consulting on behalf of Surrey Heath Borough Council ('the Client') to undertake an Air Quality Assessment for a parcel of land south of Broadford Lane, Chobham, which is being considered as a potential allocation for Gypsy and Traveller use within the emerging Surrey Heath Local Plan. .
- 6.1.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation. As such, an Air Quality Assessment was undertaken in order to determine baseline conditions and consider potential effects as a result of the scheme.
- 6.1.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks, construction and trackout activities was predicted to be **not significant**.
- 6.1.4 Potential impacts during the operational phase of the proposed development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against screening criteria provided within the IAQM<sup>20</sup> guidance. Due to the low number of anticipated vehicle trips associated with the proposals, air quality impacts were predicted to be **not significant**.
- 6.1.5 Based on the assessment results, it is concluded that air quality factors are not considered a constraint to use of the site for residential development.

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<sup>20</sup> Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

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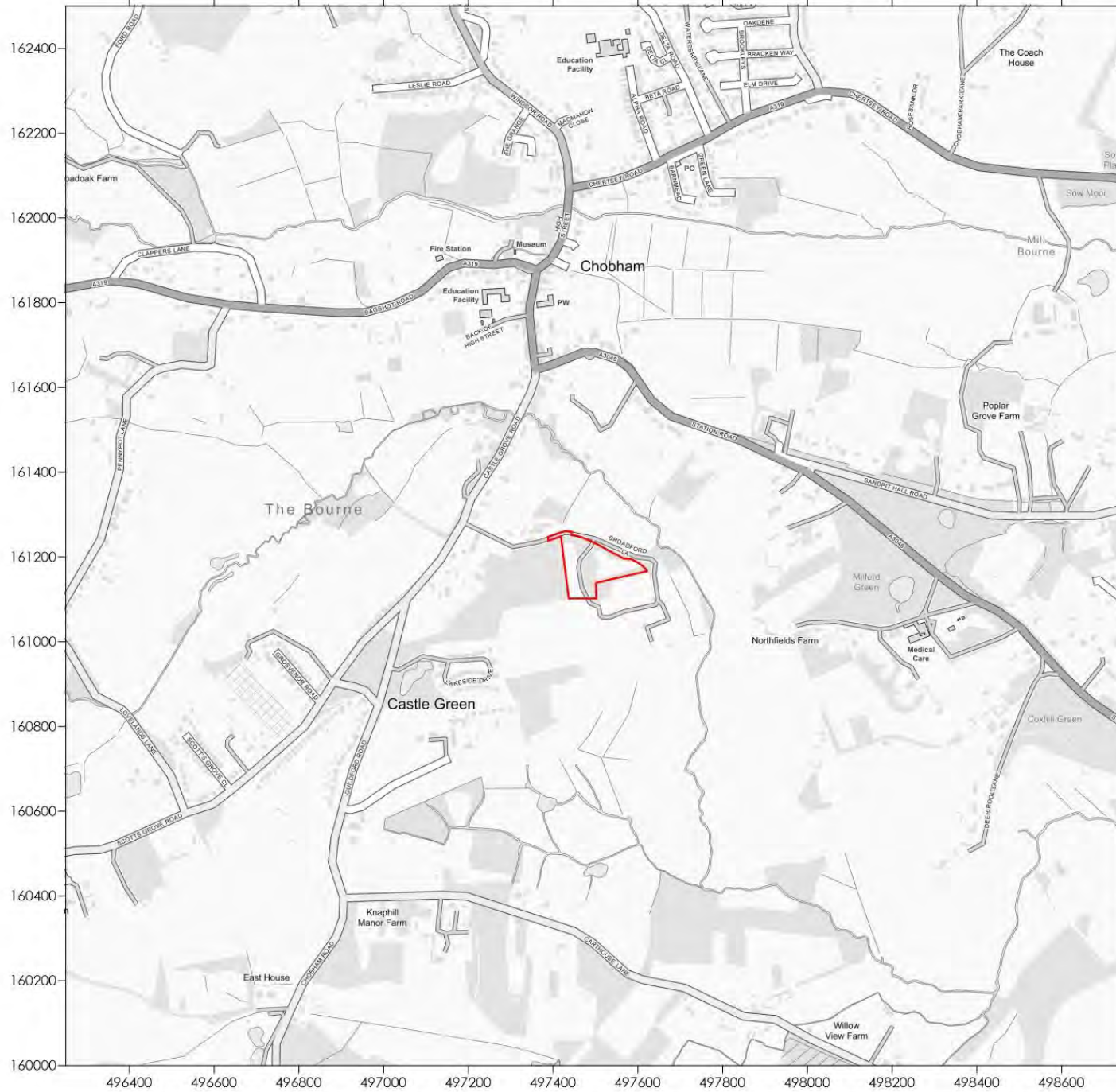
## 7.0 **ABBREVIATIONS**

AADT	Annual Average Daily Traffic
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
DEFRA	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
NGR	National Grid Reference
NO <sub>2</sub>	Nitrogen dioxide
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PM <sub>10</sub>	Particulate matter with an aerodynamic diameter of less than 10µm
PM <sub>2.5</sub>	Particulate matter with an aerodynamic diameter of less than 2.5µm
SHBC	Surrey Heath Borough Council



**Figures**

---



**Legend**



Site Boundary

**Title**  
Figure 1 - Site Location Plan

**Project**  
Air Quality Assessment  
Broadford Lane, Chobham

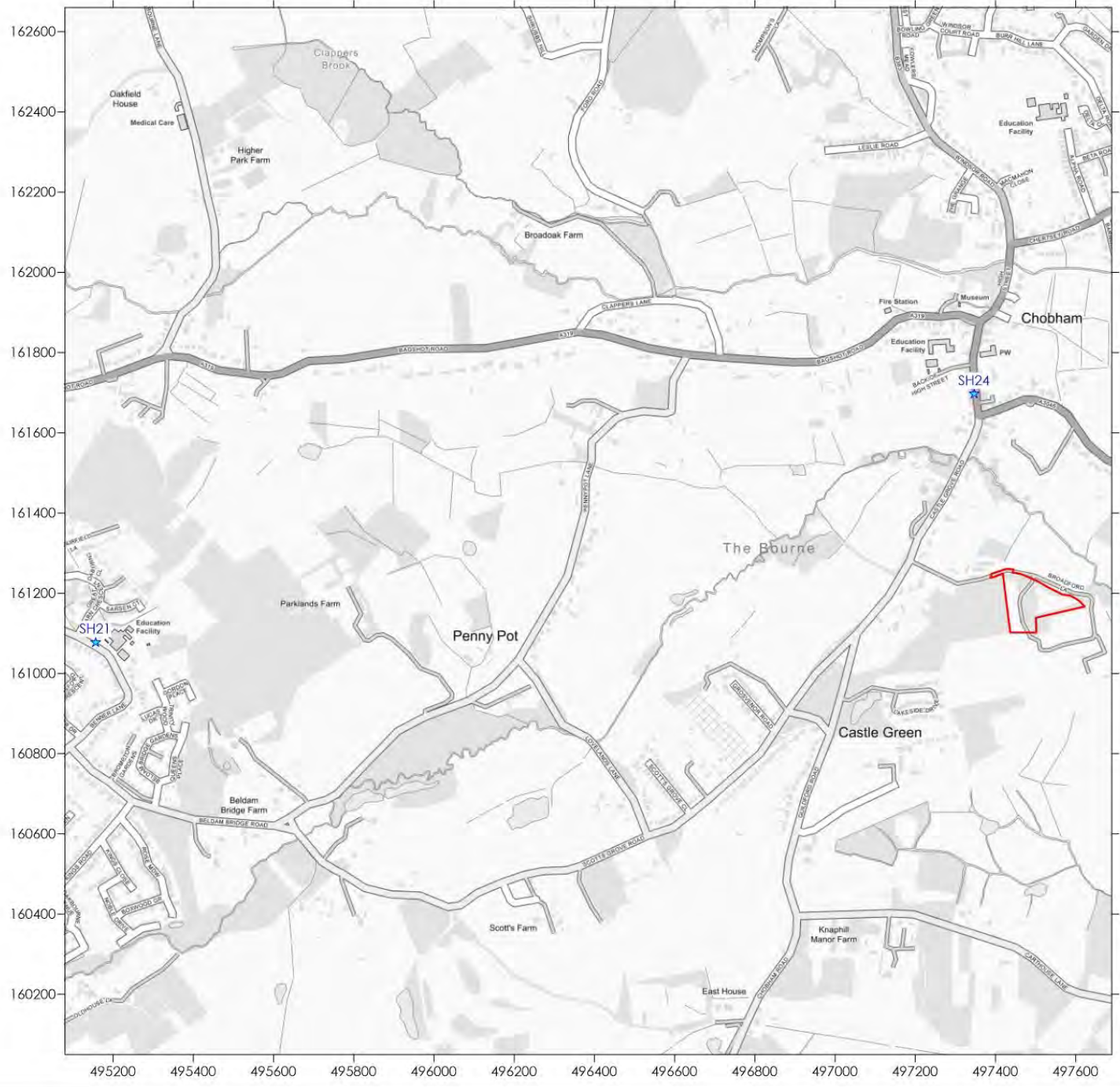
**Project Reference**  
5984

**Client**  
Environmental Planning Solutions Ltd

Contains Ordnance Survey Data  
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**Legend**

-  Site Boundary
-  Monitor

**Title**  
Figure 2 - Monitoring Locations

**Project**  
Air Quality Assessment  
Broadford Lane, Chobham

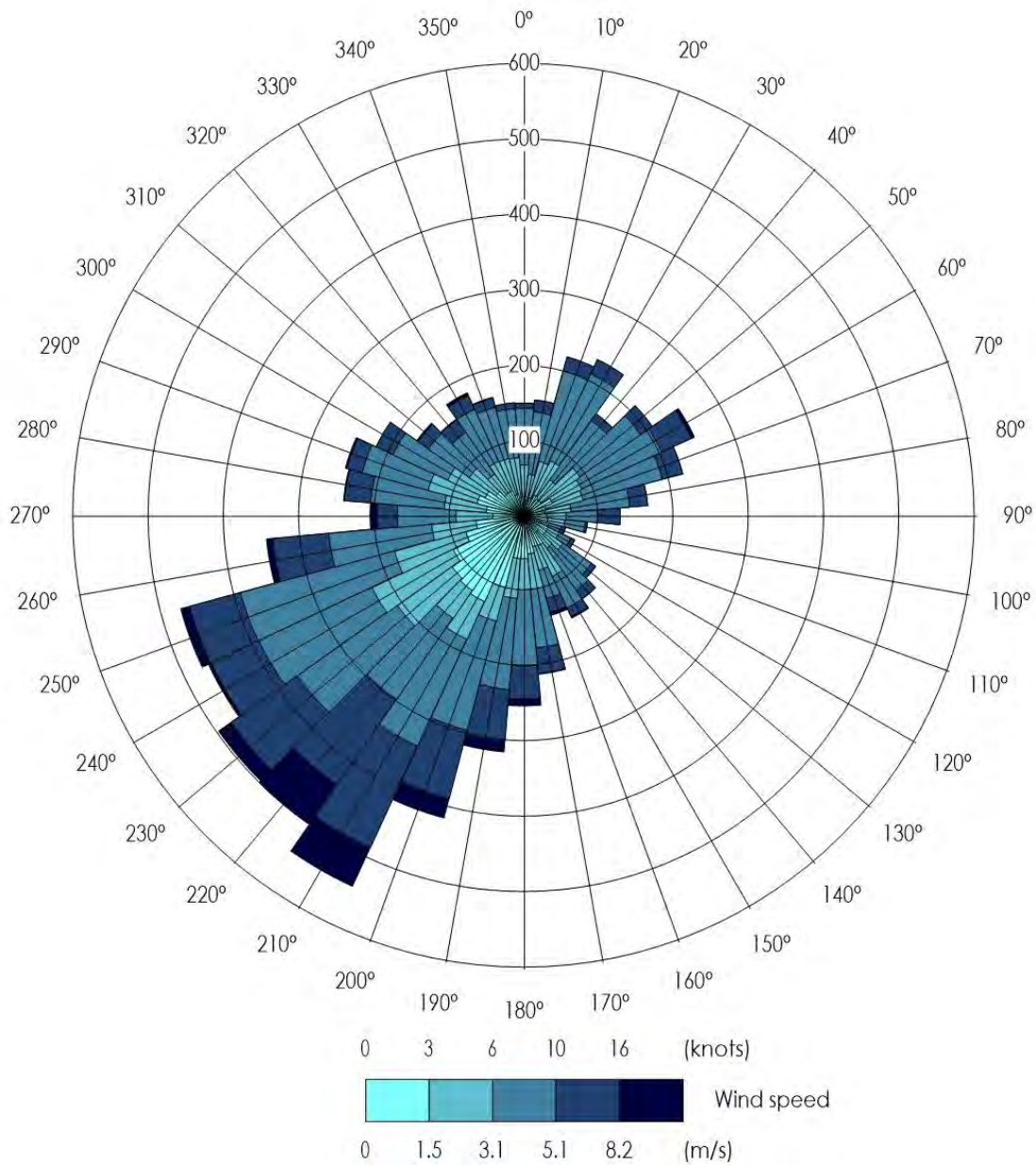
**Project Reference**  
5984

**Client**  
Environmental Planning Solutions Ltd

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**Legend**

**Title**

Figure 3 - Wind Rose of 2021  
Farnborough Airport Meteorological Data

**Project**

Air Quality Assessment  
Broadford Lane, Chobham

**Project Reference**

5984

**Client**

Environmental Planning Solutions Ltd



---

**Appendix 1 - Curricula Vitae**

### KEY EXPERIENCE:

Jethro is a Chartered Environmentalist and Director of Redmore Environmental with specialist experience in the air quality and odour sectors. His key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Production and co-ordination of Environmental Permit applications for a variety of industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-5, AERMOD-PRIME and BREEZE-ROADS. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Provision of expert witness services at Planning Inquiries.
- Design and project management of pollutant monitoring campaigns.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies, as well as involvement in production of industry guidance.

### SELECT PROJECTS SUMMARY:

#### Industrial

Shanks Waste Management - Odour Assessments of two waste management facilities to support Environmental Permit Applications.

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

Doha South Sewage Treatment Works - AQA for works extension in Qatar.

IRIS Environmental Appraisal Report Reviews, Isle of Man Government - odour assessment reviews.

Lankem, Greater Manchester - Environmental Permit Application for chemical manufacturing plant.

Newport Docks Bulk Drying, Pelleting and CHP Facility - air quality EIA for gas CHP.

Springshades, Leicester - Environmental Permit Variation Application for textile manufacturing plant.

Valspar, Chester - Odour Assessment and production of Odour Management Plan for a paint manufacturing plant in response to neighbour complaints.

Agrivert - dispersion modelling of odour and CHP emissions from numerous AD plants.

James Cropper Paper Mill, Cumbria - air quality EIA, Environmental Permit Variation and Human Health Risk Assessment for new biomass boiler adjacent to SSSI.

Rigg Approach, Leyton - Air Quality Assessment in support of waste transfer site.

Lynchford Lane Waste Transfer Station - biomass facility energy recovery plant.

Barnes Wallis Heat and Power, Cobham - biomass facility adjacent to AQMA.

#### Residential

Wood St Mill, Bury - residential development adjacent to scrap metal yard.

Hyams Lane, Holbrook - Odour Assessment to support residential development adjacent to sewage works.

North Wharf Gardens, London - peer review of EIA undertaken for large residential development.

Loxford Road, Alford - Air Quality EIA for residential development, included consideration of impacts from associated package sewage works

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

Castleford Growth Delivery Plan - baseline air quality constraints assessment for town redevelopment.

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

#### Commercial and Retail

Etihad Stadium - Air Quality EIA for the extension to the capacity of the Etihad Stadium, Manchester.

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

National Youth Theatre, Islington - redevelopment to provide new arts space and accommodation.

## KEY EXPERIENCE:

Amelia is a Principal Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads and ADMS-5. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments (EIAs) and scoping reports for developments throughout the UK.
- Advanced canyon modelling to evaluate the impact of altered urban topography on air quality in built up areas.
- Air quality monitoring at industrial sites to quantify pollutant concentrations.
- Assessment of fugitive dust impacts from a range of mineral extraction developments.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.

## SELECT PROJECTS SUMMARY:

### **Bradley Road, Huddersfield**

Air Quality EIA in support of a hybrid planning application for a residential development on land off Bradley Road, Huddersfield. This included a detailed application for circa 300 units and an outline application for the remainder of the site allocation of +1,000 dwellings. Dispersion modelling was undertaken due to the proximity of nearby Air Quality Management Areas (AQMAs). Using sensitive receptors located in areas where increased road traffic may affect pollutant levels, a comparison was made between concentrations with and without the development in place. Site suitability for residential use due to potential constraints associated with vehicle emissions from the M62 and odour emissions from an adjacent landfill site and poultry farm, was also considered.

### **Kingston Road, New Malden**

Air Quality Neutral Assessment for a mixed-use development in Kingston upon Thames to determine compliance with the London Plan requirements. This indicated an acceptable level of emissions from the scheme and the development was considered to be air quality neutral.

### **The Burrell Collection Museum, Glasgow**

Air Quality Assessment in support of an energy centre at an existing museum. The scheme included provision of three gas fired boilers. Concerns were raised the proximity of the flues to the building intake and surrounding Pollok Country Park. Impacts associated with emissions from the proposed gas boilers were assessed through detailed dispersion modelling using ADMS-5. This indicated impacts on annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations were predicted to be not significant.

### **Magnitude, Middlewich**

Air Quality EIA and a number of Air Quality Assessments in support of Phases 1b, 3, 4a, 4b and Plot 1c of the Magnitude sites in Middlewich. Detailed dispersion modelling was undertaken with the inclusion of advanced canyon modelling to evaluate the impact of the urban topography within the locality on the dispersion of traffic related pollutants, particularly within AQMAs nearby. The Results indicated the in-combination impacts were not significant.

### **Rookery Avenue, Whiteley**

Odour Impact Assessment in support of a hot food takeaway with a drive thru facility in Whiteley. The assessment considered the scale and nature of potential emissions, the location of nearest receptors and the proposed cooking type in accordance with the relevant DEFRA guidance. An appropriate ventilation system was identified and described on the basis of the assessment results. The scheme was granted planning permission.

### **Old Knotty Way, Uthoxteter**

Air Quality Assessment in support of an Aldi food store and associated facilities. Concerns had been raised in relation to the impacts during the operational phase of the proposals. Changes in pollution levels were therefore considered at sensitive receptors as a result of variations to road geometry and associated redistribution of vehicle movements across the local area. Results of the dispersion modelling study indicated air quality impacts as a result of the scheme were not significant and the scheme was granted planning permission.



## 7. Odour Assessment, Broadford Lane – January 2024 from Redmore Environmental

**Odour Assessment**  
**Broadford Lane, Chobham**

**Client: Surrey Heath Borough Council**

**Reference: 5984-1r2**

**Date: 9<sup>th</sup> January 2024**



## Report Issue

Report Title: Odour Assessment - Broadford Lane, Chobham

Report Reference: 5984-1

Field	Report Version			
	1	2	3	4
Prepared by	Olivia Davidson	Olivia Davidson		
Position	Graduate Air Quality Consultant	Air Quality Consultant		
Reviewed by	Jethro Redmore	Jethro Redmore		
Position	Director	Director		
Date of Issue	14 <sup>th</sup> September 2023	9 <sup>th</sup> January 2024		
Comments	Draft for comment	-		

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This report has been prepared for Redmore Environmental Ltd in accordance with the agreed terms and conditions of appointment. Redmore Environmental Ltd cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

## **Executive Summary**

Redmore Environmental Ltd was commissioned by eps consulting on behalf of Surrey Heath Borough Council ('the Client') to undertake an Odour Assessment for a parcel of land south of Broadford Lane, Chobham.

The Client is in the process of determining whether the site is suitable for allocation within the emerging Local Plan for up to 16 new pitches for Gypsy, Traveller and Travelling Showpeople.

The site is located adjacent to Wastewater Treatment Works operated by Thames Water. Odour emissions from the facility have the potential to cause loss of amenity for future residents of the development. An Odour Assessment was therefore undertaken to quantify effects across the site and consider feasibility for the proposed end-use.

Emissions from the relevant sources were defined based on the nature and size of the facility, as well as library data provided by UK Water Industry Research. Impacts at sensitive receptors were quantified using dispersion modelling, the results compared with the relevant odour benchmark level and the significance assessed in accordance with the appropriate guidance.

Predicted odour concentrations were above the relevant benchmark across the site for all modelling years. Resultant impacts were also classified as significant in accordance with the relevant guidance criteria.

Recommendations to further investigate conditions at the site were provided. These may be considered in order to advance the understanding of potential odour impacts on future occupants of the proposed pitches.

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## **1.0 INTRODUCTION**

### **1.1 Background**

1.1.1 Redmore Environmental Ltd was commissioned by eps consulting on behalf of Surrey Heath Borough Council ('the Client') to undertake an Odour Assessment for a parcel of land south of Broadford Lane, Chobham, which is being considered for allocation for Gypsy and Traveller use within the emerging Surrey Heath Local Plan.

1.1.2 The site is located adjacent to Chobham Wastewater Treatment Works (WwTWs), which is operated by Thames Water (TW). Odour emissions from the facility have the potential to cause loss of amenity for future residents of the development. An Odour Assessment was therefore undertaken to quantify effects across the site and consider feasibility for the proposed end-use.

### **1.2 Site Location and Context**

1.2.1 The site is located off Broadford Lane, Chobham, at approximate National Grid Reference (NGR): 497474, 161095. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The Client is in the process of determining whether the site is suitable for allocation for Gypsy and Traveller use within the emerging Local Plan. The site was included within the Surrey Heath Local Plan: Preferred Options (2019 – 2038) – Further Gypsy and Traveller and Travelling Showpeople Allocations Regulation 18 consultation, which was undertaken between August – September 2022. Whilst the consultation identifies the site as having potential capacity for up to 16 pitches, provisional indicative development plans prepared following the consultation show two possible options for the development ranging between 10 and 13 pitches.

1.2.3 The site is located adjacent to Chobham WwTWs. There is potential for odours from the WwTWs to cause loss of amenity for future residents. As such, an Odour Assessment has been undertaken to evaluate baseline conditions and consider the suitability of the site for the proposed end-use. The findings are detailed in the following report.



---

## 2.0 ODOUR BACKGROUND

### 2.1 Odour Definition

2.1.1 The Institute of Air Quality Management (IAQM) guidance<sup>1</sup> defines odour as:

"[...] the human olfactory response (perception followed by psychological appraisal) to one, or more often a complex mixture of, chemical species in the air."

2.1.2 The stated definition is considered to be relevant in the context of this assessment.

### 2.2 Odour Impacts

2.2.1 The magnitude of odour impact depends on a number of factors and the potential for complaints varies due to the subjective nature of odour perception. The **FIDOL** acronym (also stated as **FIDOR** in Environment Agency (EA) guidance<sup>2</sup>) is a useful reminder of the factors that will determine the degree of odour pollution. These are described by the IAQM<sup>3</sup> as follows:

- **F**requency - how often an individual is exposed to odour;
- **I**ntensity - the individual's perception of the strength of the odour;
- **D**uration - The overall duration that individuals are exposed to an odour over time;
- **O** odour unpleasantness - Odour unpleasantness describes the character of an odour as it relates to the 'hedonic tone' (which may be pleasant, neutral or unpleasant) at a given odour concentration/ intensity. This can be measured in the laboratory as the hedonic tone, and when measured by the standard method and expressed on a standard nine-point scale it is termed the hedonic score; and,
- **L**ocation - The type of land use and nature of human activities in the vicinity of an odour source. Tolerance and expectation of the receptor. The 'Location' factor can be considered to encompass the receptor characteristics, receptor sensitivity, and socio-economic factors.

---

<sup>1</sup> Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

<sup>2</sup> H4: Odour Management, EA, 2011.

<sup>3</sup> Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

2.2.2 It is important to note that even infrequent emissions may cause loss of amenity if odours are perceived to be particularly intense or offensive.

2.2.3 The **FIDOL** factors can be further considered to provide the following issues in regards to the potential for an odour emission to cause an impact:

- The rate of emission of the compound(s);
- The duration and frequency of emissions;
- The time of the day that this emission occurs;
- The prevailing meteorology;
- The sensitivity of receptors to the emission i.e. whether the odorous compound is more likely to cause an impact, such as the sick or elderly, who may be more sensitive;
- The odour detection capacity of individuals to the various compound(s); and,
- The individual perception of the odour (i.e. whether the odour is regarded as unpleasant). This is greatly subjective, and may vary significantly from individual to individual. For example, some individuals may consider some odours as pleasant, such as petrol, paint and creosote.

### **2.3 Odour Legislative Control**

2.3.1 The main requirement with respect to odour control from premises not authorised under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as WwTWs, is that provided in Section 79 of Part III of the Environmental Protection Act (1990) The Act defines nuisance as:

"Any dust, steam, smell or other effluvia arising on industrial, trade or business premise and being prejudicial to health or a nuisance."

2.3.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the Local Authority is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operations are being controlled according to best practicable means (BPM). The term BPM is defined as:

- "Practicable" means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications;
- The "means" to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and structures;
- The test is to apply only so far as compatible with any duty imposed by law; and,
- The test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances.

2.3.3 It should be noted that where an operator can demonstrate that BPM is being applied, or where an agreed degree of abatement deemed to be BPM is added, this will not necessarily result in the total elimination of odours.

## **2.4 Odour Benchmark Levels**

2.4.1 There is no statutory limit in the UK for ambient odour concentrations, whether set for individual chemical species or for mixtures. However, a number of indicative criteria have been utilised for the assessment of potential impacts. These are discussed in the following Sections.

### **Environment Agency Criteria**

2.4.2 The EA has issued guidance on odour<sup>4</sup> which contains indicative benchmark levels for use in the assessment of potential impacts from facilities regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments.

2.4.3 Benchmark levels are stated as the 98<sup>th</sup> percentile (%ile) of hourly mean concentrations in European odour units (ouE) over a year for odours of different offensiveness. In practice this means that for 2% of the year, or 175-hours, concentrations will be higher than this value, whilst for 98% of the year, or 8,585-hours, they will be lower. This parameter reflects the previously described **FIDOL** factors, where an odour is likely to be noted on several occasions above a particular threshold concentration before an annoyance occurs. EA odour benchmark levels are summarised in Table 1.

---

<sup>4</sup> H4: Odour Management, EA, 2011.

**Table 1 Odour Benchmark Levels**

Relative Offensiveness of Odour	Benchmark Level as 98 <sup>th</sup> %ile of 1-hour Means (ou <sub>E</sub> /m <sup>3</sup> )
Most offensive odours: <ul style="list-style-type: none"> <li>• Processes involving decaying animal or fish</li> <li>• Processes involving septic effluent or sludge</li> <li>• Biological landfill odours</li> </ul>	1.5
Moderately offensive odours: <ul style="list-style-type: none"> <li>• Intensive livestock rearing</li> <li>• Fat frying (food processing)</li> <li>• Sugar beet processing</li> <li>• Well aerated green waste composting</li> </ul>	3.0
Less offensive odours: <ul style="list-style-type: none"> <li>• Brewery</li> <li>• Confectionery</li> <li>• Coffee roasting</li> <li>• Bakery</li> </ul>	6.0

### Wastewater Industry Research

2.4.4 In addition to the levels shown in Table 1, the wastewater industry has published an in-depth study through the United Kingdom Waste Industry Research (UKWIR) into the correlation between modelled odour impacts and human response (dose-effect). This was based on a review of the relationship between reported odour complaints and modelled odour impacts at nine WwTWs in the UK with ongoing odour complaints. The findings of this research (and subsequent UKWIR research) indicated the following:

- At modelled exposures of below 5ou<sub>E</sub>/m<sup>3</sup> as 98<sup>th</sup> %ile of 1-hour means, complaints are relatively rare, at only 3% of the total registered;
- At modelled exposures between 5ou<sub>E</sub>/m<sup>3</sup> and 10ou<sub>E</sub>/m<sup>3</sup> as a 98<sup>th</sup> %ile of 1-hour means, a significant proportion of total registered complaints occur, 38% of the total; and,
- The majority of complaints occur in areas of modelled exposure greater than 10ou<sub>E</sub>/m<sup>3</sup> as a 98<sup>th</sup> %ile of 1-hour means, 59% of the total.

## Chartered Institute of Water and Environmental Management

2.4.5 The Chartered Institute of Water and Environmental Management (CIWEM) has released a Position Statement on the Control of Odour which provides guidance on likely responses to odour concentrations. These are summarised in Table 2.

**Table 2 CIWEM Odour Guidance**

Odour Concentration as 98 <sup>th</sup> %ile of 1-hour Means ( $ou_E/m^3$ )	Response
Less than 3	Complaints are unlikely to occur and exposure below this level are unlikely to constitute significant pollution or significant detriment to amenity unless the locality is highly sensitive or the odour highly unpleasant in nature
5 - 10	Complaints may occur and depending on the sensitivity of the locality and nature of the odour this level may constitute a nuisance
Greater than 10	Complaints are highly likely and odour exposure at these levels represents an actionable nuisance

## Planning Case Law

2.4.6 A  $5\ ou_E/m^3$  impact criterion has accepted as being appropriate for avoidance of significant risk of annoyance and a low risk of nuisance in a number of planning applications involving WwTWs (e.g. Newbiggin, JS Bloor Ltd, Leighton Linsalde, etc).

## Department for Environment, Food and Rural Affairs

2.4.7 In order to provide some context to the odour benchmark values, the Department for Environment, Food and Rural Affairs (DEFRA) have provided the following descriptors<sup>5</sup>:

- $1\ ou_E/m^3$  is the point of detection;
- $5\ ou_E/m^3$  is a faint odour; and,
- $10\ ou_E/m^3$  is a distinct odour.

<sup>5</sup> Odour Guidance for Local Authorities, DEFRA, 2010.

2.4.8 An odour at a strength of  $1\text{ouE}/\text{m}^3$  is in reality so weak that it would not normally be detected outside the controlled environment of an odour laboratory by the majority of people (that is individuals with odour sensitivity in the "normal" range - approximately 96% of the population<sup>6</sup>). It is important to note that these values are based on laboratory measurements and in the general environment other factors affect our sense of odour perception. These include:

- The population is continuously exposed to a wide range of background odours at a range of different concentrations, and usually people are unaware of there being any background odours at all due to normal habituation. Individuals can also develop a tolerance to background and other specific odours. In an odour laboratory the determination of detection threshold is undertaken by comparison with non-odorous air, and in carefully controlled, odour-free, conditions. Normal background odours such as those from traffic, vegetation, grass mowing etc, can provide background odour concentrations from  $5$  to  $60\text{ouE}/\text{m}^3$  or more<sup>7</sup>;
- The recognition threshold may be about  $3\text{ouE}/\text{m}^3$ <sup>8</sup>, although it might be less for offensive substances or higher if the receptor is less familiar with the odour or distracted by other stimuli; and,
- An odour which fluctuates rapidly in concentration is often more noticeable than a steady odour at a low concentration.

## 2.5 **National Planning Policy**

2.5.1 The revised National Planning Policy Framework<sup>9</sup> (NPPF) was published in December 2023 and sets out the Government's planning policies for England and how these are expected to be applied.

2.5.1 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to odour:

---

<sup>6</sup> Odour Guidance for Local Authorities, DEFRA, 2010.

<sup>7</sup> Odour Guidance for Local Authorities, DEFRA, 2010.

<sup>8</sup> Odour Guidance for Local Authorities, DEFRA, 2010.

<sup>9</sup> NPPF, Ministry of Housing, Communities and Local Government, 2023.

"c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.5.2 Chapter 12 of the NPPF details objectives in relation to achieving well-designed place. It states that:

"Planning policies and decisions should ensure that developments:

[...]

f) create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesions and resilience."

2.5.3 The implications of the NPPF have been considered throughout this assessment.

## **2.6 Local Planning Policy**

2.6.1 The Surrey Heath Local Plan currently consists of the Core Strategy and Development Management Policies 2011 - 2028<sup>10</sup>, which was adopted by Surrey Heath Borough Council (SHBC) on 1<sup>st</sup> February 2012, and the Surrey Heath Local Plan 2000<sup>11</sup>, which was adopted on 8<sup>th</sup> December 2000. Review of these documents did not reveal any planning policies of relevance to this assessment.

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<sup>10</sup> Core Strategy and Development Management Policies 2011 - 2028, SHBC, 2012.

<sup>11</sup> Surrey Heath Local Plan 2000, SHBC, 2000.



## **2.7 Institute of Air Quality Management Guidance**

2.7.1 The IAQM published the 'Guidance on the Assessment of Odour for Planning'<sup>12</sup> on 20<sup>th</sup> May 2014. This was updated in 2018<sup>13</sup> and specifically deals with assessing odour impacts for planning purposes, namely potential effects on amenity. The assessment methodology outlined in the guidance has been utilised in throughout this report where relevant.

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<sup>12</sup> Guidance on the Assessment of Odour for Planning, IAQM, 2014.

<sup>13</sup> Guidance on the Assessment of Odour for Planning, IAQM, 2018.

### **3.0 METHODOLOGY**

#### **3.1 Introduction**

3.1.1 The WwTWs may result in odour emissions during normal operation. Associated impacts were assessed in accordance with the following stages:

- Identification of odour sources;
- Identification of odour emission rates;
- Dispersion modelling of odour emissions; and,
- Comparison of the modelling results with the relevant criteria.

3.1.2 The following Sections outline the methodology and inputs used for the assessment.

#### **3.2 Dispersion Model**

3.2.1 Dispersion modelling was undertaken using ADMS-6.0 (v6.0.0.1), which is developed by Cambridge Environmental Research Consultants (CERC) Ltd. ADMS-6 is a short-range dispersion modelling software package that simulates a wide range of buoyant and passive releases to atmosphere. It is a new generation model utilising boundary layer height and Monin-Obukhov length to describe the atmospheric boundary layer and a skewed Gaussian concentration distribution to calculate dispersion under convective conditions.

3.2.2 The model utilises hourly meteorological data to define conditions for plume rise, transport and diffusion. It estimates the concentration for each source and receptor combination for each hour of input meteorology and calculates user-selected long-term and short-term averages.

3.2.3 The model requires input data that details the following parameters:

- Source and emissions data;
- Assessment area;
- Terrain information;
- Building dimensions;
- Meteorological data;

- Roughness length ( $z_0$ ); and,
- Monin-Obukhov length.

3.2.4 These are detailed in the following Sections.

### 3.3 Odour Sources

3.3.1 Potential odour sources associated with operation of the WwTWs were identified based on aerial photography. These are summarised in Table 3.

**Table 3 Odour Sources**

Source		Source Description	Total Exposed Area (m <sup>2</sup> )
1	Grit Skip	1 rectangular skip	7.5
2	Inlet Works	Inlet chamber and channels	67.5
3	Primary Settlement Tank	2 circular tanks	176.7
4	Filter Bed	3 large circular beds	804.2
5	Final Settlement Tank	2 circular tanks	176.7
6	Activated Sludge Tank	1 rectangular tank	377.0
7	Filter Bed	3 small circular beds	415.5
8	Sludge Tank	1 circular tank	95.0

3.3.2 A summary of the model inputs used to represent the sources shown in Table 3 is provided in Table 4.

**Table 4 Source Input Data**

Source		Source Type	Modelled Area (m <sup>2</sup> )
1	Grit Skip	Area	7.6
2	Inlet Works	Area	70.4
3	Primary Settlement Tank	Area	172.2
4	Filter Bed	Area	783.7
5	Final Settlement Tank	Area	172.2
6	Activated Sludge Tank	Area	377.0
7	Filter Bed	Area	404.9
8	Sludge Tank	Area	92.6

3.3.3 Reference should be made to Figure 2 for a map of the source locations.

### 3.4 Odour Emission Rates

3.4.1 Emission rates for the sources were obtained from the UKWIR technical reference document 'Odour Control in Wastewater Treatment'<sup>14</sup> and odour monitoring results from a similar site. These are summarised in Table 5.

**Table 5 Odour Emission Rates**

Source		Odour Emission Rate (ou <sub>E</sub> /m <sup>2</sup> /s)	Reference
1	Grit Skip	50.0	UKWIR <sup>(1)</sup>
2	Inlet Works	50.0	UKWIR <sup>(1)</sup>
3	Primary Settlement Tank	1.9	UKWIR <sup>(1)</sup>
4	Filter Bed	0.5	Bedford STW <sup>(2)</sup>
5	Final Settlement Tank	0.7	UKWIR <sup>(1)</sup>
6	Activated Sludge Tank	4.0	UKWIR <sup>(1)</sup>
7	Filter Bed	0.5	Bedford STW <sup>(2)</sup>

<sup>14</sup> Odour Control in Wastewater - A Technical Reference Document, UKWIR, 2001.

Source		Odour Emission Rate (ou <sub>E</sub> /m <sup>2</sup> /s)	Reference
8	Sludge Tank	40	UKWIR <sup>(1)</sup>

NOTES: (1) Odour Control in Wastewater - A Technical Reference Document, UKWIR, 2001.

(2) Odour monitoring at Bedford STW, Silsoe Odours.

3.4.2 The emission rates shown in Table 5 were multiplied by the areas shown in Table 4 to determine the total release per source. These were then entered into ADMS-6, allowing for any differences between modelled and actual areas.

3.4.3 It should be noted that in order to provide a robust assessment of potential impacts, it was assumed that the grit skip is full at all times. This is considered to represent a worst-case assumption as there will be periods when the skip does not operate at full capacity and therefore the exposed surface of potentially odorous material will be lower.

### 3.5 Modelling Scenarios

3.5.1 The scenarios considered in the modelling assessment are summarised in Table 6.

**Table 6 Assessment Scenarios**

Parameter	Modelled As	
	Short Term	Long Term
Odour	98 <sup>th</sup> %ile 1-hour mean	-

### 3.6 Assessment Area

3.6.1 The assessment area was defined based on the site location, anticipated pollutant dispersion patterns and the positioning of sensitive receptors. Ambient concentrations were predicted over NGR: 497387, 160921 to 497727, 161261. One Cartesian grid with a resolution of 10m was used within the model to produce data suitable for contour plotting using the Surfer software package.

3.6.2 Reference should be made to Figure 2 for a graphical representation of the assessment grid extents.

3.6.3 Discrete receptor locations were included in the model based on informal plans for the west and east portions of the land. These are summarised in Table 7.

**Table 7 Discrete Receptor Locations**

Receptor		NGR (m)	
		X	Y
R1	Eastern Site - Potential Pitch	497581.3	161166.0
R2	Eastern Site - Potential Pitch	497559.5	161160.9
R3	Eastern Site - Potential Pitch	497540.6	161156.3
R4	Eastern Site - Potential Pitch	497522.5	161152.0
R5	Eastern Site - Potential Pitch	497501.3	161146.9
R6	Eastern Site - Potential Pitch	497482.6	161142.5
R7	Western Site - Potential Pitch	497497.1	161106.5
R8	Western Site - Potential Pitch	497468.3	161145.6
R9	Western Site - Potential Pitch	497465.5	161167.0
R10	Western Site - Potential Pitch	497462.9	161188.7
R11	Western Site - Potential Pitch	497474.8	161218.7

3.6.4 Reference should be made to Figure 3 for a map of the receptor locations.

### **3.7 Meteorological Data**

3.7.1 Meteorological data used in the assessment was taken from Farnborough meteorological station over the period 1<sup>st</sup> January 2017 to 31<sup>st</sup> December 2021 (inclusive). This observation station is located at NGR: 485687, 154048, which is approximately 13.8km south-west of the facility. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

3.7.2 All meteorological files used in the assessment were provided by Atmospheric Dispersion Modelling Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 4 for wind roses of utilised meteorological records.

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### **3.8 Roughness Length**

3.8.1 The  $z_0$  is a modelling parameter applied to allow consideration of surface height roughness elements. A  $z_0$  of 0.3m was used to describe the modelling extents. This value is considered appropriate for the morphology of the area and is suggested within ADMS-6 as being suitable for 'agricultural areas (max)'.

3.8.2 A  $z_0$  of 0.1m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area and is suggested within ADMS-6 as being suitable for 'root crops'.

### **3.9 Monin-Obukhov Length**

3.9.1 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 10m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the nature of both areas and is suggested within ADMS-6 as being suitable for 'small towns < 50,000'.

### **3.10 Terrain Data**

3.10.1 Ordnance Survey OS Terrain 50 data was included in the model for the site and surrounding area in order to take account of the specific flow field produced by variations in ground height throughout the assessment extents. This was pre-processed using the method suggested by CERC<sup>15</sup>.

### **3.11 Assessment Criteria**

3.11.1 Predicted ground level odour concentrations were compared with the odour benchmark level of 3.0ou<sub>E</sub>/m<sup>3</sup> as a 98<sup>th</sup> %ile 1-hour mean, based on previous planning case law and research undertaken by UKWIR.

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<sup>15</sup> Note 105: Setting up Terrain Data for Input to CERC Models, CERC, 2016.



### 3.12 Significance of Odour Impacts

3.12.1 The significance of impacts was assessed through the interaction of the predicted 98<sup>th</sup> %ile of 1-hour mean odour concentrations and receptor sensitivity, as outlined in the IAQM guidance<sup>16</sup>. The relevant assessment matrix is summarised in Table 8.

**Table 8 Odour Impact**

Odour Exposure Level as 98 <sup>th</sup> %ile of 1-hour Means (ouE/m <sup>3</sup> )	Receptor Sensitivity		
	Low	Medium	High
Greater than 10	Moderate	Moderate	Substantial
5 - 10	Slight	Moderate	Moderate
3 - 5	Negligible	Slight	Moderate
1.5 - 3	Negligible	Negligible	Slight
0.5 - 1.5	Negligible	Negligible	Negligible
Less than 0.5	Negligible	Negligible	Negligible

3.12.2 The IAQM guidance<sup>17</sup> states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

### 3.13 Modelling Uncertainty

3.13.1 Uncertainty in dispersion modelling predictions can be associated with a variety of factors, including:

- Model uncertainty - due to model limitations;
- Data uncertainty - due to errors in input data, including emission estimates, operational procedures, land use characteristics and meteorology; and,
- Variability - randomness of measurements used.

<sup>16</sup> Guidance on the Assessment of Odour for Planning, IAQM, 2018.

<sup>17</sup> Guidance on the Assessment of Odour for Planning, IAQM, 2018.

3.13.2 Potential uncertainties in the model results were minimised as far as practicable and worst-case inputs used in order to provide a robust assessment. This included the following:

- Choice of model - ADMS-6 is a commonly used atmospheric dispersion model and results have been verified through a number of studies to ensure predictions are as accurate as possible;
- Meteorological data - Modelling was undertaken using five annual meteorological data sets from a local observation station to take account of a range of conditions. The assessment was based on the worst-case year to ensure maximum concentrations were considered;
- Surface characteristics - The  $z_0$  and Monin-Obukhov length were determined for both the dispersion and meteorological sites based on the surrounding land uses and guidance provided by CERC;
- Emission rates - Emission rates were derived from UKWIR technical guidance and odour emissions monitored at similar facilities. As such, they are considered to be representative of potential releases during normal operation;
- Receptor locations - A Cartesian Grid was included in the model in order to provide suitable data for contour plotting. Receptor points were also included at sensitive locations to provide additional consideration of these areas; and,
- Variability - All model inputs are as accurate as possible and worst-case conditions were considered as necessary in order to ensure a robust assessment of potential pollutant concentrations.

3.13.3 Results were considered in the context of the relevant odour benchmark level and IAQM criteria. It is considered that the use of the stated measures to reduce uncertainty and the use of worst-case assumptions when necessary has resulted in model accuracy of an acceptable level.

## 4.0 ASSESSMENT

### 4.1 Predicted Odour Concentrations

4.1.1 Dispersion modelling of potential odour emissions was undertaken using the input data specified previously. Predicted odour concentrations at the discrete receptor locations are summarised in Table 9. It should be noted that the odour concentrations are presented as a 98<sup>th</sup> %ile of 1-hour mean values over the relevant assessment year. The maximum concentration across the five years of results is highlighted in **bold**.

**Table 9 Predicted Odour Concentrations**

Receptor		Predicted 98 <sup>th</sup> %ile 1-hour Mean Odour Concentration (ou <sub>E</sub> /m <sup>3</sup> )				
		2017	2018	2019	2020	2021
R1	Eastern Site - Potential Pitch	24.06	29.08	<b>29.20</b>	25.34	29.08
R2	Eastern Site - Potential Pitch	22.07	27.21	<b>28.97</b>	23.59	27.15
R3	Eastern Site - Potential Pitch	19.08	23.98	<b>28.69</b>	21.79	24.30
R4	Eastern Site - Potential Pitch	15.99	19.77	<b>25.98</b>	19.77	21.06
R5	Eastern Site - Potential Pitch	14.92	16.32	<b>18.80</b>	17.49	16.46
R6	Eastern Site - Potential Pitch	14.38	16.81	<b>18.75</b>	16.81	16.81
R7	Western Site - Potential Pitch	49.12	49.38	<b>51.83</b>	45.92	49.12
R8	Western Site - Potential Pitch	15.61	15.97	<b>16.28</b>	14.62	14.62
R9	Western Site - Potential Pitch	9.67	10.03	<b>10.17</b>	9.80	9.67
R10	Western Site - Potential Pitch	7.03	8.01	<b>8.07</b>	7.30	6.89
R11	Western Site - Potential Pitch	6.13	6.19	<b>6.68</b>	6.31	6.02

4.1.2 As indicated in Table 9, predicted odour concentrations were above the EA odour benchmark of 3.0ou<sub>E</sub>/m<sup>3</sup> at all receptor locations for all modelling years.

4.1.3 Reference should be made to Figure 5 to Figure 9 for graphical representations of predicted odour concentrations throughout the assessment extents. These indicate maximum levels in close proximity to the odour sources with levels reducing sharply over a short distance.

## 4.2 Impact Significance

4.2.1 The significance of predicted odour impacts at the sensitive receptors is summarised in Table 10.

**Table 10 Predicted Odour Impacts**

Receptor		Odour Exposure Level as 98 <sup>th</sup> %ile of 1-hour Means (ou <sub>E</sub> /m <sup>3</sup> )	Receptor Sensitivity	Significance of Impact
R1	Eastern Site - Potential Pitch	Greater than 10	High	Substantial
R2	Eastern Site - Potential Pitch	Greater than 10	High	Substantial
R3	Eastern Site - Potential Pitch	Greater than 10	High	Substantial
R4	Eastern Site - Potential Pitch	Greater than 10	High	Substantial
R5	Eastern Site - Potential Pitch	Greater than 10	High	Substantial
R6	Eastern Site - Potential Pitch	Greater than 10	High	Substantial
R7	Western Site - Potential Pitch	Greater than 10	High	Substantial
R8	Western Site - Potential Pitch	Greater than 10	High	Substantial
R9	Western Site - Potential Pitch	Greater than 10	High	Substantial
R10	Western Site - Potential Pitch	5 - 10	High	Moderate
R11	Western Site - Potential Pitch	5 - 10	High	Moderate

4.2.2 As indicated in Table 10, the significance of odour impacts as a result of emissions from the WwTWs was predicted to be **substantial** at nine receptors and **moderate** at two locations.

4.2.3 The IAQM guidance<sup>18</sup> states that only if the impact is **moderate** or **substantial**, the effect is considered **significant**. As such, impacts are considered **significant**, in accordance with the stated methodology.

4.2.4 Based on the dispersion modelling results, it is anticipated that significant odour impacts may occur across the site as a result of emissions from Chobham WwTWs.

<sup>18</sup> Guidance on the Assessment of Odour for Planning, IAQM, 2018.

### **4.3 Recommendations for Further Works**

4.3.1 The results of the dispersion modelling identified the potential for odour effects at the site as a result of emissions from Chobham WwTWs. Recommendations for potential further work to further refine this prediction are as follows:

- Monitoring of site specific odour emissions from the WwTWs to refine the model inputs;
- Consultation with TW to further refine the modelled source inputs;
- Completion of a series of Field Odour Surveys to develop a comprehensive understanding of actual conditions at the site under a range of meteorological conditions; and,
- Investigation of potential mitigation measures in collaboration with TW that could be implemented at the WwTWs to reduce odour emissions from the site.

4.3.2 Completion of the above would allow a greater understanding of odour conditions at the site to be developed and potentially support the proposed allocation.

4.3.3 It should be noted that any further works undertaken to refine this prediction have multiple risks associated with each recommendation. Further investigations through surveys and monitoring may provide a worse outcome and the methodology and results of any works may not be deemed acceptable by TW. Any additional works should be undertaken in collaboration with any consultants approved by TW in order to minimise potential for disagreement throughout the process.

## 5.0 CONCLUSION

- 5.1.1 Redmore Environmental Ltd was commissioned by eps consulting on behalf of Surrey Heath Borough Council ('the Client') to undertake an Odour Assessment for a parcel of land south of Broadford Lane, Chobham, which is being considered as a potential allocation for Gypsy and Traveller use within the emerging Surrey Heath Local Plan.
- 5.1.2 The site is located adjacent to a WwTW operated by TW. Odour emissions from the facility have the potential to cause loss of amenity for future residents of the development. An Odour Assessment was therefore undertaken to quantify effects across the site and consider its feasibility for the proposed end-use.
- 5.1.3 Potential odour releases were defined based on the size and nature of the WwTWs. These were represented within a dispersion model produced using ADMS-6. Impacts at potential sensitive receptor locations on site were quantified, the results compared with the relevant odour benchmark level and the significance assessed in accordance with the IAQM guidance.
- 5.1.4 Predicted odour concentrations were above the relevant odour benchmark level at all discrete receptor locations for all modelling years. The significance of predicted impacts was defined as **substantial** at nine receptors and **moderate** at two locations. The overall odour effects as a result of the facility are considered to be **significant**.
- 5.1.5 Recommendations for potential further work to further refine the assessment results were provided. Completion of these elements would allow a greater understanding of odour conditions at the site to be developed and potentially support the proposed allocation.

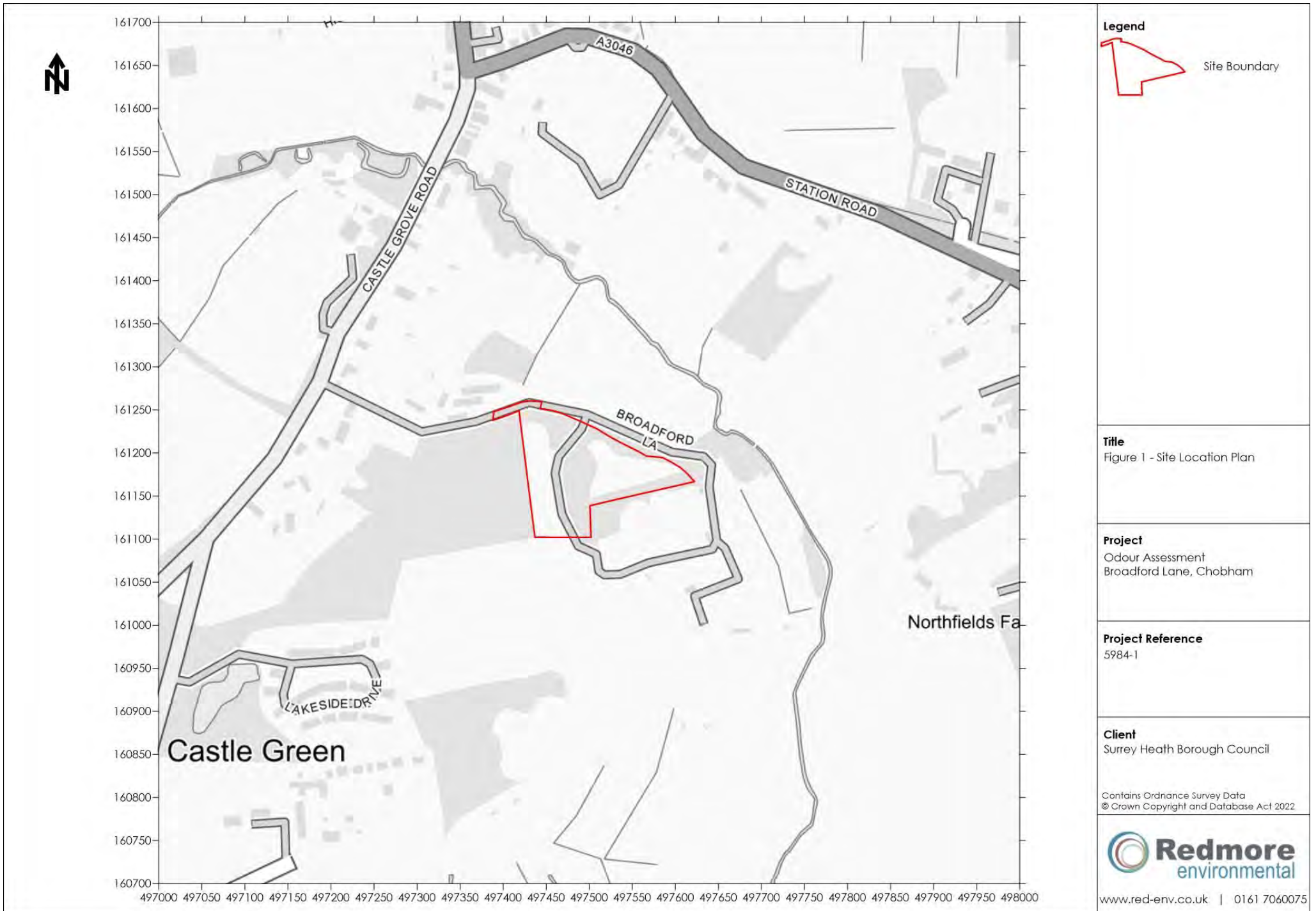
## 6.0 **ABBREVIATIONS**

CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
IAQM	Institute of Air Quality Management
NGR	National Grid Reference
NPPF	National Planning Policy
OUE	European Odour Units
SHBC	Surrey Heath Borough Council
UKWIR	United Kingdom Waste Industry Research
WwTW	Wastewater Treatment Work
$z_0$	Roughness Length
%ile	Percentile



**Figures**

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**Legend**

 Site Boundary

**Title**  
Figure 1 - Site Location Plan

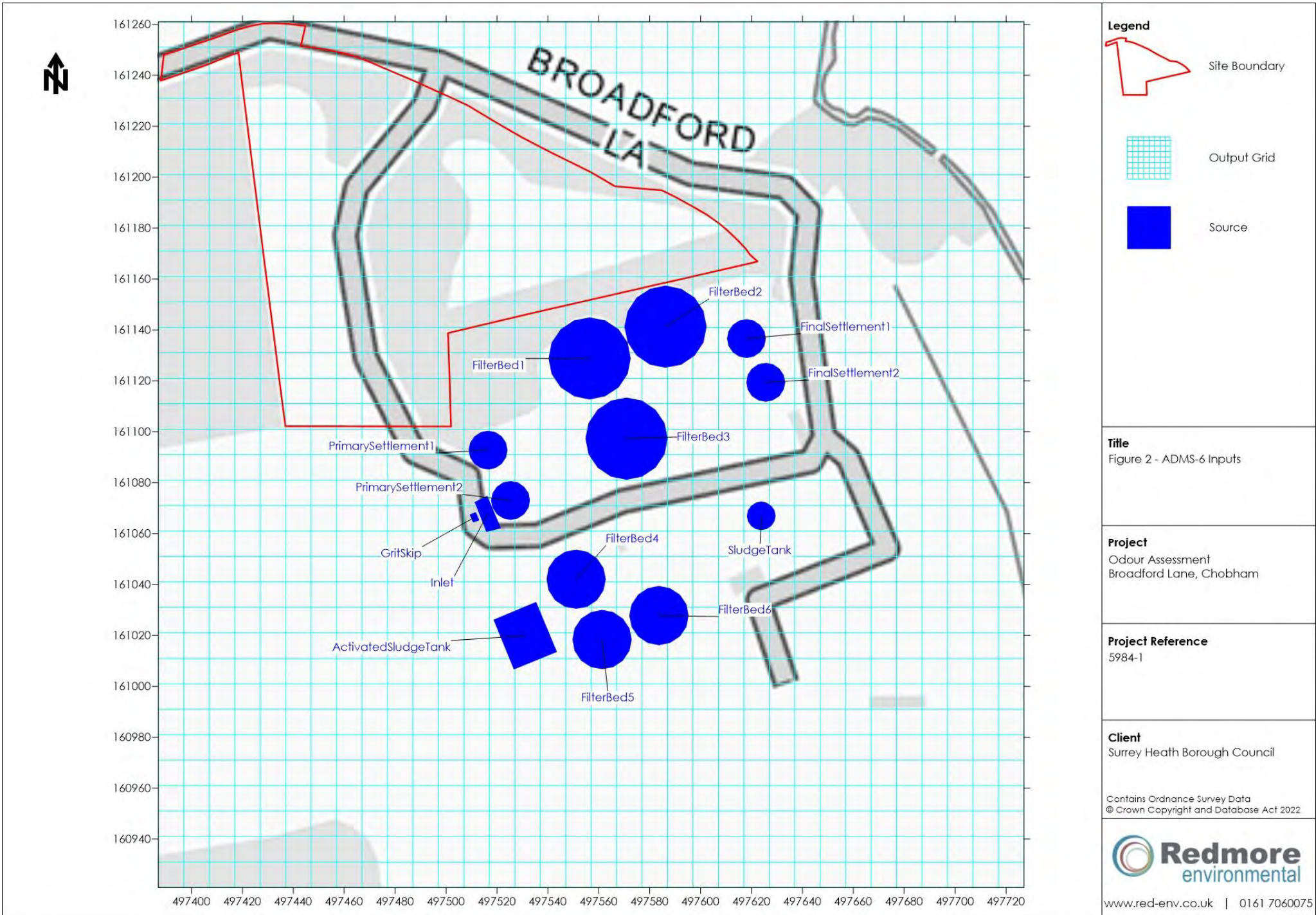
**Project**  
Odour Assessment  
Broadford Lane, Chobham

**Project Reference**  
5984-1




**Client**  
Surrey Heath Borough Council

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**Legend**

-  Site Boundary
-  Output Grid
-  Source

**Title**  
Figure 2 - ADMS-6 Inputs

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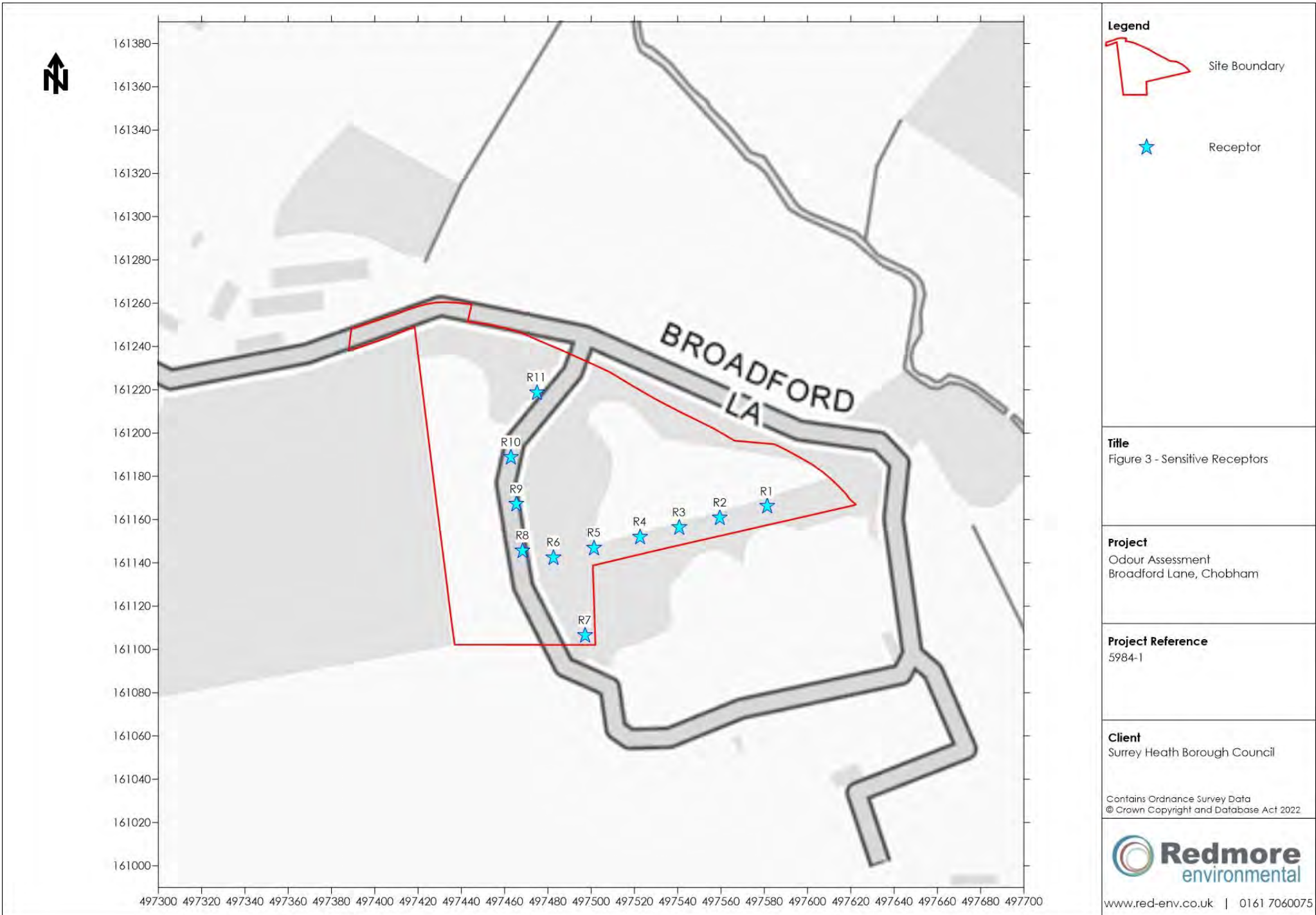
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**Legend**

-  Site Boundary
-  Receptor

**Title**  
Figure 3 - Sensitive Receptors

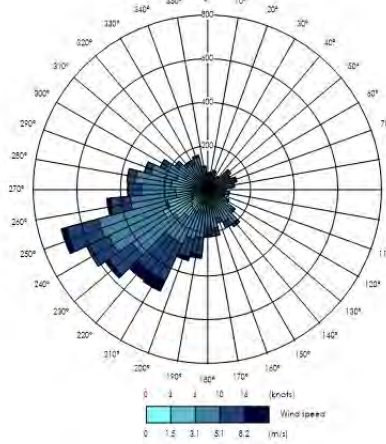
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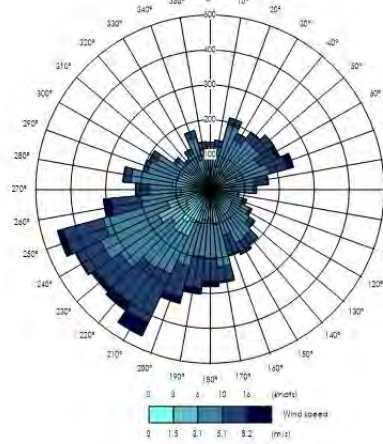
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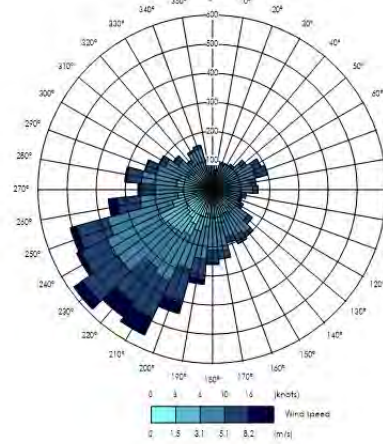




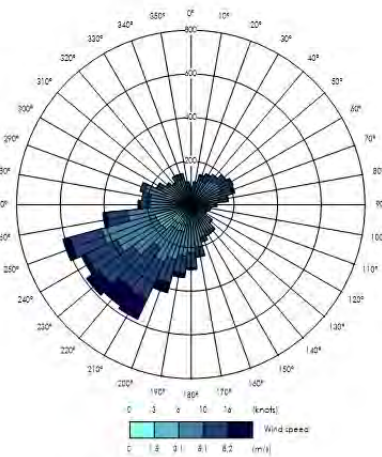
2017 Meteorological Data



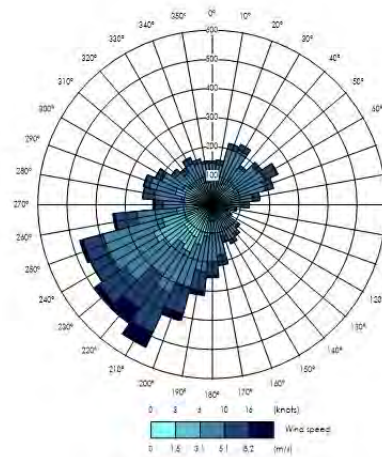
2018 Meteorological Data



2019 Meteorological Data



2020 Meteorological Data



2021 Meteorological Data

**Legend**

**Title**

Figure 4 - Wind Roses of 2017 to 2021 Farnborough Meteorological Station Data

**Project**

Odour Assessment  
Broadford Lane, Chobham

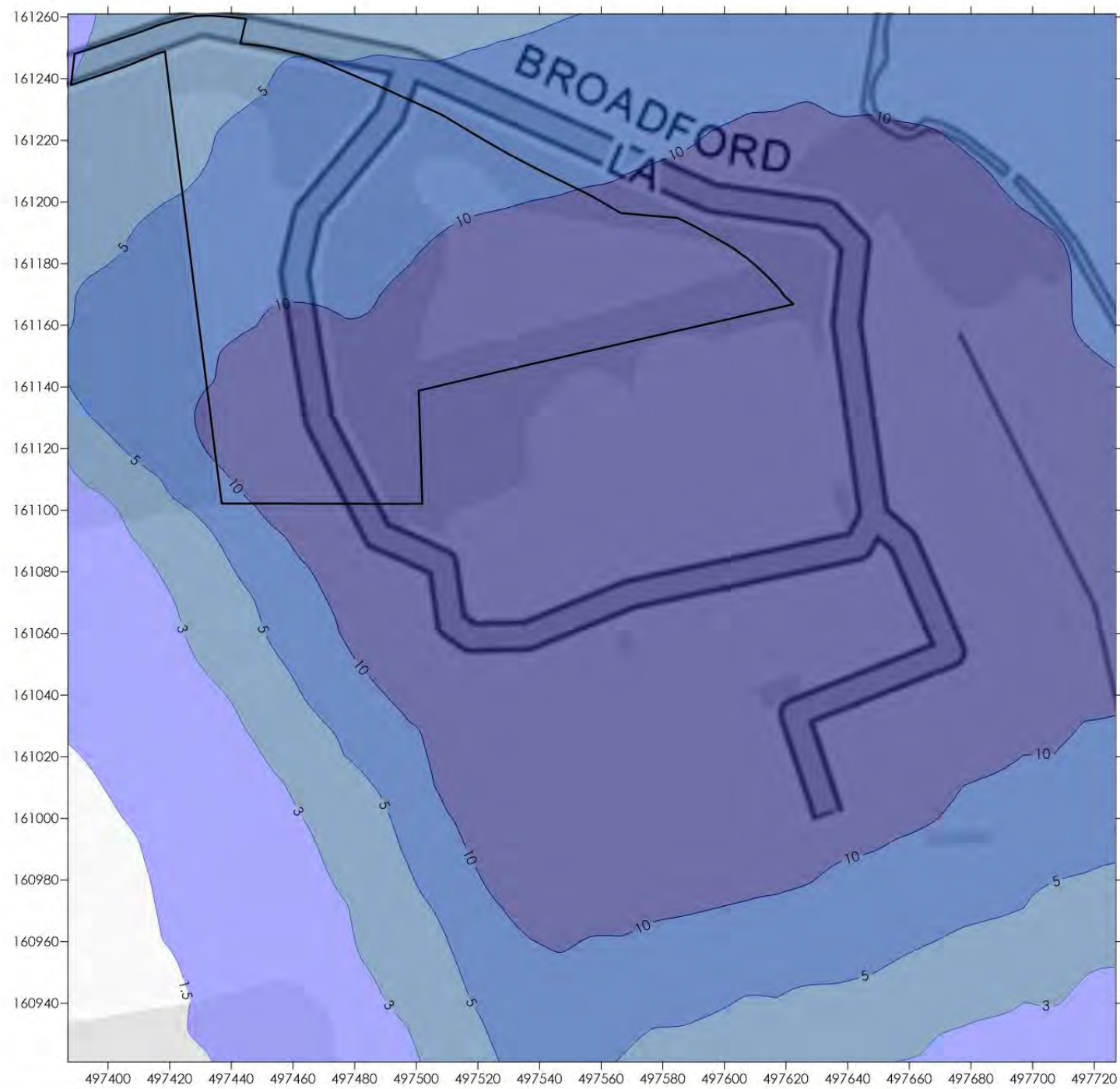
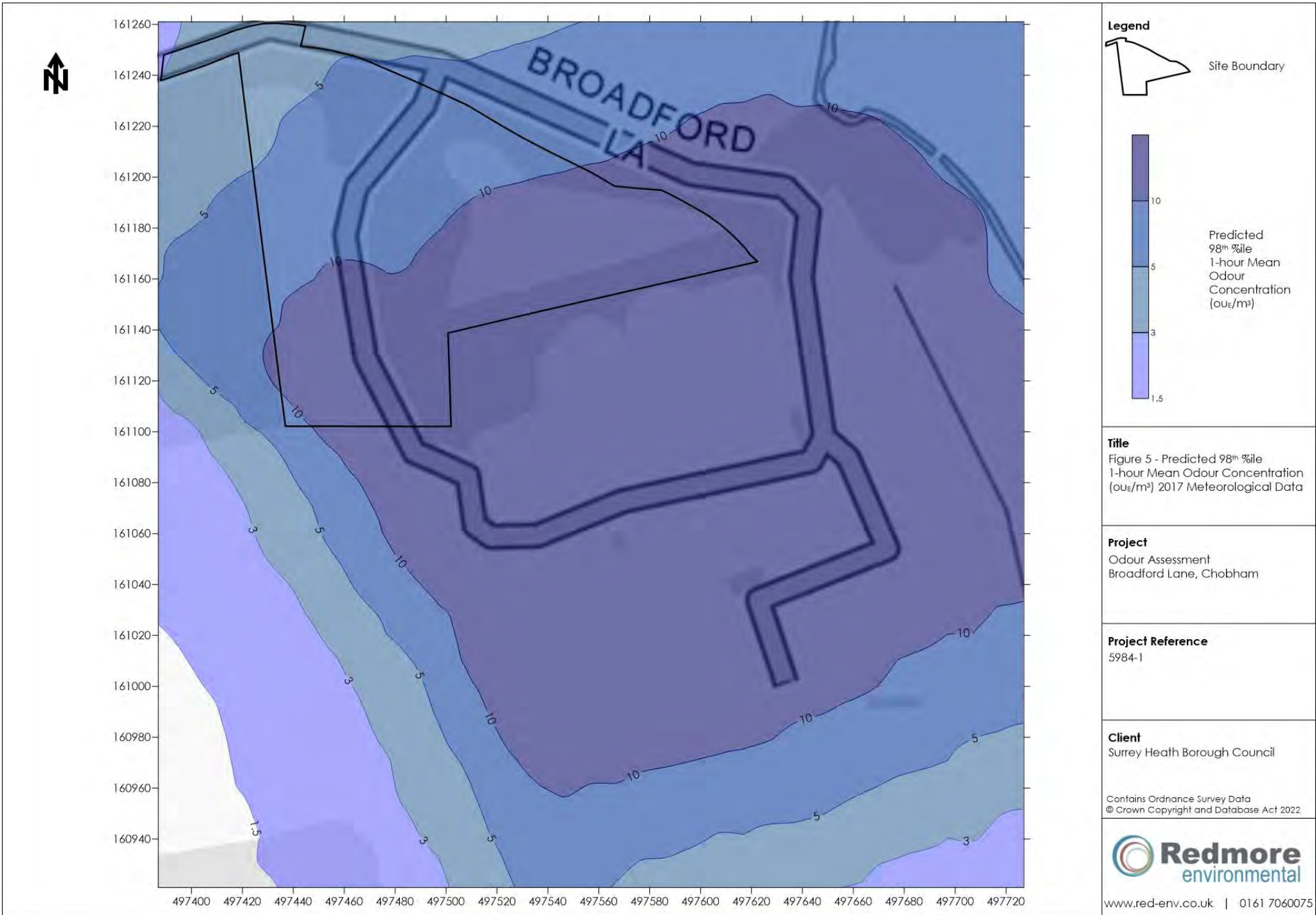
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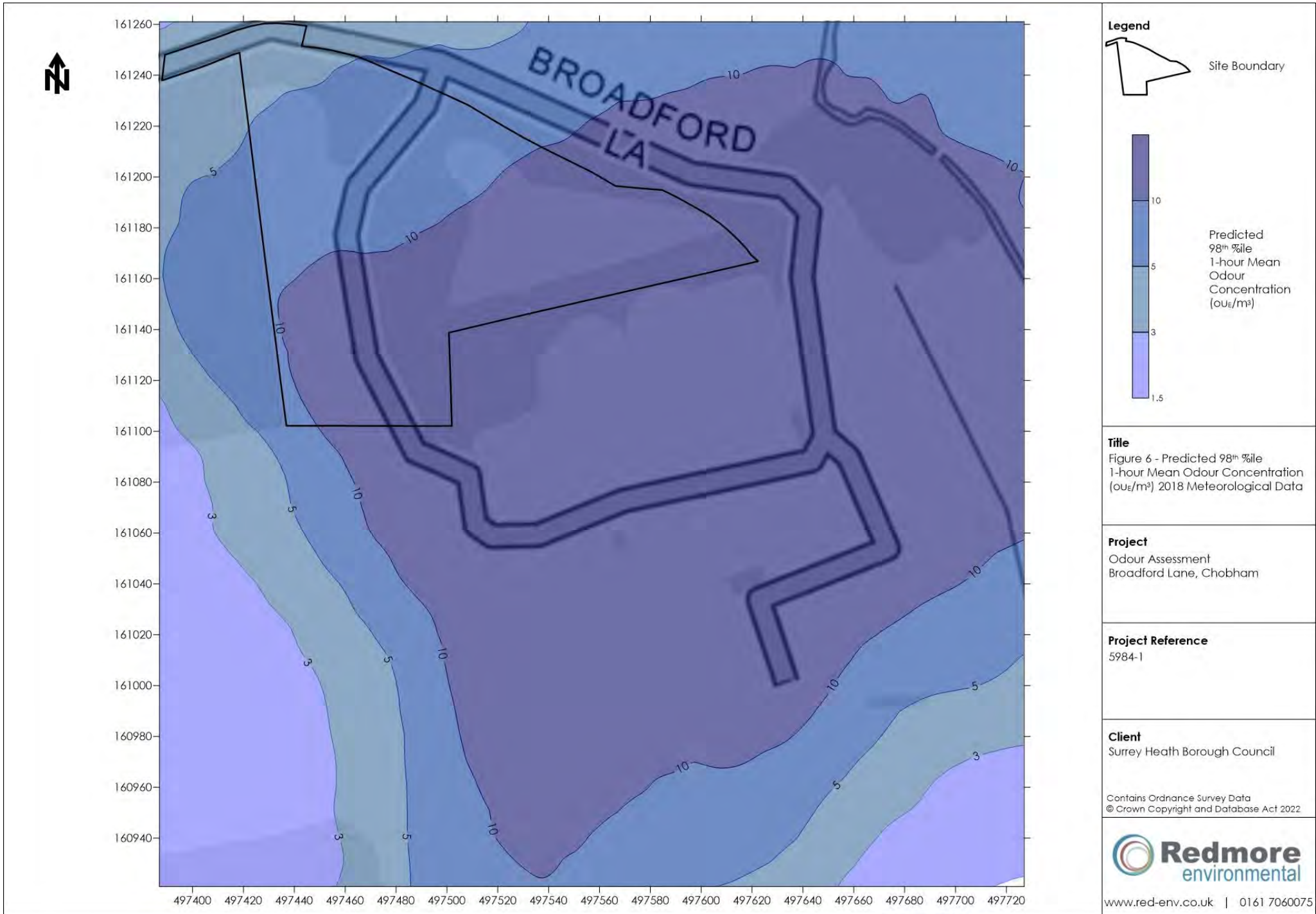
Surrey Heath Borough Council



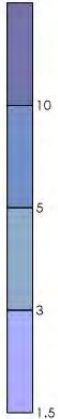
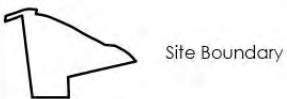


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**Legend**



Predicted  
98<sup>th</sup> %ile  
1-hour Mean  
Odour  
Concentration  
(ou<sub>e</sub>/m<sup>3</sup>)

**Title**

Figure 6 - Predicted 98<sup>th</sup> %ile  
1-hour Mean Odour Concentration  
(ou<sub>e</sub>/m<sup>3</sup>) 2018 Meteorological Data

**Project**

Odour Assessment  
Broadford Lane, Chobham

**Project Reference**

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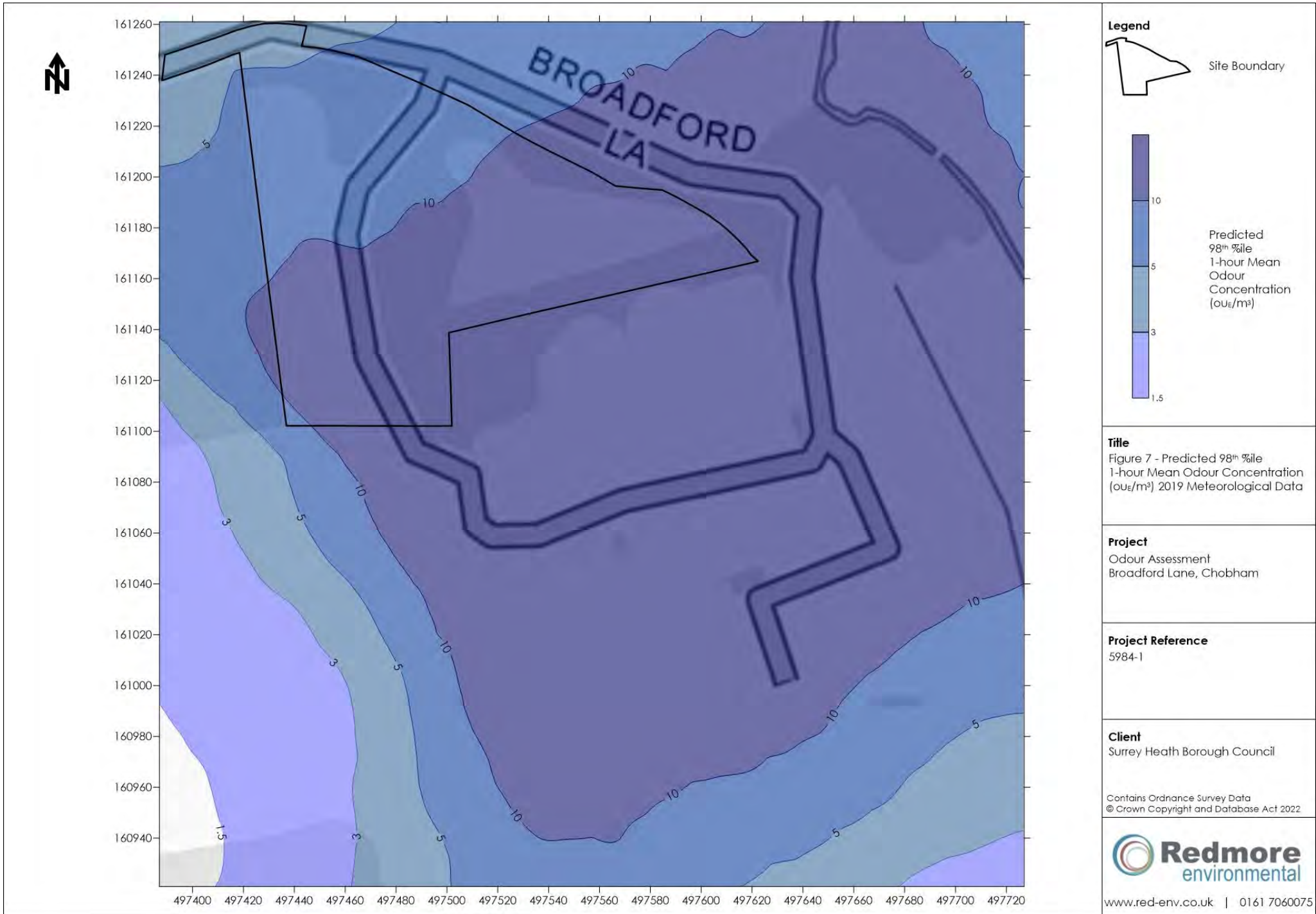
**Client**

Surrey Heath Borough Council

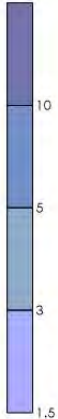
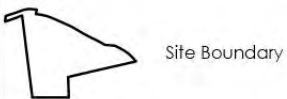
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**Legend**



Predicted  
98<sup>th</sup> %ile  
1-hour Mean  
Odour  
Concentration  
(ou<sub>e</sub>/m<sup>3</sup>)

**Title**

Figure 7 - Predicted 98<sup>th</sup> %ile  
1-hour Mean Odour Concentration  
(ou<sub>e</sub>/m<sup>3</sup>) 2019 Meteorological Data

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