

**Subject:**

FW: 1 of 3 - R18-069 - Gulliver's WBC Dev plan rep (June 2019) Our ref. GUL42/2  
(15-06-2019)

Dear all,

Please find attached a representation to the emerging local plan submitted on behalf of Gulliver's World, Warrington.

1.1 In summary, the representation both OBJECTS to and SUPPORTS relevant elements of the emerging policies DC1; DEV5; INF4 and requests a new bespoke Site Allocation "OS10". Specifically, this representation highlights a 6.39ha (5ha net) portion of the land south of the existing theme park, considering it suitable, available and deliverable for circa 5,500 sq.m of development within use classes C1, C2, A3, D1 and D2. The proposal would generate £5.5million net economic impact, with an additional £1.2million gross added value annually.

1.2 It further submits that the Council's previous finding that the site was "constrained" and was thus inappropriate for an allocation is flawed, both as demonstrated by recent approval of planning permissions and the technical document/plans/information accompanying this representation. Due to the file size, the document listed below will need to follow in three batches:

1.3 Attached you will find the following suite of documents (Batch 1):

**Batch 1 of 3**

DESCRIPTION	PLAN/DOCUMENT REF.
Representation Statement on behalf of developer	CPL, GUL40/2
Summary of proposed alterations to policy wording	CPL, GUL40/2
Transport supporting statement 13.06.19	DY190324
Who We Are (Gulliver's company profile)	Who We Are

**Batch 2 of 3**

DESCRIPTION	PLAN/DOCUMENT REF.
Plans package (inc. master plan and elevations)	Appendix A
Sequential test	Appendix B
Biodiversity Enhancement Scheme	Appendix C
Extended Phase 1 Habitat Survey of partial site	Appendix D
Himalayan Balsam Management plan	Appendix E
Woodland Management Plan V2	Appendix F
Work Programme Map ref 100103	Appendix G

**Batch 3 of 3**

DESCRIPTION	PLAN/DOCUMENT REF.
Land quality reports (Phase 1 and Phase 2)	Appendix H

We would like to engage with the Council to move forward this allocation and we would look forward to hearing from you by reply. Please contact me if there are any questions.

Kind regards

Dan

**Dan Matthewman** LL.B (Hons) MSc ACILEx MRTPI

**Director**

T. [REDACTED]

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## LOCAL PLAN REPRESENTATION STATEMENT

**OBJECTION/SUPPORT:** REPRESENTATION TO POLICIES DC1; DEV5;  
INF4 AND SITE ALLOCATIONS OF THE WARRINGTON BOROUGH  
COUNCIL EMERGING LOCAL PLAN (DRAFT SUBMISSION VERSION)

**LOCATION:** GULLIVER'S WORLD, WARRINGTON

**CALL FOR SITES REFERENCE NO.** R18/069

**ON BEHALF OF:** GULLIVER'S WORLD LTD

(OUR REF. GUL40/2)



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**RTPI**

Chartered Town Planner

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## **AUTHOR'S PROFESSIONAL SUMMARY**

This document is written by Dan Matthewman L.L.B (Hons), MSc, ACILEx, MRTPI.

I am the Managing Director of County Planning Ltd, a professional town planning and development consultancy regulated by the Royal Town Planning Institute. County Planning Ltd works across the whole development sector, with active development project portfolio in excess of £50million GDV of sites currently in either planning or construction stages.

I am dual qualified as a Chartered Town Planner and an Associate Member of the Chartered Institute of Legal Executives, holding an undergraduate honours degree in Law and a post-graduate honours MSc in Environmental Governance. I have more than a decade of planning experience which has included appearing as a witness at public inquiries, injunctions and other court proceedings in relation to planning matters.

My experience in industry includes holding senior positions in both the public and private sector including Knights PLC, DLA Piper UK LLP, Warrington Borough Council and the Environment Agency. My roles have been wide and varied, included holding Enforcement Team Leader, Principal and Senior Planning Officer positions in local planning authorities. My other roles have included a Senior Planning Advisor position within the Environment Agency where I advised five local authorities across the North West of England on the environmental implications of complex and large-scale planning applications.

Latterly before establishing County Planning Ltd, I established and managed the Cheshire planning department of Knights PLC, a multi-disciplinary consultancy with more than 140 real estate professionals working across the whole development sector.

I have visited the site numerous of times during the last five years. I also live approximately 10 miles away from the site and have visited various areas around the locality regularly since 2011. When describing the site and character of the area, I draw on both my personal and professional awareness of the site and the local area.

Date 15 June 2019

Our ref GUL40/2

LPA ref R/18/069

Contact us [REDACTED]

## REPRESENTATION TO EMERGING WARRINGTON LOCAL PLAN (2019)

RE: ALLOCATION OF 6.39HA OF LAND FOR UP TO 5,500 SQ.M (GIA) OF TOURISM AND LEISURE DEVELOPMENT WITHIN USE CLASSES C1, C2, A3, D1 AND D2, TOGETHER WITH ASSOCIATED RECREATIONAL AREAS, FOOTWAYS AND PLAY EQUIPMENT.

LOCATION: LAND SOUTH OF GULLIVER'S WORLD THEME PARK, WARRINGTON, WA5 9YZ.

POLICIES AFFECTED: REPRESENTATION TO POLICIES DC1 (WARRINGTON'S PLACES); DEV5 (RETAIL AND LEISURE); INF4 (COMMUNITY FACILITIES) AND SITE ALLOCATIONS.

### 1. INTRODUCTION

- 1.1 This document is a representation statement relating to the Warrington Borough Council (WBC/the Council) emerging Draft Local Plan (Submission Version). It is submitted on behalf of our client, Gulliver's World Ltd who are the freehold owner and occupier of the land. The representation both OBJECTS to and SUPPORTS various relevant elements of the emerging policies DC1; DEV5; INF4 and requests a new bespoke Site Allocation "OS10".
- 1.2 The overriding premise of this representation is that the Council should take further steps to promote the benefits of the visitor economy; and in particular that the land at Gulliver's World presents a clearly deliverable opportunity to create jobs and stimulate the local economy. It seeks a bespoke allocation for the land in the emerging plan.
- 1.3 Specifically, this representation highlights a 6.39ha (5ha net) portion of the land south of the existing theme park, considering it suitable, available and deliverable for circa 5,500 sq.m of development within use classes C1, C2, A3, D1 and D2. The proposal would generate £5.5million net economic impact, with an additional £1.2million gross added value annually.
- 1.4 It further submits that the Council's previous finding that the site was "constrained" is flawed, both as demonstrated by recent approval of planning permissions and the technical document/plans/information accompanying this representation.
- 1.5 It concludes that for the plan to be considered sound, amendments to the proposed policy wording and a bespoke allocation in the emerging local plan for the proposals are needed.

## 2. PREVIOUS ASSESSMENT (PREFERRED OPTIONS CONSULTATION RESPONSE)

- 2.1 In light of the clear rationale for promoting and encouraging leisure development and an identified under-supply of available employment land (necessitating release of green belt land); a net developable area of 10ha was promoted in the Strategic Land Availability Assessment (Preferred Options) Call for Sites in Oct 2017 (SHLAA ref. 3142/R18 069).
- 2.2 The site promotion was for employment (B1), retail (A1) and mixed-use leisure and hotel resort (C1/D1/D2 use class) development. The previously submitted representation confirmed that portions of the land are immediately available, some of which has an extant planning permission and that some master planning work had already been undertaken, which included commissioning several background technical reports.
- 2.3 The Council's analysis to the call for sites response was encapsulated within the WBC EDNA Final Report/February 2019 by BE Group and Mickledore (page 22).

Extract from BE Group/Mickledore report:

<p>Employment Leisure Other (Hotel, Non Residential, Assembly and Leisure)</p>	<p>Comprises existing theme park, hotel, museum Site developer owned Existing consents to expand leisure facilities by 1 ha Gullivers World seeking allocation for a future development option comprising:</p> <ul style="list-style-type: none"> <li>• B1 (a) Offices</li> <li>• B1 (b) Research and development</li> <li>• C1 Hotel/overnight tourist-visitor accommodation</li> <li>• D1 Day nursery; crèche and museum (existing)</li> <li>• D2 Assembly and Leisure, inc. amusement park</li> </ul>	<p>Minor contamination TPOs on site, already managed, would be unaffected by scheme</p>	<p>Westbrook is not identified by stakeholders or via past transactions as a desirable location for offices, with large scale demand focused at Birchwood and in the Town Centre. Existing office sites in the area, including Gemini 8 and 16, are being taken up for other uses or lost to housing.</p>	<p>Proposals are for the future redevelopment/ growth of Gullivers World for primarily leisure uses. Any B-Class employment within that redevelopment/ growth is likely to be modest and its appropriateness should be dealt with through a specific planning application rather than a broader Plan Allocation.</p>
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- 2.4 The Council's analysis indicated that the site was "constrained" and therefore could not be allocated. However, unfortunately it appears that the analysis was badly flawed as follows:
- o There are no Tree Preservation Orders within the site. It was clear from the representation that these are on third party land and in places, are situated more than 400m away from the proposed development areas;
  - o There is no "minor contamination". The extent of the former USAF Burtonwood air base is well-defined and understood. It is not a constraint to development in any case.
- 2.5 In conclusion, the adopted analysis was both incorrect and misleading of the site's prospects. It must be reappraised for the emerging plan to be sound and legally compliant.

### 3. SUPPORT FOR EMERGING POLICIES

3.1 The emerging policies are generally supportive toward the provision of new and expansion of existing tourism facilities the town. In particular, it is positive that alongside other local attractions, Gulliver's World rightfully receives recognition as a regional attraction with net economic and employment benefits. In particular, support is given in the pre-ambles to the policies at paras 2.1.30; 2.2.3 to 2.2.4 and 8.1.15 as shown in the excerpts below:

**2.1.30** In terms of the visitor economy, the Borough benefits from a number of key attractions and assets which are visited by residents within the Borough and from elsewhere, such as Gullivers World, the Halliwell Jones Stadium and Walton Hall Estate. Heritage and natural environment assets, and particularly the Borough's strategic green links, also contribute to tourism in the Borough and the local economy.

**2.2.3** However, there are a significant number of opportunities which Warrington has benefited from and will continue to do so, with new opportunities also emerging. Many of these are linked to the Borough's strategic location in the North West region between the regional centres of Liverpool and Manchester but also the important wider links on both the motorway network and West Coast Mainline. Warrington is set to improve its links nationally with the introduction of HS2 and Northern Powerhouse Rail, which will see further benefits for the town on both a national and regional level.

**2.2.4** Future opportunities for Warrington can be summarised as:

- Distinct character areas;
- Its connected network of green spaces and parks;
- Its waterways and waterfronts and the unique opportunities they bring;
- Tourist/cultural attractions – Gullivers World, Walton Hall and Gardens, live music events;
- An improving cultural offer in the Town Centre, building on the recommendations of the Warrington Culture Commission;
- An increased interest in Town Centre living – from both developers and occupiers – particularly for younger people;
- Introduction of HS2 and Northern Powerhouse Rail;
- Investment in new infrastructure;
- Thriving business community and successful economy;
- Creation of new places/areas within the Borough.

**8.1.15** Gulliver's World is a much valued attraction within the Borough, it has a wide regional catchment in terms of drawing visitors in to Warrington. The Council will continue to support this attraction and work closely with the operator in relation to future expansion plans, whilst also managing the interrelationship of this major attraction with nearby communities.

#### 4. OBJECTIONS TO EMERGING POLICIES (ALTERATIONS SOUGHT)

- 4.1 Gulliver's World in particular benefits from the diversity of its leisure offering which is both unique in the town and unparalleled in the wider region. Such is the benefit to the local economy and employment that we are seeking amendments to the draft policy wording.
- 4.2 Whilst the emerging policy rationale is to be supported to a large degree, it is not free from criticism. In particular, in an employment and economic need sense, the emerging plan appears to have concentrated solely on B-Class uses, disregarding the potential that *sui generis* and leisure uses have for generating employment opportunities. Moreover, the evaluation of the site being promoted at the Call for Sites stage (ref. R18 069) was poorly executed to the degree that this matter alone requires reappraisal.
- 4.3 We submit that considering and pursuing an appropriately wide range of developments types which can meet the Borough's employment needs and contribute positively to the local economy is a pre-requisite to the plan being sound, justified and positively prepared.
- 4.4 Case law<sup>1</sup> discusses situations where supporting text is relied on to promote or defeat proposals for uses. These cases clearly acknowledge the necessity for supporting text to assist with the *interpretation* and *application* of the policies, but they are not policies themselves for the purposes of decision making. In summary, supporting text should set the context for the policy by explaining where, why and when it should apply and direct readers to the evidence upon which it was formulated but cannot justify decisions on its own.
- 4.5 The pre-amble support is not adequately carried forward into the draft policy text itself and the wording so under-aspirational that it risks failing to deliver on the plan's wider objectives. In short, 'it requires developers to do all the heavy lifting' whereas a positively prepared plan should embody a collaborative approach between developer and an LPA. The requested alterations would help to enhance Gulliver's role as an employer and as a leisure attraction.
- 4.6 Lastly, several of the policies require sequential testing for expansion of existing leisure/tourism sites. It is self-evident that ancillary or locationally specific developments which are required to be attached to or co-located with *existing* leisure sites outside the town centre should not be required to sequentially test for alternative sites within the town centre. To do so is illogical and could result in delay to development which would otherwise improve the economic conditions of the borough and provide jobs/services in the locality.

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<sup>1</sup> *R (Cherkeley Campaign Ltd) v Mole Valley* [2014] EWCA Civ 567 and *Fox Land & Property Ltd v SoS* [2015] EWCA Civ 298 and others.



## Alterations sought

- 4.7 DC1 – Support is given to the general approach which recognises regionally and locally significant places and visitor attractions within the town. However, the policy as drafted at criteria 18 to 19 is under-ambitious and for it to achieve the overarching objectives (and thus be positively prepared and justified), it should be amended as follows:

Proposed amendments to policy wording:

### **Policy DC1 - Warrington's Places**

#### Gulliver's World

18. The Council will continue to support the operation of Gulliver's World as a successful regional attraction, including supporting the expansion and/or diversification of leisure uses connected with the exiting theme park resort where compatible with other policies in this plan.

19. The maintenance and improvement of existing facilities will be supported where this will not have a materially detrimental impact on surrounding residential areas and the local road network.

20. Consideration will be given to the adoption of a Local Development Order to facilitate the phased delivery of an agreed programme of development consistent with the site's Allocation in policy OS10.

- 4.8 DEV5 and INF4 - For these policies to be effective, justified and positively prepared, they must be amended to recognise that the sites included in paragraphs 12 to 19 of emerging policy DC1 should be exempt from the need to sequentially test for alternative sites.

Proposed amendments to policy wording:

### **Policy DEV5 – Retail and Leisure Needs**

#### New Retail and Leisure Development

4. New Retail and Leisure uses will be directed towards the Town Centre, District, Neighbourhood and Local Centres where the development is of a scale and nature appropriate to the area served by the centre. Proposals will be expected to enhance the vitality, viability and overall attractiveness of the centre.

5. Where new retail or leisure uses are proposed outside of a defined centre, excluding those functionally related to existing leisure uses set out in policy DC1, the applicant will be required to demonstrate that no suitable and viable sites are available within the centre or in edge of centre locations through applying a sequential approach.

6. Where there are no suitable, available or viable sites for the proposed new use(s) within a defined centre, the proposal must demonstrate that there are no significant adverse impact on the closest defined centre(s).

7. Other than where retail or leisure is the only appropriate or viable alternative use of an existing building (such as enabling development), Proposals for retail, leisure and office uses over 500 square metres gross-gross internal floor area will need to provide justification in the form of an impact test, proportionate to the nature and scale of the proposal.

### Policy INF4 - Community Facilities

#### General Principles

1. The Council and its partners will seek to promote health and wellbeing and reduce health inequalities within the Borough by supporting the development of new, or the co-location and co-ordination of existing education, health, social, cultural and community facilities. Where possible such new facilities, other than expansion of existing facilities set out in policy DC1, should be located in defined centres or neighbourhood hubs (See Policy DEV5 Retail and Leisure Needs).

#### Proposed allocation

- 4.9 Additionally, to the alterations to the policy wording explained above, the Gulliver's seeks a bespoke site allocation within a new policy "OS10" for 6.39ha land for up to 5,500sq.m of tourism and leisure development within use classes C1, C2, A3, D1 and D2. The proposed development will provide a further extension and enhancement of Gulliver's World, recognising its role as a regional scale leisure and tourist attraction. The amendments suggested to emerging Policy DC1 further encourages pursuance and adoption of a Local Development Order to facilitate delivery of the allocation.

#### Proposed NEW policy Allocation OS10:

### **NEW Policy OS10 – Gulliver's World**

1. The land south of Gulliver's World 6.39ha (5ha net) will be allocated for development related to the existing theme park and leisure resort of up to 5,500sq.m within use classes C1, C2, A3, D1 and D2.

#### Natural Environment

2. The proposals shall survey for, take into account and provide appropriate mitigation to prevent detrimental impacts on any important species habitats within the site. Where necessary, a package of compensatory measures will be required to offset any harm.

#### Amenity

3. Where new sources of noise are reasonably expected to result from the proposals, a package of competent assessment, prevention and mitigation measures shall be required in order to avoid significant adverse impacts on the amenity of local residents.

#### Transport and Accessibility

4. A package of access improvements will be required to support the development. Required improvements will include:

- a. Ensuring appropriate access arrangements for the site;
- b. Provision/retention of walking routes to/from the site to connect into the wider existing footway network to Sankey Valley Park and provide enhanced connectivity with the wider community;
- c. Sufficient parking for patrons and staff shall be provided in accordance with the needs identified by an appropriate Transport Assessment.

## 5. DESCRIPTION OF BESPOKE ALLOCATION SOUGHT

- 5.1 The following section sets out how and why the proposed site allocation is suitable, available and deliverable. The proposed allocation/development comprises:

### Accommodation

- o 75no. Eco Woodland Lodges @ 3.6m x 9.75m = 2,632.5 m<sup>2</sup>
- o 4no. Double Eco Woodland Lodges @ 2.4m x 5.12m = 49.152 m<sup>2</sup>
- o 4no. Group Accommodation Units @ 14m x 5.3m = 296.8 m<sup>2</sup>
- o Touring caravan site (progressed under caravan site licence exemptions)

### Ancillary Buildings:

- o Staff Training & Development Building = 562.5 m<sup>2</sup>
- o Pet Resort (day-stay and overnight kennels) = 943 m<sup>2</sup>
- o Staff HQ Building @ 30m x 14m = 420 m<sup>2</sup>
- o Woodland Retreat Facilities = 549 m<sup>2</sup>

See plans package refs. "GW-WR"

- 5.2 Together with the woodland eco lodges described below, the Woodland Resort will include a Wilderness Spa, Woodland Lodges & Pitches. Group accommodation for Scouts/Guides and similar user groups will be offered alongside a tree-top high ropes course set within the existing woodland setting, and a sports pitch for community events and organised groups. It also includes a 200 space staff car park and 56 additional guest spaces of grasscrete or similar (incorporating 'no dig' surfaces where root protection is required for existing trees).
- 5.3 An outdoor activities area includes a play area, clip and climb and woodland activities such as bird box and bug hotel making and den building, woodland crafts and nature trails.
- 5.4 The pet resort provides day care and overnight kennelling for visitor's pets, allowing visitors to ensure the welfare of their pets whilst enjoying their visit to the theme park.
- 5.5 The staff headquarters building will provide new ancillary office space for existing operations, currently located within the main theme park. This will free up space within the theme park for alternative uses/developments, streamline segregation between public/private areas and improve working conditions for staff.
- 5.6 A total of 79 Woodland eco-lodges are proposed. These would be set sensitively amongst existing (retained) tree cover. They bear their own weight and thus require minimal ground intrusion, have recessive/natural colouration and aim to assimilate into the landscape of forested areas such as seen at other popular resorts, for example Centre Parcs. As a self-catering alternative to the on-site hotels, the lodges will provide family accommodation; stay duration will vary from short breaks to longer multi-trip 'passport memberships' to the resort.

Artists impression of proposed woodland lodges ©Gulliver's:



Circular woodland walks within resort:



A tree-top high ropes/adventure trail:



Family camping and caravan site:

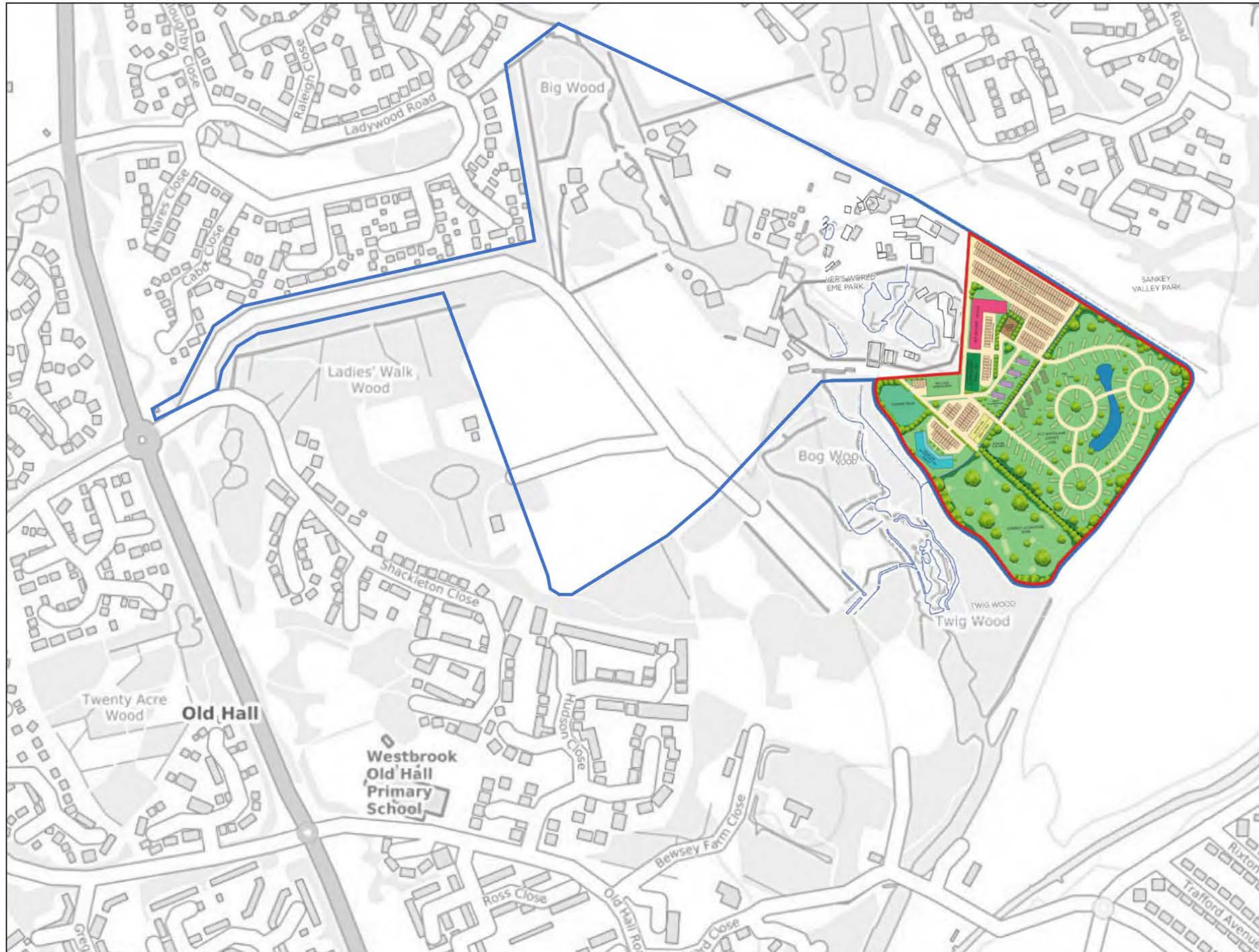


- 5.7 The camping / caravan site use will initially commence using exemptions under the Caravan Sites & Control of Development Act prior to seeking full planning permission for the uses.

A3 PAPER SIZE - Inset of proposed Masterplan (not to scale) ©Gulliver's World:



SANKEY VALLEY PARK



### Meeting the three dimensions of sustainable development

- 5.8 The allocation of the site would assist with the viability and expansion of the attraction, helping to create new and maintain existing jobs. At a construction cost of £5.5 million, the proposal would be noteworthy. It would also generate investment into the Borough by those seeking to capitalise on new opportunities and outward gross added value through additional spending in the local area on goods and services such as restaurants, shops and petrol stations.

#### Jobs, investment and growth (economic dimension)

- 5.9 Nationally there is a picture of increased 'staycations' with families choosing to stay in the UK rather than travel abroad, which is driven by a range of economic and social factors such as a weak currency and the UK's pending exit from the EU. Other tourism providers are also recognising this trend, acknowledging an under-supply of young family orientated accommodation. Longleat for example has recently sought permission for luxury log cabins and hotel (2017) and Merlin now offers overnight stays at its theme parks. Centre Parcs has recently added a six-birth timber lodge to its Whinell forest accommodation portfolio.
- 5.10 The market is a growing one and new development such as this is important to the growth of Gulliver's Warrington resort. The operator must act quickly to protect and expand their market share, as well as continue their multi-million £ phased investment in its wider portfolio.
- 5.11 Once the development is fully operational it is calculated that it will bring around £5.53million of beneficial economic impact to the local area. National policy in NPPF paragraph 80 and local planning policies PV7 and SN6 place significant weight on economic growth, jobs and prosperity which proposals can offer to the local economy. In this case, it includes:

- a) An extra 35 staff positions within the Gulliver's team. As a minimum, it is expected there will be of 28 Full-Time Equivalent staff positions comprising, 2 managerial posts; 4 grounds keeping and up to 28 part-time and peak season positions.

The jobs created would be at all levels and in many different disciplines including, management, marketing, maintenance and gardening, office administration, entertainment and safety, catering, customer care and house-keeping positions.

- b) Taking the above factors into account, during the construction phase the development has an approximate beneficial impact on the local economy of £5.6million in years 1 to 2.
- c) Once the development is fully operational it will bring a minimum of £1.3million worth of beneficial economic impact to the local area annually, in perpetuity.



### Social cohesion and local needs (Social dimension)

- 5.12 In being a significant regional attraction, taking tens of thousands of visitors each year with a strong regional presence and pull, the site acts as a major driver of tourism in the town. As a result of which, Gulliver's is a major employer within the Borough, providing more than 220 positions for staff, more than 80% of whom live within the Borough boundary and overall, more than 98.2% of whom live within a 10-mile radius of the site.

See Who We Are (Gulliver's company profile)

- 5.13 The social dimension of sustainable development promotes creation of safe and well-designed environments, providing appropriate spaces for cultural, health and social well-being to support and create strong, vibrant and healthy communities.
- 5.14 In this case, the proposal includes a range of meeting spaces and activity centres that will enhance childhood learning, creativity and imagination - these things are at the core of the development and Gulliver's business operations. The proposals, through provision of the craft and play activities will enable opportunity for children and young people to engage in both play and kinaesthetic learning (also known as tactile learning) in which they carry out physical activity and exploration. They will also learn about the woodland eco-system.
- 5.15 Other social benefits include promoting use of nearby cultural and outdoor attractions including Sankey Valley Park, Victoria Park and Walton Hall etc. Added to this, the profits from the proposal will assist the applicant to continue supporting local community groups, including girl guiding/scout movement (social benefit) and subsidising the Burtonwood Heritage Centre which provides a cultural learning centre linked to the former USAF base.

### Environmental dimension

- 5.16 Previous ecological surveys and arboricultural impact assessment have been conducted which demonstrate that there are no significant adverse impacts expected. Enhancement will be provided through the inclusion of plentiful landscaping, provision of bat and bird boxes and incorporating new areas of water bodies that might in future provide suitable aquatic habitats or foraging grounds for native species should they be present in the local area.

### **Summary**

- 5.17 There are notable net gains in all three dimensions of sustainable development, with significant weight to be given to the economic and employment benefits of the proposals. In conclusion, the proposals are wholly acceptable in principle. A bespoke allocation would be a justified, reasonable and proportionate policy response.

## 6. SUITABLE, AVAILABLE AND DELIVERABLE

- 6.1 The following section sets out how and why the proposed allocation is suitable, available and deliverable. It considers and analyses the potential constraints together with providing third party consultant evidence/reports demonstrating the absence of constraints or how such constraints can be readily overcome. It considers, planning policy; highways; tree thinning and management; land quality; noise; and invasive plant species management.

### Planning policy constraints

- 6.2 The statutory development plan, for the purposes of Section 38 of the 1990 Act (as amended) comprises the Local Plan Core Strategy (adopted July 2014) (hereafter 'LP'). It replaces the Unitary Development Plan (1995) and sets out the spatial strategy and vision for the whole Borough between 2012 and 2027.
- 6.3 The adopted LP at paragraphs 2.17 and 8.18 note that *"the borough benefits from a number of key attractions and assets which are visited by residents within the borough and from elsewhere, such as Gulliver's World"*. At para 2.34 it further recognises the town's role as a 'destination town' for leisure and entertainment.
- 6.4 At a site-specific level, the land is not subject to any policy designations within the adopted Core Strategy LP policies map. The site is within the urban area (i.e. it is not green belt land) and there are no other site-specific policies or constraints which would otherwise control the nature or scale of proposed development at the site. The current proposals, which would improve the diversity of leisure, short-break and visitor attractions in the town is a key priority and thus, it benefits from high level support from the development plan objectives overall.
- 6.5 Policy CS1 supports the presumption in favour of sustainable development and sets out high level policy objectives. CS2 relates to the distribution of development.
- 6.6 Policy CS4 promotes sustainable transport and increasing opportunities to integrate public transport links and sustainable transport links between areas of business, the town centre and leisure, education, and health facilities.
- 6.7 Policy PV3 states the joint aims to increase jobs, training and education and in particular it notes *"[the Council] will support developments which assist in strengthening the boroughs workforce and enhancing training opportunities for its residents by...establishing linkages with local businesses to support their ongoing land, development and workforce needs."*

- 6.8 Policy PV7 is the most directly relevant LP policy as it relates to promoting the visitor economy. It is specifically noted at para 8.18 of the supporting text that Gulliver's is one of several key attractions in the town and that the policy approach seeks to *"sustain and enhance Warrington's visitor attractions and ensure they continue to remain viable and actively contribute to the visitor economy"*. It gives support to provision of new and expansion of existing attractions.
- 6.9 Of further relevance is policy SN6 which confirms the acceptability of development that seeks to assist the continued viability and growth of the local economy, ensure the retention of employment generating uses and cultural facilities.

#### Sequential testing

- 6.10 LP Policy PV5 reinforces a 'town centre first' approach and in most cases requires that proposals for retail, office and leisure development of more than 500sq.m undergoes sequential and retail impact testing. Policy SN5 then cascades this approach to retail and leisure development in District Centres and Local Centres. Policy SN4 defines the District and Local Centres, the closest to the site are Westbrook and Old Hall.
- 6.11 The application site is located outside of a defined centre, however, the proposals comprise a mixed use of C1, C2, A3, D1 and D2 uses which are functionally linked to the existing theme park uses, serving patrons of that existing attraction. Policy SN4 notes the expectation of sequential and retail impact testing applies only *"where the development is of a scale and nature appropriate to the area served by the centre"* – in this case, the nature of proposals, being unique and directly linked to the theme park use could not be situated within the defined Local Centres anyhow. This notwithstanding, a sequential test has been undertaken which confirms that there are no other alternative, suitable or available sites within the town centre for the proposed development in any case.

See town centre sequential test

- 6.12 In conclusion, it is expected that the proposals will be compliant with both the current Core Strategy and the emerging local plan, such that the expectation of obtaining planning permission for the development is realistic and reasonable.

#### Conclusion

The development is considered suitable and deliverable in a planning policy sense insofar as it is considered that the proposal complies with both the adopted and emerging policies.

## Tree thinning and woodland management

- 6.13 In this case, the proposed development site was formerly open ground and the tree coverage which has grown over since is self-set, crowded and predominantly species poor.

Aerial photo of eastern portion of Camp 4 and western portion of the site circa 1955:



- 6.14 A bespoke tree survey of the tree stock has been undertaken. In the majority of cases, the existing trees have a girth of between 10-15cm. In the main, the more mature specimens of 25cm girth and above are expected to be retained as part of the proposals.

Extract from Tree survey report:

Young to Mature						
Mixed	to 11	Mix	10 to 25	See Plan	This area is densely populated with trees. The pioneer species were Alder, Silver Birch and Goat Willow; some old Ash and Oak trees were also identified lining the ditch. Himalayan Balsam was also encountered. The larger trees lining the ditch were the only trees of importance within this area. The ground was observed to be slightly wet at the time of the site visit. The ground conditions could be improved.	Manage by thinning to 30%
Young to Early Mature						
Mixed	to 17	Mix	10 to 35	See Plan	This area has an open aspect with small stands of isolated Alder, Birch and Willow, all of which are pioneer species. A dense stand of trees was observed to the north-west and Himalayan Balsam and masses of regeneration were encountered.	Manage by thinning to 25%

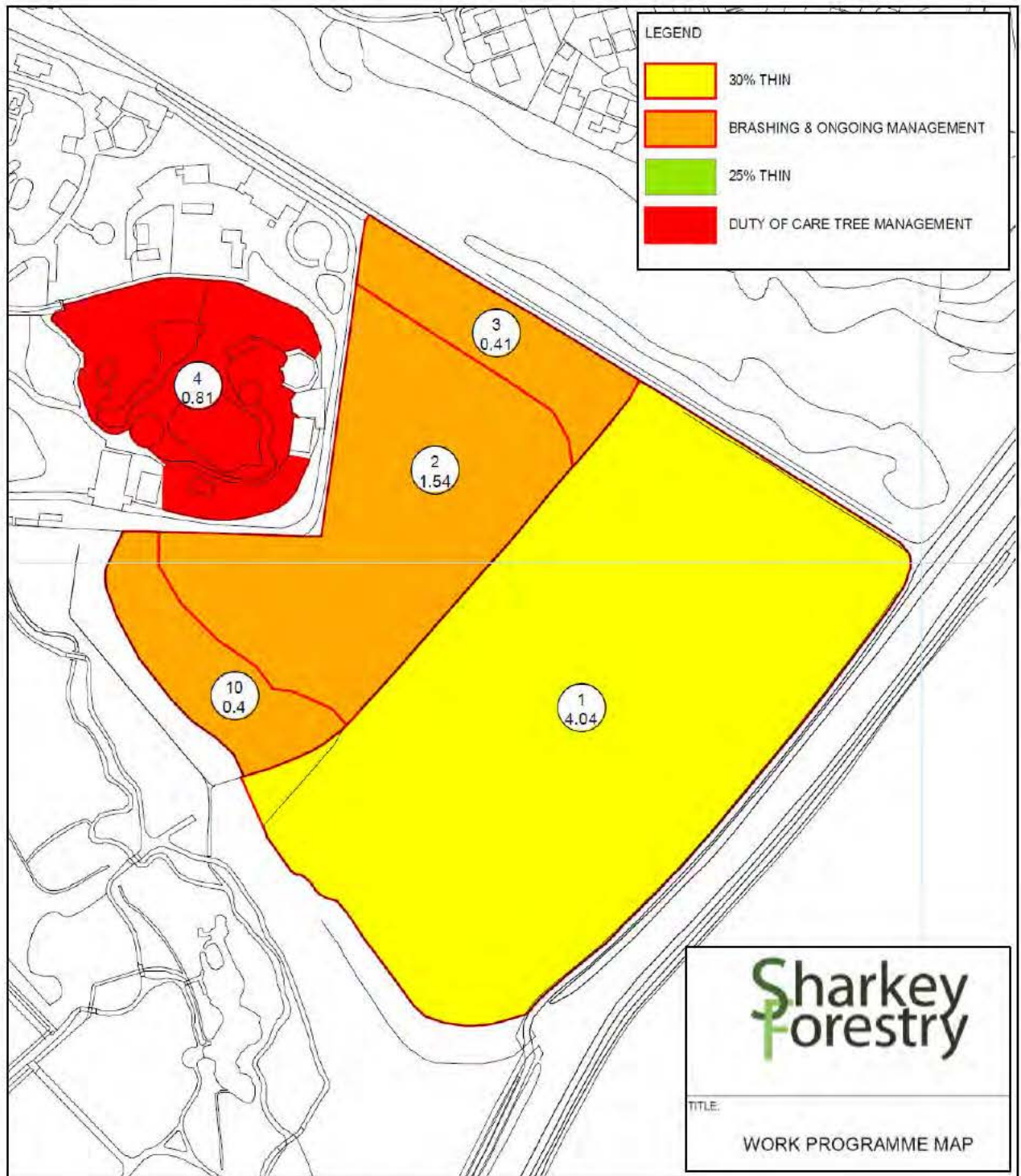
- 6.15 The woodland is ultimately being managed in accordance with a Forestry Commission approved woodland Management Plan which confirms as follows:

*"Compartments 1, 2, 3 & 10 were historically grassland with occasional parkland trees.*

*The area has since become overgrown with natural regeneration and has not been managed for the past 26 years. Work has already begun to improve compartment 2 by heavily thinning the canopy and clearing the scrub underneath to create a more attractive wooded area. It is proposed under this Plan to continue this work into compartment 1, thinning the canopy by 30% to promote the crown development of better-quality trees and aiming to retain a good mix of species rather than favouring just one species.*

*Scrub undergrowth of 7cm diameter and under will be systematically cleared to improve the structure of the understorey. As per compartment 2, a dense edge will be retained (referred to as compartments 3 & 10) to maintain screening around the site. The brash material will be chipped or mulched to create ground conditions suitable for grass seeding following the scrub removal. The trees which remain will be brashed to 2m height to remove heavy side branching and improve the developing form of the trees. It is worth considering fencing the outer boundary of the area prior to work starting."*

Extract from woodland management plan:



6.16 This translates to a more than a 30% removal of the existing tree cover overall, within which the proposed 5,500sq.m GIA of new development can be sensitively accommodated.

N.B - The band of protected woodland trees is adjacent to the westernmost ownership boundary (TPO 162) it situated some 420m away from the proposed development site on land owned by the Woodland Trust. It will be retained in full and is wholly unaffected by the proposals.

## Highways

- 6.17 Local plan policies CS4, MP1 and MP7 address Highway matters in respect of the effects and timing of traffic movements (including car parking). In combination they seek to avoid adverse implications for the operation of the public highway network and harmful impacts on highway safety. The site's geographic location close to major conurbations of Liverpool and Manchester (together with close proximity to the M62 and M6 motorways) provide both opportunity and challenges for the town in terms of traffic management and congestion.
- 6.18 Policy MP1 sets out the general transport principles, including the support for proposals which reduce and minimise reliance on private modes of transport. Policy MP7 addresses the requirements for transport assessments and the need to maintain safe roads and ensure that proposals do not prejudice the safe operation of the public highway.
- 6.19 Policies CS6, QE3 and MP1 discuss the aim to retain and improve connectivity within the borough, noting the role played by the public rights of way network and green infrastructure corridors which include Sankey Valley Park (SVP).

## Access

- 6.20 Access to the site is made by foot and by road from Cromwell Avenue, via Shackleton Close along the private driveway (known as the Old Camp Road) which leads east, then south into the vehicular parking areas. The main theme park and attractions are situated in the south east portion of the site, with the Burtonwood Heritage museum, Splash Zone swimming pools and Nerf Zone attractions being located immediately adjacent to the car parks. The existing hotel building sits adjacent to the southernmost boundary of the site. A recently approved extension to the hotel and leisure resort complex sits south-west of the site access road.
- 6.21 The site has been shown to be accessible by sustainable transport options. This includes permissive footpath routes via Sankey Valley Park as described in more detail below.

## Parking

- 6.22 There will be a net balance of 1,587 car parking spaces plus 35 coach spaces for the theme park and an extra 30 spaces dedicated for the existing hotel parking available on site. The maximum number of guests arriving by car in peak season are between 1,000 and 1,200 (with an average of 3.8 occupants per car) which equates to a parking demand of 315 spaces.
- 6.23 On top of this, 200 additional staff car parking spaces are proposed alongside an extra 53 spaces for public use to increase parking available within the new sub-site.

### Highways implications of the development

- 6.24 A bespoke Highways Statement is provided which considers the proposed development alongside the relationship with the existing highways network. It further considers the traffic likely to be generated as a result of the proposals and the adequacy of existing arrangements for access to/from the site via Cromwell Avenue.

See SCP Highways report ref. DY/190324

- 6.25 The statement shows that even taking into account committed development, save for the new visitor accommodation, the proposed land uses are primarily supportive or ancillary to existing uses on the wider land holding will not generate new trips of any measurable volume.
- 6.26 Whilst the overnight accommodation is expected to generate material trip numbers, no residual or cumulative adverse impacts are expected at this interim assessment stage. Moreover, there are no significant road safety issues arising from the proposals.
- 6.27 The immediate access onto Cromwell Avenue (A574) has been shown to be able to accommodate the anticipated traffic generated, even when base and committed development traffic is added and these figures are growthed to 2033 traffic flows.
- 6.28 The report concludes that there are no reasons in highway safety or capacity issue which would mean that an allocation in the emerging plan should not be carried forward.

### Pedestrian connections to Sankey Valley Park

- 6.29 Sankey Valley Park (SVP) which is owned between the Council and the Woodland Trust is situated to the south east of the application site, with permissive footpaths routes connecting the theme park. Existing routes within SVP, Ladies Walk Wood and Bog Wood to the south, west and east of the application site respectively, are all unaffected by the current proposals.
- 6.30 Whilst the applicant's wider land holding (beyond the application site) is notionally shown as being within the Sankey Valley Park Old Hall and New Hall Natural/Semi-Natural Green Space (Site refs.775 and 776 respectively on the Council's policy map); in reality there is no right of public access to the application site which is privately owned land. This is confirmed in the aforementioned appeal and an Allowed appeal against a Footpath Order ref. FPS/M0655/7/1 (dated 19 October 2010) which following a public inquiry, rejected an application for a Footpath Order on the land. Regardless, the current proposals do not seek to change the existing arrangements in any case and thus there is no conflict with policies CS6, QE3 or MP1.

See Appeal ref. FPS/M0655/7/1



Image of footways/cycleways:



## Ecology

- 6.31 A full Phase 1 ecological survey will be needed to build on the reporting already undertaken. Until proven otherwise, it is assumed that bats will be in and around the woodland and as such, relevant best practice guidance will be followed prior to any development commencing. To prevent any disturbance to birds whilst they are nest building, or in a nest containing eggs or young, any tree felling planned to take place between 1st March and 31st August (inclusive) will be subject to a nesting bird survey.
- 6.32 A Himalayan balsam management plan is provided with this submission in order to manage and prevent the spread of this non-native invasive plant species.

## Land Quality

- 6.33 Local plan Policy QE6 deals with emissions to ground, land, air or water such as pollutants, noise, odour, air quality and lighting. It also considers land quality, including consideration of above surface water and ground water sources. It requires that where proposals are submitted on land which is known or suspected to be affected by contamination, they must include a competent assessment. Permission will be approved where the land is or can be made suitable for the proposed end use.
- 6.34 These aspects have been fully addressed in detail in the submitted reports and previous discharge of condition applications, but they are reappraised here for clarity and the avoidance of doubt. The proposed allocation is not within an area of land formerly covered by buildings or uses associated with the former Camp 4 of USAF Burtonwood air base and is understood to be greenfield land. Detailed and competent Phase 1 and Phase 2 technical reports (including trial pits and laboratory analysis) to identify any potential for contamination and unexploded ordnance have been undertaken. The results are satisfactory.

See report refs WB04632, Clarkebond (Phase 1)

See report ref. 7057 Egniol (Phase 2)

- 6.35 It is further highlighted that the proposed accommodation is self-contained, situated on concrete bases cast over a firm clay sub-layer to break any potential for pollutant linkages to future occupiers in any case. Imposition of a standard condition for 'unsuspected contamination during construction' is considered sufficient.
- 6.36 The Council has a range of statutory powers to protect amenity including the Environmental Protection Act; Building Control Regulations 2010, as do other regulators if needed.

6.37 Ultimately, the site is beyond the area which previously formed part of the USAF Burtonwood Camp 4 boundaries and even so, this is not an impediment to delivery in any case.

Proposed development site in context of the former USAF Burtonwood Camp 4:

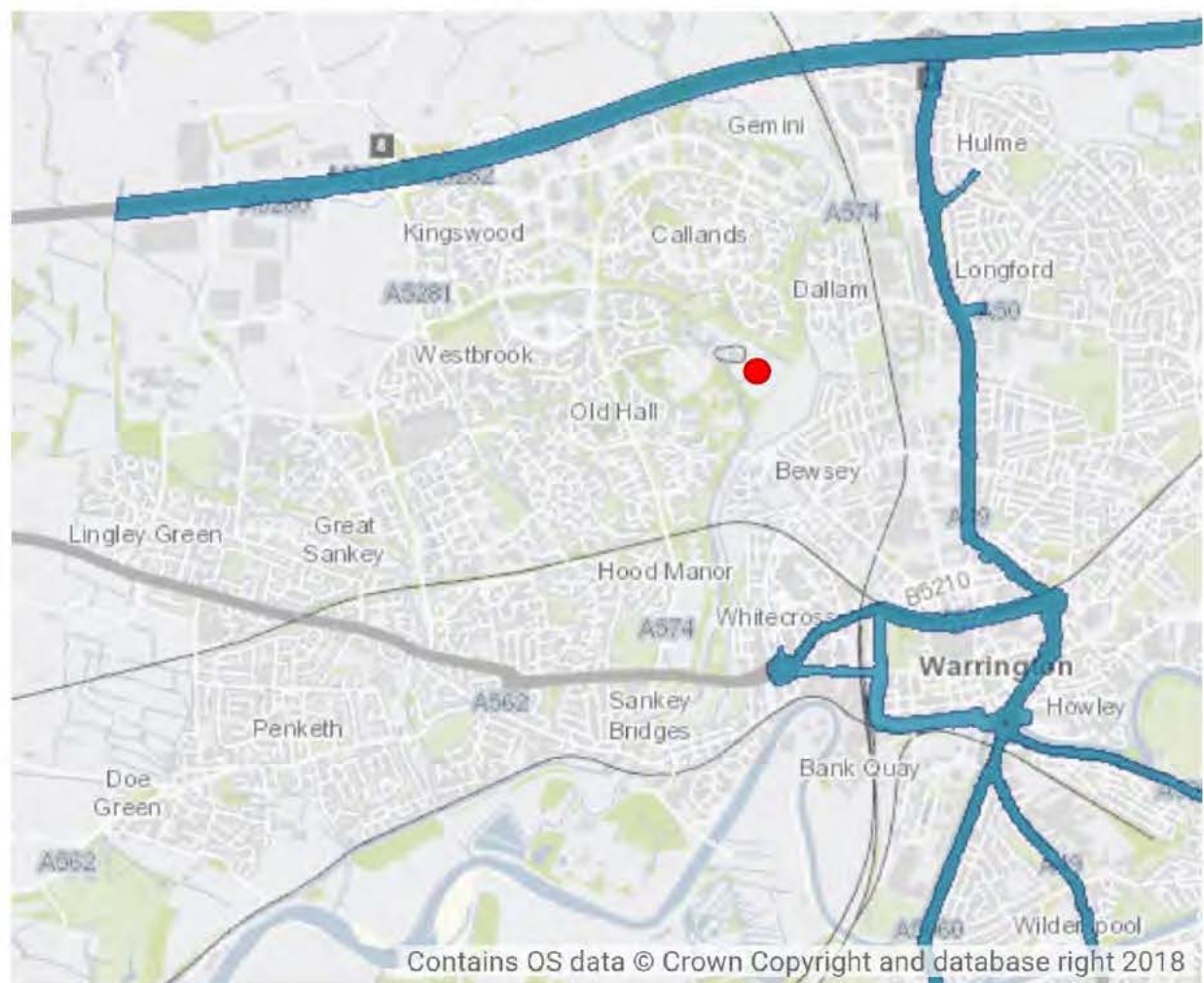


Image: 1955 image courtesy of Burtonwood Association. 2015 Satellite image © Google Earth

## Air Quality

- 6.38 It is accepted that nationally there is an aim to reduce nitrogen oxides, particulates and sulphur dioxide emitted by vehicles. Whether such considerations are relevant to a proposal will depend on the nature of proposals; in particular whether it will generate new sources of pollution and if local air quality is already poor.
- 6.39 In this case, the site is not within an Air Quality Management Area and as such, the location is less sensitive to new emissions. Irrespective, the proposal does not introduce any new point sources of air pollution or significantly change traffic volumes. Critically it is noted within the highways evidence that the proposals are not expected to increase congestion or significant alter the cumulative number of vehicles on the road at peak times. This indicates that both derivative and cumulative concentration of pollutants will not be materially affected.

Extract from DEFRA AQMA map (red dot shows site location):



- 6.40 As a result of the above factors, there is not expected to be any material concerns generated by the proposals. Consequently, policy QE6 is satisfied.

## Design and security

- 6.41 In this case, the unique nature and appearance of the buildings means that comparing them to standard policies relating to 'everyday buildings' carries limited rationale. It is more appropriate to consider whether the development is appropriate for its setting.
- 6.42 The area is well screened by surrounding woodland and the proposals will be set within the context of the wider theme park area which is not visible from any public vantage points. The low height and mass of the buildings is appropriate for their usage and will include elements of innovative design and construction. It will be accessible, adaptable and energy efficient.

## Lighting

- 6.43 To enhance the visitor experience and create an 'atmosphere' consistent with the theming of the resort, lighting will be low level (other than where deployed specifically for security purposes) and will use low energy/low luminance bulbs to avoid impacts on the natural environment. Close-to-ground bollard lighting with integrated directional spill shields will be used on pedestrian areas. Details can be provided as part of a planning condition on approval.

## Security

- 6.44 Given the nature of the proposals being aimed at children and families, safety and security are of paramount importance. As such, the development site has been fenced on all sides to create a safe and secure environment. A secured entrance gate can be erected and access to the woodland lodges can be supervised by staff in the proposed headquarters building.
- 6.45 A 2.4m high eco profile mesh has already been around the perimeter of the proposed allocation site and it is set within the natural screening effect of the existing tree cover which protects visual amenity of the site for visiting guests and the public.

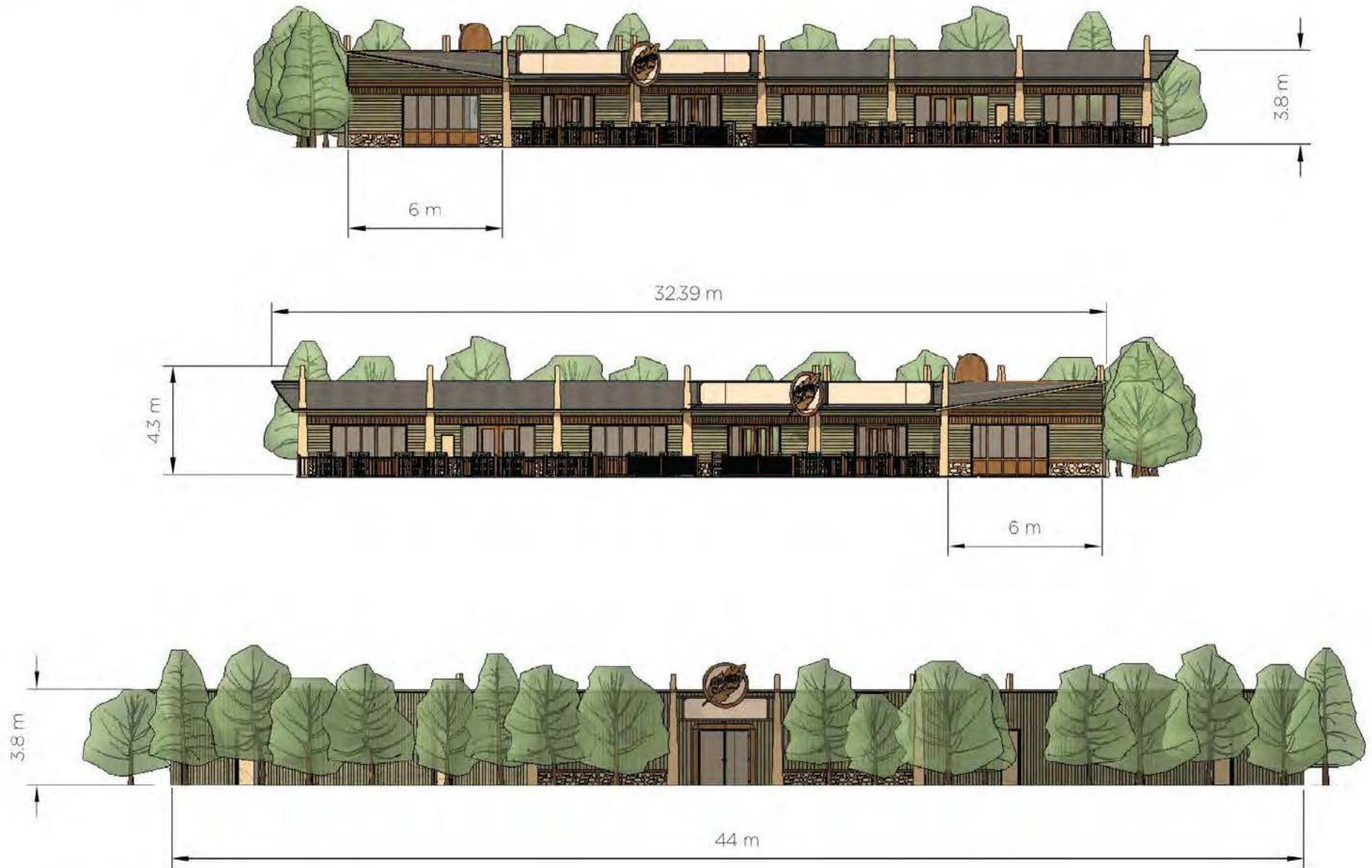
Examples of eco mesh fencing:



Proposed group accommodation ©Gulliver's World (2019):



Proposed spa/guest facilities building:



## Noise

- 6.46 Both the NPPF and LP policy QE6 deal with potential for unacceptable adverse impacts on amenity resulting from noise. The phraseology in the LP (2014) is superseded by Paragraph 180 the NPPF (2019) which adopts the more up-to-date standard of avoiding “significant adverse impacts” and cross referring to the Noise Policy Statement for England (NPSE).
- 6.47 The noise survey undertaken at the site boundary on the western site limit was undertaken in relation to planning applications submitted and approved in 2019. The survey evaluated the existing noise climate over a period of 4 days continuous monitoring during the existing theme park’s peak season. It derived the typical background noise levels before modelling the noise levels which would derive from proposals that were largely similar to the current proposals.
- 6.48 In summary, the previous reporting reached the following findings:
- a) noise levels throughout the survey were generally dictated by local road traffic primarily beyond the site boundary and general background noise;
  - b) the noise sources having most impact on the measurement locations are those which are beyond the site boundary and outside the operational control of the theme park;
  - c) any noise from human activity in and around the [proposed] accommodation would have no effect on the health and quality of life of nearby NSR locations;
  - d) the car parking activity associated with the proposal would have no effect on the health and quality of life of nearby noise sensitive receptors.

See Noise Impact Assessment, Sharps Gayler (Nov, 2018)

- 6.49 In light of the above, noise is not expected to be an impediment to the proposed development as it is expected that the proposals would comply with (or can otherwise be made so through operational conditions) paragraph 180 of the NPPF, the NPSE and Local plan policy QE6.



## 7. CONCLUSIONS

- 7.1 This document is a representation to policies DC1; DEV5; INF4 and the Allocations policy of the Warrington Local Plan review draft Submission Version consultation (June 2019). The representations are submitted on behalf of Gulliver's World Ltd.
- 7.2 The representation SUPPORTS the pre-amble of the policies at paras 2.1.30; 2.2.3 to 2.2.4 and 8.1.15, but it ultimately finds that the translation of this support into the actual policy wording, which would guide future development, is insufficient. Moreover, the previous appraisal of the site at the Call for Sites stage was factually incorrect and misleading in material particular.
- 7.3 In light of the above, this representation OBJECTS to the plan seeking alterations to policies:
- o DC1 criteria 18 & 19 (and a new criterion 20);
  - o DEV5 criteria 4 to 7 inclusive;
  - o INF4 criterion 10
- 7.4 In order to most effectively translate the plan's stated objectives into a positively prepared plan, Gulliver's World Ltd further seeks a bespoke allocation through the creation and adoption of a bespoke policy ALLOCATION OS10 for a 6.39ha (5ha net) portion of the land south of the existing theme park. This representation has demonstrated that the site is suitable, available and deliverable for circa 5,500 sq.m of development within use classes C1, C2, A3, D1 and D2. These proposals draw considerable support from policies PV7 and SN6 of the local plan. At a national level, the proposals engender support from paragraphs 11 and 80 in particular. The proposals comply with Core Strategy policies CS6; MP1; MP7; QE3; QE5; QE6; and QE7 and there are no policy reasons why such an allocation should not be supported.
- 7.5 The proposal would have a £5.6million construction cost and generate £5.5million net economic impact, with an additional annual £1.2million gross added value. Furthermore, it would generate around 35 jobs (28FTE) within the Borough across a range of disciplines.
- 7.6 The proposed allocation is in a sustainable location and there are no highways, geo-environmental or other notable areas of concern which would prevent the proposed allocation from being deliverable. There are no alternative suitable and available sites within the town centre where such a development could reasonably be located.
- 7.7 In conclusion, it is considered that a bespoke allocation is a proportionate and justified policy response to meet regional/local need. Furthermore, it is considered that progressing and adopting a Local Development Order to help deliver the proposals would be appropriate.



## PLANS/APPENDIX SCHEDULE

The list of submitted plans and documents is as follows:

<u>DESCRIPTION</u>	<u>PLAN/DOCUMENT REF.</u>
Transport supporting statement 13.06.19	DY190324
Who We Are (Gulliver's company profile)	Who We Are
Summary of proposed alterations to policy wording	GUL40/2
Plans package (inc. master plan and elevations)	Appendix A
Sequential test	Appendix B
Biodiversity Enhancement Scheme	Appendix C
Extended Phase 1 Habitat Survey of partial site	Appendix D
Himalayan Balsam Management plan	Appendix E
Woodland Management Plan V2	Appendix F
Work Programme Map ref 100103	Appendix G
Land quality reports (Phase 1 and Phase 2)	Appendix H

## **Policy DEV5 – Retail and Leisure Needs**

### New Retail and Leisure Development

4. New Retail and Leisure uses will be directed towards the Town Centre, District, Neighbourhood and Local Centres where the development is of a scale and nature appropriate to the area served by the centre. Proposals will be expected to enhance the vitality, viability and overall attractiveness of the centre.
5. Where new retail or leisure uses are proposed outside of a defined centre, excluding those functionally related to existing leisure uses set out in policy DC1, the applicant will be required to demonstrate that no suitable and viable sites are available within the centre or in edge of centre locations through applying a sequential approach.
6. Where there are no suitable, available or viable sites for the proposed new use(s) within a defined centre, the proposal must demonstrate that there are no significant adverse impact on the closest defined centre(s).
7. Other than where retail or leisure is the only appropriate or viable alternative use of an existing building (such as enabling development), Proposals for retail, leisure and office uses over 500 square metres gross-gross internal floor area will need to provide justification in the form of an impact test, proportionate to the nature and scale of the proposal.

## **Policy INF4 - Community Facilities**

### General Principles

1. The Council and its partners will seek to promote health and wellbeing and reduce health inequalities within the Borough by supporting the development of new, or the co-location and co-ordination of existing education, health, social, cultural and community facilities. Where possible such new facilities, other than expansion of existing facilities set out in policy DC1, should be located in defined centres or neighbourhood hubs (See Policy DEV5 Retail and Leisure Needs).

## **Policy DC1 - Warrington's Places**

### Gulliver's World

18. The Council will continue to support the operation of Gulliver's World as a successful regional attraction, including supporting the expansion and/or diversification of leisure uses connected with the exiting theme park resort where compatible with other policies in this plan.
19. The maintenance and improvement of existing facilities will be supported where this will not have a materially detrimental impact on surrounding residential areas and the local road network.
20. Consideration will be given to the adoption of a Local Development Order to facilitate the phased delivery of an agreed programme of development consistent with the site's Allocation in policy OS10.

## **NEW Policy OS10 – Gulliver's World**

1. The land south of Gulliver's World 6.39ha (5ha net) will be allocated for development related to the existing theme park and leisure resort of up to 5,500sq.m within use classes C1, C2, A3, D1 and D2.

### Natural Environment

2. The proposals shall survey for, take into account and provide appropriate mitigation to prevent detrimental impacts on any important species habitats within the site. Where necessary, a package of compensatory measures will be required to offset any harm.

### Amenity

3. Where new sources of noise are reasonably expected to result from the proposals, a package of competent assessment, prevention and mitigation measures shall be required in order to avoid significant adverse impacts on the amenity of local residents.

### Transport and Accessibility

4. A package of access improvements will be required to support the development. Required improvements will include:

- a. Ensuring appropriate access arrangements for the site;
- b. Provision/retention of walking routes to/from the site to connect into the wider existing footway network to Sankey Valley Park and provide enhanced connectivity with the wider community;
- c. Sufficient parking for patrons and staff shall be provided in accordance with the needs identified by an appropriate Transport Assessment.

## Masterplan for the Woodland Retreat at Gulliver's World, Warrington

DY/190324

13<sup>th</sup> June 2019

### 1.0 INTRODUCTION

- 1.1 This Highway Planning Statement supports a request by Gulliver's World Ltd for a bespoke allocation in the emerging Local Plan for a Woodland Retreat comprising woodland lodges, spa, a new staff headquarters and associated development at Gulliver's World in Warrington.
- 1.2 This document will now look at the proposals to expand the site and consider its relationship with the local road network. It will then consider the traffic likely to be generated by the proposed expansion of the site and then demonstrate that the existing access arrangements onto the main road network (Cromwell Avenue) are adequate for the Masterplan proposals. This important pre-cursor to deliverability is thus satisfied.
- 1.3 This Statement will also show that the site is located in a sustainable location which is accessible by walking, cycling and public transport.
- 1.4 This assessment concludes that the site is accessible by sustainable transport modes, the main junction near the site can accommodate the traffic from the intensification of use of the site and that there is no existing significant road safety problem in the area.

## **2.0 EXISTING SITE AND LOCATION**

- 2.1 Gulliver's World is a theme park which opened in 1989 and, save for special events, its peak periods are seasonal during the spring and summer months, from March to November. The theme park hosts special events throughout the year which are held on Halloween, Easter and at Christmas. The theme park is family themed and caters for family visitors with children aged between 2-13 years old, typically travelling in groups. The usual theme park opening hours are 10:30-18:00.
- 2.2 The theme park contains more than 90 rides and attractions as well as an indoor water park (Splashzone), the Burtonwood Heritage Association Museum, Nerf Zone and laser tag attractions. There is a hotel on-site for visitors and planning permission has been secured for a number of accommodation lodges.
- 2.3 Site access is taken from Shackleton Close via a priority junction. Shackleton Close joins Cromwell Avenue/Twenty Acre Road at a four-arm roundabout. Cromwell Avenue is a Local Distributer Road (A574) accommodating north/south movement to the west of Warrington town centre.
- 2.4 Gulliver's World has approximately 1,660 parking spaces available for both visitors and staff which are divided into a mix of hardstanding and grass provided on either side of the main access road. The existing coach parking area provides space for up to 35 coaches or the equivalent of 140 car parking spaces. In addition to the main parking area, the existing hotel car parking area provides approximately 30 parking spaces inclusive of 5 disabled spaces
- 2.5 At peak times parking is stewarded for efficiency and safety. The cars are directed into spaces in blocks and once a particular area of the car park is full, further traffic is directed into the overflow car parks.
- 2.6 A review of the most recently available five-year personal injury accident data (2014 - 2018) has been undertaken to assess the number and severity of accidents that have been recorded in the vicinity of the site. There has been one serious injury accident (shown in red – see Figure 1) and six slight injury accidents (orange).

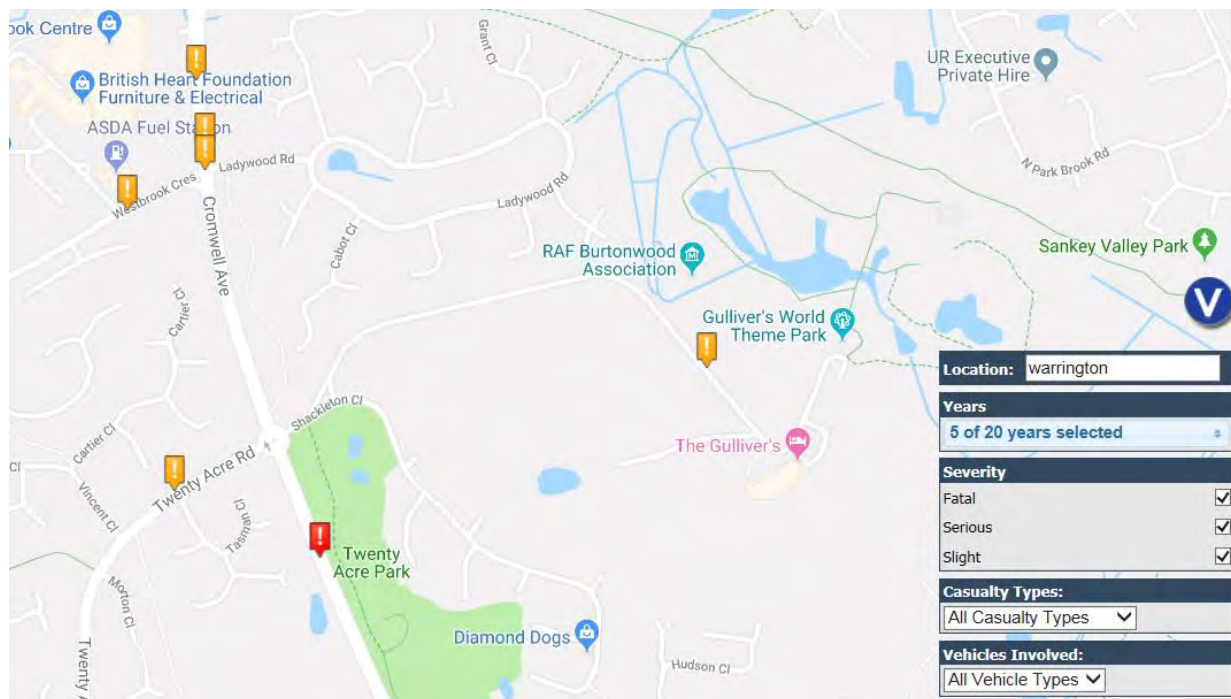


Figure 1 – Personal Injury Accidents. Source Crashmap (2014-2018)

### **3.0 THE PROPOSED MASTERPLAN**

3.1 The expansion of the site is expected to provide the following accommodation:

Visitor Accommodation:

- 75 x Eco Woodland Lodges @ 3.6m x 9.75m = 2,632.5 m<sup>2</sup>
- 4 x Double Eco Woodland Lodges @ 2.4m x 5.12m = 49.152 m<sup>2</sup>
- 4 x Group Accommodation Units @ 14m x 5.3m = 296.8 m<sup>2</sup>
- Touring caravan site (progressed under caravan site licence exemptions)

Ancillary Buildings:

- 1 x Staff Training & Development Building = 562.5 m<sup>2</sup>
- 1 x Pet Resort (day-stay and overnight kennels) = 943 m<sup>2</sup>
- 1 x Staff HQ Building @ 30m x 14m = 420 m<sup>2</sup>
- 1 x Woodland Retreat Facilities = 549 m<sup>2</sup>

Parking:

- 200 space staff car park

Existing buildings

- 1 x Woodland Management Building @ 18m x 12m = 216 m<sup>2</sup>

3.2 The proposed masterplan is illustrated in Figure 2 below:





Figure 2 – Masterplan. Source Architect plan

## **4.0 TRAFFIC GENERATION AND TRAFFIC FLOWS**

### 4.1 The proposed uses fall into 3 main categories

- Accommodation – this falls into two sub-types of accommodation, 79 lodges intended for guests – the traffic generation for these lodges are based on the traffic generation used in the Transport Assessment, undertaken by SCP, in support of the approved () planning application for 71 lodges and ancillary accommodation (2019/34295, 5<sup>th</sup> April 2019). Plus, dormitory style accommodation intended for groups such as Scouts/Guides/schools etc. It is assumed that these will arrive via coach (or minibus), the accommodation is 4 x 24 bed dormitories.
- Ancillary accommodation – this accommodation comprises staff welfare, training and related accommodation and educational facilities aimed at schools and young people (typically staying in the dormitory accommodation). The Pet Resort is day and overnight kennel accommodation for those with pets, pets can stay here whilst people visit the theme park or stay in the existing or proposed on-site accommodation. These uses are not in themselves expected to generate additional trips.
- Car parking – this is additional on-site parking for use by staff and guests at the proposed accommodation, whilst this will not generate additional trips, the parking provision makes sure that the uses being planned for this site will not cause parking capacity problems at the existing theme park car park.

### 4.2 The traffic generation for the additional accommodation has been based on the methodologies and calculations previously accepted by the Council for other Lodge accommodation on this site.

### 4.3 Building on traffic data set out in the Transport Assessment supporting the aforementioned planning application, the traffic flows from this site have been modelled as follows:

- Base traffic – based on surveys undertaken on Friday 22<sup>nd</sup> June and Saturday 23<sup>rd</sup> June 2018
- Traffic assessment year 2023 based on TEMPRO
- Traffic generation from the Phase 2 hotel and approved lodges. This was based on the information provided by Gulliver's World relating to the existing operation of the site with different arrival/departure patters for visitors and staff. This suggests 20% of visitors arriving between 16:00-17:00 and 40% departing between 10:00- 11:00. Staff movements are outside of these peak times.
- Traffic assignment to the network was based on the traffic survey data.

### 4.4 Building on traffic data set out in the Transport Assessment supporting the aforementioned planning permission. Added to which two further adjustments need to be made for this masterplan:

- Traffic growth, based on TEMPRO – growth assumed to be 10 years from 2023
  - Friday – 1.059

- Saturday – 1.066
    - The traffic generated by the proposed additional 79 lodges, assuming 100% occupancy (typical for this site is 84% occupancy). Trips pro-rata the previous Transport Assessment.
- 4.5 The site access is assumed to work given the traffic flows involved. However, the most important junction to test is the adjacent roundabout between Cromwell Avenue/Shackleton Close/Twenty Acre Road.
- 4.6 Using the industry standard ARCADY module of 'Junctions 9'. Junctions 9 models the traffic flow and calculates the Ratio of Flow to Capacity (RFC) along with an estimate of the likely traffic queues. RFC values between 0.00 and 0.85 are generally accepted as representing stable and acceptable operating conditions. Values between 0.85 and 1.00 represent variable operation (i.e. possible queues building up at the junction during the period under consideration and increases in vehicular delay moving through the junction). RFC values in excess of one indicate overloaded conditions (i.e. congestion).
- 4.7 The results of this assessment are tabulated below (see Appendix A for the full results) and compare the performance of this junction with traffic growth to 2033 and the Masterplanning, against the existing traffic flows growthed to 2023 and with the approved development traffic added to the 2023 base flow.

Arm	Friday AM (09:45-10:45)		Saturday AM (10:15-11:15)		Friday PM (15:45-16:45)		Saturday PM (16:45-17:45)	
	RFC	Queue (PCU)	RFC	Queue (PCU)	RFC	Queue (PCU)	RFC	Queue (PCU)
<b>Base 2023</b>								
Shackleton Close	0.03	0	0.05	0	0.12	0	0.38	1
Cromwell Avenue South	0.33	1	0.41	1	0.44	1	0.37	1
Twenty Acre Road	0.12	0	0.15	0	0.14	0	0.13	0
Cromwell Avenue North	0.36	1	0.55	1	0.50	1	0.41	1
<b>Base 2023 + Committed + approved Development</b>								
Shackleton Close	0.03	0	0.05	0	0.15	0	0.41	1
Cromwell Avenue South	0.33	1	0.41	1	0.44	1	0.38	1
Twenty Acre Road	0.12	0	0.15	0	0.14	0	0.13	0
Cromwell Avenue North	0.36	1	0.56	1	0.50	1	0.41	1
<b>Above plus 2033 plus Masterplan development</b>								
Shackleton Close	0.04	0	0.05	0	0.17	0	0.43	1
Cromwell Avenue South	0.36	1	0.44	1	0.47	1	0.40	1
Twenty Acre Road	0.13	0	0.17	0	0.15	0	0.14	0
Cromwell Avenue North	0.41	1	0.62	2	0.53	1	0.43	1

Table 1 – ARCADY results – Source SCP analysis using Junctions9

## 5.0 SUSTAINABLE TRANSPORT APPRAISAL

5.1 This section discusses the accessibility of the site by walking, cycling and public transport modes. As 82% of the existing workforce live within 8km of the site, they are well placed to use sustainable modes to travel to/from work. A proportion of the workforce are engaged on the Apprenticeship Programme, they will make significant use of the staff training facility but are also more dependent upon sustainable travel modes.

### Pedestrians

5.2 Walking is recognised as the most important mode of travel at a local level and it offers the greatest potential to replace short car trips, particularly under two kilometres. As such, consideration has been given to the existing pedestrian facilities in the vicinity of the proposed development.

5.3 The pedestrian accessibility of the development has been assessed based on an acceptable walking distance of 2km of the site. The accessibility of the site is shown below. The green routes in Sankey Valley Park are proposed permissive routes.

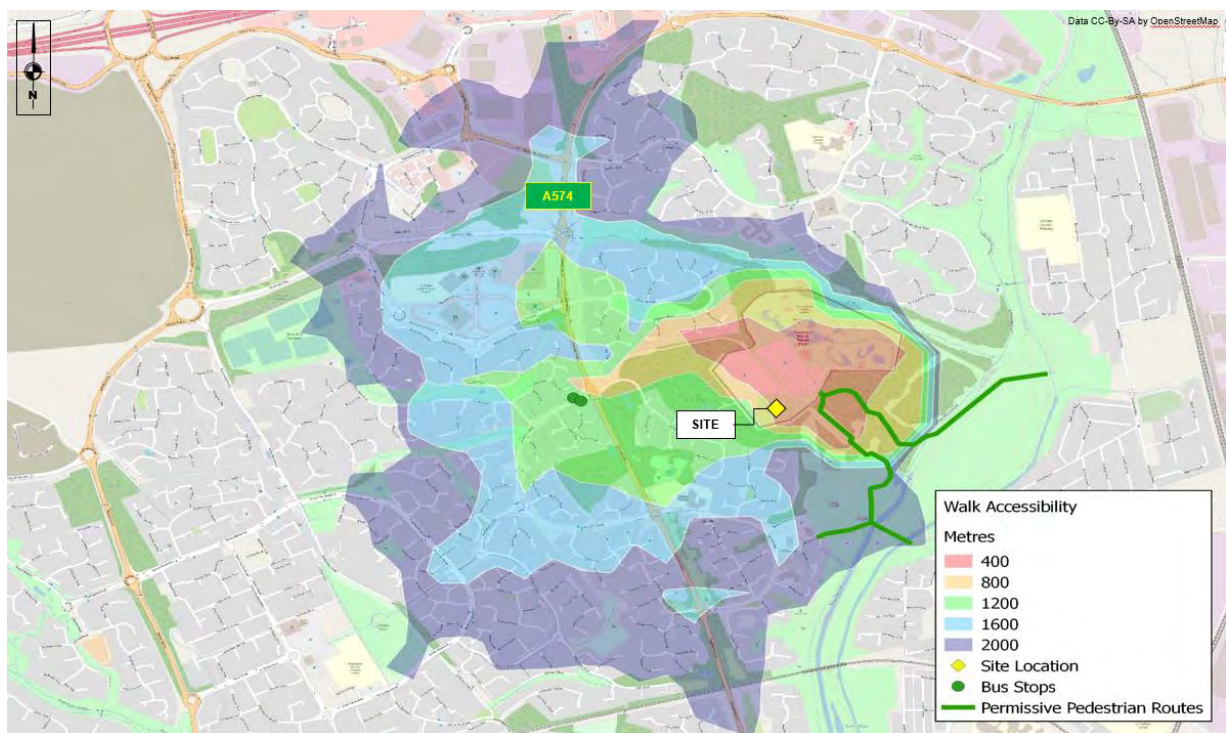


Figure 3 – Walking accessibility. Source SCP analysis using TRACC

5.4 As demonstrated on the pedestrian accessibility plan, a large residential area surrounds the site. It is within Warrington's urban area with good connection to a variety of modes of public transport to/from the site as well as other conveniences such as an ASDA supermarket which has potential to combine outings in order to reduce multiple trips for those staying overnight at the resort.

5.5 Well-lit, segregated pedestrian footways are provided along the majority of routes that surround the site and connect the site to a large local residential area. Pedestrian access already exists at the same location as the vehicular access points with a continuous pedestrian footpath provided along the site's access road from Shackleton Close.

## Cyclists

- 5.6 Transport Policy identifies that cycling represents a realistic and healthy option to use as opposed to the private car for making journeys up to 5km as a whole journey or as part of a longer journey by public transport.
- 5.7 Based on a 5km cycle isochrones from the site and is shown below. This shows that that a number of residential locations are within 5km of the development, including Warrington town centre. Therefore, cycle access to the site is a viable option for many staff and some customers.

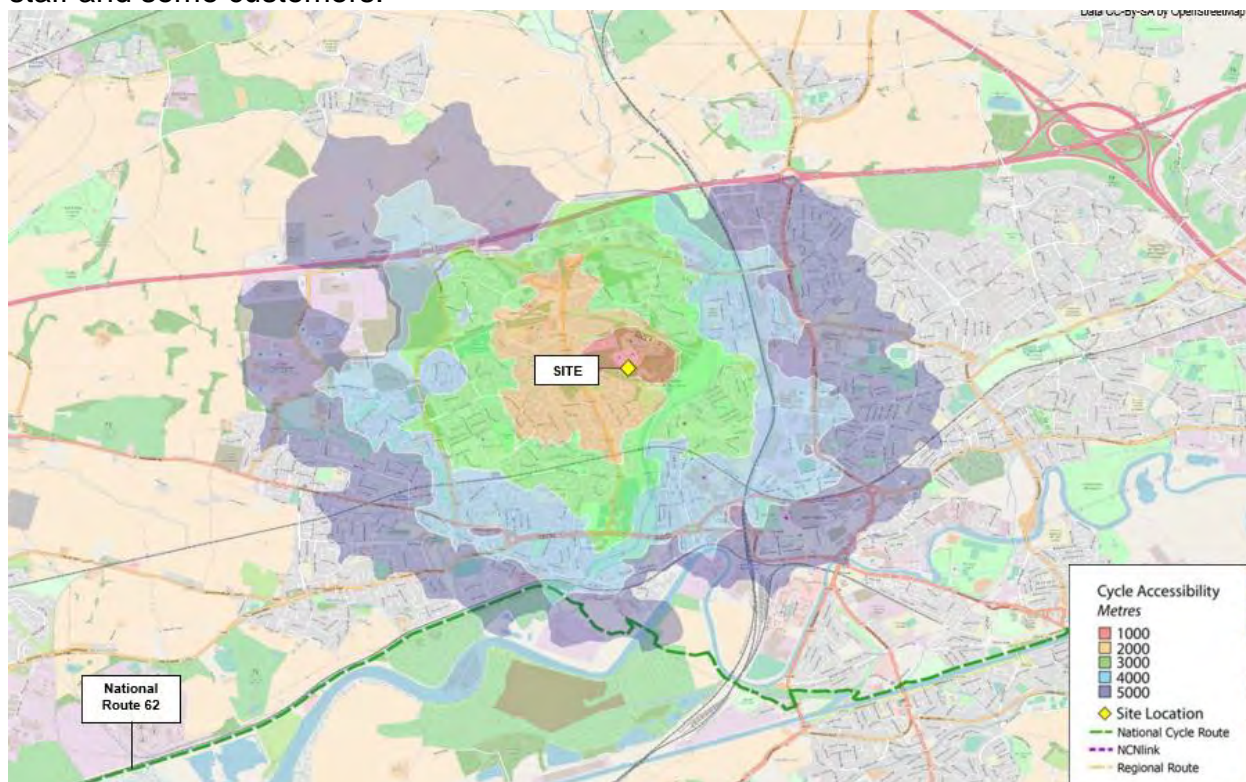


Figure 4 – Cycling accessibility. Source SCP analysis using TRACC

- 5.8 Although there are no dedicated cycle routes within the immediate vicinity of the site, the footpath on the western side of Cromwell Avenue provides a lane for cyclists in the form of a shared use combined footway / cycleway. Furthermore, the masterplan for this site is considering a new permissive pedestrian and cycle routes.

**Public Transport**

5.9 The following plan illustrates the distance that can be travelled within 60 minutes by public transport to and from the site. The time includes walk distances to the bus stops and demonstrates that the key areas of Warrington, parts of Halton, Wigan and Manchester are within an acceptable 60 minute public transport commute.

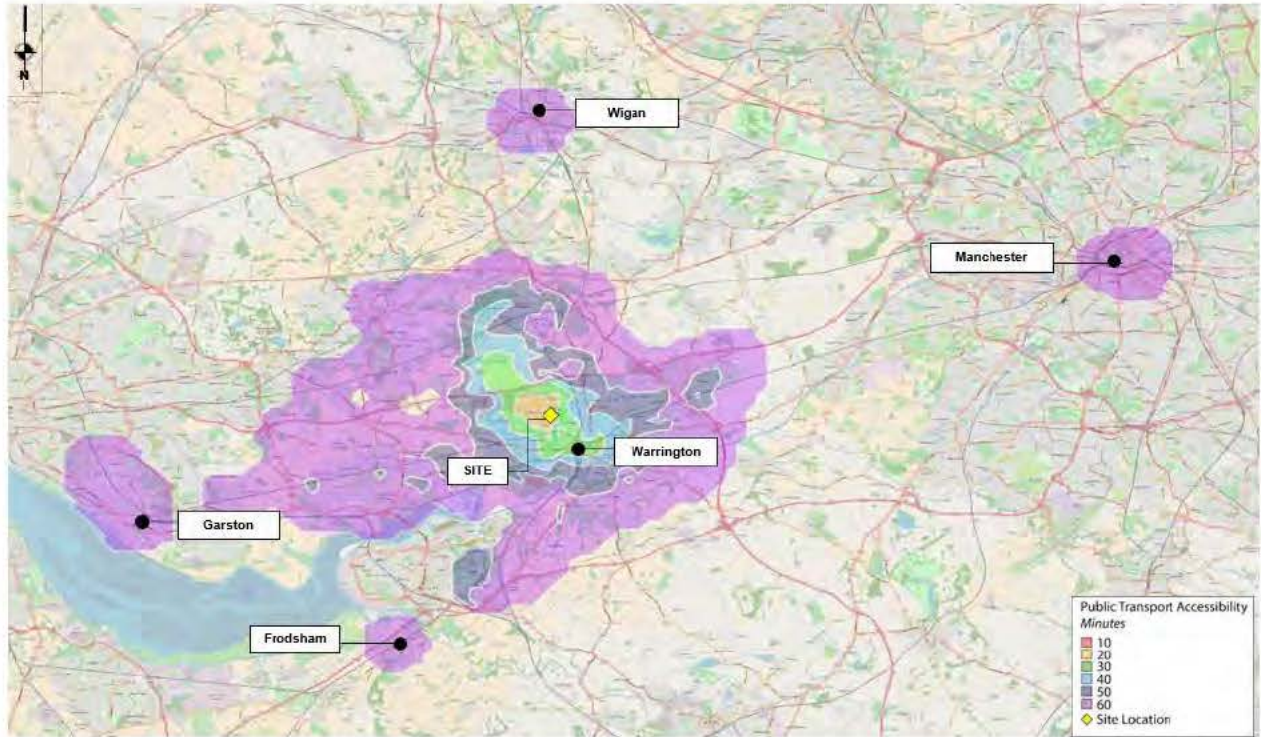


Figure 5 – Public Transport accessibility. Source SCP analysis using TRACC

**Bus**

5.10 The nearest bus stops to the site are located on Twenty Acre Road, approximately 900m to the west of the site. These bus stops are served by bus service 17 and 18. The stops serving these services are marked by a shelter and a bus bay. These bus services provide direct connections to Warrington and the surrounding area with a cumulative frequency of four buses per hour Monday to Saturday and one per hour on Sundays.

SERVICE	ROUTE	MON-FRI	SAT	SUN
17/17C	Birchwood – Hilden Island – Padgate – Warrington – Westbrook – Gemini – Callands	Every 30 minutes	Every 30 minutes	Every 60 minutes
18/18E	Warrington – Old Hall – Westbrook – Gemini – Callands	Every 30 minutes	Every 30 minutes	No service

Table 2 – Local Bus Services – Twenty Acre Road (January 2019)

## **Rail**

- 5.11 Sankey for Penketh railway station is approximately 3.4km to the south of the site. Services are roughly hourly in each direction which increase to two trains per hour in the peak hours, towards Widnes and Liverpool Lime Street to the west, and towards Warrington Central and Manchester Oxford Road to the east.
- 5.12 Further stations in the locality include Warrington Central and Warrington Bank Quay. Warrington Bank Quay is 4.18km from the site. This has major routes towards Liverpool, Manchester Piccadilly, Salford Stations, Manchester Airport (serving Cheshire suburbs of Wilmslow, Handforth and Alderley Edge) and Ellesmere Port.
- 5.13 From Sankey for Penketh railway station the most convenient method of travel to the site is via the number 13 bus which can be taken from Kingslade Road which is approximately 10 minutes on foot from the station and departed from at Boston Boulevard. From Boston Boulevard the site is an approximate 10 minute Walk.
- 5.14 Warrington Central railway station is approximately 4.3km to the south east of the site. Eight trains an hour pass through the station with the station connecting Liverpool Lime Street and Manchester Oxford Road. Bus numbers 17 and 18 can be accessed from Warrington Interchange which is an approximate 4 minute walk from the station.
- 5.15 From mid-2019 the site will become even more accessible with the opening of Warrington West Station which is located off Boston Boulevard, approximately 2.3km to the south west of the site.

## **6.0 CONCLUSIONS**

- 6.1 This Highways Supporting Statement has been prepared to support the proposed allocation of land in the emerging Warrington Local Plan for new accommodation and ancillary land uses in conjunction with the adjacent Gulliver's World.
- 6.2 This statement looks at the proposed land uses, much of which support or ancillary to existing uses on the site and therefore will not generate new trips of any measurable volume. The exception being the new visitor overnight accommodation in lodges and in dormitory accommodation. The latter is unlikely to generate material trip numbers as shared trip making is assumed.
- 6.3 The site has been shown to be accessible by sustainable transport options.
- 6.4 There are no significant road safety issues which these plans will materially impact on. No residual or cumulative adverse impacts are expected at this interim evaluation stage.
- 6.5 The immediate access onto Cromwell Avenue (A574) has been shown to be able to accommodate the anticipated traffic generated, even when base and committed development traffic is added and these are growthed to 2033.
- 6.6 There are no reasons in highway safety or capacity terms which the proposed allocation in the emerging plan should not be carried forward.



**APPENDIX A – JUNCTIONS 9 TRAFFIC CALCULATIONS**

<h1>Junctions 9</h1>
<h2>ARCADY 9 - Roundabout Module</h2>
Version: 9.0.2.5947 © Copyright TRL Limited, 2017
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<b>The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution</b>

**Filename:** Cromwell Avenue Shackleton Close Roundabout - Friday.j9  
**Path:** Z:\Job Library\2019\190324 - Gulliver's World, Lodges\Traffic Data  
**Report generation date:** 04/06/2019 15:47:03

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- »2018 Friday, AM
- »2018 Friday, PM
- »2023 Friday , AM
- »2023 Friday, PM
- »2023 + Committed Friday, AM
- »2023 + Committed Friday, PM
- »2023 + Committed + Development Friday, AM
- »2023 + Committed + Development Friday, PM
- »2033 + Committed + Development Friday [D9], AM
- »2033 + Committed + Development Friday [D10], PM

### Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
<b>2018 Friday</b>								
1 - Shackleton Close	0.0	2.68	0.03	A	0.1	3.47	0.11	A
2 - Cromwell Avenue South	0.5	2.79	0.31	A	0.7	3.53	0.41	A
3 - Twenty Acre Road	0.1	2.62	0.11	A	0.1	2.93	0.13	A
4 - Cromwell Avenue North	0.5	2.90	0.34	A	0.9	3.67	0.48	A
<b>2023 Friday</b>								
1 - Shackleton Close	0.0	2.72	0.03	A	0.1	3.58	0.12	A
2 - Cromwell Avenue South	0.5	2.87	0.33	A	0.8	3.69	0.44	A
3 - Twenty Acre Road	0.1	2.67	0.12	A	0.2	3.02	0.14	A
4 - Cromwell Avenue North	0.5	2.97	0.35	A	1.0	3.83	0.50	A
<b>2023 + Committed Friday</b>								
1 - Shackleton Close	0.0	2.72	0.03	A	0.1	3.64	0.13	A
2 - Cromwell Avenue South	0.5	2.87	0.33	A	0.8	3.71	0.44	A
3 - Twenty Acre Road	0.1	2.68	0.12	A	0.2	3.03	0.14	A
4 - Cromwell Avenue North	0.6	2.99	0.36	A	1.0	3.83	0.50	A
<b>2023 + Committed + Development Friday</b>								
1 - Shackleton Close	0.0	2.72	0.03	A	0.2	3.73	0.15	A
2 - Cromwell Avenue South	0.5	2.88	0.33	A	0.8	3.77	0.44	A
3 - Twenty Acre Road	0.1	2.68	0.12	A	0.2	3.07	0.14	A
4 - Cromwell Avenue North	0.6	3.02	0.36	A	1.0	3.83	0.50	A
<b>2023 + Committed + Development Friday [D9]</b>								
1 - Shackleton Close	0.0	2.77	0.04	A				
2 - Cromwell Avenue South	0.6	3.01	0.36	A				
3 - Twenty Acre Road	0.1	2.78	0.13	A				
4 - Cromwell Avenue North	0.7	3.30	0.41	A				
<b>2023 + Committed + Development Friday [D10]</b>								
1 - Shackleton Close					0.2	3.93	0.17	A
2 - Cromwell Avenue South					0.9	4.03	0.47	A
3 - Twenty Acre Road					0.2	3.20	0.15	A
4 - Cromwell Avenue North					1.1	4.08	0.53	A

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

### File summary

#### File Description

Title	(untitled)
Location	
Site number	
Date	27/06/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	SCP\sam.chapman
Description	

## Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

## Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

## Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2018 Friday	AM	ONE HOUR	09:30	11:00	15	✓
D2	2018 Friday	PM	ONE HOUR	15:30	17:00	15	✓
D3	2023 Friday	AM	ONE HOUR	09:30	11:00	15	✓
D4	2023 Friday	PM	ONE HOUR	15:30	17:00	15	✓
D5	2023 + Committed Friday	AM	ONE HOUR	09:30	11:00	15	✓
D6	2023 + Committed Friday	PM	ONE HOUR	15:30	17:00	15	✓
D7	2023 + Committed + Development Friday	AM	ONE HOUR	09:30	11:00	15	✓
D8	2023 + Committed + Development Friday	PM	ONE HOUR	15:30	17:00	15	✓
D9	2033 + Committed + Development Friday [D9]	AM	ONE HOUR	09:30	11:00	15	✓
D10	2033 + Committed + Development Friday [D10]	PM	ONE HOUR	15:30	17:00	15	✓

## Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

# 2018 Friday, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	2.81	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Arms

### Arms

Arm	Name	Description
1	Shackleton Close	
2	Cromwell Avenue South	
3	Twenty Acre Road	
4	Cromwell Avenue North	

### Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Shackleton Close	2.90	7.30	22.0	27.0	32.0	22.5	
2 - Cromwell Avenue South	3.75	7.70	24.6	16.5	32.0	22.0	
3 - Twenty Acre Road	3.65	7.50	27.0	22.0	32.0	20.5	
4 - Cromwell Avenue North	3.67	7.71	21.0	18.0	32.0	23.0	

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - Shackleton Close	0.679	1757
2 - Cromwell Avenue South	0.714	1960
3 - Twenty Acre Road	0.724	1978
4 - Cromwell Avenue North	0.703	1905

*The slope and intercept shown above include any corrections and adjustments.*

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2018 Friday	AM	ONE HOUR	09:30	11:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	40	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	534	100.000
3 - Twenty Acre Road		ONE HOUR	✓	155	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	572	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	16	3	21
	2 - Cromwell Avenue South	26	0	12	496
	3 - Twenty Acre Road	2	14	0	139
	4 - Cromwell Avenue North	91	398	83	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.03	2.68	0.0	A	37	55
2 - Cromwell Avenue South	0.31	2.79	0.5	A	490	735
3 - Twenty Acre Road	0.11	2.62	0.1	A	142	213
4 - Cromwell Avenue North	0.34	2.90	0.5	A	525	787

### Main Results for each time segment

#### 09:30 - 09:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	30	8	372	1505	0.020	30	89	0.0	0.0	2.441	A
2 - Cromwell Avenue South	402	101	80	1903	0.211	401	321	0.0	0.3	2.396	A
3 - Twenty Acre Road	117	29	408	1683	0.069	116	74	0.0	0.1	2.297	A
4 - Cromwell Avenue North	431	108	32	1883	0.229	429	493	0.0	0.3	2.474	A

## 09:45 - 10:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	36	9	445	1455	0.025	36	107	0.0	0.0	2.536	A
2 - Cromwell Avenue South	480	120	96	1892	0.254	480	385	0.3	0.3	2.549	A
3 - Twenty Acre Road	139	35	488	1625	0.086	139	88	0.1	0.1	2.422	A
4 - Cromwell Avenue North	514	129	38	1878	0.274	514	589	0.3	0.4	2.638	A

## 10:00 - 10:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	44	11	545	1387	0.032	44	131	0.0	0.0	2.679	A
2 - Cromwell Avenue South	588	147	118	1876	0.313	587	471	0.3	0.5	2.793	A
3 - Twenty Acre Road	171	43	597	1546	0.110	171	108	0.1	0.1	2.617	A
4 - Cromwell Avenue North	630	157	46	1872	0.336	629	722	0.4	0.5	2.894	A

## 10:15 - 10:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	44	11	545	1387	0.032	44	131	0.0	0.0	2.680	A
2 - Cromwell Avenue South	588	147	118	1876	0.313	588	471	0.5	0.5	2.793	A
3 - Twenty Acre Road	171	43	598	1545	0.110	171	108	0.1	0.1	2.618	A
4 - Cromwell Avenue North	630	157	46	1872	0.336	630	722	0.5	0.5	2.896	A

## 10:30 - 10:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	36	9	445	1455	0.025	36	107	0.0	0.0	2.537	A
2 - Cromwell Avenue South	480	120	96	1892	0.254	481	385	0.5	0.3	2.553	A
3 - Twenty Acre Road	139	35	489	1625	0.086	139	88	0.1	0.1	2.425	A
4 - Cromwell Avenue North	514	129	38	1878	0.274	515	590	0.5	0.4	2.642	A

## 10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	30	8	373	1504	0.020	30	90	0.0	0.0	2.444	A
2 - Cromwell Avenue South	402	101	81	1903	0.211	402	322	0.3	0.3	2.401	A
3 - Twenty Acre Road	117	29	409	1682	0.069	117	74	0.1	0.1	2.299	A
4 - Cromwell Avenue North	431	108	32	1883	0.229	431	494	0.4	0.3	2.481	A

# 2018 Friday, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.53	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2018 Friday	PM	ONE HOUR	15:30	17:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	117	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	655	100.000
3 - Twenty Acre Road		ONE HOUR	✓	162	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	814	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	30	6	81
	2 - Cromwell Avenue South	19	0	19	617
	3 - Twenty Acre Road	4	12	0	146
	4 - Cromwell Avenue North	35	586	193	0

## Vehicle Mix



### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.11	3.47	0.1	A	107	161
2 - Cromwell Avenue South	0.41	3.53	0.7	A	601	902
3 - Twenty Acre Road	0.13	2.93	0.1	A	149	223
4 - Cromwell Avenue North	0.48	3.67	0.9	A	747	1120

### Main Results for each time segment

#### 15:30 - 15:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	88	22	594	1354	0.065	88	44	0.0	0.1	2.843	A
2 - Cromwell Avenue South	493	123	210	1810	0.272	492	471	0.0	0.4	2.728	A
3 - Twenty Acre Road	122	30	538	1589	0.077	122	164	0.0	0.1	2.453	A
4 - Cromwell Avenue North	613	153	26	1886	0.325	611	634	0.0	0.5	2.819	A

#### 15:45 - 16:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	105	26	710	1274	0.083	105	52	0.1	0.1	3.078	A
2 - Cromwell Avenue South	589	147	252	1781	0.331	588	564	0.4	0.5	3.017	A
3 - Twenty Acre Road	146	36	644	1512	0.096	146	196	0.1	0.1	2.634	A
4 - Cromwell Avenue North	732	183	31	1883	0.389	731	758	0.5	0.6	3.124	A

#### 16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	129	32	870	1166	0.110	129	64	0.1	0.1	3.469	A
2 - Cromwell Avenue South	721	180	308	1740	0.414	720	691	0.5	0.7	3.525	A
3 - Twenty Acre Road	178	45	789	1407	0.127	178	240	0.1	0.1	2.928	A
4 - Cromwell Avenue North	896	224	38	1878	0.477	895	928	0.6	0.9	3.660	A

#### 16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	129	32	871	1165	0.111	129	64	0.1	0.1	3.471	A
2 - Cromwell Avenue South	721	180	308	1740	0.414	721	691	0.7	0.7	3.531	A
3 - Twenty Acre Road	178	45	789	1407	0.127	178	240	0.1	0.1	2.929	A
4 - Cromwell Avenue North	896	224	39	1878	0.477	896	929	0.9	0.9	3.666	A

**16:30 - 16:45**

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	105	26	712	1273	0.083	105	52	0.1	0.1	3.084	A
2 - Cromwell Avenue South	589	147	252	1780	0.331	590	565	0.7	0.5	3.024	A
3 - Twenty Acre Road	146	36	645	1511	0.096	146	196	0.1	0.1	2.638	A
4 - Cromwell Avenue North	732	183	32	1883	0.389	733	760	0.9	0.6	3.132	A

**16:45 - 17:00**

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	88	22	596	1352	0.065	88	44	0.1	0.1	2.847	A
2 - Cromwell Avenue South	493	123	211	1810	0.272	494	473	0.5	0.4	2.737	A
3 - Twenty Acre Road	122	30	540	1587	0.077	122	164	0.1	0.1	2.456	A
4 - Cromwell Avenue North	613	153	26	1886	0.325	613	636	0.6	0.5	2.828	A

# 2023 Friday , AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	2.88	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	2023 Friday	AM	ONE HOUR	09:30	11:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	42	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	560	100.000
3 - Twenty Acre Road		ONE HOUR	✓	163	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	599	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	17	3	22
	2 - Cromwell Avenue South	27	0	13	520
	3 - Twenty Acre Road	2	15	0	146
	4 - Cromwell Avenue North	95	417	87	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.03	2.72	0.0	A	39	58
2 - Cromwell Avenue South	0.33	2.87	0.5	A	514	771
3 - Twenty Acre Road	0.12	2.67	0.1	A	150	224
4 - Cromwell Avenue North	0.35	2.97	0.5	A	550	824

### Main Results for each time segment

#### 09:30 - 09:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	32	8	390	1492	0.021	32	93	0.0	0.0	2.463	A
2 - Cromwell Avenue South	422	105	84	1900	0.222	420	337	0.0	0.3	2.432	A
3 - Twenty Acre Road	123	31	427	1669	0.074	122	77	0.0	0.1	2.327	A
4 - Cromwell Avenue North	451	113	33	1882	0.240	450	517	0.0	0.3	2.511	A

#### 09:45 - 10:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	38	9	466	1440	0.026	38	111	0.0	0.0	2.566	A
2 - Cromwell Avenue South	503	126	101	1889	0.267	503	403	0.3	0.4	2.598	A
3 - Twenty Acre Road	147	37	511	1608	0.091	146	93	0.1	0.1	2.462	A
4 - Cromwell Avenue North	538	135	40	1877	0.287	538	618	0.3	0.4	2.688	A

#### 10:00 - 10:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	46	12	571	1369	0.034	46	136	0.0	0.0	2.720	A
2 - Cromwell Avenue South	617	154	123	1872	0.329	616	494	0.4	0.5	2.863	A
3 - Twenty Acre Road	179	45	626	1525	0.118	179	113	0.1	0.1	2.674	A
4 - Cromwell Avenue North	660	165	48	1871	0.353	659	757	0.4	0.5	2.968	A

#### 10:15 - 10:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	46	12	571	1369	0.034	46	137	0.0	0.0	2.721	A
2 - Cromwell Avenue South	617	154	123	1872	0.329	617	494	0.5	0.5	2.866	A
3 - Twenty Acre Road	179	45	626	1525	0.118	179	113	0.1	0.1	2.675	A
4 - Cromwell Avenue North	660	165	48	1871	0.353	660	757	0.5	0.5	2.971	A

10:30 - 10:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	38	9	467	1440	0.026	38	112	0.0	0.0	2.569	A
2 - Cromwell Avenue South	503	126	101	1888	0.267	504	404	0.5	0.4	2.600	A
3 - Twenty Acre Road	147	37	512	1608	0.091	147	93	0.1	0.1	2.463	A
4 - Cromwell Avenue North	538	135	40	1877	0.287	539	619	0.5	0.4	2.691	A

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	32	8	391	1491	0.021	32	93	0.0	0.0	2.467	A
2 - Cromwell Avenue South	422	105	84	1900	0.222	422	338	0.4	0.3	2.437	A
3 - Twenty Acre Road	123	31	429	1668	0.074	123	78	0.1	0.1	2.331	A
4 - Cromwell Avenue North	451	113	33	1882	0.240	451	518	0.4	0.3	2.519	A

# 2023 Friday, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.69	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	2023 Friday	PM	ONE HOUR	15:30	17:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	122	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	685	100.000
3 - Twenty Acre Road		ONE HOUR	✓	170	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	851	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	31	6	85
	2 - Cromwell Avenue South	20	0	20	645
	3 - Twenty Acre Road	4	13	0	153
	4 - Cromwell Avenue North	37	612	202	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.12	3.58	0.1	A	112	168
2 - Cromwell Avenue South	0.44	3.69	0.8	A	629	943
3 - Twenty Acre Road	0.14	3.02	0.2	A	156	234
4 - Cromwell Avenue North	0.50	3.83	1.0	A	781	1171

### Main Results for each time segment

#### 15:30 - 15:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	92	23	621	1336	0.069	92	46	0.0	0.1	2.894	A
2 - Cromwell Avenue South	516	129	220	1803	0.286	514	492	0.0	0.4	2.788	A
3 - Twenty Acre Road	128	32	563	1571	0.081	128	171	0.0	0.1	2.494	A
4 - Cromwell Avenue North	641	160	28	1885	0.340	639	663	0.0	0.5	2.882	A

#### 15:45 - 16:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	110	27	743	1253	0.088	110	55	0.1	0.1	3.149	A
2 - Cromwell Avenue South	616	154	263	1772	0.347	615	589	0.4	0.5	3.109	A
3 - Twenty Acre Road	153	38	674	1491	0.103	153	205	0.1	0.1	2.690	A
4 - Cromwell Avenue North	765	191	33	1882	0.407	764	793	0.5	0.7	3.220	A

#### 16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	134	34	909	1139	0.118	134	67	0.1	0.1	3.581	A
2 - Cromwell Avenue South	754	189	322	1730	0.436	753	721	0.5	0.8	3.681	A
3 - Twenty Acre Road	187	47	825	1381	0.136	187	251	0.1	0.2	3.014	A
4 - Cromwell Avenue North	937	234	41	1876	0.499	936	971	0.7	1.0	3.822	A

#### 16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	134	34	911	1139	0.118	134	67	0.1	0.1	3.583	A
2 - Cromwell Avenue South	754	189	323	1730	0.436	754	722	0.8	0.8	3.688	A
3 - Twenty Acre Road	187	47	826	1380	0.136	187	251	0.2	0.2	3.016	A
4 - Cromwell Avenue North	937	234	41	1876	0.499	937	972	1.0	1.0	3.831	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	110	27	745	1251	0.088	110	55	0.1	0.1	3.153	A
2 - Cromwell Avenue South	616	154	264	1772	0.348	617	591	0.8	0.5	3.118	A
3 - Twenty Acre Road	153	38	675	1489	0.103	153	205	0.2	0.1	2.695	A
4 - Cromwell Avenue North	765	191	33	1882	0.407	766	795	1.0	0.7	3.230	A

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	92	23	623	1334	0.069	92	46	0.1	0.1	2.898	A
2 - Cromwell Avenue South	516	129	221	1803	0.286	516	494	0.5	0.4	2.799	A
3 - Twenty Acre Road	128	32	565	1569	0.082	128	172	0.1	0.1	2.499	A
4 - Cromwell Avenue North	641	160	28	1885	0.340	641	665	0.7	0.5	2.897	A



# 2023 + Committed Friday, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	2.89	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	2023 + Committed Friday	AM	ONE HOUR	09:30	11:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	42	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	562	100.000
3 - Twenty Acre Road		ONE HOUR	✓	163	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	604	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	17	3	22
	2 - Cromwell Avenue South	29	0	13	520
	3 - Twenty Acre Road	2	15	0	146
	4 - Cromwell Avenue North	100	417	87	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.03	2.72	0.0	A	39	58
2 - Cromwell Avenue South	0.33	2.87	0.5	A	516	774
3 - Twenty Acre Road	0.12	2.68	0.1	A	150	224
4 - Cromwell Avenue North	0.36	2.99	0.6	A	554	831

### Main Results for each time segment

#### 09:30 - 09:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	32	8	390	1492	0.021	32	98	0.0	0.0	2.463	A
2 - Cromwell Avenue South	423	106	84	1900	0.223	422	337	0.0	0.3	2.434	A
3 - Twenty Acre Road	123	31	429	1668	0.074	122	77	0.0	0.1	2.329	A
4 - Cromwell Avenue North	455	114	35	1881	0.242	453	517	0.0	0.3	2.520	A

#### 09:45 - 10:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	38	9	466	1440	0.026	38	118	0.0	0.0	2.566	A
2 - Cromwell Avenue South	505	126	101	1889	0.268	505	403	0.3	0.4	2.601	A
3 - Twenty Acre Road	147	37	513	1607	0.091	146	93	0.1	0.1	2.464	A
4 - Cromwell Avenue North	543	136	41	1876	0.289	543	618	0.3	0.4	2.700	A

#### 10:00 - 10:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	46	12	571	1369	0.034	46	144	0.0	0.0	2.720	A
2 - Cromwell Avenue South	619	155	123	1872	0.330	618	494	0.4	0.5	2.868	A
3 - Twenty Acre Road	179	45	628	1524	0.118	179	113	0.1	0.1	2.677	A
4 - Cromwell Avenue North	665	166	51	1869	0.356	664	757	0.4	0.5	2.986	A

#### 10:15 - 10:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	46	12	571	1369	0.034	46	144	0.0	0.0	2.721	A
2 - Cromwell Avenue South	619	155	123	1872	0.330	619	494	0.5	0.5	2.871	A
3 - Twenty Acre Road	179	45	629	1523	0.118	179	113	0.1	0.1	2.678	A
4 - Cromwell Avenue North	665	166	51	1869	0.356	665	757	0.5	0.6	2.988	A

10:30 - 10:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	38	9	467	1440	0.026	38	118	0.0	0.0	2.569	A
2 - Cromwell Avenue South	505	126	101	1888	0.268	506	404	0.5	0.4	2.606	A
3 - Twenty Acre Road	147	37	514	1606	0.091	147	93	0.1	0.1	2.468	A
4 - Cromwell Avenue North	543	136	41	1876	0.289	544	619	0.6	0.4	2.702	A

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	32	8	391	1491	0.021	32	99	0.0	0.0	2.465	A
2 - Cromwell Avenue South	423	106	84	1900	0.223	423	338	0.4	0.3	2.437	A
3 - Twenty Acre Road	123	31	430	1667	0.074	123	78	0.1	0.1	2.333	A
4 - Cromwell Avenue North	455	114	35	1881	0.242	455	518	0.4	0.3	2.527	A

# 2023 + Committed Friday, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.70	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	2023 + Committed Friday	PM	ONE HOUR	15:30	17:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	135	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	685	100.000
3 - Twenty Acre Road		ONE HOUR	✓	170	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	851	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	35	7	93
	2 - Cromwell Avenue South	20	0	20	645
	3 - Twenty Acre Road	4	13	0	153
	4 - Cromwell Avenue North	37	612	202	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.13	3.64	0.1	A	124	186
2 - Cromwell Avenue South	0.44	3.71	0.8	A	629	943
3 - Twenty Acre Road	0.14	3.03	0.2	A	156	234
4 - Cromwell Avenue North	0.50	3.83	1.0	A	781	1171

### Main Results for each time segment

#### 15:30 - 15:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	102	25	621	1336	0.076	101	46	0.0	0.1	2.917	A
2 - Cromwell Avenue South	516	129	227	1799	0.287	514	495	0.0	0.4	2.799	A
3 - Twenty Acre Road	128	32	569	1566	0.082	128	172	0.0	0.1	2.502	A
4 - Cromwell Avenue North	641	160	28	1885	0.340	639	669	0.0	0.5	2.882	A

#### 15:45 - 16:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	121	30	743	1253	0.097	121	55	0.1	0.1	3.181	A
2 - Cromwell Avenue South	616	154	271	1767	0.349	615	593	0.4	0.5	3.124	A
3 - Twenty Acre Road	153	38	681	1485	0.103	153	206	0.1	0.1	2.701	A
4 - Cromwell Avenue North	765	191	33	1882	0.407	764	800	0.5	0.7	3.220	A

#### 16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	149	37	909	1139	0.130	148	67	0.1	0.1	3.632	A
2 - Cromwell Avenue South	754	189	332	1723	0.438	753	726	0.5	0.8	3.708	A
3 - Twenty Acre Road	187	47	834	1375	0.136	187	252	0.1	0.2	3.030	A
4 - Cromwell Avenue North	937	234	41	1876	0.499	936	980	0.7	1.0	3.822	A

#### 16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	149	37	911	1139	0.131	149	67	0.1	0.1	3.635	A
2 - Cromwell Avenue South	754	189	333	1723	0.438	754	727	0.8	0.8	3.715	A
3 - Twenty Acre Road	187	47	835	1374	0.136	187	252	0.2	0.2	3.032	A
4 - Cromwell Avenue North	937	234	41	1876	0.499	937	981	1.0	1.0	3.831	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	121	30	745	1251	0.097	122	55	0.1	0.1	3.186	A
2 - Cromwell Avenue South	616	154	272	1766	0.349	617	594	0.8	0.5	3.136	A
3 - Twenty Acre Road	153	38	682	1484	0.103	153	206	0.2	0.1	2.706	A
4 - Cromwell Avenue North	765	191	33	1882	0.407	766	802	1.0	0.7	3.230	A

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	102	25	623	1334	0.076	102	46	0.1	0.1	2.921	A
2 - Cromwell Avenue South	516	129	228	1798	0.287	516	497	0.5	0.4	2.809	A
3 - Twenty Acre Road	128	32	571	1565	0.082	128	173	0.1	0.1	2.507	A
4 - Cromwell Avenue North	641	160	28	1885	0.340	641	671	0.7	0.5	2.897	A

# 2023 + Committed + Development Friday, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	2.91	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D7	2023 + Committed + Development Friday	AM	ONE HOUR	09:30	11:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	42	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	564	100.000
3 - Twenty Acre Road		ONE HOUR	✓	163	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	613	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	17	3	22
	2 - Cromwell Avenue South	31	0	13	520
	3 - Twenty Acre Road	2	15	0	146
	4 - Cromwell Avenue North	109	417	87	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.03	2.72	0.0	A	39	58
2 - Cromwell Avenue South	0.33	2.88	0.5	A	518	776
3 - Twenty Acre Road	0.12	2.68	0.1	A	150	224
4 - Cromwell Avenue North	0.36	3.02	0.6	A	562	844

### Main Results for each time segment

#### 09:30 - 09:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	32	8	390	1492	0.021	32	107	0.0	0.0	2.463	A
2 - Cromwell Avenue South	425	106	84	1900	0.223	423	337	0.0	0.3	2.438	A
3 - Twenty Acre Road	123	31	430	1667	0.074	122	77	0.0	0.1	2.331	A
4 - Cromwell Avenue North	461	115	36	1880	0.246	460	517	0.0	0.3	2.534	A

#### 09:45 - 10:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	38	9	466	1440	0.026	38	128	0.0	0.0	2.566	A
2 - Cromwell Avenue South	507	127	101	1889	0.268	507	403	0.3	0.4	2.605	A
3 - Twenty Acre Road	147	37	515	1606	0.091	146	93	0.1	0.1	2.466	A
4 - Cromwell Avenue North	551	138	43	1875	0.294	551	618	0.3	0.4	2.719	A

#### 10:00 - 10:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	46	12	571	1369	0.034	46	156	0.0	0.0	2.720	A
2 - Cromwell Avenue South	621	155	123	1872	0.332	620	494	0.4	0.5	2.873	A
3 - Twenty Acre Road	179	45	630	1522	0.118	179	113	0.1	0.1	2.681	A
4 - Cromwell Avenue North	675	169	53	1868	0.361	674	757	0.4	0.6	3.014	A

#### 10:15 - 10:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	46	12	571	1369	0.034	46	156	0.0	0.0	2.721	A
2 - Cromwell Avenue South	621	155	123	1872	0.332	621	494	0.5	0.5	2.876	A
3 - Twenty Acre Road	179	45	631	1522	0.118	179	113	0.1	0.1	2.681	A
4 - Cromwell Avenue North	675	169	53	1868	0.361	675	757	0.6	0.6	3.017	A



10:30 - 10:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	38	9	467	1440	0.026	38	128	0.0	0.0	2.569	A
2 - Cromwell Avenue South	507	127	101	1888	0.269	508	404	0.5	0.4	2.609	A
3 - Twenty Acre Road	147	37	516	1605	0.091	147	93	0.1	0.1	2.468	A
4 - Cromwell Avenue North	551	138	43	1875	0.294	552	619	0.6	0.4	2.724	A

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	32	8	391	1491	0.021	32	107	0.0	0.0	2.467	A
2 - Cromwell Avenue South	425	106	84	1900	0.223	425	338	0.4	0.3	2.440	A
3 - Twenty Acre Road	123	31	432	1666	0.074	123	78	0.1	0.1	2.334	A
4 - Cromwell Avenue North	461	115	36	1880	0.246	462	518	0.4	0.3	2.541	A

# 2023 + Committed + Development Friday, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.73	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D8	2023 + Committed + Development Friday	PM	ONE HOUR	15:30	17:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	159	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	685	100.000
3 - Twenty Acre Road		ONE HOUR	✓	170	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	851	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	41	8	110
	2 - Cromwell Avenue South	20	0	20	645
	3 - Twenty Acre Road	4	13	0	153
	4 - Cromwell Avenue North	37	612	202	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.15	3.73	0.2	A	146	219
2 - Cromwell Avenue South	0.44	3.77	0.8	A	629	943
3 - Twenty Acre Road	0.14	3.07	0.2	A	156	234
4 - Cromwell Avenue North	0.50	3.83	1.0	A	781	1171

### Main Results for each time segment

#### 15:30 - 15:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	120	30	621	1336	0.090	119	46	0.0	0.1	2.960	A
2 - Cromwell Avenue South	516	129	240	1789	0.288	514	500	0.0	0.4	2.820	A
3 - Twenty Acre Road	128	32	582	1557	0.082	128	173	0.0	0.1	2.518	A
4 - Cromwell Avenue North	641	160	28	1885	0.340	639	681	0.0	0.5	2.882	A

#### 15:45 - 16:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	143	36	743	1253	0.114	143	55	0.1	0.1	3.243	A
2 - Cromwell Avenue South	616	154	287	1755	0.351	615	598	0.4	0.5	3.156	A
3 - Twenty Acre Road	153	38	696	1474	0.104	153	207	0.1	0.1	2.723	A
4 - Cromwell Avenue North	765	191	33	1882	0.407	764	816	0.5	0.7	3.220	A

#### 16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	175	44	909	1139	0.154	175	67	0.1	0.2	3.732	A
2 - Cromwell Avenue South	754	189	352	1709	0.441	753	732	0.5	0.8	3.763	A
3 - Twenty Acre Road	187	47	852	1361	0.137	187	253	0.1	0.2	3.065	A
4 - Cromwell Avenue North	937	234	41	1876	0.499	936	998	0.7	1.0	3.822	A

#### 16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	175	44	911	1139	0.154	175	67	0.2	0.2	3.735	A
2 - Cromwell Avenue South	754	189	352	1709	0.441	754	733	0.8	0.8	3.770	A
3 - Twenty Acre Road	187	47	853	1361	0.138	187	253	0.2	0.2	3.067	A
4 - Cromwell Avenue North	937	234	41	1876	0.499	937	1000	1.0	1.0	3.831	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	143	36	745	1251	0.114	143	55	0.2	0.1	3.251	A
2 - Cromwell Avenue South	616	154	288	1755	0.351	617	600	0.8	0.5	3.168	A
3 - Twenty Acre Road	153	38	698	1473	0.104	153	207	0.2	0.1	2.726	A
4 - Cromwell Avenue North	765	191	33	1882	0.407	766	817	1.0	0.7	3.233	A

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	120	30	623	1334	0.090	120	46	0.1	0.1	2.967	A
2 - Cromwell Avenue South	516	129	241	1788	0.288	516	502	0.5	0.4	2.831	A
3 - Twenty Acre Road	128	32	584	1555	0.082	128	173	0.1	0.1	2.521	A
4 - Cromwell Avenue North	641	160	28	1885	0.340	641	684	0.7	0.5	2.897	A

# 2033 + Committed + Development Friday [D9], AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.11	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D9	2033 + Committed + Development Friday [D9]	AM	ONE HOUR	09:30	11:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	44	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	611	100.000
3 - Twenty Acre Road		ONE HOUR	✓	173	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	694	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	18	3	23
	2 - Cromwell Avenue South	46	0	14	551
	3 - Twenty Acre Road	4	15	0	154
	4 - Cromwell Avenue North	160	442	92	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.04	2.77	0.0	A	40	61
2 - Cromwell Avenue South	0.36	3.01	0.6	A	561	841
3 - Twenty Acre Road	0.13	2.78	0.1	A	159	238
4 - Cromwell Avenue North	0.41	3.30	0.7	A	637	955

### Main Results for each time segment

#### 09:30 - 09:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	33	8	412	1477	0.022	33	158	0.0	0.0	2.492	A
2 - Cromwell Avenue South	460	115	89	1897	0.242	459	357	0.0	0.3	2.500	A
3 - Twenty Acre Road	130	33	465	1641	0.079	130	82	0.0	0.1	2.381	A
4 - Cromwell Avenue North	522	131	49	1871	0.279	521	547	0.0	0.4	2.665	A

#### 09:45 - 10:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	40	10	493	1422	0.028	40	189	0.0	0.0	2.603	A
2 - Cromwell Avenue South	549	137	106	1885	0.291	549	427	0.3	0.4	2.695	A
3 - Twenty Acre Road	156	39	557	1575	0.099	155	98	0.1	0.1	2.535	A
4 - Cromwell Avenue North	624	156	58	1864	0.335	623	654	0.4	0.5	2.902	A

#### 10:00 - 10:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	48	12	604	1347	0.036	48	231	0.0	0.0	2.771	A
2 - Cromwell Avenue South	673	168	130	1868	0.360	672	522	0.4	0.6	3.009	A
3 - Twenty Acre Road	190	48	682	1485	0.128	190	120	0.1	0.1	2.781	A
4 - Cromwell Avenue North	764	191	72	1855	0.412	763	801	0.5	0.7	3.297	A

#### 10:15 - 10:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	48	12	604	1346	0.036	48	231	0.0	0.0	2.772	A
2 - Cromwell Avenue South	673	168	130	1868	0.360	673	523	0.6	0.6	3.012	A
3 - Twenty Acre Road	190	48	683	1484	0.128	190	120	0.1	0.1	2.782	A
4 - Cromwell Avenue North	764	191	72	1855	0.412	764	802	0.7	0.7	3.300	A

10:30 - 10:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	40	10	494	1421	0.028	40	189	0.0	0.0	2.604	A
2 - Cromwell Avenue South	549	137	106	1885	0.291	550	428	0.6	0.4	2.700	A
3 - Twenty Acre Road	156	39	558	1574	0.099	156	98	0.1	0.1	2.539	A
4 - Cromwell Avenue North	624	156	58	1864	0.335	625	655	0.7	0.5	2.908	A

10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	33	8	414	1476	0.022	33	158	0.0	0.0	2.496	A
2 - Cromwell Avenue South	460	115	89	1897	0.243	460	358	0.4	0.3	2.508	A
3 - Twenty Acre Road	130	33	467	1640	0.079	130	82	0.1	0.1	2.386	A
4 - Cromwell Avenue North	522	131	49	1871	0.279	523	549	0.5	0.4	2.673	A

# 2033 + Committed + Development Friday [D10], PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.97	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D10	2033 + Committed + Development Friday [D10]	PM	ONE HOUR	15:30	17:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	169	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	726	100.000
3 - Twenty Acre Road		ONE HOUR	✓	180	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	902	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	43	9	117
	2 - Cromwell Avenue South	21	0	21	684
	3 - Twenty Acre Road	4	14	0	162
	4 - Cromwell Avenue North	39	649	214	0

## Vehicle Mix



### Heavy Vehicle Percentages

From	To			
	1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
1 - Shackleton Close	0	0	0	0
2 - Cromwell Avenue South	0	0	0	0
3 - Twenty Acre Road	0	0	0	0
4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.17	3.93	0.2	A	155	233
2 - Cromwell Avenue South	0.47	4.03	0.9	A	666	999
3 - Twenty Acre Road	0.15	3.20	0.2	A	165	248
4 - Cromwell Avenue North	0.53	4.08	1.1	A	828	1242

### Main Results for each time segment

#### 15:30 - 15:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	127	32	658	1310	0.097	127	48	0.0	0.1	3.042	A
2 - Cromwell Avenue South	547	137	255	1778	0.307	545	530	0.0	0.4	2.915	A
3 - Twenty Acre Road	136	34	617	1532	0.088	135	183	0.0	0.1	2.577	A
4 - Cromwell Avenue North	679	170	29	1884	0.360	677	723	0.0	0.6	2.976	A

#### 15:45 - 16:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	152	38	788	1222	0.124	152	57	0.1	0.1	3.363	A
2 - Cromwell Avenue South	653	163	305	1742	0.375	652	634	0.4	0.6	3.300	A
3 - Twenty Acre Road	162	40	738	1444	0.112	162	219	0.1	0.1	2.807	A
4 - Cromwell Avenue North	811	203	35	1880	0.431	810	865	0.6	0.8	3.362	A

#### 16:00 - 16:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	186	47	964	1102	0.169	186	70	0.1	0.2	3.928	A
2 - Cromwell Avenue South	799	200	374	1693	0.472	798	776	0.6	0.9	4.016	A
3 - Twenty Acre Road	198	50	904	1324	0.150	198	268	0.1	0.2	3.196	A
4 - Cromwell Avenue North	993	248	43	1875	0.530	992	1059	0.8	1.1	4.070	A

#### 16:15 - 16:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	186	47	966	1101	0.169	186	70	0.2	0.2	3.933	A
2 - Cromwell Avenue South	799	200	374	1693	0.472	799	777	0.9	0.9	4.027	A
3 - Twenty Acre Road	198	50	905	1323	0.150	198	269	0.2	0.2	3.199	A
4 - Cromwell Avenue North	993	248	43	1875	0.530	993	1060	1.1	1.1	4.083	A

16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	152	38	790	1221	0.124	152	58	0.2	0.1	3.369	A
2 - Cromwell Avenue South	653	163	306	1742	0.375	654	636	0.9	0.6	3.311	A
3 - Twenty Acre Road	162	40	740	1442	0.112	162	220	0.2	0.1	2.813	A
4 - Cromwell Avenue North	811	203	35	1880	0.431	812	867	1.1	0.8	3.377	A

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	127	32	661	1308	0.097	127	48	0.1	0.1	3.051	A
2 - Cromwell Avenue South	547	137	256	1777	0.308	547	532	0.6	0.4	2.929	A
3 - Twenty Acre Road	136	34	620	1530	0.089	136	184	0.1	0.1	2.583	A
4 - Cromwell Avenue North	679	170	29	1884	0.360	680	726	0.8	0.6	2.990	A

# Junctions 9

## ARCADY 9 - Roundabout Module

Version: 9.0.2.5947

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**Filename:** Cromwell Avenue Shackleton Close Roundabout - Saturday.j9

**Path:** Z:\Job Library\2019\190324 - Gulliver's World, Lodges\Traffic Data

**Report generation date:** 04/06/2019 15:54:21

- »2018 Saturday, AM
- »2018 Saturday, PM
- »2023 Saturday, AM
- »2023 Saturday , PM
- »2023 + Committed Saturday, AM
- »2023 + Committed Saturday, PM
- »2023 + Committed + Development, AM
- »2023 + Committed + Development, PM
- »2033 + Committed + Development [D9], AM
- »2033 + Committed + Development [D10], PM

## Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
<b>2018 Saturday</b>								
1 - Shackleton Close	0.0	2.83	0.04	A	0.5	4.34	0.36	A
2 - Cromwell Avenue South	0.6	3.18	0.39	A	0.5	3.47	0.35	A
3 - Twenty Acre Road	0.2	2.92	0.14	A	0.1	2.99	0.12	A
4 - Cromwell Avenue North	1.1	4.16	0.52	A	0.6	3.13	0.39	A
<b>2023 Saturday</b>								
1 - Shackleton Close	0.1	2.89	0.05	A	0.6	4.57	0.38	A
2 - Cromwell Avenue South	0.7	3.30	0.41	A	0.6	3.62	0.37	A
3 - Twenty Acre Road	0.2	3.00	0.15	A	0.1	3.08	0.13	A
4 - Cromwell Avenue North	1.2	4.41	0.55	A	0.7	3.23	0.41	A
<b>2023 + Committed Saturday</b>								
1 - Shackleton Close	0.1	2.89	0.05	A	0.6	4.66	0.39	A
2 - Cromwell Avenue South	0.7	3.30	0.41	A	0.6	3.65	0.37	A
3 - Twenty Acre Road	0.2	3.00	0.15	A	0.1	3.10	0.13	A
4 - Cromwell Avenue North	1.2	4.45	0.55	A	0.7	3.23	0.41	A
<b>2023 + Committed + Development</b>								
1 - Shackleton Close	0.1	2.89	0.05	A	0.7	4.82	0.41	A
2 - Cromwell Avenue South	0.7	3.31	0.41	A	0.6	3.70	0.38	A
3 - Twenty Acre Road	0.2	3.01	0.15	A	0.1	3.14	0.13	A
4 - Cromwell Avenue North	1.3	4.52	0.56	A	0.7	3.23	0.41	A
<b>2033 + Committed + Development [D9]</b>								
1 - Shackleton Close	0.1	2.96	0.05	A				
2 - Cromwell Avenue South	0.8	3.52	0.44	A				
3 - Twenty Acre Road	0.2	3.17	0.17	A				
4 - Cromwell Avenue North	1.7	5.35	0.62	A				
<b>2033 + Committed + Development [D10]</b>								
1 - Shackleton Close					0.7	5.08	0.43	A
2 - Cromwell Avenue South					0.7	3.87	0.40	A
3 - Twenty Acre Road					0.2	3.24	0.14	A
4 - Cromwell Avenue North					0.8	3.38	0.43	A

*There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.*

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.*

## File summary

### File Description

Title	(untitled)
Location	
Site number	
Date	27/06/2018
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	SCP\sam.chapman
Description	

### Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

### Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

### Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2018 Saturday	AM	ONE HOUR	10:00	11:30	15	✓
D2	2018 Saturday	PM	ONE HOUR	16 30	18:00	15	✓
D3	2023 Saturday	AM	ONE HOUR	10:00	11:30	15	✓
D4	2023 Saturday	PM	ONE HOUR	16 30	18:00	15	✓
D5	2023 + Committed Saturday	AM	ONE HOUR	10:00	11:30	15	✓
D6	2023 + Committed Saturday	PM	ONE HOUR	16 30	18:00	15	✓
D7	2023 + Committed + Development	AM	ONE HOUR	10:00	11:30	15	✓
D8	2023 + Committed + Development	PM	ONE HOUR	16 30	18:00	15	✓
D9	2033 + Committed + Development [D9]	AM	ONE HOUR	10:00	11:30	15	✓
D10	2033 + Committed + Development [D10]	PM	ONE HOUR	16 30	18:00	15	✓

### Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

# 2018 Saturday, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.62	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Arms

### Arms

Arm	Name	Description
1	Shackleton Close	
2	Cromwell Avenue South	
3	Twenty Acre Road	
4	Cromwell Avenue North	

### Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Shackleton Close	2.90	7.30	22.0	27.0	32.0	22.5	
2 - Cromwell Avenue South	3.75	7.70	24.6	16.5	32.0	22.0	
3 - Twenty Acre Road	3.65	7.50	27.0	22.0	32.0	20.5	
4 - Cromwell Avenue North	3.67	7.71	21.0	18.0	32.0	23.0	

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - Shackleton Close	0.679	1757
2 - Cromwell Avenue South	0.714	1960
3 - Twenty Acre Road	0.724	1978
4 - Cromwell Avenue North	0.703	1905

*The slope and intercept shown above include any corrections and adjustments.*

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2018 Saturday	AM	ONE HOUR	10:00	11:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	54	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	655	100.000
3 - Twenty Acre Road		ONE HOUR	✓	189	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	863	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	15	7	32
	2 - Cromwell Avenue South	84	0	14	557
	3 - Twenty Acre Road	8	24	0	157
	4 - Cromwell Avenue North	315	450	98	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.04	2.83	0.0	A	50	74
2 - Cromwell Avenue South	0.39	3.18	0.6	A	601	902
3 - Twenty Acre Road	0.14	2.92	0.2	A	173	260
4 - Cromwell Avenue North	0.52	4.16	1.1	A	792	1188

### Main Results for each time segment

#### 10:00 - 10:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	41	10	429	1466	0.028	41	305	0.0	0.0	2.526	A
2 - Cromwell Avenue South	493	123	103	1887	0.261	492	367	0.0	0.4	2.578	A
3 - Twenty Acre Road	142	36	505	1613	0.088	142	89	0.0	0.1	2.448	A
4 - Cromwell Avenue North	650	162	87	1844	0.352	648	560	0.0	0.5	3.005	A

## 10:15 - 10:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	49	12	514	1408	0.034	49	366	0.0	0.0	2.647	A
2 - Cromwell Avenue South	589	147	123	1872	0.314	588	439	0.4	0.5	2.803	A
3 - Twenty Acre Road	170	42	605	1541	0.110	170	107	0.1	0.1	2.625	A
4 - Cromwell Avenue North	776	194	104	1832	0.424	775	670	0.5	0.7	3.406	A

## 10:30 - 10:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	59	15	629	1330	0.045	59	447	0.0	0.0	2.833	A
2 - Cromwell Avenue South	721	180	151	1853	0.389	720	538	0.5	0.6	3.178	A
3 - Twenty Acre Road	208	52	740	1442	0.144	208	131	0.1	0.2	2.916	A
4 - Cromwell Avenue North	950	238	128	1815	0.523	949	821	0.7	1.1	4.148	A

## 10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	59	15	630	1329	0.045	59	448	0.0	0.0	2.834	A
2 - Cromwell Avenue South	721	180	151	1853	0.389	721	538	0.6	0.6	3.180	A
3 - Twenty Acre Road	208	52	741	1442	0.144	208	131	0.2	0.2	2.917	A
4 - Cromwell Avenue North	950	238	128	1815	0.523	950	821	1.1	1.1	4.161	A

## 11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	49	12	515	1407	0.035	49	366	0.0	0.0	2.651	A
2 - Cromwell Avenue South	589	147	123	1872	0.315	590	440	0.6	0.5	2.809	A
3 - Twenty Acre Road	170	42	606	1540	0.110	170	107	0.2	0.1	2.628	A
4 - Cromwell Avenue North	776	194	104	1832	0.424	777	671	1.1	0.7	3.418	A

## 11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	41	10	431	1464	0.028	41	307	0.0	0.0	2.530	A
2 - Cromwell Avenue South	493	123	103	1887	0.261	494	369	0.5	0.4	2.584	A
3 - Twenty Acre Road	142	36	507	1611	0.088	142	90	0.1	0.1	2.450	A
4 - Cromwell Avenue North	650	162	87	1843	0.352	650	562	0.7	0.5	3.021	A



# 2018 Saturday, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.51	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2018 Saturday	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	415	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	510	100.000
3 - Twenty Acre Road		ONE HOUR	✓	147	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	659	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	104	26	285
	2 - Cromwell Avenue South	28	0	24	458
	3 - Twenty Acre Road	3	9	0	135
	4 - Cromwell Avenue North	39	472	148	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
1 - Shackleton Close	0	0	0	0
2 - Cromwell Avenue South	0	0	0	0
3 - Twenty Acre Road	0	0	0	0
4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.36	4.34	0.5	A	381	571
2 - Cromwell Avenue South	0.35	3.47	0.5	A	468	702
3 - Twenty Acre Road	0.12	2.99	0.1	A	135	202
4 - Cromwell Avenue North	0.39	3.13	0.6	A	605	907

### Main Results for each time segment

#### 16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	312	78	472	1436	0.218	311	53	0.0	0.3	3.197	A
2 - Cromwell Avenue South	384	96	344	1714	0.224	383	439	0.0	0.3	2.701	A
3 - Twenty Acre Road	111	28	579	1559	0.071	110	149	0.0	0.1	2.484	A
4 - Cromwell Avenue North	496	124	30	1884	0.263	495	659	0.0	0.4	2.589	A

#### 16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	373	93	565	1373	0.272	373	63	0.3	0.4	3.598	A
2 - Cromwell Avenue South	458	115	412	1666	0.275	458	526	0.3	0.4	2.980	A
3 - Twenty Acre Road	132	33	693	1477	0.089	132	178	0.1	0.1	2.676	A
4 - Cromwell Avenue North	592	148	36	1880	0.315	592	789	0.4	0.5	2.796	A

#### 17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	457	114	692	1287	0.355	456	77	0.4	0.5	4.329	A
2 - Cromwell Avenue South	562	140	505	1600	0.351	561	643	0.4	0.5	3.463	A
3 - Twenty Acre Road	162	40	848	1365	0.119	162	218	0.1	0.1	2.992	A
4 - Cromwell Avenue North	726	181	44	1874	0.387	725	966	0.5	0.6	3.131	A

#### 17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	457	114	693	1287	0.355	457	77	0.5	0.5	4.338	A
2 - Cromwell Avenue South	562	140	505	1599	0.351	562	644	0.5	0.5	3.467	A
3 - Twenty Acre Road	162	40	849	1364	0.119	162	218	0.1	0.1	2.994	A
4 - Cromwell Avenue North	726	181	44	1874	0.387	726	967	0.6	0.6	3.134	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	373	93	566	1373	0.272	374	63	0.5	0.4	3.606	A
2 - Cromwell Avenue South	458	115	413	1665	0.275	459	527	0.5	0.4	2.988	A
3 - Twenty Acre Road	132	33	694	1476	0.090	132	178	0.1	0.1	2.679	A
4 - Cromwell Avenue North	592	148	36	1880	0.315	593	790	0.6	0.5	2.799	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	312	78	474	1435	0.218	313	53	0.4	0.3	3.207	A
2 - Cromwell Avenue South	384	96	346	1713	0.224	384	441	0.4	0.3	2.711	A
3 - Twenty Acre Road	111	28	581	1558	0.071	111	149	0.1	0.1	2.487	A
4 - Cromwell Avenue North	496	124	30	1884	0.263	497	662	0.5	0.4	2.597	A

# 2023 Saturday, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.80	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	2023 Saturday	AM	ONE HOUR	10:00	11:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	57	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	686	100.000
3 - Twenty Acre Road		ONE HOUR	✓	197	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	904	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	16	7	34
	2 - Cromwell Avenue South	88	0	15	583
	3 - Twenty Acre Road	8	25	0	164
	4 - Cromwell Avenue North	330	471	103	0

## Vehicle Mix

### Heavy Vehicle Percentages

From	To			
	1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
1 - Shackleton Close	0	0	0	0
2 - Cromwell Avenue South	0	0	0	0
3 - Twenty Acre Road	0	0	0	0
4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.05	2.89	0.1	A	52	78
2 - Cromwell Avenue South	0.41	3.30	0.7	A	629	944
3 - Twenty Acre Road	0.15	3.00	0.2	A	181	271
4 - Cromwell Avenue North	0.55	4.41	1.2	A	830	1244

### Main Results for each time segment

#### 10:00 - 10:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	43	11	449	1452	0.030	43	320	0.0	0.0	2.554	A
2 - Cromwell Avenue South	516	129	108	1883	0.274	515	384	0.0	0.4	2.629	A
3 - Twenty Acre Road	148	37	529	1595	0.093	148	94	0.0	0.1	2.487	A
4 - Cromwell Avenue North	681	170	91	1841	0.370	678	586	0.0	0.6	3.089	A

#### 10:15 - 10:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	51	13	538	1392	0.037	51	383	0.0	0.0	2.685	A
2 - Cromwell Avenue South	617	154	129	1868	0.330	616	460	0.4	0.5	2.876	A
3 - Twenty Acre Road	177	44	633	1520	0.117	177	112	0.1	0.1	2.680	A
4 - Cromwell Avenue North	813	203	109	1828	0.444	812	702	0.6	0.8	3.537	A

#### 10:30 - 10:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	63	16	658	1310	0.048	63	468	0.0	0.1	2.886	A
2 - Cromwell Avenue South	755	189	158	1847	0.409	755	563	0.5	0.7	3.293	A
3 - Twenty Acre Road	217	54	775	1417	0.153	217	137	0.1	0.2	2.999	A
4 - Cromwell Avenue North	995	249	133	1811	0.550	994	859	0.8	1.2	4.394	A

#### 10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	63	16	659	1309	0.048	63	469	0.1	0.1	2.887	A
2 - Cromwell Avenue South	755	189	159	1847	0.409	755	564	0.7	0.7	3.296	A
3 - Twenty Acre Road	217	54	776	1416	0.153	217	138	0.2	0.2	3.000	A
4 - Cromwell Avenue North	995	249	133	1811	0.550	995	860	1.2	1.2	4.411	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	51	13	540	1391	0.037	51	384	0.1	0.0	2.687	A
2 - Cromwell Avenue South	617	154	130	1868	0.330	617	461	0.7	0.5	2.882	A
3 - Twenty Acre Road	177	44	635	1519	0.117	177	113	0.2	0.1	2.685	A
4 - Cromwell Avenue North	813	203	109	1828	0.444	814	703	1.2	0.8	3.554	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	43	11	452	1450	0.030	43	321	0.0	0.0	2.559	A
2 - Cromwell Avenue South	516	129	109	1883	0.274	517	386	0.5	0.4	2.637	A
3 - Twenty Acre Road	148	37	531	1594	0.093	148	94	0.1	0.1	2.490	A
4 - Cromwell Avenue North	681	170	91	1841	0.370	681	588	0.8	0.6	3.109	A

# 2023 Saturday , PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.65	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	2023 Saturday	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	434	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	534	100.000
3 - Twenty Acre Road		ONE HOUR	✓	153	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	690	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	109	27	298
	2 - Cromwell Avenue South	29	0	25	480
	3 - Twenty Acre Road	3	9	0	141
	4 - Cromwell Avenue North	41	494	155	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.38	4.57	0.6	A	398	597
2 - Cromwell Avenue South	0.37	3.62	0.6	A	490	735
3 - Twenty Acre Road	0.13	3.08	0.1	A	140	211
4 - Cromwell Avenue North	0.41	3.23	0.7	A	633	950

### Main Results for each time segment

#### 16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	327	82	494	1422	0.230	326	55	0.0	0.3	3.282	A
2 - Cromwell Avenue South	402	101	360	1703	0.236	401	459	0.0	0.3	2.761	A
3 - Twenty Acre Road	115	29	606	1540	0.075	115	155	0.0	0.1	2.526	A
4 - Cromwell Avenue North	519	130	31	1883	0.276	518	690	0.0	0.4	2.634	A

#### 16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	390	98	591	1356	0.288	390	66	0.3	0.4	3.725	A
2 - Cromwell Avenue South	480	120	431	1652	0.291	480	550	0.3	0.4	3.069	A
3 - Twenty Acre Road	138	34	725	1454	0.095	137	186	0.1	0.1	2.734	A
4 - Cromwell Avenue North	620	155	37	1879	0.330	620	825	0.4	0.5	2.859	A

#### 17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	478	119	724	1265	0.378	477	80	0.4	0.6	4.561	A
2 - Cromwell Avenue South	588	147	528	1583	0.371	587	673	0.4	0.6	3.612	A
3 - Twenty Acre Road	168	42	887	1336	0.126	168	228	0.1	0.1	3.082	A
4 - Cromwell Avenue North	760	190	45	1873	0.406	759	1010	0.5	0.7	3.229	A

#### 17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	478	119	724	1265	0.378	478	80	0.6	0.6	4.573	A
2 - Cromwell Avenue South	588	147	528	1583	0.371	588	674	0.6	0.6	3.617	A
3 - Twenty Acre Road	168	42	889	1335	0.126	168	228	0.1	0.1	3.085	A
4 - Cromwell Avenue North	760	190	45	1873	0.406	760	1012	0.7	0.7	3.232	A



17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	390	98	592	1355	0.288	391	66	0.6	0.4	3.740	A
2 - Cromwell Avenue South	480	120	432	1652	0.291	481	551	0.6	0.4	3.075	A
3 - Twenty Acre Road	138	34	727	1452	0.095	138	186	0.1	0.1	2.740	A
4 - Cromwell Avenue North	620	155	37	1879	0.330	621	827	0.7	0.5	2.865	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	327	82	496	1420	0.230	327	55	0.4	0.3	3.293	A
2 - Cromwell Avenue South	402	101	362	1702	0.236	402	461	0.4	0.3	2.772	A
3 - Twenty Acre Road	115	29	608	1538	0.075	115	156	0.1	0.1	2.532	A
4 - Cromwell Avenue North	519	130	31	1883	0.276	520	693	0.5	0.4	2.643	A

# 2023 + Committed Saturday, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.82	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	2023 + Committed Saturday	AM	ONE HOUR	10:00	11:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	57	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	687	100.000
3 - Twenty Acre Road		ONE HOUR	✓	197	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	909	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	16	7	34
	2 - Cromwell Avenue South	89	0	15	583
	3 - Twenty Acre Road	8	25	0	164
	4 - Cromwell Avenue North	335	471	103	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.05	2.89	0.1	A	52	78
2 - Cromwell Avenue South	0.41	3.30	0.7	A	630	946
3 - Twenty Acre Road	0.15	3.00	0.2	A	181	271
4 - Cromwell Avenue North	0.55	4.45	1.2	A	834	1251

### Main Results for each time segment

#### 10:00 - 10:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	43	11	449	1452	0.030	43	324	0.0	0.0	2.554	A
2 - Cromwell Avenue South	517	129	108	1883	0.275	516	384	0.0	0.4	2.630	A
3 - Twenty Acre Road	148	37	530	1595	0.093	148	94	0.0	0.1	2.488	A
4 - Cromwell Avenue North	684	171	92	1841	0.372	682	586	0.0	0.6	3.100	A

#### 10:15 - 10:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	51	13	538	1392	0.037	51	388	0.0	0.0	2.685	A
2 - Cromwell Avenue South	618	154	129	1868	0.331	617	460	0.4	0.5	2.878	A
3 - Twenty Acre Road	177	44	634	1519	0.117	177	112	0.1	0.1	2.681	A
4 - Cromwell Avenue North	817	204	110	1828	0.447	816	702	0.6	0.8	3.555	A

#### 10:30 - 10:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	63	16	658	1310	0.048	63	475	0.0	0.1	2.886	A
2 - Cromwell Avenue South	756	189	158	1847	0.409	756	563	0.5	0.7	3.296	A
3 - Twenty Acre Road	217	54	777	1416	0.153	217	137	0.1	0.2	3.001	A
4 - Cromwell Avenue North	1001	250	134	1811	0.553	999	859	0.8	1.2	4.428	A

#### 10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	63	16	659	1309	0.048	63	476	0.1	0.1	2.887	A
2 - Cromwell Avenue South	756	189	159	1847	0.410	756	564	0.7	0.7	3.299	A
3 - Twenty Acre Road	217	54	777	1416	0.153	217	138	0.2	0.2	3.002	A
4 - Cromwell Avenue North	1001	250	134	1810	0.553	1001	860	1.2	1.2	4.446	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	51	13	540	1391	0.037	51	389	0.1	0.0	2.689	A
2 - Cromwell Avenue South	618	154	130	1868	0.331	618	461	0.7	0.5	2.884	A
3 - Twenty Acre Road	177	44	635	1518	0.117	177	113	0.2	0.1	2.684	A
4 - Cromwell Avenue North	817	204	110	1828	0.447	819	703	1.2	0.8	3.573	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	43	11	452	1450	0.030	43	326	0.0	0.0	2.557	A
2 - Cromwell Avenue South	517	129	109	1883	0.275	518	386	0.5	0.4	2.639	A
3 - Twenty Acre Road	148	37	532	1593	0.093	148	94	0.1	0.1	2.493	A
4 - Cromwell Avenue North	684	171	92	1840	0.372	685	588	0.8	0.6	3.118	A

# 2023 + Committed Saturday, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.69	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	2023 + Committed Saturday	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	447	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	534	100.000
3 - Twenty Acre Road		ONE HOUR	✓	153	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	690	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	112	28	307
	2 - Cromwell Avenue South	29	0	25	480
	3 - Twenty Acre Road	3	9	0	141
	4 - Cromwell Avenue North	41	494	155	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.39	4.66	0.6	A	410	615
2 - Cromwell Avenue South	0.37	3.65	0.6	A	490	735
3 - Twenty Acre Road	0.13	3.10	0.1	A	140	211
4 - Cromwell Avenue North	0.41	3.23	0.7	A	633	950

### Main Results for each time segment

#### 16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	337	84	494	1422	0.237	335	55	0.0	0.3	3.311	A
2 - Cromwell Avenue South	402	101	368	1698	0.237	401	462	0.0	0.3	2.773	A
3 - Twenty Acre Road	115	29	612	1535	0.075	115	156	0.0	0.1	2.535	A
4 - Cromwell Avenue North	519	130	31	1883	0.276	518	696	0.0	0.4	2.634	A

#### 16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	402	100	591	1356	0.296	401	66	0.3	0.4	3.770	A
2 - Cromwell Avenue South	480	120	440	1646	0.292	480	552	0.3	0.4	3.086	A
3 - Twenty Acre Road	138	34	733	1448	0.095	137	187	0.1	0.1	2.747	A
4 - Cromwell Avenue North	620	155	37	1879	0.330	620	834	0.4	0.5	2.859	A

#### 17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	492	123	724	1265	0.389	491	80	0.4	0.6	4.645	A
2 - Cromwell Avenue South	588	147	539	1576	0.373	587	676	0.4	0.6	3.641	A
3 - Twenty Acre Road	168	42	897	1329	0.127	168	229	0.1	0.1	3.101	A
4 - Cromwell Avenue North	760	190	45	1873	0.406	759	1020	0.5	0.7	3.229	A

#### 17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	492	123	724	1265	0.389	492	80	0.6	0.6	4.657	A
2 - Cromwell Avenue South	588	147	539	1575	0.373	588	677	0.6	0.6	3.645	A
3 - Twenty Acre Road	168	42	898	1328	0.127	168	229	0.1	0.1	3.104	A
4 - Cromwell Avenue North	760	190	45	1873	0.406	760	1022	0.7	0.7	3.232	A

## 17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	402	100	592	1355	0.297	403	66	0.6	0.4	3.786	A
2 - Cromwell Avenue South	480	120	441	1645	0.292	481	554	0.6	0.4	3.092	A
3 - Twenty Acre Road	138	34	735	1446	0.095	138	187	0.1	0.1	2.750	A
4 - Cromwell Avenue North	620	155	37	1879	0.330	621	836	0.7	0.5	2.865	A

## 17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	337	84	496	1420	0.237	337	55	0.4	0.3	3.326	A
2 - Cromwell Avenue South	402	101	369	1697	0.237	402	463	0.4	0.3	2.784	A
3 - Twenty Acre Road	115	29	615	1533	0.075	115	157	0.1	0.1	2.538	A
4 - Cromwell Avenue North	519	130	31	1883	0.276	520	699	0.5	0.4	2.643	A

# 2023 + Committed + Development, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.86	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D7	2023 + Committed + Development	AM	ONE HOUR	10:00	11:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	57	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	690	100.000
3 - Twenty Acre Road		ONE HOUR	✓	198	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	918	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	16	7	34
	2 - Cromwell Avenue South	92	0	15	583
	3 - Twenty Acre Road	9	25	0	164
	4 - Cromwell Avenue North	344	471	103	0

## Vehicle Mix



### Heavy Vehicle Percentages

From	To			
	1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
1 - Shackleton Close	0	0	0	0
2 - Cromwell Avenue South	0	0	0	0
3 - Twenty Acre Road	0	0	0	0
4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.05	2.89	0.1	A	52	78
2 - Cromwell Avenue South	0.41	3.31	0.7	A	633	950
3 - Twenty Acre Road	0.15	3.01	0.2	A	182	273
4 - Cromwell Avenue North	0.56	4.52	1.3	A	842	1264

### Main Results for each time segment

#### 10:00 - 10:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	43	11	449	1452	0.030	43	334	0.0	0.0	2.554	A
2 - Cromwell Avenue South	519	130	108	1883	0.276	518	384	0.0	0.4	2.635	A
3 - Twenty Acre Road	149	37	532	1593	0.094	149	94	0.0	0.1	2.492	A
4 - Cromwell Avenue North	691	173	95	1838	0.376	689	586	0.0	0.6	3.124	A

#### 10:15 - 10:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	51	13	538	1392	0.037	51	400	0.0	0.0	2.685	A
2 - Cromwell Avenue South	620	155	129	1868	0.332	620	460	0.4	0.5	2.884	A
3 - Twenty Acre Road	178	44	637	1517	0.117	178	112	0.1	0.1	2.687	A
4 - Cromwell Avenue North	825	206	113	1825	0.452	824	702	0.6	0.8	3.593	A

#### 10:30 - 10:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	63	16	658	1310	0.048	63	489	0.0	0.1	2.886	A
2 - Cromwell Avenue South	760	190	158	1847	0.411	759	563	0.5	0.7	3.306	A
3 - Twenty Acre Road	218	55	780	1414	0.154	218	137	0.1	0.2	3.010	A
4 - Cromwell Avenue North	1011	253	139	1807	0.559	1009	859	0.8	1.3	4.498	A

#### 10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	63	16	659	1309	0.048	63	490	0.1	0.1	2.887	A
2 - Cromwell Avenue South	760	190	159	1847	0.411	760	564	0.7	0.7	3.309	A
3 - Twenty Acre Road	218	55	781	1413	0.154	218	138	0.2	0.2	3.011	A
4 - Cromwell Avenue North	1011	253	139	1807	0.559	1011	860	1.3	1.3	4.518	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	51	13	540	1391	0.037	51	401	0.1	0.0	2.687	A
2 - Cromwell Avenue South	620	155	130	1868	0.332	621	461	0.7	0.5	2.888	A
3 - Twenty Acre Road	178	44	638	1516	0.117	178	113	0.2	0.1	2.690	A
4 - Cromwell Avenue North	825	206	113	1825	0.452	827	703	1.3	0.8	3.611	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	43	11	452	1450	0.030	43	335	0.0	0.0	2.559	A
2 - Cromwell Avenue South	519	130	109	1883	0.276	520	386	0.5	0.4	2.643	A
3 - Twenty Acre Road	149	37	534	1592	0.094	149	94	0.1	0.1	2.497	A
4 - Cromwell Avenue North	691	173	95	1838	0.376	692	588	0.8	0.6	3.145	A

# 2023 + Committed + Development, PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.76	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D8	2023 + Committed + Development	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	471	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	534	100.000
3 - Twenty Acre Road		ONE HOUR	✓	153	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	690	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	118	29	324
	2 - Cromwell Avenue South	29	0	25	480
	3 - Twenty Acre Road	3	9	0	141
	4 - Cromwell Avenue North	41	494	155	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.41	4.82	0.7	A	432	648
2 - Cromwell Avenue South	0.38	3.70	0.6	A	490	735
3 - Twenty Acre Road	0.13	3.14	0.1	A	140	211
4 - Cromwell Avenue North	0.41	3.23	0.7	A	633	950

### Main Results for each time segment

#### 16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	355	89	494	1422	0.249	353	55	0.0	0.3	3.365	A
2 - Cromwell Avenue South	402	101	381	1688	0.238	401	466	0.0	0.3	2.794	A
3 - Twenty Acre Road	115	29	625	1526	0.075	115	157	0.0	0.1	2.551	A
4 - Cromwell Avenue North	519	130	31	1883	0.276	518	709	0.0	0.4	2.634	A

#### 16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	423	106	591	1356	0.312	423	66	0.3	0.5	3.858	A
2 - Cromwell Avenue South	480	120	456	1635	0.294	480	558	0.3	0.4	3.117	A
3 - Twenty Acre Road	138	34	748	1437	0.096	137	188	0.1	0.1	2.770	A
4 - Cromwell Avenue North	620	155	37	1879	0.330	620	849	0.4	0.5	2.859	A

#### 17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	519	130	724	1265	0.410	518	80	0.5	0.7	4.808	A
2 - Cromwell Avenue South	588	147	558	1562	0.377	587	683	0.4	0.6	3.693	A
3 - Twenty Acre Road	168	42	916	1315	0.128	168	230	0.1	0.1	3.138	A
4 - Cromwell Avenue North	760	190	45	1873	0.406	759	1039	0.5	0.7	3.229	A

#### 17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	519	130	724	1265	0.410	519	80	0.7	0.7	4.822	A
2 - Cromwell Avenue South	588	147	559	1561	0.377	588	684	0.6	0.6	3.699	A
3 - Twenty Acre Road	168	42	917	1314	0.128	168	230	0.1	0.1	3.141	A
4 - Cromwell Avenue North	760	190	45	1873	0.406	760	1040	0.7	0.7	3.232	A

## 17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	423	106	592	1355	0.313	424	66	0.7	0.5	3.874	A
2 - Cromwell Avenue South	480	120	458	1634	0.294	481	559	0.6	0.4	3.124	A
3 - Twenty Acre Road	138	34	750	1435	0.096	138	188	0.1	0.1	2.776	A
4 - Cromwell Avenue North	620	155	37	1879	0.330	621	851	0.7	0.5	2.862	A

## 17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	355	89	496	1420	0.250	355	55	0.5	0.3	3.383	A
2 - Cromwell Avenue South	402	101	383	1687	0.238	402	468	0.4	0.3	2.805	A
3 - Twenty Acre Road	115	29	628	1524	0.076	115	157	0.1	0.1	2.557	A
4 - Cromwell Avenue North	519	130	31	1883	0.276	520	712	0.5	0.4	2.643	A

# 2033 + Committed + Development [D9], AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	4.38	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D9	2033 + Committed + Development [D9]	AM	ONE HOUR	10:00	11:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	60	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	744	100.000
3 - Twenty Acre Road		ONE HOUR	✓	211	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	1016	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	17	7	36
	2 - Cromwell Avenue South	110	0	16	618
	3 - Twenty Acre Road	11	26	0	174
	4 - Cromwell Avenue North	408	499	109	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.05	2.96	0.1	A	55	83
2 - Cromwell Avenue South	0.44	3.52	0.8	A	683	1024
3 - Twenty Acre Road	0.17	3.17	0.2	A	194	290
4 - Cromwell Avenue North	0.62	5.35	1.7	A	932	1398

### Main Results for each time segment

#### 10:00 - 10:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	45	11	476	1434	0.032	45	397	0.0	0.0	2.591	A
2 - Cromwell Avenue South	560	140	114	1879	0.298	558	407	0.0	0.4	2.722	A
3 - Twenty Acre Road	159	40	573	1563	0.102	158	99	0.0	0.1	2.563	A
4 - Cromwell Avenue North	765	191	110	1827	0.419	762	622	0.0	0.7	3.371	A

#### 10:15 - 10:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	54	13	569	1370	0.039	54	475	0.0	0.0	2.734	A
2 - Cromwell Avenue South	669	167	136	1863	0.359	668	487	0.4	0.6	3.011	A
3 - Twenty Acre Road	190	47	686	1481	0.128	190	119	0.1	0.1	2.786	A
4 - Cromwell Avenue North	913	228	132	1812	0.504	912	744	0.7	1.0	3.996	A

#### 10:30 - 10:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	66	17	697	1284	0.051	66	581	0.0	0.1	2.955	A
2 - Cromwell Avenue South	819	205	167	1841	0.445	818	595	0.6	0.8	3.516	A
3 - Twenty Acre Road	232	58	840	1370	0.170	232	145	0.1	0.2	3.163	A
4 - Cromwell Avenue North	1119	280	162	1791	0.625	1116	911	1.0	1.6	5.312	A

#### 10:45 - 11:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	66	17	698	1283	0.051	66	582	0.1	0.1	2.957	A
2 - Cromwell Avenue South	819	205	167	1841	0.445	819	597	0.8	0.8	3.522	A
3 - Twenty Acre Road	232	58	841	1369	0.170	232	145	0.2	0.2	3.165	A
4 - Cromwell Avenue North	1119	280	162	1791	0.625	1119	912	1.6	1.7	5.352	A

11:00 - 11:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	54	13	571	1369	0.039	54	477	0.1	0.0	2.737	A
2 - Cromwell Avenue South	669	167	137	1863	0.359	670	489	0.8	0.6	3.022	A
3 - Twenty Acre Road	190	47	688	1480	0.128	190	119	0.2	0.1	2.789	A
4 - Cromwell Avenue North	913	228	132	1812	0.504	916	745	1.7	1.0	4.030	A

11:15 - 11:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	45	11	478	1432	0.032	45	399	0.0	0.0	2.594	A
2 - Cromwell Avenue South	560	140	115	1879	0.298	561	409	0.6	0.4	2.734	A
3 - Twenty Acre Road	159	40	576	1561	0.102	159	100	0.1	0.1	2.568	A
4 - Cromwell Avenue North	765	191	111	1827	0.419	766	624	1.0	0.7	3.398	A



# 2033 + Committed + Development [D10], PM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Vehicle Mix		HV% is zero for all movements / time segments. Vehicle Mix matrix should be completed whether working in PCUs or Vehs.

## Junction Network

### Junctions

Junction	Name	Junction Type	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout	1, 2, 3, 4	3.93	A

### Junction Network Options

Driving side	Lighting
Left	Normal/unknown

## Traffic Demand

### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D10	2033 + Committed + Development [D10]	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

### Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Shackleton Close		ONE HOUR	✓	478	100.000
2 - Cromwell Avenue South		ONE HOUR	✓	566	100.000
3 - Twenty Acre Road		ONE HOUR	✓	163	100.000
4 - Cromwell Avenue North		ONE HOUR	✓	732	100.000

## Origin-Destination Data

### Demand (PCU/hr)

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	124	31	323
	2 - Cromwell Avenue South	31	0	26	509
	3 - Twenty Acre Road	3	10	0	150
	4 - Cromwell Avenue North	44	524	164	0

## Vehicle Mix

### Heavy Vehicle Percentages

		To			
		1 - Shackleton Close	2 - Cromwell Avenue South	3 - Twenty Acre Road	4 - Cromwell Avenue North
From	1 - Shackleton Close	0	0	0	0
	2 - Cromwell Avenue South	0	0	0	0
	3 - Twenty Acre Road	0	0	0	0
	4 - Cromwell Avenue North	0	0	0	0

## Results

### Results Summary for whole modelled period

Arm	Max RFC	Max delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Shackleton Close	0.43	5.08	0.7	A	439	658
2 - Cromwell Avenue South	0.40	3.87	0.7	A	519	779
3 - Twenty Acre Road	0.14	3.24	0.2	A	150	224
4 - Cromwell Avenue North	0.43	3.38	0.8	A	672	1008

### Main Results for each time segment

#### 16:30 - 16:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	360	90	524	1401	0.257	358	59	0.0	0.3	3.448	A
2 - Cromwell Avenue South	426	107	389	1683	0.253	425	494	0.0	0.3	2.859	A
3 - Twenty Acre Road	123	31	647	1510	0.081	122	166	0.0	0.1	2.595	A
4 - Cromwell Avenue North	551	138	33	1882	0.293	549	737	0.0	0.4	2.698	A

#### 16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	430	107	627	1331	0.323	429	70	0.3	0.5	3.990	A
2 - Cromwell Avenue South	509	127	465	1628	0.313	508	591	0.3	0.5	3.212	A
3 - Twenty Acre Road	147	37	775	1417	0.103	146	199	0.1	0.1	2.832	A
4 - Cromwell Avenue North	658	165	40	1877	0.351	658	882	0.4	0.5	2.950	A

#### 17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	526	132	768	1236	0.426	525	86	0.5	0.7	5.060	A
2 - Cromwell Avenue South	623	156	569	1554	0.401	622	724	0.5	0.7	3.862	A
3 - Twenty Acre Road	179	45	949	1291	0.139	179	243	0.1	0.2	3.236	A
4 - Cromwell Avenue North	806	201	48	1871	0.431	805	1080	0.5	0.8	3.374	A

#### 17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	LOS
1 - Shackleton Close	526	132	769	1235	0.426	526	86	0.7	0.7	5.078	A
2 - Cromwell Avenue South	623	156	570	1553	0.401	623	724	0.7	0.7	3.871	A
3 - Twenty Acre Road	179	45	950	1290	0.139	179	243	0.2	0.2	3.239	A
4 - Cromwell Avenue North	806	201	48	1871	0.431	806	1081	0.8	0.8	3.379	A



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



Gulliver's Valley Resort  
**WHO WE ARE**  
OCTOBER 2016

# Contents



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## Mission Statement

Our vision is to expand a unique and sustainable group of family theme parks, attractions and resorts where a warm and friendly team enjoys providing our guests with great family experiences that they'll remember forever.



# Our history



over 40 years of building and operating three theme parks, from green field sites, to successful family entertainment venues



## Part two - the Gulliver's story Who we are

A British family company with a 40-year history of designing, building and operating successful family entertainment venues, Gulliver's charts its beginnings back to 1976 and is today one of the UK's top three independent attractions attracting one million visitors every year.

Our attractions are designed with families at their core, delivering tangible benefits to child development with a firm focus on fun.

Back then, Ray Phillips built a model village for his children in the town of Matlock Bath, which soon expanded into a tourist attraction for other families to enjoy. Since then, the Phillips family has carved a niche in the leisure industry for their ability to transform greenfield sites into thriving family destinations which introduce a wealth of benefits to each chosen region. They are still as hands-on today as Mr Phillips was back then.

Currently, Gulliver's portfolio encompasses resorts in Warrington, Milton Keynes and Matlock Bath - each of these three sites attracts repeat generational visitors consistently year after year.

We work with big names including...

BBC



### Gulliver's in numbers...

- Gulliver's can entertain **up to 13,000 people** per day with nearly 1,000 staying on our sites overnight
- We donate £34,000 worth of tickets to schools and charities
- Gulliver's hosts over **4,200 birthday parties** a year, that's a lot of candles!
- Every year over **85,000 people** have a sleepover at our Hotel, Village and Campsites
- **50,000 children** visit Santa's grotto every Christmas
- **250,000 hot drinks and 790,000 cold drinks** sold every year
- We have **15,000 sets of plans** in our development tanks
- Our costume department produces **600 pieces of uniform every year...**
- ... plus 300 costumes
- Our wardrobe department has **over 3,000 costumes** to fit entertainers and mascots!

- Warrington
- Matlock Bath
- Milton Keynes



# Warrington



# Warrington

Chosen for its excellent location nestled equidistant between Liverpool and Manchester, Warrington is our largest theme park site to date set across 100 acres and opened in 1989.

Here, we offer families a full theme park experience, which includes rides, soft play, indoor attractions, a multitude of food outlets and outdoor picnic areas set around the natural surroundings of a beautiful lake.

The first of our locations to boast a SplashZone indoor water play factory, Gulliver's Warrington resort also features an official Nerf Zone, Star Studios recording suite as well as a 58 suite family and business hotel.

Burtonwood Heritage Centre is located on the site of Gulliver's Warrington and funded by Gulliver's. A historical tribute to the UK's largest US airbase during a 50 year period spanning World War Two and the Cold War, Burtonwood attracts visitors including veterans, school groups and families from all over the world.

## ***Gulliver's World incorporates:***

Theme park | Hotel | Nerf Zone | Burtonwood Heritage Centre | SplashZone | Star Studios





# Matlock Bath



# Matlock Bath

Where it all began! Matlock Bath is a unique theme park set on a hillside overlooking the picture perfect Derbyshire Dales.

The theme park itself offers chair lift and travelator access to the many attractions featured within, including all the usual great Gulliver's rides, play areas and more.

We also have an official Nerf Zone live gaming centre and a Spy Zone discovery centre available to visit by special appointment both of these year round, indoor play zones attract regular birthday party bookings from our young customers.

**Gulliver's Kingdom incorporates:**

Theme park | Nerf Zone | Spy Zone



# Milton Keynes



# Milton Keynes

Our Milton Keynes resort has grown at a rapid pace since it opened in 1999. Today, it is home to a large theme park, SplashZone, official Nerf Zone as well as the Dinosaur and Farm Park, a hands on, back to nature attraction designed to enthrall families and educational groups alike.

A camping and caravanning site allows families to extend their visit with great value 'stay and play' packages available campers benefit from a restaurant and full events schedule with BBQs, family movie nights and children's entertainment.

This year, we have unveiled our latest Milton Keynes attraction the SFEAR is the first hi lo rope climbing challenge experience in the world and further strengthens our offering to families from the local area and beyond for group trips and birthday parties.

## ***Adventurers Village - fully themed glamping acomodation:***

Western Lodges | Dino Dens | Beach Dens

## ***Gulliver's Land incorporates:***

Theme park | Camping and Caravanning Club Site | Nerf Zone  
SplashZone | Dinosaur and Farm Park | The SFEAR | Adventurers Village



## The Gulliver's ethos

Family is at the heart of everything we do. First and foremost, we are a family – the business was founded by Ray and Hilary Phillips in the 1970s and today it is managed by their children, Julie Dalton and Nick Phillips.

Ray and Hilary's vision was quite simply to give their own children a great day out. While they take more of a back seat today, leaving their trusted daughter and son to oversee the running of the parks, Ray and Hilary's original goal endures. Gulliver's is committed to creating unforgettable days out for thousands of families every year.

Conceptually, the Gulliver's theme continues with its core demographic firmly at the heart of everything. Designed and built by a family for other families to enjoy, Gulliver's theme parks, hotels, campsites and attractions are all created for children aged two to 13 (not forgetting accompanying grown ups too).

## A family attitude

Right from its humble beginnings, Gulliver's had firm ideas about its brand ethos and those values live on in the day-to-day running of every attraction.

There are no bars on the theme parks, and no gambling games at any of the Gulliver's family attractions. We do not permit entry to unaccompanied adults and there are no groups of older teenagers for this reason, we nurture an atmosphere of family fun and a completely safe environment for our valued – and well looked after – visitors.

This attitude gives our family visitors comfort and reassurance that we understand their needs and cater for their specific expectations of a great family day out.

## Family value

We are a family. As such, we know days out can be expensive and many people simply cannot afford to visit the UK's bigger theme parks and tourist attractions.

Our prices are designed to offer consistent value for money to families who choose to spend their hard-earned cash with us. Entrance prices include all rides, attractions and even food and drink too if families opt for our budget-busting all-inclusive ticket options.

Gifts, food and beverages are kept to competitive high street pricing rates to maintain our inclusive attitude – we are among the cheapest attractions in the UK for a multitude of items, from hot dogs and coffees to ride pictures and waterproof ponchos!



## Company values

Passion and pride – we show conviction and emotion in our products, promises and services with a can-do attitude. Trust and respect – we listen to our customers, maximise profit and minimise wastage, believe in our team's abilities and share knowledge and experience.

One family team – our focus is unfalteringly on wholesome family fun, staying true to our core market and encouraging loyalty within the extended Gulliver's family

## Gulliver's means team

The Gulliver's family extends beyond the original family members to embrace an almost 600-strong workforce of trusted, loyal employees, many of whom we have worked alongside for more than 20 years.

In-house production of the vast majority of what you see on-site creates rafts of work for our committed and hardworking staff. Painting, sewing, landscaping, gardening, joinery, catering, product design – from concept to completion, we excel in handling everything



we do in-house and outsourcing very little to other companies.

Gulliver's prides itself on offering real career paths in the leisure industry with upward progression open to all. Many of our management team started out as teenage ride operators and across such a large company as ours, the opportunities are plentiful for personal and professional development.

Our dedicated Management Training Programme is now in its 2nd year.

Apprenticeships are available at each of our locations and we offer excellent staff training and development programmes to empower our personnel to thrive in this supportive and aspirational environment.

Annually, we hold open recruitment days and encourage applications for seasonal work from all job seekers, inclusive of all backgrounds, skillsets and previous experience. We have welcomed staff from all walks of life and we are proud to nurture our unique team of individuals to professional success with us.

### Mission Statement

Our vision is to expand a unique and sustainable group of family theme parks, attractions and resorts where a warm and friendly team enjoys providing our guests with great family experiences that they'll remember forever.

### Financial standing

Gulliver's is a self-financing company committed to its sustainable business model.

We do not take out bank loans or rely on lending to develop our attractions, we fund our own projects and invest profits back into the business to continue our ongoing programme of expansion and evolution.

Gulliver's has already completed three similar projects with land purchased at agricultural rates, all of which have been self-funding and profitable. As a business, we do not take on any project that we do not consider to be a viable proposition, nor one that would have a negative impact on our company values.

### Our customers

Gulliver's theme parks' core market is young children and families. 79% of children are under the age of nine and only 5% are over 13.

By expanding into the world of live gaming and adventure attractions, we have successfully adapted our business over the years to attract children and young people of all ages.



### Our Operational Year

#### Our Core Theme Parks

Gulliver's caters for families with children aged from 2 to 13 years so our opening times and dates all relate to catering for this age group.

Our busier times are during school holidays and at weekends in the summer months, which means that on large sections of the term time days the main parks being closed. A sample opening calendar can be seen opposite.

Our normal park operational hours also relate to the age group we attract. Our parks open at 10.30am in the morning and close around 5pm at night. We do not run late into the evening as it is not required by our visitors. The only nights that will run later are the firework nights around Bonfire night when the parks are open until approximately 8pm.

#### Our Accommodation

Gulliver's operates a range of different accommodation across its sites. Some of which is open all year around, such as our hotel and some of our lodges. Our campsites and glamping accommodation only operates seasonally.

#### Our Indoor Attractions

Gulliver's Splashzone, NERFzone and SFear are all indoor attractions that do operate all year around, but again are busier at weekends and school holidays. The visitor numbers are limited to pre-schoolers during term time, with opening times normally 10.30am until 3pm.

### Gulliver's World Opening Times & Prices

NOV 10

Calendar Key

- Open 10.30am - 5.00pm
- Special Event
- Christmas Opening
- Closed

Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Gulliver's opening times formula accommodates peaks and troughs in demand to ensure sustainability.



# Benefits Gulliver's bring to the Community

## Employment

- Employment opportunities - for all ages and skills
- Work experience opportunities - for both school age right through to return to work
- Volunteering opportunities - with our charity initiatives
- Service Academy will train local staff and members of the community in local skills and employability

## Community space & civic pride

- Community open space that's convenient, pleasant and safe for all
- Venues available for hire for special occasions, business use and group events
- Reduction in anti-social behavior – facilities and community open spaces will provide the region's troubled and disaffected young people with somewhere to go and something to do
- Community centre available to all
- Meeting places for families and friends

## Economic

- Increase in tourists to a place will see the benefits spread to other local business and boost local economy generally
- Local suppliers and contractors used
- Wherever possible work done in house with own employees to keep inward investment local.
- Local Community Engagement programme



# Local Community Engagement Programme

Gulliver's works very closely with the local community at our other locations. Here are just a few of the things that we do at present which would become part of the Rother Valley offer.

## Community Weekends

Throughout the year we operate a number of community weekends which invite local charities to apply for free tickets for their groups to visit. Every year we give away around £34,000 of tickets to local groups. Community weekend will be an annual diary date at Gulliver's Rother Valley to support local children's charities.

Gulliver's supports local schools and charity auctions by offering prizes and we will continue to do this in the Rother Valley. Organisations can apply for prizes to use in draws, we give away annually around £30,000 worth of tickets.

## Local Youth Team Sponsorship

Gulliver's is proud to support local youth sports teams in each of the theme park areas and we will actively seek out organisations to which we can lend our financial support in the Rother Valley local area.

## Retired Walking Groups

As well as working with family and youth groups we also work with retired groups to keep people active. Our car parks and restaurants are used by local walking groups as the base for their walks at existing sites and we plan to promote this facility to groups in the Rother Valley to benefit members of the local community.



## Schools and groups facilities support

Every year local schools and groups come and use existing Gulliver's facilities out of hours, free of charge to work on specific projects and programmes.

Our theatres are used by local schools to put on some of their big performances which will not fit into the school hall.

Our grounds are used by local Scout and Guide groups for woodland studies, pond dipping, orienteering, sports events and more.

Food bank weekends are held twice a year to raise much needed donations for local food banks. Each weekend gather's up to 10 van fulls of food donations per park.





**Riley, Peter**

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**To:** Dan Matthewman  
**Subject:** RE: 2 of 3 - R18-069 - Gulliver's WBC Dev plan rep (June 2019) Our ref. GUL42/2 (15-06-2019)

Batch 2 of 3

DESCRIPTION	PLAN/DOCUMENT REF.
Plans package (inc. master plan and elevations)	Appendix A
Sequential test	Appendix B
Biodiversity Enhancement Scheme	Appendix C
Extended Phase 1 Habitat Survey of partial site	Appendix D
Himalayan Balsam Management plan	Appendix E
Woodland Management Plan V2	Appendix F
Work Programme Map ref 100103	Appendix G

Kind regards

Dan

**Dan Matthewman** LL.B (Hons) MSc ACILEx MRTPI

**Director**



W. [www.countyplanning.co.uk](http://www.countyplanning.co.uk)

## APPENDIX A

TO DEVELOPMENT PLAN REPRESENTATION

WARRINGTON BOROUGH COUNCIL LOCAL PLAN (SUBMISSION VERSION)

Site Ref: 18/069 Gulliver's World

## PLANS PACKAGE



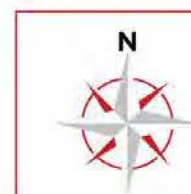
(OUR REF. GUL40/2)

# GULLIVER'S WORLD - WOODLAND RETREAT MASTERPLAN



**SCALE**  
1:2500

50M



**PROJECT:**  
GULLIVER'S WORLD WOODLAND RETREAT

**DRAWING NAME:** GW-WR-MP-001C  
**LOCATION:** GULLIVER'S WORLD

**DATE:** 04/06/2019

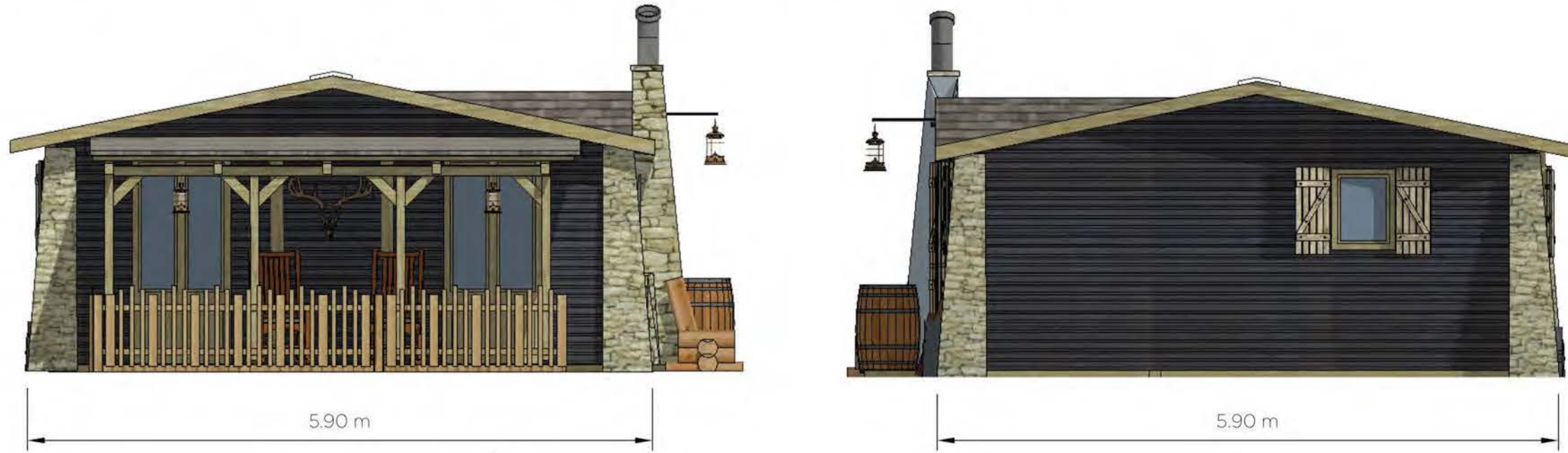
**DESCRIPTION:**  
GULLIVER'S WORLD WOODLAND RETREAT COLOUR MASTER PLAN

**SCALE:** 1:2500 @ A3

**DRAWN BY:** P Williams



# GULLIVER'S WORLD - WOODLAND RETREAT - GROUP ACCOMMODATION



PROJECT: WOODLAND RETREAT  
GROUP ACCOMMODATION

DRAWING NAME: GW-WR-GACC-EL-001A

LOCATION: GULLIVER'S WORLD

DATE: 03/06/2019

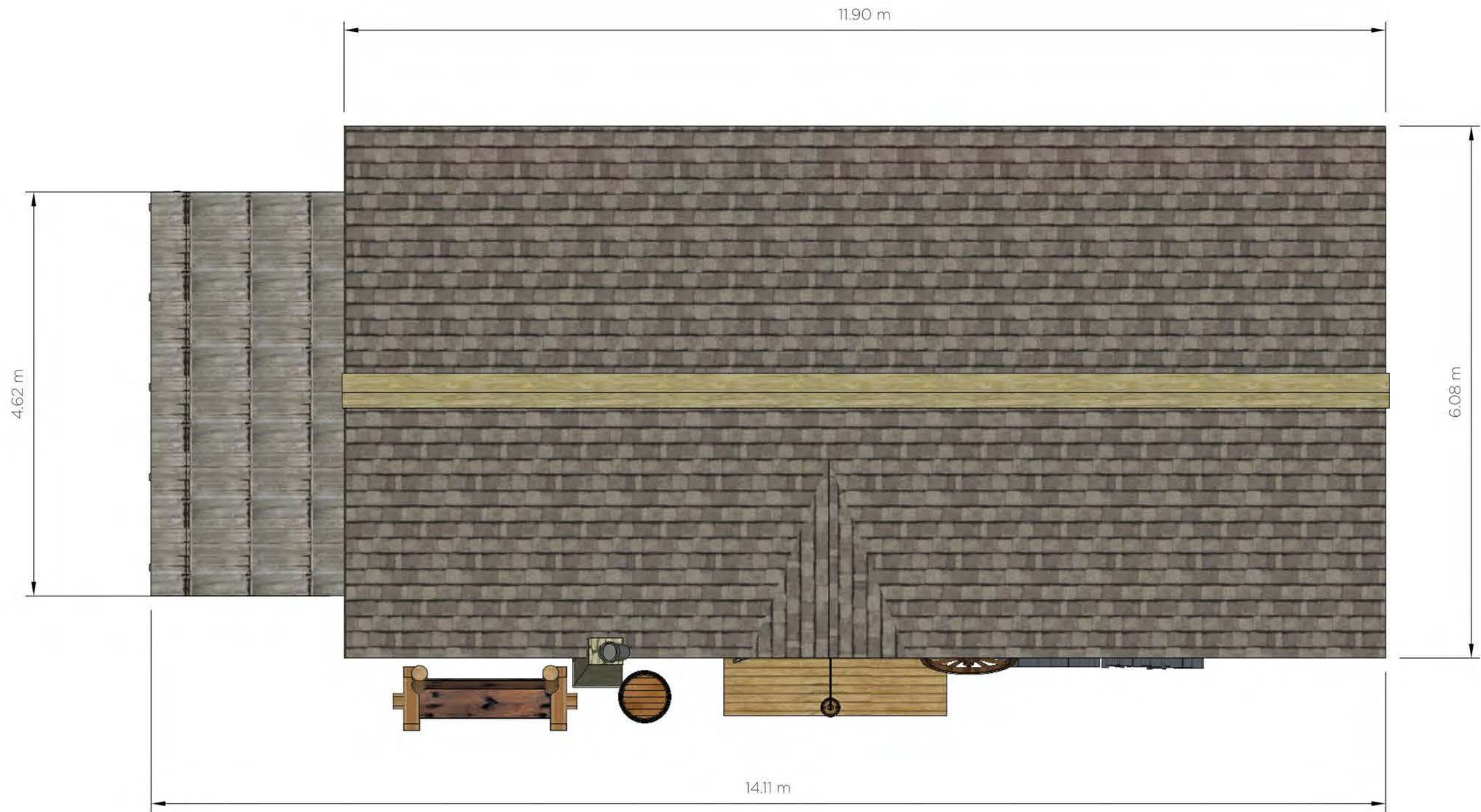
DESCRIPTION:  
Colour elevations for the Woodland  
Retreat Group Accommodation  
at Gulliver's World.

SCALE: 1:50 @ A3

DRAWN BY: P Williams



# GULLIVER'S WORLD - WOODLAND RETREAT - GROUP ACCOMMODATION



PROJECT: WOODLAND RETREAT  
GROUP ACCOMMODATION

DRAWING NAME: GW-WR-GACC-PL-001A

LOCATION: GULLIVER'S WORLD

DATE: 03/06/2019

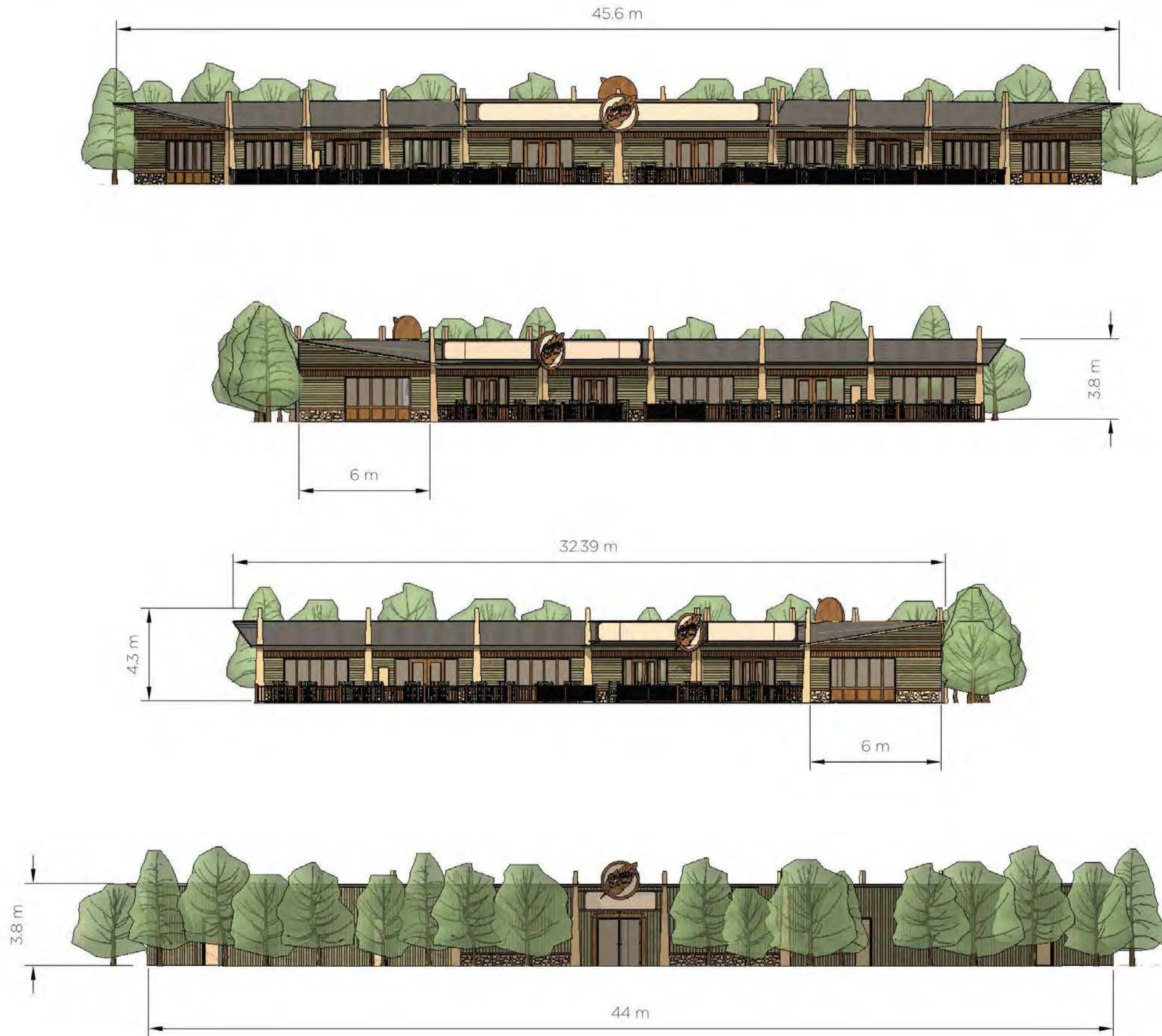
DESCRIPTION:  
Colour plan for the Woodland  
Retreat Group Accommodation  
at Gulliver's World.

SCALE: 1:50 @ A3

DRAWN BY: P Williams



# GULLIVER'S WORLD - WOODLAND RETREAT - GUEST FACILITIES BUILDING



PROJECT: WOODLAND RETREAT GUEST FACILITIES BUILDING
DRAWING NAME: GW-WR-GF-EL-001
LOCATION: GULLIVER'S WORLD
DATE: 30/05/2019
DESCRIPTION: Colour elevations for the Woodland Retreat Guest Facilities Building at Gulliver's World.
SCALE: 1:200 @ A3
DRAWN BY: P Williams



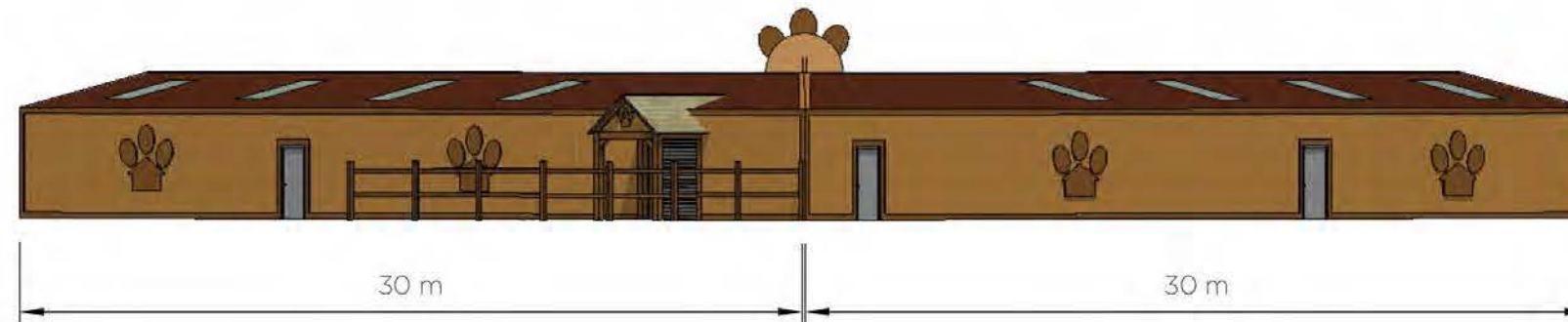
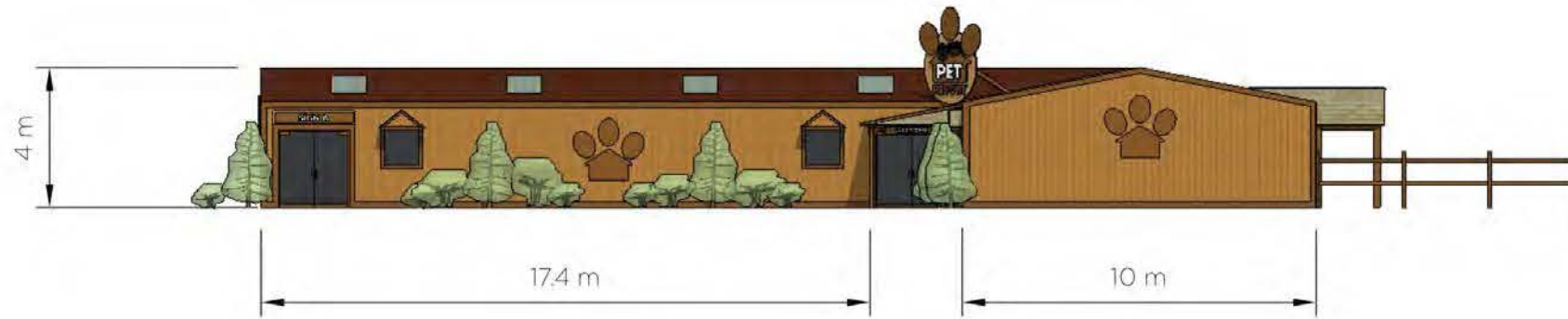
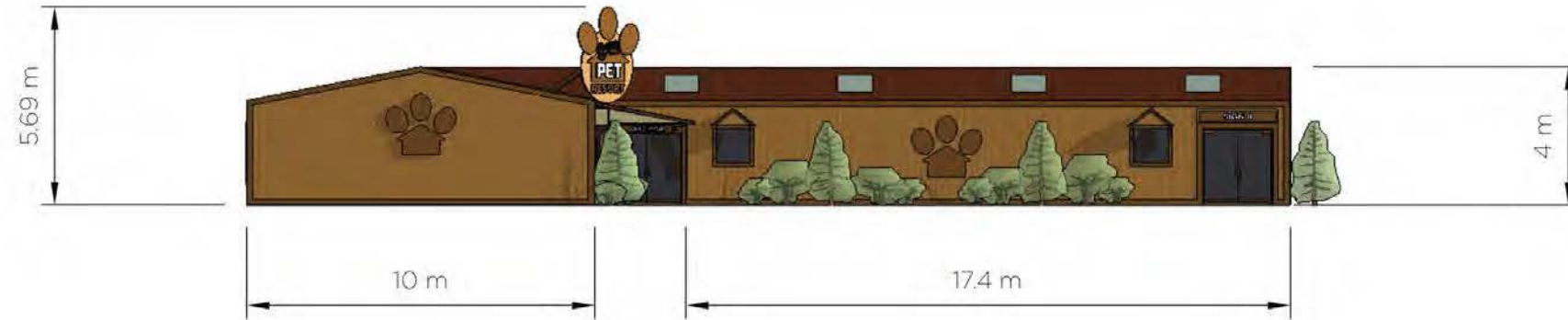
# GULLIVER'S WORLD - WOODLAND RETREAT - GUEST FACILITIES BUILDING



PROJECT: WOODLAND RETREAT GUEST FACILITIES BUILDING
DRAWING NAME: GW-WR-GF-PL-001
LOCATION: GULLIVER'S WORLD
DATE: 30/05/2019
DESCRIPTION: Colour plan for the Woodland Retreat Guest Facilities Building at Gulliver's World.
SCALE: 1:200 @ A3
DRAWN BY: P Williams



# GULLIVER'S WORLD - WOODLAND RETREAT - PET RESORT BUILDING



PROJECT: WOODLAND RETREAT  
 PET RESORT BUILDING

DRAWING NAME: GW-WR-PR-EL-001

LOCATION: GULLIVER'S WORLD

DATE: 30/05/2019

DESCRIPTION:  
 Colour elevations for the Woodland  
 Retreat Pet Resort Building at  
 Gulliver's World.

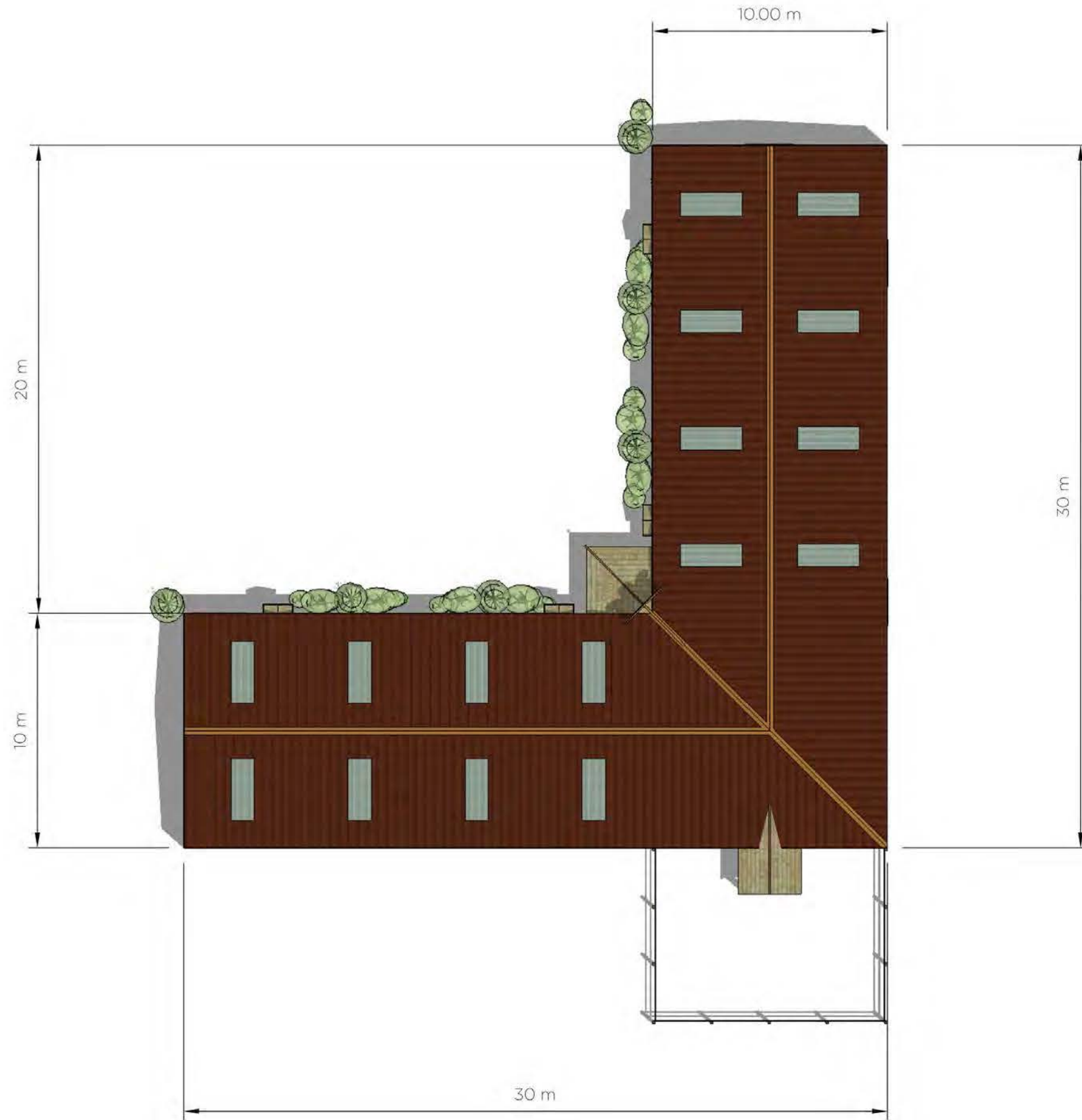
SCALE: 1:200 @ A3

DRAWN BY: P Williams





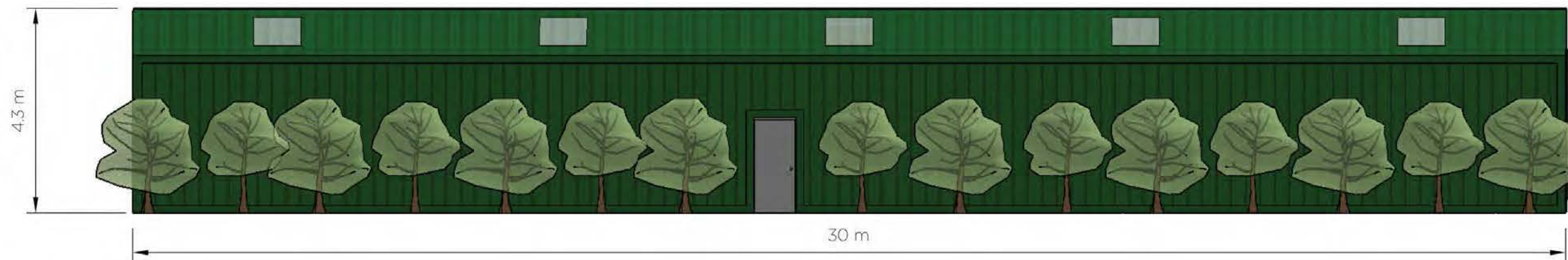
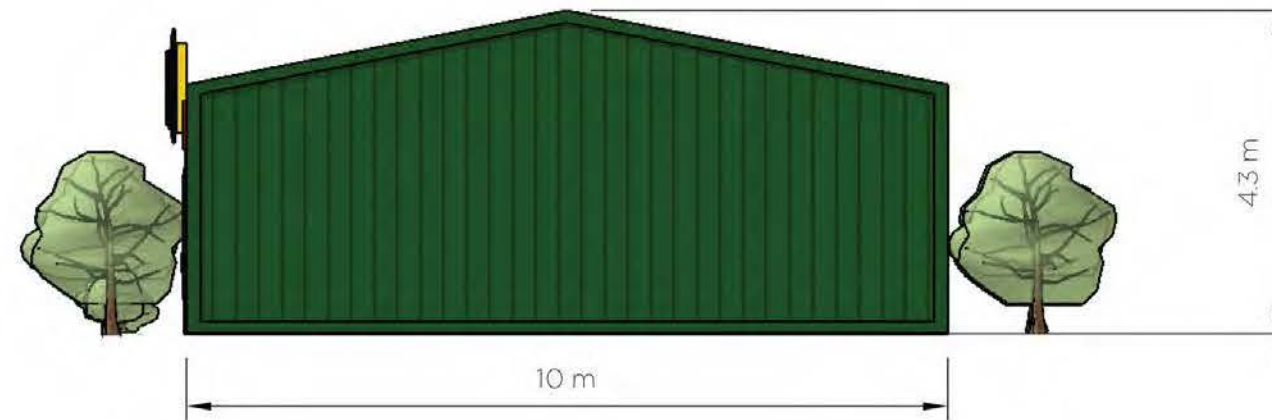
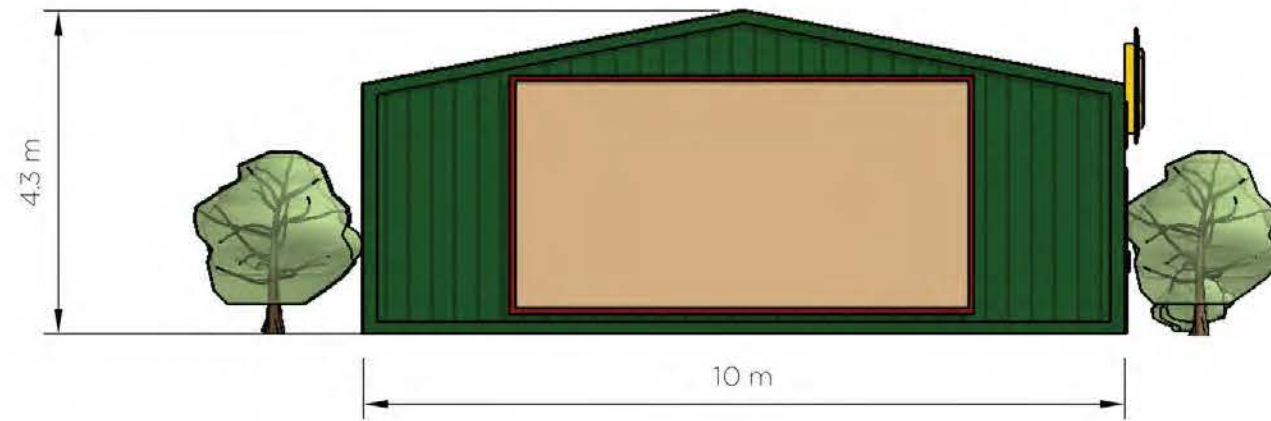
# GULLIVER'S WORLD - WOODLAND RETREAT - PET RESORT BUILDING



PROJECT: WOODLAND RETREAT PET RESORT BUILDING
DRAWING NAME: GW-WR-PR-PL-001
LOCATION: GULLIVER'S WORLD
DATE: 30/05/2019
DESCRIPTION: Colour plan for the Woodland Retreat Pet Resort Building at Gulliver's World.
SCALE: 1:200 @ A3
DRAWN BY: P Williams



# GULLIVER'S WORLD - WOODLAND RETREAT - STAFF HEADQUARTERS BUILDING



PROJECT: WOODLAND RETREAT  
STAFF HEADQUARTERS  
BUILDING

DRAWING NAME: GW-WR-SHQ-EL-001A

LOCATION: GULLIVER'S WORLD

DATE: 31/05/2019

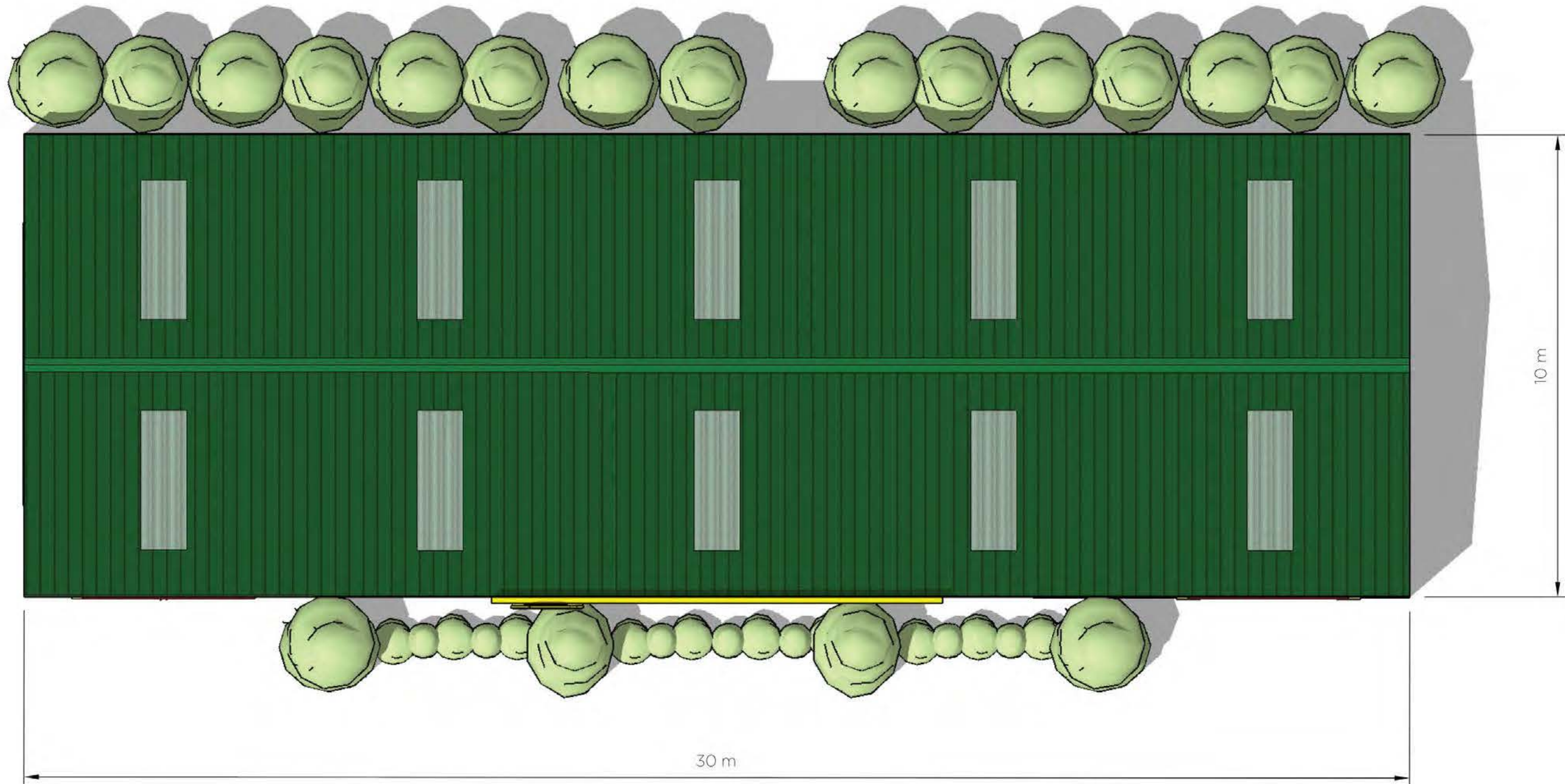
DESCRIPTION:  
Colour elevations for the Woodland  
Retreat Staff Headquarters Building at  
Gulliver's World.

SCALE: 1:100 @ A3

DRAWN BY: P Williams



# GULLIVER'S WORLD - WOODLAND RETREAT - STAFF HEADQUARTERS BUILDING



PROJECT: WOODLAND RETREAT  
STAFF HEADQUARTERS  
BUILDING

DRAWING NAME: GW-WR-SHQ-PL-001

LOCATION: GULLIVER'S WORLD

DATE: 30/05/2019

DESCRIPTION:  
Colour plan for the Woodland  
Retreat Staff Headquarters Building at  
Gulliver's World.

SCALE: 1:100 @ A3

DRAWN BY: P Williams



## APPENDIX B

TO DEVELOPMENT PLAN REPRESENTATION

WARRINGTON BOROUGH COUNCIL LOCAL PLAN (SUBMISSION VERSION)

Site Ref: 18/069 Gulliver's World

## SEQUENTIAL TEST



COUNTY PLANNING LTD

Moving Development Forward

(OUR REF. GUL40/2)



COUNTY PLANNING LTD

Moving Development Forward

## ALTERNATIVE SITES SEQUENTIAL TEST (LEISURE)

**DESCRIPTION OF PROPOSALS:** PROPOSED DEVELOPMENT OF 5,500 SQ.M (GIA) OF TOURISM AND LEISURE DEVELOPMENT WITHIN USE CLASSES C1, C2, A3, D1 AND D2, TOGETHER WITH ASSOCIATED RECREATIONAL AREAS, PARKING AREAS, ACCESS ROADS, FOOTWAYS AND PLAY EQUIPMENT.

**LOCATION:** GULLIVER'S WORLD, WARRINGTON

**ON BEHALF OF:** GULLIVER'S WORLD LTD

(OUR REF. GUL40/3)



COUNTY PLANNING LTD

PO Box 515, Worsley, Manchester, M28 8EY

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



**RTPI**

Chartered Town Planner

Date 15 June 2019  
Our ref GUL40/2  
LPA ref R/18/069  
Contact us [REDACTED]

## SEQUENTIAL TEST FOR ALTERNATIVE TOWN CENTRE SITES

RE: PROPOSED DEVELOPMENT OF 5,500 SQ.M (GIA) OF TOURISM AND LEISURE DEVELOPMENT WITHIN USE CLASSES C1, C2, A3, D1 AND D2, TOGETHER WITH ASSOCIATED RECREATIONAL AREAS, PARKING AREAS, ACCESS ROADS, FOOTWAYS AND PLAY EQUIPMENT.

LOCATION: LAND SOUTH OF GULLIVER'S WORLD THEME PARK, WARRINGTON, WA5 9YZ.

### 1. INTRODUCTION

- 1.1 This document is a sequential test in relation to the proposed development of 5,500 sq.m (GIA) of tourism and leisure development within use classes c1, c2, a3, d1 and d2, together with associated recreational areas, parking areas, access roads, footways and play equipment on land south of Gulliver's World theme park, Warrington.
- 1.2 The purpose of the leisure resort is to provide accommodation to existing visitors to the theme park, together with diversifying the range of entertainment on offer to patrons. The existing theme park sits together with 1660 parking spaces. The proposed development will be used by new and existing visitors of the current theme park is of critical background in the given context. We submit that it would be both unreasonable and illogical to seek an alternative site within the town centre for the proposals, but the Council has indicated that the site must be sequentially tested nonetheless.
- 1.3 Previous submissions to the Council set out clearly and cogently how and why the new accommodation represents an improved offer which will convert day visitors into overnight visitors. It remains the applicant's resolute position that sequential testing is not required for this application because the proposals are in accordance with policy PV7 of the local plan.
- 1.4 The following paragraphs explain the approach to sequential testing and set out the findings and criteria against which alternative suitable and available development sites are sought. These relate to the site size; location; built environment and heritage considerations; flood risk; availability; link to existing facilities; and resilience to crime and security together with other relevant matters.
- 1.5 In conclusion, it is found that there are no other suitable or available sites for the development and therefore the sequential test is satisfied.

## 2. RELEVANT BACKGROUND

- 2.1 The wider site is a children's theme park. The land was sold to the applicant by the Warrington and Runcorn Development Corporation (WRDC) in 1984 and on 18<sup>th</sup> May 1988 Development Consent was granted under the New Towns Act 1981.
- 2.2 Later, on 22<sup>nd</sup> March 2005, planning permission (ref. 2005/05467) was sought for: *"Full planning application for the extension of the theme park to allow the erection of an 80 bedroom hotel and the erection of buildings to comprise heritage attraction (related to former Burtonwood air base)."* The refusal of planning permission was appealed by the applicant (ref. APP/M0655/A/05/2005001) and following a public inquiry, the Appeal was allowed, and permission was approved on 11<sup>th</sup> January 2007.
- 2.3 Permission is now sought to expand the existing facilities as described below.

## 3. RELEVANT BACKGROUND

- 3.1 The proposed development comprises:

### Accommodation

- o 75no. Eco Woodland Lodges @ 3.6m x 9.75m = 2,632.5 m<sup>2</sup>
- o 4no. Double Eco Woodland Lodges @ 2.4m x 5.12m = 49.152 m<sup>2</sup>
- o 4no. Group Accommodation Units @ 14m x 5.3m = 296.8 m<sup>2</sup>
- o Touring caravan site (progressed under caravan site licence exemptions)

### Ancillary Buildings:

- o Staff Training & Development Building = 562.5 m<sup>2</sup>
- o Pet Resort (day-stay and overnight kennels) = 943 m<sup>2</sup>
- o Staff HQ Building @ 30m x 14m = 420 m<sup>2</sup>
- o Woodland Retreat Facilities = 549 m<sup>2</sup>

See plans package refs. "GW-WR"

- 3.2 Together with 79no. woodland eco lodges described below, the Woodland Resort will include a Wilderness Spa, Woodland Lodges & Pitches. Group accommodation for Scouts/Guides and similar user groups will be offered alongside a tree-top high ropes course set within the existing woodland setting, and a sports pitch for community events and organised groups. It also includes a 200 space staff car park and 56 additional guest spaces of grasscrete or similar (incorporating 'no dig' surfaces where root protection is required for existing trees).

#### 4. APPLICATION OF THE SEQUENTIAL TEST

- 4.1 Whilst if read technocratically and in isolation, Local Plan policies SN5 and PV5 might suggest that sequential testing is needed, this is materially outweighed by the context of the wider strategic policies such as Policy SN6 relating to the economy. However, it is noted that sequential testing should only be required where (as per para 86), the proposal is not in accordance with an up-to-date plan Policy PV7 in particular is a bespoke policy for this development type (and it is refined even more so by naming the application site in particular), as a result, very substantial weight should be given to policy PV7 in decision making. The supporting text to Policy PV7 sets out the context to the development plan.
- 4.2 Recent case law discusses situations where supporting text is relied on and those cases clearly acknowledge the necessity for supporting text to assist with the interpretation and application of those same policies. In this case, the relevant Policy is PV7 and its wording and supporting text are unequivocal in its support for exactly this kind of tourism development that contributes favourably to the local economy. Indeed, Gulliver's world is cited as a specific example of where that policy applies and should not therefore be subject to sequential testing at all.
- 4.3 In light of the bespoke requirements, the criteria for sequentially testing for suitable and available sites within the defined town centre boundary (defined by policy CS7) are:
- a) Site size of circa 5ha or greater

The proposed development site is circa 5ha and is set within a wider woodland site of 6.39ha amongst existing trees, many of which are to be retained and incorporated into the development. Therefore, a site of comparable size and scale in order to meet the requirements of the development and legislative compliance with the Caravan Site Licencing legislation which demands minimum 6m separation distances between the units of accommodation.
  - b) Site access

The site should have access to a primary road network to provide appropriate access.
  - c) Outside the Primary Shopping Area as defined by policy PV4

The Council's approved Town Centre Master Plan (2017) does not identify any suitable sites for the proposed uses within the town centre and it promotes regeneration primarily through retail, office and residential development. Given the nature/scale and character of the proposed development, any alternative sites would need to be located outside the Primary Shopping Area, in order to help



ensure the continued viability and vitality of the town centre.

d) Outside adopted Conservation Areas

The proposals are for a Pirate Ship and Fairy-tale Castle Hotel together with a range of safari, wild west and lost world lodges. The character and theming of the proposed accommodation required for a children's entertainment venue such as that proposed would be discordant with the objectives of the conservation area.

e) Within Flood Risk Zone 1

The proposal includes the siting of timber lodges and caravans which have low resilience to flood risk. Siting of such accommodation in areas of flood risk such as zones 2 or 3 is likely to be judged unsuitable.

f) Existing or ability to provide support infrastructure including drainage and parking.

Any alternative site must be capable of accommodating the requirement for 250+ parking spaces. It must also be capable of disposing of foul and surface water adequately (noting that the existing application site already has drainage infrastructure installed) and is connected to the mains drains.

g) For sale or likely to become available

The site must either be immediately available sale or likely to become available for purchase or lease within a reasonable period of time, in the given context that time period is between 12-24 months from now.

h) Directly linked or in close proximity to an existing children's theme park catering for families with young children aged 3 to 13 years;

Given the nature/scale and character of the proposed development it is critical that the development site is linked to the theme park. This is a requirement for the operation, management and maintenance of the site.

i) Crime and security - safe and secure for the siting of timber lodges and caravans;

Given the nature/scale and character of the proposed development it is critical that the development site can be made safe for children aged between 2 and 13 years of age. Additionally, that the location would have to be made safe and resilient to an increased risk of crime often found within town centre locations.

- 4.4 The above criteria have been tested against available sites within the town centre boundary, on the council's brownfield register and/or identified in the 2017 Strategic Land Availability Assessment. There were three potential sites identified which might have otherwise fulfilled criteria b) to e) listed above, these are shown in Appendix 1 and below. However, none of the sites satisfied the criteria a) g), h) or i) listed above in any case:

Site No.	Location	Size	Year Available	Comments
1	Pinners Brow Retail Park	1.9ha	2028	Occupied by existing retail park.
2	Land a Winwick Street	3ha	2022	Ear-marked for Council's Stadium Quarter regeneration project.
3	Wilson Patten Street	3.3ha	2025	Occupied. Unavailable for leasehold or free hold purchase.

#### Comments

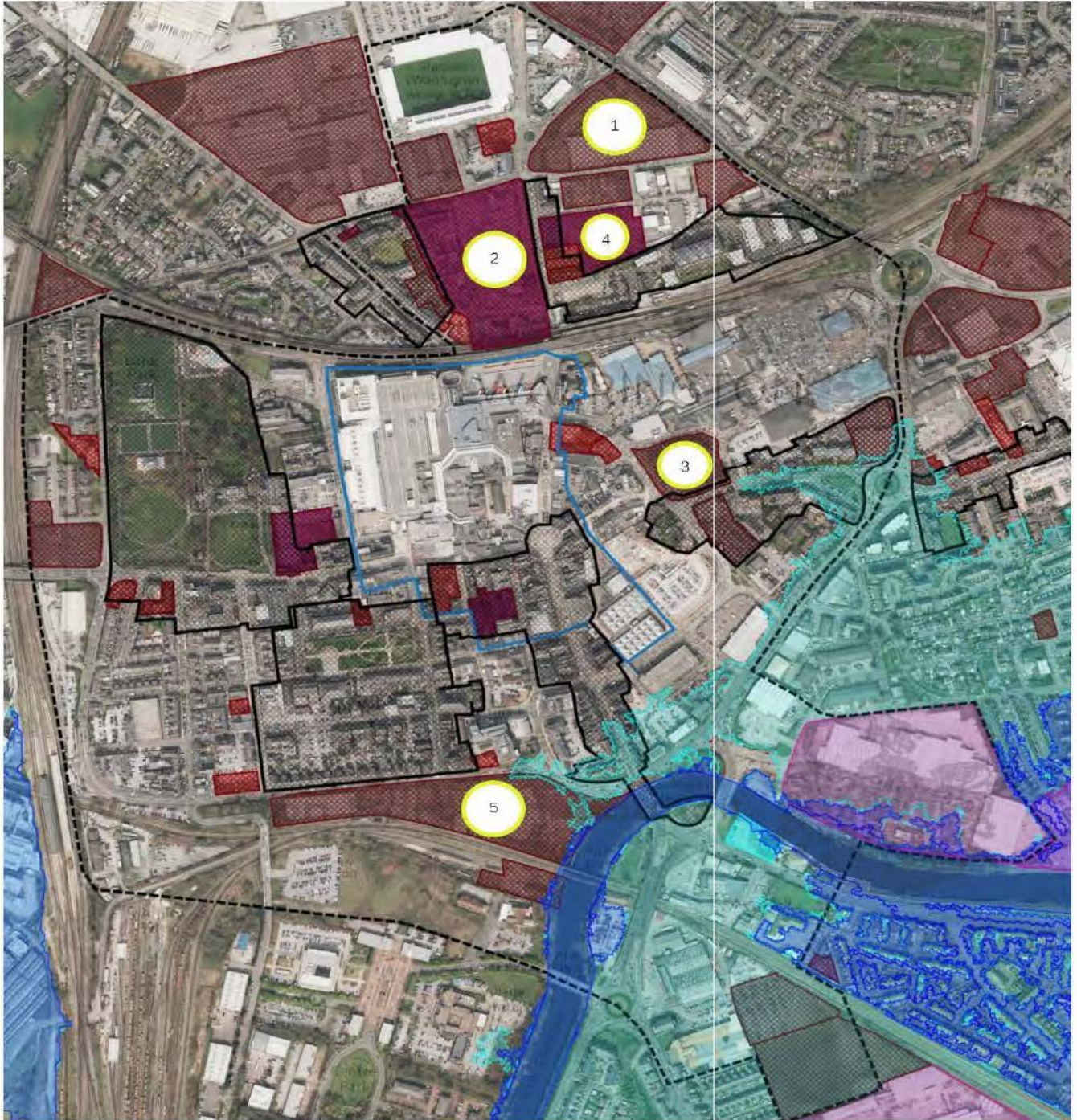
- 4.5 Site 1 is occupied by an existing retail park and will not be available until 2028 which is beyond an appropriate time horizon. It is also less than half the required size and located on prime retail land such that its location would not be appropriate or likely viable.
- 4.6 Whilst theoretically Site 2 might become available, it has already been earmarked for Council owned and led regeneration projects, of which the Stadium Quarter regeneration development project in particular is advancing, and land acquisitions have been ongoing to assemble the site over several years. Consequently, this site is ruled out.
- 4.7 Site 3 was the only remaining site which was potentially available from 2025. Notwithstanding that again, it is too small for the proposed development, enquiries were made with the freehold landowner who confirmed that the site was not available to the applicants on either a leasehold or freehold basis (See Appendix 2).

## 5. CONCLUSIONS

- 5.1 The proposal is for a leisure resort to serve an established and existing children's theme park in the borough. It is essential to co-locate it with this existing attraction. Moreover, the adopted town centre master plan does not presume or allocate any land within the town centre as being suitable for the proposed uses.
- 5.2 After conducting an appropriate search for alternative locations, there are no other suitable or available sites within the town centre boundary.

## APPENDIX 1

All development constraints overlaid on brownfield register:



## APPENDIX 2

Enquiries into site availability for site No.3:

### **Dan Matthewman**

---

**From:** Jack Critchley  
**Sent:** 05 March 2019 16:20  
**To:** Dan Matthewman  
**Subject:** Re: GUL40/1 - Land south of Wilson Patten Street

Dan,

Many thanks for your email.

Unfortunately this site isn't available leasehold, and we are not planning on selling the Freehold.

Thanks again,

Jack

On Tue, 5 Mar 2019 at 14:32, Dan Matthewman <[dan@countyplanning.co.uk](mailto:dan@countyplanning.co.uk)> wrote:

Dear Jack,

My purpose in writing is to follow up our earlier conversation. I understand that you are Director of the company which owns the Freehold title to the land shown on the Council's Brownfield Land database in the image below cross hatched brown and known as land south of Wilson Patten Street.

I understand that this is in long term lease to a retail outlet with a notable lease period remaining.

My purpose in emailing is to check whether the land is a) available for sale and b) whether you are willing to sell it to my client for development for a children's themed hotel. Please could you confirm by reply?

## APPENDIX C

TO DEVELOPMENT PLAN REPRESENTATION

WARRINGTON BOROUGH COUNCIL LOCAL PLAN (SUBMISSION VERSION)

Site Ref: 18/069 Gulliver's World

## BIODIVERSITY ENHANCEMENT SCHEME



(OUR REF. GUL40/2)



# RACHEL HACKING ECOLOGY

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Tel: 0161 465 8971

[mail@rachelhackingecology.co.uk](mailto:mail@rachelhackingecology.co.uk)

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

4<sup>th</sup> March 2019

## **2019/34295 Biodiversity Enhancement Measures for land at Gulliver's World, off Shackleton Close, Warrington**

### **Background**

Rachel Hacking Ecology Limited was commissioned in 2019 by County Planning Limited to write a biodiversity statement for land at Gulliver's World, off Shackleton Close, Warrington. The site is the subject of a planning application with Warrington Borough Council (WBC) for the provision of accommodation and ancillary buildings to form a leisure resort (planning reference: 2019/34295).

As part of the planning application, Greater Manchester Ecology Unit (GMEU) was consulted and recommended a planning condition be attached to any approval regarding the biodiversity value of the site. GMEU recommended the condition should state: *A scheme for the Biodiversity Enhancement Measures shall be submitted to and approved in writing by the Local Planning Authority. The approved scheme shall be implemented prior to first occupation of the development (or in accordance with a phasing plan which shall first be agreed in writing with the local planning authority) and shall be retained thereafter.*

In an aim to prevent pre-commencement conditions, this document details the Biodiversity Enhancement Scheme at the site to be submitted to WBC pre-determination.

### **Biodiversity Enhancement Scheme**

Rachel Hacking Ecology considers that the proposed landscaping scheme (Gulliver's World, Drawing GWR-LA-01A) will enhance the biodiversity of the site due to the planting of feature trees and shrubs and retention of the surrounding woodland.

It is recommended that a planting list includes native and non-native species and varieties of flowering shrubs and trees, that will fit in with the amenity themes of the site and amenity management objectives whilst bringing biodiversity gain to the site. The species listed below include a range of species that flower at different times of year, prolonging the season of nectar and pollen provision.

Recommended Tree species:

- Copper Beech *Fagus silvatica purpurea*
- Elder *Sambucus nigra*
- Field Maple *Acer campestre*
- Guelder-rose *Viburnum opulus*
- Holly *Ilex aquifolium*
- Alder *Alnus glutinosa*
- Laburnum *Laburnum anagyroides*
- Lilac *Syringa vulgaris*
- Magnolia *Magnolia* sp.
- Rowan *Sorbus aucuparia*
- Stag's-horn Sumach *Rhus typhina*
- Tulip Tree
- White Willow *Salix alba*
- Yew *Taxus baccata*

Recommended Shrub Species:

- Angels Trumpet *Brugmansia*
- Black-eyed Susan *Rudbeckia*
- Blueblossom *Ceanothus thyrsiflorus repens*
- Cherry Laurel *Prunus laurocerasus*
- David Viburnum *Viburnum davidii*
- Dogwood *Cornus sanguinea*
- Fatsia *Fatsia japonica*
- Flowering Currant *Ribes sanguineum*
- Garden Lavender *Lavandula angustifolia*
- Heather *Calluna vulgaris*
- Hedge Veronica *Veronica x franciscana*
- Lady's-mantle *Alchemilla vulgaris*
- Hebe *Hebe* var.
- Oregon-grape *Mahonia aquifolium*
- Ox-eye Daisy *Leucanthemum vulgare*
- Pink Elle *Escallonia laevis*
- Red-hot Poker *Kniphofia*
- Sea Buckthorn *Hippophae rhamnoides*
- Skimmia *Skimmia japonica*
- Spindle *Euonymus europaeus*
- Spurge Laurel *Daphne laureola*
- Star Jasmine *Trachelospermum jasminoides*
- Tutsan *Hypericum androsaemum*
- Yellow Loosestrife *Lysimachia vulgaris*

**Bird Boxes**

Please refer to Figure 1 at the back of the report for indicative bird box locations on the landscaping plan.

The following bird boxes will be erected onto existing trees on the site boundary:

- 2 x Schwegler Woodcrete Open Front nest box
- 2 x Schwegler Woodcrete 32mm-hole nest box
- 2 x Schwegler Woodcrete 26mm-hole nest box

The bird boxes will be positioned at least 2 metres off the ground. None of the boxes will be positioned facing south. The bird boxes chosen are known to be rugged and are guaranteed by the manufacturer for 25 years.

The boxes will be monitored every 2 months and checked for signs of breakage or weather deterioration and will be replaced if no longer useable.

### **Bat Boxes**

Please refer to Figure 1 at the back of the report for indicative bat box locations on landscaping plan.

The following bat boxes will be provided on the site, to provide roosting habitat for crevice-dwelling bats such as Common Pipistrelle *Pipistrellus pipistrellus*:

- 4 x Schwegler 2F Woodcrete Bat Box

The 2F bat boxes will be positioned onto the existing trees along the site boundary. None of the bat boxes will be positioned facing north.

The bat boxes will be monitored every 6 months and will be replaced if broken.



## APPENDIX D

TO DEVELOPMENT PLAN REPRESENTATION

WARRINGTON BOROUGH COUNCIL LOCAL PLAN (SUBMISSION VERSION)

Site Ref: 18/069 Gulliver's World

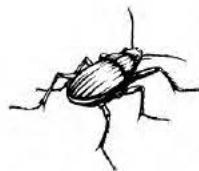
## ECOLOGY REPORT (INTERIM)



(OUR REF. GUL40/2)

**EXTENDED PHASE 1 HABITAT SURVEY OF  
LAND AT GULLIVER'S WORLD, OFF  
SHACKLETON CLOSE, WARRINGTON,  
CHESHIRE**

**SEPTEMBER 2018**



**RACHEL  
HACKING  
ECOLOGY**

Bowden Hall, Bowden Lane, Marple, Stockport, Cheshire, SK6 6ND

Tel: 0161 465 8971

[mail@rachelhackingecology.co.uk](mailto:mail@rachelhackingecology.co.uk)

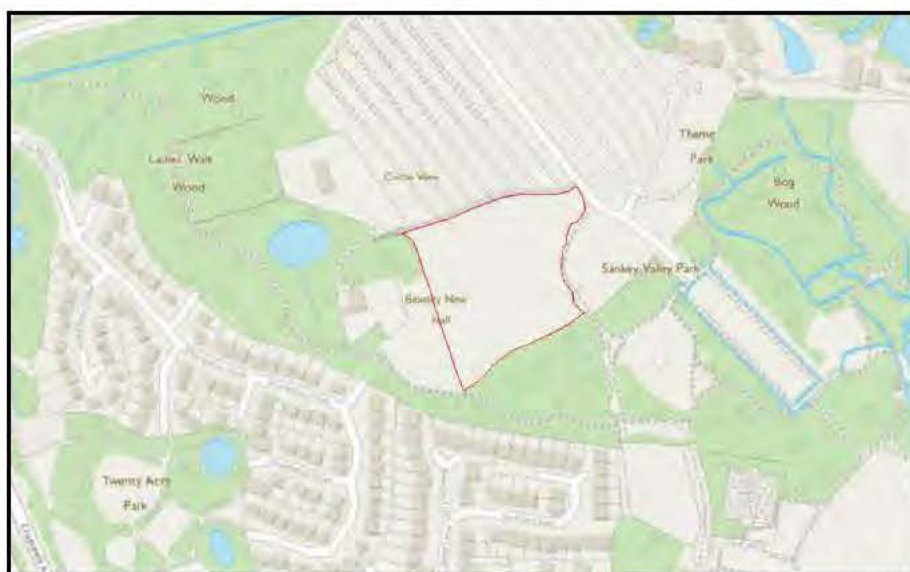
[www.rachelhackingecology.co.uk](http://www.rachelhackingecology.co.uk)

## **CONTENTS**

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3. RESULTS	
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PROTECTED SPECIES	10
PROTECTED SITES	14
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PHASE 1 HABITAT MAP	

## **1.0 INTRODUCTION**

- 1.1 Rachel Hacking Ecology Limited was commissioned in 2018 by Gulliver's World Limited, to undertake an Extended Phase 1 Habitat Survey of a piece of land off Shackleton Close, Warrington. The site will be the subject of a planning application for the provision of accommodation and ancillary buildings to form a leisure resort.
- 1.2 The site is situated east of Ladies' Walk Wood, South of Gulliver's World in Warrington, Cheshire (O.S. grid reference: SJ 58869 89887 – see Figure 1). The site comprises amenity grassland surrounded by broad-leaved woodland and amenity grassland. The woodland borders the site to the south and west.
- 1.3 The aims of the survey were to:
- Describe and map the habitats present on the site
  - Assess the potential for protected species to be present on the site or just outside the immediate site boundary
  - Identify where further survey may be necessary.



**Figure 1 showing the location of the site within the red line boundary**

## **2.0 METHODOLOGY**

- 2.1 A Phase 1 Habitat survey was undertaken to JNCC standards (JNCC, 2010). The site was walked, and each habitat was assigned a Phase 1 habitat category. Species lists were taken at each habitat and the abundance of each species was noted. All botanical nomenclature follows Stace, 2010. A Phase 1 map was produced showing habitat boundaries.
- 2.2 During the Phase 1 survey, the habitats were assessed for their potential to support protected species. This included, looking for signs of Badger activity (e.g. setts, paths, latrines and hairs on fences), assessing any waterbodies on site or near the site for their potential to support Great Crested Newt and assessing the potential for any buildings or mature trees to be used by bats.
- 2.3 The site was also surveyed for invasive, non-native plant species such as Japanese Knotweed, Himalayan Balsam and Giant Hogweed.
- 2.4 Rosie Fisher and Joe Walters (Ecologists) undertook the survey on 5th September 2018. The weather was dry and sunny. Both surveyors are fully experienced with habitat and protected species surveys and are fully trained. September is an optimum time of year for botanical surveys. September is within the optimal time of year for protected species assessments. The site was fully accessible and there were no constraints to the survey.

## **3.0 RESULTS**

### **HABITATS**

- 3.1 The Phase 1 Habitat Map can be found at the back of the report. The habitats present on site are described below.

#### **Amenity Grassland**

- 3.2 The site comprises predominately mown, species-poor amenity grassland (see Photograph 1). This is dominated by grasses including Perennial Rye-grass *Lolium perenne* and Yorkshire Fog *Holcus lanatus*. Abundant species include White Clover *Trifolium repens*, Dandelion *Taraxacum officinale* agg., Greater Plantain *Plantago major*, Creeping Buttercup *Ranunculus repens*, Ribwort Plantain *Plantago lanceolata*, Broad-leaved Dock *Rumex obtusifolius*, and Selfheal *Prunella vulgaris*. Other species include Scented Mayweed *Matricaria recutita*, Thyme-Leaved Speedwell *Veronica serpyllifolia*, Meadow Vetchling *Lathyrus pratensis*, Spear Thistle *Cirsium vulgare* and Bird's-foot Trefoil *Lotus corniculatus*.

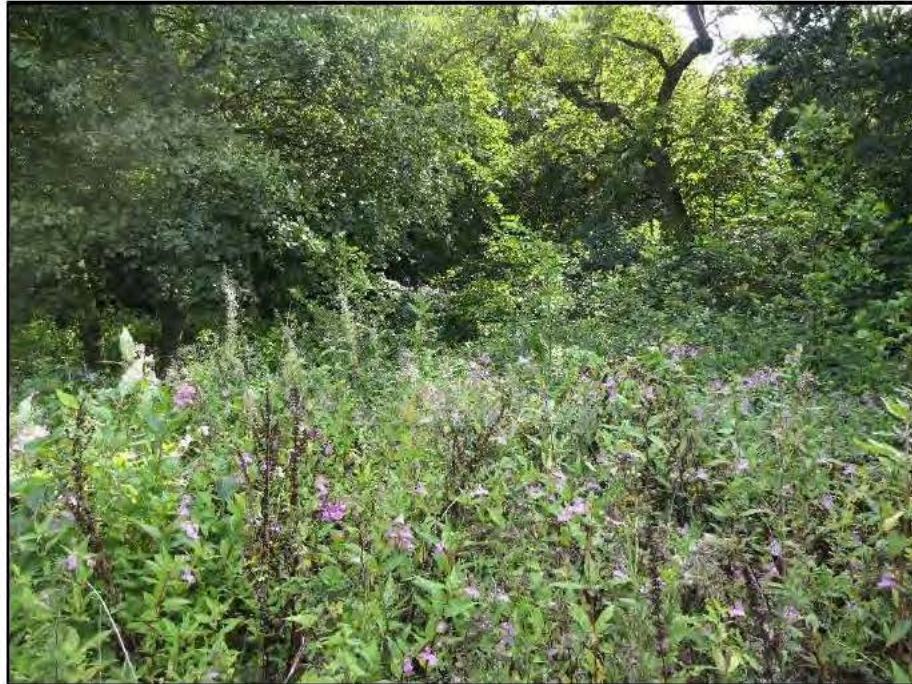


**Photograph 1 showing the amenity grassland**

#### **Tall, Ruderal Herb**

- 3.3 Tall, ruderal vegetation is present around the western and southern boundaries (see Photograph 2) as well as in two small patches within the amenity grassland. Species include Common Nettle *Urtica dioica*, Hedge Bindweed *Calystegia sepium*, Creeping Thistle *Cirsium arvense*, Rosebay Willowherb *Chamerion angustifolium*, Hogweed *Heracleum sphondylium*, Hedge Woundwort *Stachys sylvatica*, Great Willowherb *Epilobium hirsutum*, Bramble *Rubus fruticosus* agg. and Wood Avens *Geum urbanum*. Less frequently occurring species present include Ragwort *Senecio jacobaea*, Soft-rush *Juncus effusus*, Creeping

Cinquefoil *Potentilla reptans*, Red Campion *Silene dioica*, Silverweed *Potentilla anserina* and Fox-and-Cubs *Pilosella aurantiaca*.



Photograph 2 showing the tall, ruderal vegetation

#### **Broad-leaved Plantation Woodland**

- 3.4 Broad-leaved plantation woodland is situated at the south-west corner of the site (see Photograph 3). Woody species present include Sycamore *Acer pseudoplatanus*, Alder *Alnus glutinosa*, Elder *Sambucus nigra*, Field Maple *Acer campestre*, Hawthorn *Crataegus monogyna* and Willow *Salix* sp. The ground flora comprises Himalayan Balsam *Impatiens glandulifera*, Common Nettle *Urtica dioica*, Wood Avens *Geum urbanum* and Bramble *Rubus fruticosus* agg. Ferns and fungi including Dead Man's Fingers *Xylaria polymorpha* also occur.



**Photograph 3 showing the broad-leaved plantation woodland**

**Continuous Scrub**

- 3.5 One small patch of scrub is present on the north of the site. within the short-mown amenity grassland (see Photograph 4). This has recently been cut back. The scrub comprises Willow *Salix* sp., Bramble *Rubus fruticosus* agg., Common Nettle *Urtica dioica* and Broad-leaved Dock *Rumex obtusifolius*



**Photograph 4 showing continuous scrub**



### **Trees**

- 3.6 Several juvenile trees are scattered along the boundaries and occur in a tree belt on the south-eastern boundary (see Photograph 5). The trees comprise Pedunculate Oak *Quercus robur*, Alder *Alnus glutinosa*, Sycamore *Acer pseudoplatanus*, Silver Birch *Betula pendula*, Hazel *Corylus avellana* and Willow *Salix* sp.



**Photograph 5 showing the scattered trees**

### **Scattered Scrub**

- 3.7 Scattered scrub is present in the tall, ruderal vegetation, where it has become unmanaged. Species include Bramble *Rubus fruticosus* agg., Elder *Sambucus nigra*, Horse Chestnut *Aesculus hippocastanum* saplings and Willow *Salix* sp. saplings.



**Photograph 6 showing the scattered scrub**

**Bare Ground**

- 3.8 Bare ground exists on site, in the form of a concrete path. A gravel path also exists at the east of the site which supports ephemeral vegetation (see Photograph 7).



**Photograph 7 showing the bare ground**

### **Existing Building**

- 3.9 One building occurs at the south-eastern corner of the site (see Photograph 8). This is a wooden shed has a pitched fibreglass roof (see Photograph 9).



**Photograph 8 showing the building**



**Photograph 9 showing the roof**

## INVASIVE SPECIES

- 3.10 Himalayan Balsam *Impatiens glandulifera* is present on site, scattered in the tall, ruderal vegetation. This is an invasive, non-native species, listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). Inclusion on Schedule 9 makes it an offence to allow this species to spread into the wild.

## PROTECTED SPECIES

### Badger

- 3.11 Badgers *Meles meles* are protected under the Protection of Badgers Act 1992. This Act, for example, makes it illegal to disturb a Badger whilst it is in a sett, to kill, injure or take a badger and to obstruct the entrance to a Badger sett.
- 3.12 The site was searched for evidence of Badger presence including; setts, paths, latrines and hairs on fences. No evidence of Badger activity was found on the site or immediately adjacent to the site.

### Bats

- 3.13 All bat species are European Protected Species under the Conservation (Natural Habitats etc.) Regulations 1994. This is implemented in the UK through the Conservation of Habitats and Species Regulations 2017. Bats are also protected under the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and the Natural Environment and Rural Communities Act (NERC, 2006). It is illegal to disturb or damage a bat roost.
- 3.14 One building is present on application site. This is a wooden shed, which is in good material condition and has a large gap between the walls and roof. The shed is not deemed suitable for bats due to the poor thermal qualities of the building materials, particularly the roof. No cavities or voids exist at the shed and no evidence of bat activity was found.
- 3.15 Several trees are present within the site. These were all inspected from the ground for potential bat roosting features, such as cavities and limb damage. No trees were found to support such features that could be used by bats and all offer negligible bat roost potential. Bats may use the linear features such as the tree belts, for foraging and commuting along.

### Great Crested Newt

- 3.16 Great Crested Newt *Triturus cristatus* is a European Protected Species (EPS). It is listed under Annex IV of the EC Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. This is implemented in the UK through The Conservation of Habitats and Species Regulations 2017 and the species is fully protected under the Wildlife and Countryside Act 1981 (as amended).
- 3.17 Four ponds exist within 250 metres of the site. All of these were fully assessed for their suitability to support Great Crested Newt (GCN),

under the Habitat Suitability Index (HSI) criteria. The four ponds occur within Gulliver's World, Ladies' Walk Wood and Twenty Acre Park, with the closest 64 metres to the west of the site, separated by broad-leaved woodland.

- 3.18 Pond 1 is located inside the theme park and beyond the application site boundary, within an area of short-mown amenity grassland and hardstanding (see Photograph 10). Pond 1 features a number of islands covered by scrub, trees and short mown amenity grassland (see Photograph 11). This pond has a large amount of wildfowl activity and has a population of fish. The pond is approximately 6,680m<sup>2</sup>. Very little aquatic vegetation is present. Species include Yellow Flag *Iris pseudacorus*, Bulrush *Typha latifolia*, Common Duckweed *Lemna minor*, Soft-rush *Juncus effusus* and Himalayan Balsam *Impatiens glandulifera* (see Photograph 12). This pond has a GCN Habitat Suitability Index score of 0.28, which is 'Poor'.



Photograph 10 showing Pond 1



**Photograph 11 showing one of the islands in Pond 1**



**Photograph 12 showing plant species including Himalayan Balsam in Pond 1**

- 3.19 Pond 2 is the closest to the site and lies within Ladies' Walk Wood, 64 metres away (see Photograph 13). The pond is approximately 1,210m<sup>2</sup> and supports wildfowl. The banks are 80% shaded by various tree species including Alder *Alnus glutinosa*, Horse Chestnut *Aesculus hippocastanum*, Beech *Fagus sylvatica* and Lime *Tilia europaea*. The pond is also completely covered in Common Duckweed *Lemna minor*. The HIS score for Pond 2 is 0.54, which is 'Below Average'.



**Photograph 13 showing Pond 2**

- 3.20 Pond 3 is located to the south-west of the site, within Twenty Acre Park (see Photograph 14). The pond was dry at the time of survey. The pond is almost completely shaded by scrub and trees and has marginal vegetation dominated by Yellow Flag *Iris pseudacorus*. The pond is 380m<sup>2</sup>. Pond 3 scores 0.56 on the Habitat Suitability Index which is 'Below Average' suitability for GCN.



**Photograph 14 showing Pond 3**

- 3.21 Pond 4 is situated in Twenty Acre Park to the south-west of the site (see Photograph 15). The pond is 550m<sup>2</sup> and is covered with Common Duckweed *Lemna minor*. The pond is surrounded by trees and scrub which provide 85% shade. This pond has a HSI score of 0.64 which is 'Average'.



Photograph 15 showing Pond 4

- 3.22 The proposed construction site supports limited suitable terrestrial habitat for GCN. The short-mown amenity grassland does not provide any cover for GCN. Ladies' Walk Wood, just west of the site, offers more suitable terrestrial habitat for GCN. The field boundaries also offer cover for GCN, such as the ruderal vegetation and scrub.

#### **Nesting Birds**

- 3.23 All bird species are protected at their nest under the Wildlife and Countryside Act 1981 (as amended).

- 3.24 The scrub and trees provide suitable nesting habitat for birds.

#### **PROTECTED SITES**

- 3.25 No statutory protected sites exist on the site or immediately adjacent to the site. Two statutory protected sites occur within 5 kilometres of the development site. Woolston Eyes Site of Special Scientific Interest (SSSI) and Paddington Meadows Local Nature Reserve (LNR) are the closest, with both situated 4km to the east of the site. These are separated from the site by residential development, roads, railway and Dallam Brook. Woolston Eyes SSSI is designated for its nationally important breeding population of lowland open water birds and wintering wildfowl.



- 3.26 The site is within an SSSI Impact Risk Zone, which lists certain types of development that may have a deleterious impact on protected sites nearby. Natural England may need to be consulted on developments related to aviation, combustion or air pollution. The type of development proposed is not included within the criteria.
- 3.27 No locally designated sites fall on, or lie adjacent to, the development site. Ladies' Walk Wood, owned by the Woodland Trust, lies directly adjacent to the site.

## **4.0 ASSESSMENT**

### **HABITATS**

- 4.1 The Phase 1 Habitats present on the site are common throughout the UK. No nationally rare or locally rare plant species were located during the extended Phase 1 Habitat Survey.
- 4.2 The proposed development site supports short-mown amenity grassland, which is of little ecological value. The boundary habitats are to be retained. The wider site offers better quality habitats, such as the ruderal vegetation which offers a limited pollen and nectar source for invertebrates. The scrub and tall, ruderal vegetation offer cover for wildlife. The trees offer nesting habitat for birds.

### **Development Context**

- 4.3 The proposed development involves the loss of mainly short-mown amenity grassland. The field boundaries off-site, including scrub, tall, ruderal vegetation and hedgerows, are proposed to be retained and protected. It is recommended for the hedgerows to be protected during construction with measures including Root Protection Areas and a sensitive lighting scheme, where appropriate. Given the low ecological value of the habitats to be lost, no specific habitat mitigation is considered to be necessary.

### **PROTECTED SPECIES**

#### **Badger**

- 4.4 No evidence of Badger activity was found on site or immediately adjacent to the site. Badgers are not considered to be a constraint on the development.

#### **Bats**

- 4.5 The shed on site has negligible potential to support a bat roost. No other buildings exist on site. No trees with bat roosting potential were found on site. No further bat survey work is considered necessary and bats are not considered to be a constraint on development at this time.

#### **Great Crested Newt**

- 4.6 The proposed development will not involve the loss of any Great Crested Newt (GCN) breeding habitat. Four ponds exist within 250 metres. These score between Average–Poor under HSI criteria. There is no habitat connectivity between Ponds 3 and 4 and the site. The habitat within Ladies Walk Wood and Twig and Bog Woods is good terrestrial habitat for GCN, therefore, it is likely that if any newts occur in the ponds, they will favour the woodland habitats. The site supports limited GCN terrestrial habitat. Only short-mown amenity grassland will be lost which is considered to be unsuitable habitat for GCN. The tall, ruderal vegetation and scrub are more suitable as terrestrial habitat for GCN.

- 4.7 Given the lack of connectivity to breeding habitat in the locality and poor terrestrial habitat on site, it is not reasonably likely that GCN occurs on the development site. GCN is not considered to be a constraint on development at this time.

#### **Nesting Birds**

- 4.8 The site supports suitable nesting habitats for birds within the trees. Nesting birds can be mitigated for by allowing no works to potential nesting habitats to be carried out within the bird nesting season (which is generally March – August) unless a nesting bird survey is undertaken first.

#### **INVASIVE SPECIES**

- 4.9 Himalayan Balsam is present on site. This species is listed on Schedule 9 of The Wildlife and Countryside Act 1981 (as amended). It is recommended that the Himalayan Balsam is eradicated from the site, using a suitable eradication methodology such as hand-pulling, strimming or herbicide application, over a number of years, to deplete the seed bank.

#### **PROTECTED SITES**

- 4.10 No statutory or non-statutory protected sites exist on the site or immediately adjacent to the site. The statutory protected sites are all over 4km from the proposed development. The protected sites are all separated from the proposed development site by adequate buffer zones and habitats, such as roads, rivers and railway lines. The habitats in the designated sites are wildflower meadows and wetlands which do not occur on site. Because of this, it is not considered that there will be any detrimental impact on the protected sites from the development.

## **5.0 RECOMMENDATIONS**

### **Further Survey**

5.1 Protected species are a material consideration when a planning authority is considering a planning application. The presence of protected species, the effect of the proposed development and suitable mitigation, if required, must be established before planning permission can be granted. Following the findings from the Extended Phase 1 Habitat Survey, the following may be required:

- **Nesting Birds** - If any work to the scrub or trees needs to be carried out within the bird nesting season (generally March to August), then a nesting bird survey will be required by experienced personnel immediately prior to work commencing.

### **Invasive Species**

5.2 The Himalayan Balsam will need to be removed prior to work commencing or during construction and thereafter managed in accordance with a removal and management strategy

### **Habitat Enhancement**

5.3 It is recommended that the following measures are taken into account if a landscaping plan is produced for the red line boundary, to increase the biodiversity value of the site:

- Tree and shrub planting – where practical, native tree species should be planted.
- Soft landscaping should include the provision of native and non-native flowering perennial species, to provide a pollen and nectar source for invertebrates.

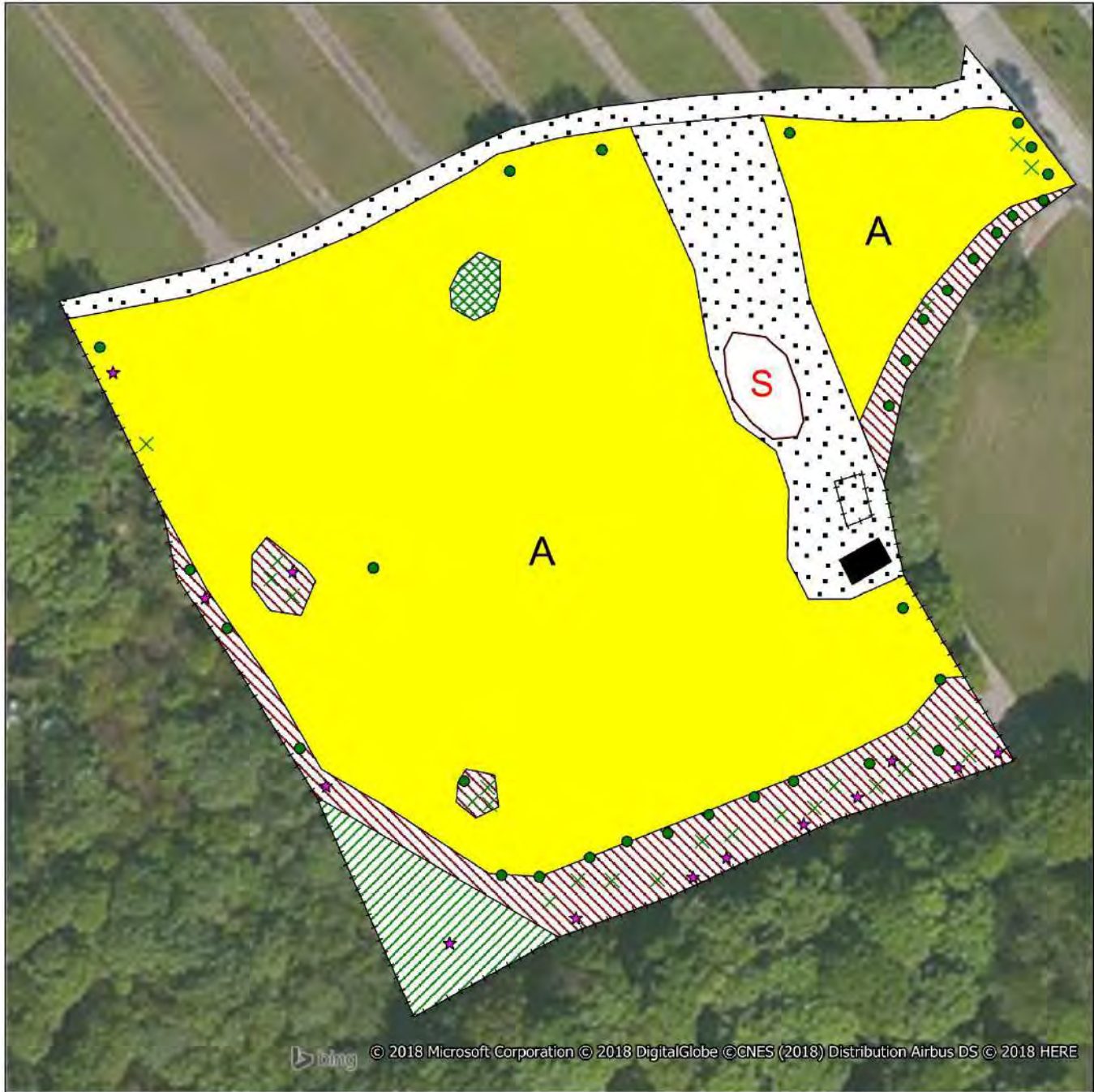
## **6.0 REFERENCES**

JNCC. *Phase 1 Habitat Survey – a technique for environmental audit*, JNCC, Updated 2010.

Preston, C.D., Pearman, D. & Dines, T. (2002). *New Atlas of the British and Irish Flora*. Oxford University Press.

Stace, C. A. (2010). *New Flora of the British Isles, 3<sup>rd</sup> Edition*. Cambridge University Press.

## PHASE 1 HABITAT MAP



- Key**
- A Amenity Grassland
  - Bare Ground
  - / / / / Broad-leaved Plantation Woodland
  - Building
  - x x x x Continuous Scrub
  - S Spoil
  - / / / / Tall Ruderal Herb
  - ++++ Fence
  - × Scattered Scrub
  - ★ Himalayan Balsam
  - Tree

**Phase 1 Habitat Map**

**Gulliver's World,  
off Shackleton Close,  
Warrington**

**NOT TO SCALE**

**Drawn by: RF  
Date: 13/09/2018**



## APPENDIX E

TO DEVELOPMENT PLAN REPRESENTATION

WARRINGTON BOROUGH COUNCIL LOCAL PLAN (SUBMISSION VERSION)

Site Ref: 18/069 Gulliver's World

## HIMALAYAN BALSAM MANAGEMENT PLAN



(OUR REF. GUL40/2)





## **HIMALAYAN BALSAM MANAGEMENT PLAN**

### **Gulliver's World, Warrington**

#### **Introduction**

1. This document is a Himalayan Balsam Management Plan (HBMP) to control, prevent the spread of and where possible eradicate Himalayan Balsam which is an invasive plant species listed on Schedule 9 Part II (plants) of the Wildlife and Countryside Act 1981 (as amended).
2. The site was surveyed by Rachel Hacking Ecology (Sept 2017) recommended that this species of plant is eradicated from the site, prior to, or during, demolition works. This document provides an eradication programme for the treatment/removal for the site.

#### **Background**

3. Himalayan Balsam which is an invasive plant species. It is an offence to knowingly or recklessly allow it to spread. There are other legal provisions concerning "controlled waste", which are set out in Part II of the Environmental Protection Act 1990.
4. This HBMP deals is also to be deployed in relation to the disposal of any soil contaminated by the plan which then becomes a controlled waste for which there is a positive duty of care to dispose of it lawfully and appropriately by an authorised company.

#### **What is Himalayan Balsam?**

5. Himalayan balsam is a non-native invasive terrestrial plant species. The species is particularly frequent along the banks of watercourses, where it often forms continuous stands. It can also establish in damp woodland, flushes and mires. It is the tallest annual (species of plant that completes its life cycle in one year) and due to its rapid growth, it shades out most of our native species. Individual plants reach 2m in height, have translucent fleshy stems, pink-purple slipper-shaped flowers and large oval pointed leaves with obvious teeth around their edges.

Image of Himalayan balsam:



6. Each tooth carries a small globular 'gland' and produces large numbers of flowers which are followed by 'seed pods' about 25mm long. When mature and dry, the fruits split open explosively if touched, flinging the seeds a considerable distance from the parent plant. Each plant produces about 2,500 seeds which fall to the ground, and with several parent plants close together, seeds can occur at a density of between 5000-6000 seeds per square metre. The seeds float, making watercourses a prime route for dispersal of the species. Seeds can also begin to germinate in water on their way to new sites.
  
7. For this reason, treatment and eradication of the species must be done with great care.

## How do we remove it?

8. There are several suitable methods for treatment and removal. Successful treatment must take into account a number of factors including timescales, budgets and the development proposals and how they may alter the approach for the site. The three main types of treatment are:
  - A herbicide program (chemical treatment)
  - Non chemical mitigation (pulling)
  - Removal off site to a licensed landfill (dig and dump)
  
9. In this case, the areas of infestation are not directly affected by the development proposals and therefore the 'dig and dump' strategy is not required, and it can be treated in situ on site.
10. As the plant has shallow roots, it can remove it without chemicals by pulling or digging it out of the ground, though it can cut it or suppress its growth with mulch. All plants are pulled firmly, removing the rootball and placed within a sealed 'black bin' for containment and stored separately on site for 6-12 months prior to disposal. Care is taken not to spread the seeds if they have already started to seed and is so, it is removed immediately by a licenced waste carrier or contained on site to dry out prior to burning inside a fireproof container.
  
11. Gulliver's system or removal is that of cutting, or pulling Himalayan regularly for around three years, as this is sometimes able to completely eradicate the plant from isolated stands. However, when cutting Himalayan Balsam, it should be remembered to cut it below the lowest node; this prevents it from reflowering. The best season to undertake the removal programme is in June and September. If this is unsuccessful, then chemical controls are to be used to remove the Himalayan Balsam. This will involve treating the plant with either a contact weedkiller that contains acetic acid, or a systematic weedkiller that contains glyphosate. If using a contact weedkiller, you should catch it before it flowers. If opting for a systematic weedkiller instead, we treat the plant in the early flowering stages. Inspections of publicly accessible areas will be more frequent and given higher priority for treatment.
  
12. Where present in close proximity to waterways or waterbodies, the risks of overflow and leakage into the water can be disastrous for plant and water life. In such instance, disposal containers are kept away from the water's edge to avoid accidental spillage and that any surrounding plants or vegetation are covered when using a weedkiller that contains glyphosate. This is because glyphosate kills any plant it comes into contact with.

## APPENDIX F

TO DEVELOPMENT PLAN REPRESENTATION

WARRINGTON BOROUGH COUNCIL LOCAL PLAN (SUBMISSION VERSION)

Site Ref: 18/069 Gulliver's World

## WOODLAND MANAGEMENT PLAN

(OUR REF. GUL40/2)

# Woodland Management Plan

Woodland Property Name	<b>Gulliver's World</b>	
Case Reference	-	
Plan Period (Ten years)	Approval Date: December 2015	To: November 2025
Five Year Review Date	December 2020	

Revision No.	Date	Status (draft/final)	Reason for Revision
The landowner agrees this plan as a statement of intent for the woodland			Yes

## UKFS Management Planning Criteria

Approval of this plan will be considered against the following UKFS criteria, prior to submission review your plan against the criteria using the check list below.

No.	UKFS Management Plan Criteria	Approval Criteria	Applicant Check
1	Forest management plans should state the objectives of management and set out how the appropriate balance between economic, environmental and social objectives will be achieved.	Have objectives of management been stated? Consideration given to economic, environmental and social factors (Section 2.2)	Yes
2	Forest management plans should address the forest context and the forest potential and demonstrate how the relevant interests and issues have been considered and addressed.	Does the management strategy (section 6) take into account the forest context and any special features identified within the woodland survey (section 4)	Yes
3	In designated areas, for example national parks, particular account should be taken of landscape and other sensitivities in the design of forests and forest infrastructure.	Have appropriate designations been identified (section 4.2) if so are these reflected through the work proposals in the management strategy (Section 6)	Yes
4	At the time of felling and restocking, the design of existing forests should be re-assessed and any necessary changes made so that they meet UKFS Requirements.	Felling and restocking are consistent with UKFS forest design principles (Section 5 of the UKFS)	Yes
5	Consultation on forest management plans and proposals should be carried out according to forestry authority procedures and, where required, the Environmental Impact Assessment Regulations.	Has consultation happened in line with current FC guidance and recorded as appropriate in section 7	Yes
6	Forests should be designed to achieve a diverse structure of habitat, species and ages of trees, appropriate to the scale and context.	Do the felling and restocking proposals create or improve structural diversity (refer to the plan of operations)	Yes
7	Forests characterised by a lack of diversity due to extensive areas of even-aged trees should be progressively restructured to achieve a range of age classes.	Do the felling and restocking proposals create or improve age class diversity (refer to the plan of operations)	Yes
8	Management of the forest should conform to the plan, and the plan should be updated to ensure it is current and relevant.	Has a 5 year review period been stated (1st page) and where relevant achievements recorded in section 3	Yes
9	New forests and woodlands should be located and designed to maintain or enhance the visual, cultural and ecological value and character of the landscape.	When new planting is being proposed under this plan is it consistent with UKFS and FC guidance on woodland creation	Yes

## 1. Property Details

<a href="#">Woodland Property Name</a>		Gulliver's World	
Name	Julie Dalton	Owner	
Email	jhd@gulliversfun.co.uk	Contact Number	01925 [REDACTED]
Agent Name (if applicable)		Liz Sharkey (Sharkey Forestry Ltd)	
Email	liz@sharkeyforestryltd.co.uk	Contact Number	[REDACTED]
County	Cheshire	<a href="#">Local Authority</a>	Warrington Borough Council
Grid Reference	SJ 590 899	Single Business Identifier	-
Management Plan Area (Hectares)		10.67ha	
Have you included a Plan of Operations with this management plan?		Yes	
List the maps associated with this management plan		Compartment Map ref: FOR/158/1001/01 Constraints Map ref: FOR/158/1001/02 Work Programme Map ref: FOR/158/1001/03	
Do you intend to use the information within the management plan and associated plan of operations to apply for the following		Felling Licence	Yes
		Thinning Licence	Yes
		Woodland Regeneration Grant	No
Declaration of management control and agreement to public availability of the plan		Yes	

## 2. Vision and Objectives

To develop your long term vision, you need to express as clearly as possible the overall direction of management for the woodland and how you envisage it will be in the future. This covers the duration of the plan and beyond.

### 2.1 Vision

Describe your long term vision for the woodland.

**The long term vision for the management of the woodlands at Gulliver's World is to protect them as important landscape features and ensure their longevity into the future for important screening around the theme park and for their amenity value to the recreational visitors.**

The woodlands will be sustainably managed to strengthen their resilience to the negative effects of climate change and pests and diseases whilst retaining and improving their ecological importance. Wildlife habitats will be maintained and enhanced to create a diverse woodland which is attractive to wildlife and high in amenity value.

The woodland management will be carried out following a well-structured plan and the sustainable wood products produced as a result will help to generate an income to contribute towards the cost of the management operations.

### 2.2 Management Objectives

State the objectives of management demonstrating how sustainable forest management is to be achieved. Objectives are a set of specific, quantifiable statements that represent what needs to happen to achieve the long term vision.

No.	Objectives (include environmental, economic and social considerations)
1	Maintain the longevity of the woodlands in the landscape by increasing their resilience against threats from climate change, pests and diseases.
2	Maintain and enhance the conservation and amenity value of the woodland habitats to attract wildlife and provide interest for recreational visitors.
3	Improve and protect the biodiversity and conservation value of the Ancient Semi-Natural Woodland.
4	Manage the woodlands as cost effectively as possible and secure grant funding to support uneconomical operations and maximise the potential of the woodland asset.



### 3. Plan Review - Achievements

Use this section to identify achievements made against previous plan objectives. This section should be completed at the 5 year review and could be informed through monitoring activities undertaken.

Objectives	Achievement

## 4. Woodland Survey

This section is about collecting information relating to your woodland and its location, including any statutory constraints i.e. designations.

### 4.1 Description

**Gulliver's World is a family run children's** theme park which opened in 1989 in Warrington, Cheshire. The park is located to the north west of Warrington centre not far from the M62, making it easily accessible and popular with families in the North West. **Sankey Valley Park adjoins Gulliver's World along the** southern and eastern boundary in a landscape otherwise dominated by housing and industrial estates.

The woodlands within the park vary in size from 0.2ha to 4.04ha to provide an overall wooded cover of 10.67ha within the ownership boundary. The woodlands are located on flat ground and lie at 10m above sea level on sandy and loamy soils which are naturally wet and very acidic.

The woodland compartments have either been planted or have naturally regenerated over the years, except for Compartment 4 which is a fragmented piece of Ancient **Semi-Natural Woodland (dating back to at least the 1600's) likely to have been** connected to Bog Wood to the south in the past. The existing mature woodlands and the later planted blocks provide important screening for the park and are currently **managed as and when required under the land owner's Duty of Care. The larger** blocks of woodlands present an opportunity for more proactive work to improve and enhance the existing habitats.

The location of the woodland can be seen on the Compartment Map in Appendix 1 and a full description of each compartment can be seen in the Sub-Compartment Record in Appendix 2.

## 4.2 Information

Use this section to identify features that are both present in your woodland and where required, on land adjacent to your woodland. It may be useful to identify known features on an accompanying map. Woodland information for your property can be found on the [Magic](#) website or the Forestry Commission [Land Information Search](#).

Feature	Within Woodland	Cpts	Adjacent to Woodland	Map No
<b><u>Biodiversity- Designations</u></b>				
Site of Special Scientific Interest	No		No	
Special Area of Conservation	No		No	
Tree Preservation Order	No		No	
Conservation Area	No		No	
Special Protection Area	No		No	
Ramsar Site	No		No	
National Nature Reserve	No		No	
Local Nature Reserve	No		No	
Other: Sankey Valley Public Park	No		Yes	1001/02
<b>Notes</b>	Magic Map and local council website checked for designations. Sankey Valley Park lies to the south and east of the site.			

Feature	Within Woodland	Cpts	Map No	Notes	
<b><u>Biodiversity - European Protected Species</u></b>					
Bat	Species (if known) Daubenton's bat	Yes	All	1001/01	The National Biodiversity Network Gateway has a record of Daubenton's bats within the area. It is assumed that bats use the woodland areas.
Dormouse		No			NBN Gateway checked.
Great Crested Newt		No			NBN Gateway checked.
Otter		No			NBN Gateway checked.
Sand Lizard		No			NBN Gateway checked.
Smooth Snake		No			NBN Gateway checked.
Natterjack Toad		No			NBN Gateway checked.
<b><u>Biodiversity - Priority Species</u></b>					
<a href="#">Schedule 1 Birds</a>	Species: Lapwing, Grey partridge	Yes	All	1001/01	The RSPB has recorded these birds to be within the area.
Mammals (Red Squirrel, Water Vole, Pine Marten etc)		No			NBN Gateway checked.

Feature	Within Woodland	Cpts	Map No	Notes
<b>Biodiversity – <u>Priority Species</u></b>				
Reptiles (grass snake, adder, common lizard etc)	Yes	All	1001/01	Common species expected on site.
Plants	Yes	All	1001/01	Common species expected on site.
Fungi/Lichens	Yes	All	1001/01	Common species expected on site.
Invertebrates (butterflies, moths, beetles etc)	Yes	All	1001/01	Common species expected on site.
Amphibians (pool frog, common toad)	Yes	All	1001/01	Common species expected on site.
Other (please Specify):	No			
<b><u>Historic Environment</u></b>				
Scheduled Monuments	No			Magic Map checked.
Unscheduled Monuments	No			Magic Map checked.
Registered Parks and Gardens	No			Magic Map checked.
Boundaries and Veteran Trees	Yes	1, 3	1001/01	Large, mature (not veteran) trees can be seen along the northern edge of compartments 1 and 3 and along the north western boundary of compartment 1 along the ditch line.
Listed Buildings	No			Magic Map checked.
Other (please Specify):	No			
<b><u>Landscape</u></b>				
<b><u>National Character Area</u> (please Specify): 60 Mersey Valley</b>				
National Park	No			Magic Map checked.
Area of Outstanding Natural Beauty	No			Magic Map checked.
Other: Theme park	Yes	All	1001/01	The woodlands are within the ownership boundary of Gulliver's World theme park.
<b><u>People</u></b>				
CROW Access	No			Natural England website checked.
Public Rights of Way (any)	No			OS maps checked.
Other Access Provision	Yes	4	1001/01	Compartment 4 is fully accessible to the public due to park attractions being located within the woodland.

Feature	Within Woodland	Cpts	Map No	Notes
<b>People (continued)</b>				
Public Involvement	No			The visiting public are not directly involved in the woodland areas.
Visitor Information	No			Visitor information is not specifically related to the woodland.
Public Recreation Facilities	Yes	All	1001/01	The site has full recreational facilities as part of the theme park.
Provision of Learning Opportunities	No			None on site which relates specifically to the woodland.
Anti-social Behaviour	Yes	1, 9	1001/01	Rubbish has been dumped in compartment 9 due to its close proximity to the site car park. The public regularly access compartment 1 without permission as no fencing or barriers are in place until reaching the outer security fence of the theme park.
Other (please Specify):	No			
<b>Water</b>				
Watercourses	Yes	6	1001/02	A watercourse runs north south through compartment 6 feeding the lakes within the park.
Lakes	Yes		1001/02	The park contains a series of lakes, see Constraints Map in Appendix 3.
Ponds	No			No ponds on site.
Other (please Specify):	No			

## 4.3 Habitat Types

This section is to consider the habitat types within your woodland that might impact/inform your management decisions. Larger non-wooded areas within your woodland should be classified according to broad habitat type where relevant this information should also help inform your management decisions. Woodlands should be designed to achieve a diverse structure of habitat, species and ages of trees, appropriate to the scale and context of the woodland.

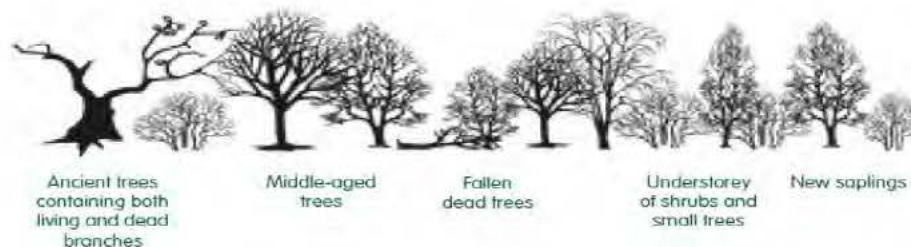
Feature	Within Woodland	Cpts	Map No	Notes
<b>Woodland Habitat Types</b>				
Ancient Semi-Natural Woodland	Yes	4	1001/02	Cpt 4 is Ancient Woodland Twig Wood
Planted Ancient Woodland Site	No			Magic Map checked.
Semi-natural features in PAWS	No			Site surveyed.
Lowland beech and yew	No			Magic Map checked.
Lowland mixed deciduous woodland	Yes	1,3,4 6,7,8 9	1001/01	The majority of the woodland is mixed deciduous.
Upland mixed ash woods	No			Magic Map checked.
Upland Oakwood	No			Magic Map checked.
Wet woodland	No		1001/01	Bog Wood next to compartment 1 & 10 has characteristics of wet woodland.
Wood-pasture and parkland	No			Magic Map checked.
<b>Non Woodland Habitat Types</b>				
Blanket bog	No			Magic Map checked.
Fenland	No			Magic Map checked.
Lowland calcareous grassland	No			Magic Map checked.
Lowland dry acid grassland	No			Magic Map checked.
Lowland heath land	No			Magic Map checked.
Lowland meadows	No			Magic Map checked.
Lowland raised bog	No			Magic Map checked.
Rush pasture	No			Magic Map checked.
Reed bed	No			Magic Map checked.
Wood pasture	No			Magic Map checked.
Upland hay meadows	No			Magic Map checked.
Upland heath land	No			Magic Map checked.
Unimproved grassland	No			Magic Map checked.
Peat lands	No			Magic Map checked.
Wetland habitats	Yes	4	1001/01	Alder & willow are common by the lake in compartment 4.

## 4.4 Structure

This section should provide a snapshot of the current structure of your woodland as a whole. A full inventory for your woodland can be included in the separate Plan of Operations spreadsheet. Ensuring woodland has a varied structure in terms of age, species, origin and open space will provide a range of benefits for the biodiversity of the woodland and its resilience. The diagrams below show an example of both uneven and even aged woodland.

Woodland Type (Broadleaf, Conifer, Coppice, Intimate Mix)	Percentage of Mgt Plan Area	Age Structure (even/uneven)	Notes (i.e. understory or natural regeneration present)
Native broadleaves	50%	Uneven	See Sub-Compartment Record in Appendix 2 for detailed species composition information on each compartment.
Non-native broadleaves	20%	Even	See Sub-Compartment Record in Appendix 2 for detailed species composition information on each compartment.
Intimate Mix	10%	Even	See Sub-Compartment Record in Appendix 2 for detailed species composition information on each compartment.
Open space	20%	-	See Sub-Compartment Record in Appendix 2 for detailed species composition information on each compartment.

Uneven-aged woodland – many wildlife habitats because of high diversity



Even-aged woodland – tidy but of low diversity



## 5. Woodland Protection

Woodlands in England face a range of threats; this section allows you to consider the potential threats that could be facing your woodland. Using the simple Risk Assessment process below woodland owners and managers can consider any potential threats to their woodland and whether there is a need to take action to protect their woodlands.

### 5.1 Risk Matrix

The matrix below provides a system for scoring risk. The matrix also indicates the advised level of action to take to help manage the threat.

<b>Impact</b>	High	Plan for Action	Action	Action
	Medium	Monitor	Plan for Action	Action
	Low	Monitor	Monitor	Plan for Action
		Low	Medium	High
<b>Likelihood of Presence</b>				

### 5.2 [Plant Health](#)

Threat (e.g. Ash Dieback, <i>Phytophthora</i> , Needle Blight)	Ash Dieback ( <i>Chalara</i> )
Likelihood of presence (high/medium/low)	Medium
Impact (high/medium/low)	Medium
Response (inc protection measures)	Ash Dieback was first confirmed in the UK in 2012. The disease is caused by a fungus called <i>Hymenoscyphus fraxineus</i> (previously called <i>Chalara fraxinea</i> , hence the name) and affects all species of ash. The spores can be spread several miles by wind but the main spread has been through the movement of diseased plants which is now banned under a government Plant Health Order. The disease causes leaf loss and crown dieback which usually proves fatal. However, some trees may have a genetic resistance. Although no sign of the disease was discovered during the survey, it has been confirmed on sites around Manchester and is likely to keep spreading. Ash provides canopy cover at Gulliver's World and it will be closely monitored for symptoms of the disease. The management strategy will work towards achieving a mixed canopy to spread the risk of losing ash within the woodland.



Threat (e.g. Ash Dieback, <i>Phytophthora</i> , Needle Blight)	Acute Oak Decline (AOD)
Likelihood of presence (high/medium/low)	Medium
Impact (high/medium/low)	High
Response (inc protection measures)	Acute Oak Decline was first seen in the UK in the <b>1980's. The disease mainly affects mature oak (both sessile and pedunculate) over 50 years old.</b> The tree declines rapidly and death generally occurs within 4 to 6 years. Symptoms exhibited on affected trees include dark fluid seeping out of vertical cracks on the stem <b>and in most cases 'D' shaped exit holes where the beetle <i>Agrilus biguttatus</i> is present.</b> Forest Research is continuing research to understand more about the disease and how it spreads. Acute Oak Decline is prevalent in the Midlands but is steadily spreading <b>further. If the disease reaches Gulliver's World it will</b> cause a detrimental effect to the woodlands, particularly the ancient woodland area of compartment 4. No symptoms have been observed on site but the trees will be monitored and Forestry Commission Practice Note 15 'Managing Acute Oak Decline' will be adhered to if the disease is confirmed.

Threat (e.g. Ash Dieback, <i>Phytophthora</i> , Needle Blight)	<i>Phytophthora ramorum</i>
Likelihood of presence (high/medium/low)	Medium
Impact (high/medium/low)	Medium
Response (inc protection measures)	<i>Phytophthora ramorum</i> is a fungus-like pathogen which causes extensive damage and mortality to a wide range of trees and plants. It was first found in the UK in 2002 on a viburnum but few trees were affected up until 2009 when it killed large numbers of Japanese larch in the South West. It killed further larch stands in Wales and Ireland in 2010 and also in West Scotland in 2011. The pathogen also affects holly, rhododendron, beech, sweet chestnut and <b>Douglas Fir, species which can be found at Gulliver's World.</b> The phytophthora affects shrubs such as rhododendron, not killing them but using them as a host to generate more spores and as a result affecting

	and killing trees nearby. No cure is available but preventing spread of spores is important. Any infected material (such as timber) must not be removed from site without a Movement Licence. More information is available on the Forestry Commission website: <a href="http://www.forestry.gov.uk/pramorun">http://www.forestry.gov.uk/pramorun</a>
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### 5.3 Deer

Likelihood of presence (high/medium/low)	Low
Impact (high/medium/low)	Medium
Response (inc protection measures)	Deer prevent understorey species and natural regeneration from developing by browsing the young plants. This browsing pressure is detrimental to the development of a diverse and species-rich woodland structure, which in turn affects wildlife. Due to the high volume of public using the park and the close proximity of the housing and industrial estates, deer are not likely to inhabit the area. No sign of deer or deer damage was noted during the survey and with the varied structure and amount of natural regeneration developing in the understorey of the woodlands, it appears that deer pressure is not currently an issue.

### 5.4 Grey Squirrels

Likelihood of presence (high/medium/low)	High
Impact (high/medium/low)	High
Response (inc protection measures)	Grey squirrels strip bark from branches and main stems causing the tops of trees to fall out and timber to be seriously degraded. The impact of grey squirrels is having a major effect on woodland conservation, biodiversity and sustainability. Damage is generally targeted on trees between 10 and 40 years old with the most vulnerable species being beech, sycamore, oak and sweet chestnut. Sycamore, beech and oak are common within the woodlands at <b>Gulliver's World</b> and, although only minor damage was noted, if the squirrel population increases then woodland cover and tree health will be at threat. Although challenging within a public place, it is strongly advised that trapping is

	carried out wherever possible following the Forestry Commission guidelines. A new Squirrel Policy and Action Plan has recently been published by the Forestry Commission and new guidance on control is due to be released, but until then, the 2007 Forestry Commission Practice Note 'Controlling Grey Squirrel Damage to Woodlands' should be followed.
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## 5.5 Livestock and Other Mammals

Threat (Sheep, Horse, Rabbit)	Rabbits & hares
Likelihood of presence (high/medium/low)	Medium
Impact (high/medium/low)	Medium
Response (inc protection measures)	No damage was noted on young trees or natural regeneration but rabbits and hares are likely to be in the densely wooded areas. Due to high public use of the site and close proximity of housing and industrial developments the number of rabbits and hares will not be excessive. If any damage starts to occur, spiral guards should be installed on selected regeneration.

## 5.6 Water & Soil

Threat (Soil Erosion, Pollution, Acidification of Water etc)	Soil erosion
Likelihood of presence (high/medium/low)	Low
Impact (high/medium/low)	Low
Response (inc protection measures)	The woodland along the watercourse in compartments 6 and 7 and the trees around the lakes help to protect the soils from disturbance and also reduce erosion through the action of the tree roots. The trees also increase water storage capacity which helps to prevent direct surface run-off. By managing the woodland through continuous cover, the continuity of the woodland will prevent any changes to water levels.

Threat (Soil Erosion, Pollution, Acidification of Water etc)	Diffuse pollution
Likelihood of presence (high/medium/low)	Low

Impact (high/medium/low)	Low
Response (inc protection measures)	Where a herbicide application may be required to control unwanted vegetation, a 5m buffer zone will be observed around any woodland ditches, watercourses or lakes. A spill kit will be taken to each work area when herbicides are used on site.

## 5.7 Environmental

Threat (Pollution, Fire, Flood, Wind, Invasive Species, Anti-social Behaviour etc)	Waste
Likelihood of presence (high/medium/low)	Low
Impact (high/medium/low)	Low
Response (inc protection measures)	Any waste arising from new planting work and herbicide applications will be disposed of off-site to minimise any negative environmental impact. Plastic bags used in the delivery of new plants will be re-used, chemical containers will be returned to the <b>supplier or disposed of as per the manufacturer's</b> recommendations and tree shelters will be made from recycled plastic and re-used where possible.

Threat (Pollution, Fire, Flood, Wind, Invasive Species, Anti-social Behaviour etc)	Invasive species
Likelihood of presence (high/medium/low)	High
Impact (high/medium/low)	Medium
Response (inc protection measures)	Rhododendron is present within compartments 6 and 7. Rhododendron is a non-native shrub which spreads quickly, overshadowing and out-competing naturally regenerating native shrub and tree species. However, signs on the ground indicate that work has been undertaken in the past to control the shrub from spreading further into the woodland. The patches of rhododendron will need to be cut and the stumps treated with a 1:10 solution of <i>glyphosate</i> to prevent regrowth. Himalayan balsam is present in compartments 1, 3, 6, 7, 9 & 10 and is another non-native invasive plant, more commonly found along watercourses and on damp ground. Each plant can produce 2500 seeds each year which has a negative impact on the successful development of native

	waterside vegetation. Plants should either be cut to <b>below the lowest 'node', hand pulled to remove the root</b> or the foliage treated with <i>glyphosate</i> . Treatment must be carried out in Spring before the seed heads are produced (April/May). Any vehicles and machinery used on site must also be cleaned to prevent spread.
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Threat (Pollution, Fire, Flood, Wind, Invasive Species, Anti-social Behaviour etc)	Fire
Likelihood of presence (high/medium/low)	Medium
Impact (high/medium/low)	High
Response (inc protection measures)	Fire causes widespread damage in woodlands if started deliberately or by climatic conditions. Prolonged drought causes the long term loss of moisture in vegetation which increases susceptibility to ignition. Conifer is a high risk factor therefore the areas which contain conifer (compartments 5, 6 and 7) should be checked during susceptible periods. The local fire brigade have maps of the theme park and security staff are always on site to deal with any problems.

Threat (Pollution, Fire, Flood, Wind, Invasive Species, Anti-social Behaviour etc)	Anti-social behaviour
Likelihood of presence (high/medium/low)	High
Impact (high/medium/low)	Medium
Response (inc protection measures)	Fly tipping has been observed during the woodland survey in compartment 9 due to its close proximity to the car park. Unwanted access is also being gained from/to Sankey Valley Park across compartment 1 but fencing could be installed along the boundary if this becomes a serious problem. Particularly as the forestry operations start, attention will be drawn to woodland area and unwanted access may increase and could include the theft of felled timber. The boundary gates of the theme park itself are kept locked to prevent any unauthorised access.

## 5.8 Climate Change Resilience

Threat (Uniform Structure, Provenance, Lack of Diversity)	Lack of diversity
Likelihood of presence (high/medium/low)	Medium
Impact (high/medium/low)	Medium
Response (inc protection measures)	The younger woodlands (compartments 5, 8 and 9) which were planted to enhance site screening contain a good range of species which will help to spread the potential risk of the damaging effects of pests and diseases and climate change. Oak is an important component of the mature woodland canopy in compartments 4, 6 and 7 and as a species is currently affected by a disease as detailed in Section 5.2. Ash is also present and is likely to succumb to ash dieback in the future. Although beech and <b>sycamore also contribute to the park's woodland cover</b> , it is essential that the existing species mix is extended to include others to spread the risk. Any supplementary planting following thinning will contain a carefully selected variety of species, as detailed in Section 6. Further information on species diversity can easily be found on the Forestry Commission website: <a href="http://www.forestry.gov.uk/forestry/infd-8v5rma">www.forestry.gov.uk/forestry/infd-8v5rma</a>

Threat (Uniform Structure, Provenance, Lack of Diversity)	Uniform structure
Likelihood of presence (high/medium/low)	Medium
Impact (high/medium/low)	Medium
Response (inc protection measures)	Both the mature woodlands (compartments 4, 6 and 7) and the later planted woodlands (compartments 5, 8 and 9) are generally of uniform structure with trees of the same age creating a uniform canopy over occasional patches of understorey. Managing these areas of woodland through a continuous cover approach of thinning and supplementary planting will help to alter the structure of the woodland and spread the risk of potentially damaging impacts such as wind storms and susceptibility to pests and diseases whilst at the same time improving wildlife habitat.

## 6. Management Strategy

This section requires a statement of intent, setting out how you intend to achieve your management objectives and manage important features identified within the previous sections of the plan. A detailed work programme by sub-compartment can be added to the Plan of Operations.

Management Objective/Feature	Management Intention
<p>Maintain the longevity of the woodlands in the landscape by increasing their resilience against threats from climate change, pests and diseases.</p>	<p>All of the work operations have been planned to ensure that the woodland continues to provide adequate <b>screening around Gulliver's World and maintains long</b> term continuity in the landscape. Thinning and supplementary planting using a wide mix of species will help to strengthen the resilience of the woodland against the negative effects of climate change and pests and diseases.</p> <p>The following silvicultural operations will be used to manage the woodland areas. The Work Programme Map showing the location of work areas can be found in Appendix 4 and the Work Programme detailing the timing of operations can be seen in Appendix 5.</p> <p>Thinning by 25% - to take place in compartments 5, 6, 8 and 9.</p> <p>Thinning will be carried out to open up around natural regeneration and remove weaker trees in favour of promoting the crown development of better quality trees. The canopy will be thinned by no more than 25% with the aim of creating a mixed species woodland rather than favouring just one species. The canopy will be opened up to allow more light to reach the woodland floor which will enhance the development of ground flora and encourage the growth of natural regeneration to create a more diverse understorey. Thinning will be undertaken on a 7 to 10 year cycle, depending on growth of each individual compartment, with 7 years being the expected length of time between interventions.</p> <p>Thinning by 30% - to take place in compartment 1.</p> <p>As detailed in the Sub-Compartment Record in Appendix 2, compartments 1, 2, 3 &amp; 10 were</p>

historically grassland with occasional parkland trees. The area has since become overgrown with natural regeneration and has not been managed for the past 26 years. Work has already begun to improve compartment 2 by heavily thinning the canopy and clearing the scrub underneath to create a more attractive wooded area. It is proposed under this Plan to continue this work into compartment 1, thinning the canopy by 30% to promote the crown development of better quality trees and aiming to retain a good mix of species rather than favouring just one species. Scrub undergrowth of 7cm diameter and under will be systematically cleared to improve the structure of the understorey. As per compartment 2, a dense edge will be retained (referred to as compartments 3 & 10) to maintain screening around the site. The brush material will be chipped or mulched to create ground conditions suitable for grass seeding following the scrub removal. The trees which remain will be brashed to 2m height to remove heavy side branching and improve the developing form of the trees. It is worth considering fencing the outer boundary of the area prior to work starting.

Supplementary Planting – to take place in compartments 4, 6 and 7

Additional trees and shrubs will be added to compartment 6 following thinning to enhance species and structural diversity. Additional plants will also be added to compartment 4 and 7 if any trees are required to be removed for Health and Safety reasons. Planting will be carried out randomly across the compartments using the following species:

- Compartments 6 and 7  
40% mixed major broadleaves: oak, beech, alder, small leaved lime and walnut  
30% mixed minor broadleaves: rowan, wild cherry and downy birch  
5% Scots pine  
25% woody shrubs: hawthorn, holly, hazel and dog rose

- Compartment 4  
80% locally sourced oak and 20% locally sourced common alder to be used within the Ancient Semi-Natural Woodland area.

The selection of trees and shrubs have been chosen



	<p>using on-site observations and by studying the Forest Research Ecological Site Classification system which produces a report listing species suitable for planting in this specific area.</p> <p>Maintenance To ensure successful establishment and development of any planted young trees and shrubs planted at <b>Gulliver's World, maintenance will include:</b></p> <ul style="list-style-type: none"> <li>- Removal of competing vegetation around the base of each plant until fully established.</li> <li>- Maintenance of protective guards and removal of guards which are no longer required.</li> <li>- Control of any bramble or bracken affecting the growth of developing trees and shrubs.</li> </ul> <p>Information released by the Forestry Commission and Forest Research in relation to pests, diseases and climate change affecting UK trees and woodland will be regularly checked to ensure that management operations are proactive in protecting the woodland at <b>Gulliver's World as an important screening and landscape feature.</b></p>
<p>Maintain and enhance the conservation and amenity value of the woodland habitats to attract wildlife and provide interest for recreational visitors.</p>	<p>The thinning and supplementary planting as detailed in this Plan will not only improve the biodiversity and structure of the woodlands, the operations will also improve aesthetic value and ensure that the woodlands remain in the landscape for the land owner and recreational visitors to enjoy long into the future.</p> <p>Ride Enhancement Compartment 6 contains minor woodland rides (paths) which would benefit from being opened up during the thinning operation. This would help to create more varied and graded edges and improve the marginal ride habitat. This improved structure will provide ecological benefit in terms of foraging habitat for invertebrates, small mammals, reptiles, amphibians, birds and bats. Natural regeneration and regrowth from cut stools will be encouraged to develop where the edge is opened up, however hazel, holly and hawthorn can be planted if necessary to increase the number of shrubs present along the edges.</p> <p>Provision of Deadwood Habitat Both standing and fallen deadwood is of valuable conservation benefit and can be found within the mature woodland compartments. Deadwood standing, fallen or on live trees will be retained during management operations where it does not pose a</p>

	<p>threat to public safety. Brash resulting from management operations within compartments 5, 6, 7, 8 and 9 will be left in habitat piles as far away from the paths as possible to break down naturally.</p> <p><b>Invasive Plant Control</b> Rhododendron regrowth is present in compartments 6 and 7 and Himalayan balsam is present in compartments 1, 3, 6, 7, 9 &amp; 10. Both invasive non-natives will be controlled regularly as described in Section 5.7.</p> <p><b>Health and Safety Tree Management</b> The individual trees within public access areas will be subject to surveys under the Duty of Care of the land owner. Trees will be retained and remedial works undertaken to remove any tree related hazards before considering the felling of any trees. Public safety is the main priority and a tree will be removed if this is compromised and there is no other option. Standing deadwood will be retained where it does not pose a threat to public safety. The health and safety of the public will also need to be addressed during the work operations in compartment 1. Warning signs and/or site fencing will need to be installed prior to work starting.</p> <p><b>European Protected Species</b> It is assumed that bats will be in and around the woodland compartments. Relevant guidance for best practice will be followed prior to any felling work commencing. To prevent any disturbance to birds whilst they are nest building, or in a nest containing eggs or young, any tree felling planned to take place between 1<sup>st</sup> March and 31<sup>st</sup> August (inclusive) will be subject to a nesting bird survey. Prior to any felling work being undertaken, a site inspection for the presence of European Protected Species will be carried out. A copy of the site inspection record which will be used can be seen in Appendix 6.</p>
<p>Improve and protect the biodiversity and conservation value of the Ancient Semi-Natural Woodland.</p>	<p>Compartment 4 is Ancient Semi-Natural Woodland, which is defined as woodland on an area which has had evidence of woodland cover since 1600 AD. Ancient woodland is generally managed in accordance with the <b>Forestry Commission guidance 'Managing Ancient and Native Woodland in England'</b>. However, the ancient woodland within <b>Gulliver's World is small in size and is</b> located around and within some of the theme park attractions. The Forestry Commission guidance states <b>that</b>, 'Where native woods contain large, mature and</p>

	<p>even over-mature trees near to routes used by people then particular care should be taken to ensure they are reasonably safe. This will require regular inspection and appropriate tree surgery, or where absolutely necessary felling of trees that constitute a severe risk.' <b>This</b> guidance reflects the proposed managed as mentioned above under the second management objective. Any trees which need to be removed will be replaced to ensure continuous cover is maintained.</p>
<p>Manage the woodlands as cost effectively as possible and secure grant funding where possible to support uneconomical operations.</p>	<p>A felling licence will be sought for all of the silvicultural operations as detailed within this Plan using the Felling and Restocking information in Appendix 7 and the Work Programme Map in Appendix 4.</p> <p>The Plan ensures that any wood products such as stakes, binders, fencing materials, firewood and chipwood can be produced sustainably, with supplementary planting carried out to establish the next generation of trees. The Work Programme in Appendix 5 will be followed to ensure that the work is carried out sensitively and well-known, reliable timber buyers and/or forestry contractors will be used to carry out the work.</p> <p>Any produce from the woodlands can be sold to help support the cost of the operations and grant funding sources will be regularly checked to see whether the woodland is eligible for any funding.</p>

## 7. Stakeholder Engagement

There can be a requirement on both the FC and the owner to undertake consultation/engagement. Please refer to [Operations Note 35](#) for further information. Use this section to identify people or organisations with an interest in your woodland and also to record any engagement that you have undertaken, relative to activities identified within the plan.

<b>Work Proposal</b>	<b>Individual/ Organisation</b>	<b>Date Contacted</b>	<b>Date feedback received</b>	<b>Response</b>	<b>Action</b>
Woodland Management Plan – first draft	Julie Dalton/ Gulliver’s World	21 <sup>st</sup> October 2015	23 <sup>rd</sup> November 2015	Happy with Plan to be finalised.	Agree Plan with Forestry Commission.
	Dannielle Lea- Smith/ Forestry Commission	27 <sup>th</sup> November 2015	11 <sup>th</sup> December 2015	A few amendments to compartments & additional info required.	Make amendments & re- submit.
	Dannielle Lea- Smith/ Forestry Commission	14 <sup>th</sup> December 2015	18 <sup>th</sup> December 2015	Happy with amended Plan.	Awai felling licence for work detailed in Plan.

## 8. Monitoring

Indicators of progress/success should be defined for each management objective and then checked at regular intervals. Other management activities could also be considered within this monitoring section. The data collected will help to evaluate progress.

<b>Management Objective/Activities</b>	<b>Indicator of Progress/Success</b>	<b>Method of Assessment</b>	<b>Frequency of Assessment</b>	<b>Responsibility</b>	<b>Assessment Results</b>
Maintain the longevity of the woodlands in the landscape by increasing their resilience against threats from climate change, pests and diseases.	Well managed woodland compartments which contain natural regeneration and a good mix of species at various stages of growth.	Walkover survey, photographic evidence from a fixed point.	Walkover survey: annually. Photographs: every 5 years.	Land owner/ Woodland agent	
Maintain and enhance the conservation and amenity value of the woodland habitats to attract wildlife and provide interest for recreational visitors.	Woodland with an increased resilience to the potential impact of climate change, containing a range of attractive species and well maintained access infrastructure. Work planned well in advance to reduce disturbance.	Walkover survey and photographic evidence from a fixed point. Adherence to work programme.	Walkover survey: annually. Photographs: every 5 years. Work programme: annually.	Land owner/ Woodland agent	

<b>Management Objective/Activities</b>	<b>Indicator of Progress/Success</b>	<b>Method of Assessment</b>	<b>Frequency of Assessment</b>	<b>Responsibility</b>	<b>Assessment Results</b>
Improve and protect the biodiversity and conservation value of the Ancient Semi-Natural Woodland.	Continuity of woodland cover and preservation of ancient trees with young trees planted for future generation.	Walkover survey and photographic evidence from a fixed point.	Annually.	Land owner/ Woodland agent	
Manage the woodlands as cost effectively as possible and secure grant funding where possible to support uneconomical operations.	Timber income contributes towards the cost of the work taking place and the woodland areas are under a beneficial grant scheme.	Ensure market rates are regularly tested for the best price on timber sales. Keep up to date on grant funding sources.	Annually.	Land owner/ Woodland agent	

## FC Approval – FC Office Use Only

UKFS Management Plan Criteria	Approval Criteria	Achieved	Notes
Forest management plans should state the objectives of management, and set out how the appropriate balance between economic, environmental and social objectives will be achieved.	Have objectives of management been stated? Consideration given to economic, environmental and social factors (Section 2.2)	Yes/No	
Forest management plans should address the forest context and the forest potential, and demonstrate how the relevant interests and issues have been considered and addressed.	Does the management strategy (section 6) take into account the forest context and any special features identified within the woodland survey (section 4)	Yes/No	
In designated areas, for example national parks, particular account should be taken of landscape and other sensitivities in the design of forests and forest infrastructure.	Have appropriate designations been identified (section 4.2) if so are these reflected through the work proposals in the management strategy (Section 6)	Yes/No	
At the time of felling and restocking, the design of existing forests should be re-assessed and any necessary changes made so that they meet UKFS Requirements.	Felling and restocking are consistent with UKFS forest design principles (Section 5 of the UKFS)	Yes/No	
Consultation on forest management plans and proposals should be carried out according to forestry authority procedures and, where required, the Environmental Impact Assessment Regulations.	Has consultation happened in line with current FC guidance and recorded as appropriate in section 7	Yes/No	
Forests should be designed to achieve a diverse structure of habitat, species and ages of trees, appropriate to the scale and context.	Do the felling and restocking proposals create or improve structural diversity (refer to the plan of operations)	Yes/No	
Forests characterised by a lack of diversity due to extensive areas of even-aged trees should be progressively restructured to achieve a range of age classes.	Do the felling and restocking proposals create or improve age class diversity (refer to the plan of operations)	Yes/No	
Management of the forest should conform to the plan, and the plan should be updated to ensure it is current and relevant.	Has a 5 year review period been stated (1st page) and where relevant achievements recorded in section 3	Yes/No	
New forests and woodlands should be located and designed to maintain or enhance the visual, cultural and ecological value and character of the landscape.	When new planting is being proposed under this plan is consistent with UKFS and FC guidance on woodland creation	Yes/No	
Approving Officer Name		Plan approved	Yes/no

## APPENDIX G

TO DEVELOPMENT PLAN REPRESENTATION

WARRINGTON BOROUGH COUNCIL LOCAL PLAN (SUBMISSION VERSION)

Site Ref: 18/069 Gulliver's World

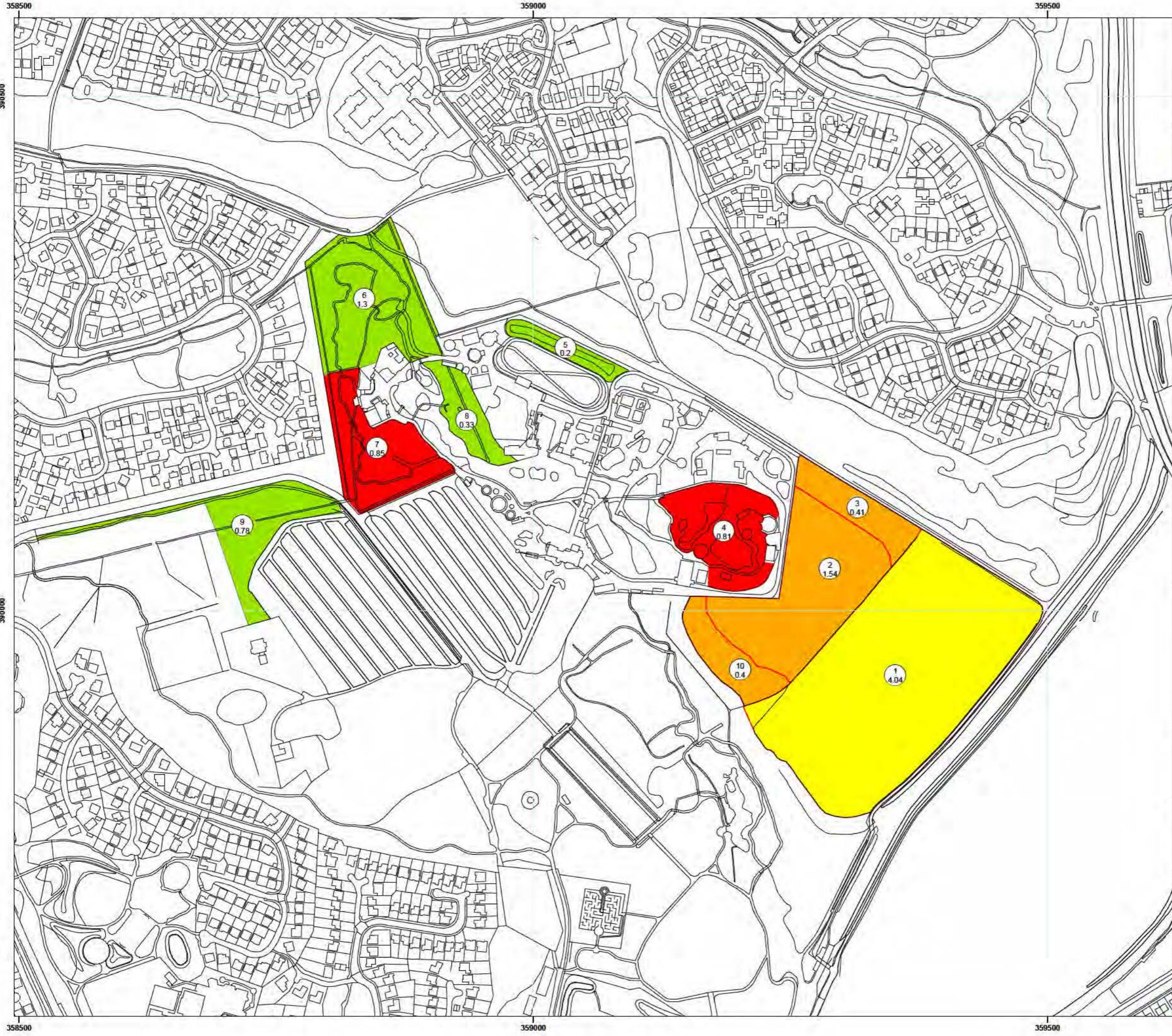
## WOODLAND MANAGEMENT PLAN

## WORK PROGRAMME

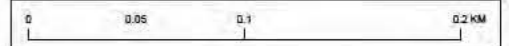


(OUR REF. GUL40/2)





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**LEGEND**

- 30% THIN
- BRASHING & ONGOING MANAGEMENT
- 25% THIN
- DUTY OF CARE TREE MANAGEMENT



TITLE:  
WORK PROGRAMME MAP

SITE:  
GULLIVER'S WORLD  
WARRINGTON

CLIENT: GULLIVER'S THEME PARKS

SCALE: 1:3,500 (A3)      DATE: 27/11/2015

CENTRAL GRID REFERENCE: SJ 591 901

FILE REFERENCE: FOR/158/1001/03/A

email: [liz@sharkeyforestryltd.co.uk](mailto:liz@sharkeyforestryltd.co.uk)  
web: [www.sharkeyforestry.co.uk](http://www.sharkeyforestry.co.uk)

# APPENDIX A

TO DEVELOPMENT PLAN REPRESENTATION

WARRINGTON BOROUGH COUNCIL LOCAL PLAN (SUBMISSION VERSION)

Site Ref: 18/069 Gulliver's World

## LAND QUALITY REPORTS

(OUR REF. GUL40/2)

# Phase 1 Preliminary Risk Assessment(Desk Study)

Gulliver's World, Warrington



WB04362/R1




Report No.	Date.
WB04362	10/10/16

Project
Gulliver's World, Warrington

Client Name
Gulliver's World Ltd

Issue Date/ Number	Status	Description of Amendments
30 Sept 2016	Final	For comment
10 Oct 2016	Final	General text amendments

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- B – GroundSure Reports**
- C – Historic Maps**
- D – Planning History**
- E – Clarkebond Ground Engineering Capabilities**

**EXECUTIVE SUMMARY**

<b>Client</b>	Gulliver's World Ltd	
<b>Site and Location</b>	<p>Next to the existing Gulliver's World site and immediately west of the hotel land. About 2km north west of central Warrington and 25km east of Liverpool, at approximate National Grid Reference 358869E, 389886N.</p> <p>The site ("Area B") currently comprises mostly grassland and is currently used as an overflow carpark.</p> <p>South and west of the site are woodland and residential areas. East of the site lies a hotel (Area A).</p>	
<b>Proposed Development</b>	Commercial development, plus a small caravan park.	
<b>History of Site and Surroundings</b>	<p>The site itself has remained unchanged since the earliest available maps.</p> <p>The surroundings have seen the expansion of Warrington from the south east, the development and disuse of a military establishment immediately east and north (camps for RAF Burtonwood), and finally Gulliver's World Theme Park to the NE. The RAF Burtonwood camp immediately east was "Site 4" and is not shown on OS mapping. It lies about 1km from the former runways and was covered in Nissen huts and other associated buildings, all serving an RAF accommodation usage.</p>	
<b>Ground Conditions</b>	<b>Depth (m)</b>	<b>Brief Description</b>
	<b>East of site</b>	
	0m to 0.3m	<b>TOPSOIL</b>
	1m to 2-3m	SAND with occasional gravel, or firm to stiff CLAY with occasional gravel <b>(GLACIOFLUVIAL SHEET DEPOSITS)</b>
	2-3m to 8m	Firm to stiff grey sandy gravelly CLAY, potentially with boulders <b>(TILL)</b>
	8m to depth	SANDSTONE, weathered to very dense SAND for say the first 0.5m. <b>(WILMSLOW SANDSTONE FORMATION)</b>
<b>West of site</b>		
0m to 0.4m	<b>TOPSOIL.</b>	
0.4m to 8m	Firm to stiff grey sandy gravelly CLAY, potentially with boulders <b>(TILL)</b>	
8m to depth	SANDSTONE, weathered to very dense SAND for say the first 0.5m. <b>(WILMSLOW SANDSTONE FORMATION)</b>	
<b>Hydrology &amp; Hydrogeology</b>	<p>A drain is noted on site, close to the southern eastern corner and extending southwards out of the site. Other surface-water features lie near the site. The potential sensitivity of these receptors (should any contamination exist) is deemed to be high.</p> <p>Groundwater is only likely to be encountered as seepages. <i>Bog Wood</i> lies nearby and could indicate locally high groundwater.</p> <p>It is estimated that groundwater flows under the site from approximately N to S. The site is underlain by Secondary and Principal aquifers.</p> <p>The site is located within a Source Protection Zone (SPZ) (Zone 3).</p>	

<b>Geotechnical Considerations</b>	<ul style="list-style-type: none"> <li>• Standard strip and pad foundations should be feasible founded at about 1m depth (or deeper near existing trees).</li> <li>• Suspended floor slabs will provide protection to ground heave.</li> <li>• Special measures for the protection of buried concrete may be required.</li> <li>• Standard soakaway drainage may not be possible and thus other SUDS may be required</li> <li>• We consider that our site would be low risk from UXO.</li> </ul>
<b>Environmental Considerations</b>	<p>No radon protection measures are required on site.</p> <p>A slight risk exists that made ground from the adjacent brownfield RAF land could encroach into the site, albeit risks are unlikely to be significant and thus not warrant any remediation or risk-reduction measures.</p>
<b>Risk Rating</b>	<p>The general geotechnical risk is considered to be <b>low</b>.</p> <p>The general risk of significant contamination is considered to be <b>low</b>.</p>
<b>Site Investigation Recommendations</b>	<p>No significant environmental/contamination-type risks appear to exist and thus no investigation is required for such (but see investigation below).</p> <p>An investigation is required for Geotechnical aspects (e.g. foundation design) as follows:</p> <ul style="list-style-type: none"> <li>• Cable percussion boreholes.</li> <li>• Trial pitting (potentially with soakaway testing).</li> <li>• In situ CBR testing</li> <li>• Geotechnical laboratory testing that is recommended includes pH and water soluble sulphate, Atterberg limits, gradings and natural moisture content.</li> <li>• An <i>Express UXO risk assessment</i> is recommended</li> </ul> <p>This work can be used to prove if any made ground exists along the very eastern edge of Area B (the site). If any were to be found then samples would be taken and any risks assessed.</p>
<b>Outline Strategy for Remediation &amp; Risk Reduction</b>	<p>No remediation appears likely to be required.</p> <p>Risk-reduction measures are as follows:</p> <ul style="list-style-type: none"> <li>• All imported topsoils and subsoils should be tested to prove that they do not contain any unacceptable (including naturally occurring) contamination.</li> <li>• A survey should be undertaken for invasive species such as Japanese Knotweed</li> </ul>

## **1.0 INTRODUCTION**

### **1.1 Instruction and Brief**

Clarkebond (UK) Limited (CB) was commissioned by De Pol Associates Ltd on behalf of Gulliver's World Ltd to undertake a Phase I Preliminary Risk Assessment (Desk Study) on a site known as Gulliver's World, Warrington.

### **1.2 Proposals**

The site is being considered for commercial development and a small caravan park.

### **1.3 Scope of Works**

The objectives of the investigation were to determine the sub-surface conditions in respect of:

- Preliminary geotechnical advice relating to the anticipated ground conditions
- Preliminary contamination assessment to consider potential significant pollutant linkages arising from the historic land uses on and off site.

### **1.4 Limitations**

This report is provided for the benefit only of the party to whom it is addressed and we do not accept responsibility to any third party for the whole or any part of the contents and we exercise no duty of care in relation to this report to any third party.

This assessment has been based to a large extent on third party data acquired from Third Parties. This data has been taken at face value and has not been subjected to any third party validation.



## 2.0 PHASE 1 ASSESSMENT

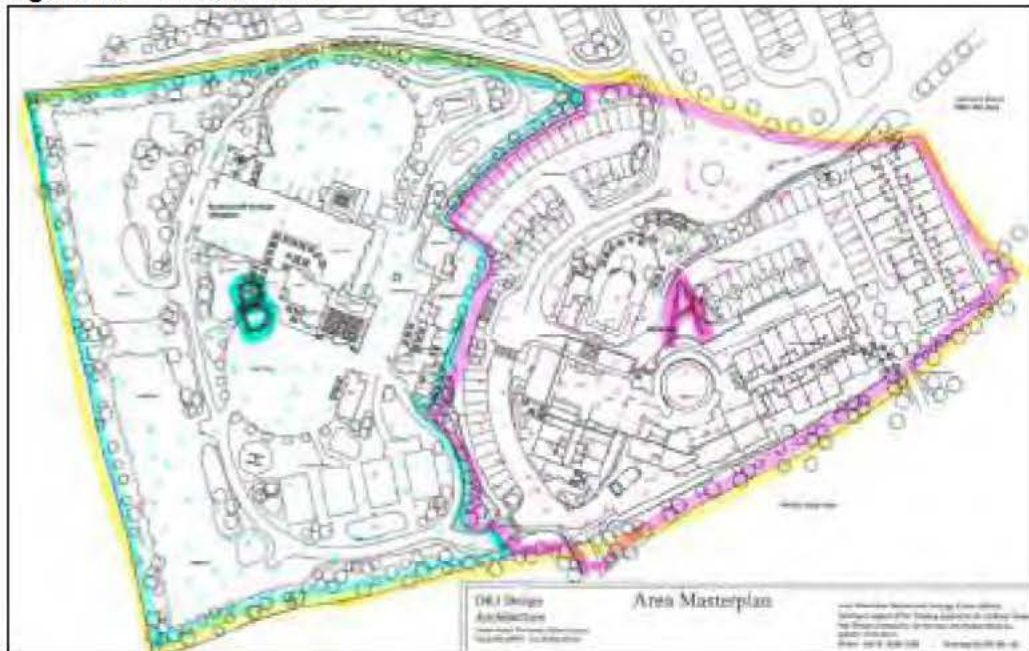
### 2.1 Site Location and Description

The site is located about 2km north west of central Warrington and 25km east of Liverpool, at approximate National Grid Reference 358869E, 389886N.

The site is **Area B** on Figure 2.1 below.

The site (Area B) is also the western half of the area shown on the aerial photograph further below, as well as the maps in Appendix C and further plans in Appendix A.

**Figure 2.1 – Sites A and B**



**Figure 2.2 – Aerial Photograph of the site**



Given the nature of the site then a walkover survey has not currently been undertaken, but will be undertaken on the first day of ground investigation. It is unlikely that a walkover will reveal anything that will significantly affect the Phase 1 report, nor the scope of the Phase 2 works. The following summarises the site (**Area B**), as shown in Figures 2.1 and 2.2 above:

- The site is irregular in shape and covers an area of approximately 1.4ha.
- The site is generally level, with a slight increase in elevation towards the south western corner.
- The site is currently grassland which is used as an overflow car park.
- The surface comprises of predominantly grass.
- Mature trees were noted along the western and southern boundaries of the site, as well as sporadically across the site.

The site is bounded as follows:

**Table 2.1 – Site Surroundings**

North	Theme Park car parking
East	Gulliver’s World Hotel ( <b>Area A</b> on previous page), Theme Park and woodland.
South	Woodland beyond which lies residential houses.
West	Woodland beyond which lies residential houses.

## 2.2 Geology

The geology of the site is shown on the maps obtained from the Groundsure report which are extracted from the British Geological Survey (BGS) Digital Geological Map of Great Britain at 1:50,000 scale.

The site is underlain by two superficial deposits;

1. **Till** underlies the whole site, however only outcrops along the western edge of the site (approx. 1 acre).
2. **Glaciofluvial Sheet Deposits** overlie the Till across the rest of the site.

Based on Line of Section 1 from BGS Sheet 97, Runcorn Drift Edition, it is estimated that the Glaciofluvial Deposits extend to around 2-3m depth, and the Till to around 10m depth.

The superficial deposits are underlain by the **Wilmslow Sandstone Formation** (bedrock geology). The BGS Lexicon describes this unit as: *Sandstone, fine- to medium-grained, red-brown to brick red, generally pebble-free, cross stratified, with sporadic siltstones.*

In Section 2.6, the data sheets suggest Coal mining may potentially affect the site. However, the BGS map 97 shows that the strata containing the coal measures lie at about 300m depth and therefore pose no significant risk to the site.

A site investigation completed on behalf of Clarkebond was completed approximately 900m north west of the site, at the Asda store. A desk study and phase 2 site investigation was completed, the findings of the latter are useful in this report. The phase 2 report is titled as follows;

- *Report on a Ground Investigation carried out at Cromwell Avenue, Westbrook, Warrington, Asda Stores Limited, February 2005.*

The investigation comprised 3 cable percussion boreholes, all of which encountered brown and grey sandy gravelly clay described as Till. This material was encountered to the base of each hole, the maximum depth of which was 8.45m. SPT ‘N’ values increased with depth from between N10-15 at around 1.5m to N20 at 6m and refusal (N50+) from >7m. Groundwater was encountered at between 3m and 5.5m.

**2.3 Hydrology and Hydrogeology**

A drain is noted on site, close to the south eastern corner and extending southwards out of the site. Other surface water features in close proximity to the site include additional drains to the east and south east of the site, as well as a pond roughly 60m west of the site. The Environmental Database sheets identify a primary river 99m north east. Due to the proximity to such and the site, the potential sensitivity of these receptors to any potentially significant contaminants (should such exist) is deemed to be **high**.

It is estimated that groundwater flows under the site from approximately north to south.

“Bog Wood” lies just west of the site and may be indicative of a high groundwater table.

Table 2.2 gives the aquifers under the site, based on guidance from the Environment Agency.

**Table 2.2 – Aquifers underlying the site**

Strata	Aquifer
Glacial Till (Superficial)	Secondary (Undifferentiated layers)
Glaciofluvial Sheet Deposits (Superficial)	Secondary (A) Aquifer – Permeable Layers
Wilmslow Sandstone Formation (Bedrock)	Principal Aquifer

The nearest licensed groundwater abstraction lies 1902m north and thus is of **low** sensitivity. The site is located within a Source Protection Zone (SPZ) (Zone 3).

**2.4 Flood Risk**

Flood risk has been separately assessed.

**2.5 Site History**

Historical maps of the site area have been obtained via Groundsure. Pertinent information determined from review of these maps is set out in the following table and the maps are contained in Appendix C:

**Table 2.3 - Historic Mapping Review**

Date	On-site	Off-site
1893	A square field occupies the western half of the site. A path crosses the eastern half of the site from south east to north west. Numerous trees noted in the eastern half of the site, with the north edge of a large forested area occupying the south western edge of the site.	Bewsey New Hall lies immediately west of the site, and is surrounded by woodland with a pond to its north (still present today).  Woodland to the east known as “Bog Wood”.
1910	No Significant Change	Increased development of Warrington.
1937	Trees no longer present on site.	
1961	Eastern section of the site part of a disused camp (RAF Burtonwood).	Disused camp to north, and south of site.
1989	A track now runs through the north eastern corner of the site.	Large residential developments to the south, west and north of the site.
2002	No Significant change	Gulliver’s World theme Park now present on the maps to the north east of the site.

The site itself has remained unchanged since the earliest available maps.

The surroundings have seen the expansion of Warrington from the south east, the development and disuse of a military establishment immediately north and east, and finally Gulliver’s World Theme Park to the north east.

It should be noted that military bases were invariably not shown on OS mapping at the time of the war, but plans showing the RAF base location and thus it’s relation to our site have been obtained and are discussed in Section 2.8.

**2.6 Environmental Database**

A Groundsure report was commissioned to provide an indication of the site history and surrounding land uses available on the public registers. The reports provide data from a number of service providers including the British Geological Survey, Environment Agency and Natural England. The reports are included in Appendix B.

The location of data point references is provided relative to the site boundary and the search radius extends 1km from it. For the purpose of the Groundsure report, the site boundary includes both **Area A** and **Area B**, but the inclusion of Area A has no significant effect on Area B.

CB have examined the datasets and the following Table 2.3 provides a summary of what CB consider are **significant** data reference points, together with an indication of the potential hazard type.

**Table 2.3 - Environmental Data Review**

Data Type	Distance from Area A & Area B boundary	Potentially Significant Hazard
Groundwater vulnerability	On Site	Minor aquifer – high leaching potential (most likely refereeing to the Glaciofluvial deposits).
Extreme flooding from rivers or sea without defences.	29m E	Zone 2 and 3 flood plains around 30m east which pose a risk to the site.
Contemporary Trade Directory Entries	101m SW	Electricity Sub Station
Environmentally Sensitive Areas	9m NE On Site	Ancient Woodland Nitrate Vulnerable Zone
Ground Workings	59m W 188m SE	Pond Pond
Coal Mining	On Site	The study site is located within the specified search distance of an identified mining area.

**2.7 Other Information**

Because the site lay on or near RAF Burtonwood (a site not potentially shown on OS mapping), CB undertook internet research and obtained the plans and aerial photographs shown in Appendix A.

The first four plans show the RAF base developing. Two buildings are highlighted pink as these remained until relatively recently and thus form good reference points for the wider extent of the airbase. Such buildings have no relation to our site.

Between 1940 and 1945 the RAF base expanded with the addition of 5nr satellite sites (Site 1 to Site 5) at varying distances from the main base. Our site (Area B) lies on an apparently greenfield site immediately adjacent to “Site 4”, as shown on the plans, and was the furthest satellite site from the airfield.

The fifth plan (from 1975) and sixth plan show the Area A and Area B location relative to the “Site 4” boundary. This shows that our development area was not part of the RAF base, but that the hotel area adjacent to our site (Area A) lay over what were Nissen huts. The RAF boundary appears to following the existing roadway between Area A and Area B.

The last two sheets in Appendix A show an aerial photograph of the RAF base (albeit not showing “Site 4”) and a recent 2005 photograph giving RAF buildings (with the two red boxes) that act as reference points.

Appendix D contains some information that was obtained from DePol and from the planning portal. The Depol information finds that:

- The theme park was built on part of 'USAF Site 4' (RAF Burtonwood airbase). Site 4 accommodated 1,200 service personnel and had 146 Nissen huts. It also had a hobby shop, chapel, main store and an ice cream plant.
- After WWII the base gradually fell into dereliction, was abandoned in the early 1960s, before being sold for redevelopment in 1963.
- The site remained unchanged until 1984 when the land was leased for the development of a theme park. Full planning permission was granted for the site by WRDC on 18th May 1988.
- On 22nd March 2005, planning permission (ref. 2005/05467) was sought using the following description of development: "Full planning application for the extension of the theme park to allow the erection of an 80 bedroom hotel and the erection of buildings to comprise heritage attraction (related to former Burtonwood air base)." Permission was granted on appeal. This application relates to the hotel area (Area A) just east of our development site and the *Heritage Centre* that was supposed to have been built on our current development site, but which never went ahead.

In 2005 neighbours to the proposed development had objected (see Appendix D) on the (inferred) grounds that the use of the **Area A** as (largely) RAF accommodation could have resulted in:

- Soil contamination by asbestos cement fragments, lagging and insulation.
- Mercury and Phosphorous residues from fluorescent lighting tubes.
- Lead residues from (water supply) pipework.
- Heavy Metals contamination from the demolition of the ice cream parlour.
- The spread of the above across the site during demolition and landscaping.

Such assessment from historic risks is however the reason for Phase 1 Preliminary Risk Assessments such as this one. The risks identified in this report, remain as "potential" until proven one way or the other via an intrusive (Phase 2) investigation.

Condition 2 of that application concerned contamination. A Phase 1 desk study was presented to the local authority who (in January 2011) noted it to confirm *the absence of any activity on the development site which may have lead to contamination*. On the basis that the Phase 1 found no risk, the condition was thus discharged.

## 2.8 Unexploded Ordnance (UXO) Assessment

RAF Burtonwood "Site 4" (thus **Area A** and further east of such) lies just over 1000m from the runways/taxiways of RAF Burtonwood. An internet search revealed the following.

Bactec International Ltd undertook a *Preliminary Unexploded Ordnance Risk Assessment* for a site lying about 2-3km from our site (**Area B**) and about 200m from RAF Burtonwood runways. That site was:

- ~200m from a location where Bactec had previously removed *shell casings*.
- ~300m from a site that had undergone *army explosive ordnance clearance tasks/recess*.
- At potential risk of UXO varying from **Low to High**.

Bactec then produced a more detailed *Explosive Ordnance Threat Assessment* for the same site, which concluded that site to be at **medium** risk from UXO. This relates to both shallow-buried allied UXO and deep-buried German UXO.

Based on the above we consider that our site (Area A) would be **low** risk, but we would recommend a *Preliminary/Express UXO risk assessment* by a specialist consultancy to confirm such.

### 3.0 PRELIMINARY CONCEPTUAL MODEL

The site characterisation attempts to identify potential previous and existing site sources of contamination. The conceptual model links the identified sources likely to cause significant possibility of significant harm via pathways to identified critical receptors. The conceptual model is therefore based on a number of identified source-pathway-receptor scenarios. For land to be classified as contaminated a significant pollutant linkage will need to be identified which will include each component of the conceptual model. The absence or removal of a source or interception of a pathway will 'break' the pollutant linkage.

The conceptual model is characterised by identification of the following:

- **On-site** sources, which may impact **on-site** receptors via plausible pathways.
- **On-site** sources, which may impact **off-site** receptors via plausible pathways.
- **Off-site** sources, which may impact **on-site** receptors via plausible pathways.

In the event of a change of land use, the planning regime will require assessment of the new site development layout within the context of the sources or risk and introducing new exposure pathways. The assessment is also used to determine if the site, once developed, would class as contaminated land under the definition provided by the Part 2A of the Environment Act 1990 as defined in the Environment Protection Act 1995.

The method used for risk evaluation is qualitative based on interpretation of the available geoenvironmental and geotechnical data in order to provide an overall impression of the potential risks present at the site. This is described in terms of two variables as follows:

- **"Probability"** – being the likelihood that a hazard is present on site or in the surroundings.
- **"Consequence"** – being the potential outcome of the hazard.

The combination of these is used to define the risk. Clearly if a hazard is not present there can be no consequence. Similarly hazards that are potentially present will have different degrees of potential consequence. The combination of the presence of a hazard, and the potential severity of outcome of such a hazard within any event, can be used to manage the approach to management of the risk.

The **probability** (likelihood) of an event can be classified on a four point system using the following terms and definitions based on CIRIA C552:

- **Highly likely:** The event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;
- **Likely:** It is probable that an event will occur, or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;
- **Low likelihood:** Circumstances are possible under which an event could occur, but it is not certain even in the long term that an event would occur and it is less likely in the short term;
- **Unlikely:** Circumstances are such that it is improbable the event would occur even in the long term.

The **consequence** (severity) can be classified using a similar system also based on CIRIA C552. The terms and definitions relating to consequence are:

- **Severe:** Short term (acute) risk to human health likely to result in 'significant harm'#. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. Short term risk to an ecosystem or organism forming part of that ecosystem#;
- **Medium:** Chronic damage to human health ('significant harm'#), pollution of sensitive water resources, significant change in an ecosystem or organism forming part of that ecosystem#;

- **Mild:** Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm'#). Damage to sensitive buildings, structures or the environment; and
- **Minor:** Harm, not necessarily significant, but that could result in financial loss or expenditure to resolve. Non-permanent human health effects easily prevented by use of personal protective clothing. Easily repairable damage to buildings, structures and services.

#: Defined in Defra Circular on "Contaminated Land", EPA 1990 Part 2a", 01/2006, September 2006.

Once the probability of an event occurring and its consequence have been classified, a risk category can be assigned as Table 3.1.

**Table 3.1 Risk Classification System (CIRIA 552)**

		Consequence			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low likelihood	Moderate	Moderate/Low	Low	Very Low
	Unlikely	Moderate/Low	Low	Very Low	Very Low

Risk Level	Action
Low to Very Low	None
Moderate to Moderate/Low	Undertake appropriate mitigation measures to reduce the risk level by appropriate on-site practice at little additional cost.
High to Very High	Designers should take such risks into account and avoid or reduce risk level to acceptable levels. Additional resources required.

Tables 3.3 to 3.5 provide a summary of the data reference points, together with an indication of the hazard, probability, consequence and thus degree of risk.

The hazard, consequence and degree of risk all remain as 'potential' until assessed by intrusive investigation.

A preliminary conceptual model is indicated in Tables 3.2 to 3.4. The tables indicate that the site and environs are considered as **Very Low to Low/Moderate** risk with respect to contamination.

In summary the potential sources of risk (>low risk) are:

**Table 3.2 Potential Risks and Contaminants of Concern**

Source of Risk	Contaminants of Concern#
Made ground that could potentially encroach into our site from the off-site RAF land immediately east	Heavy metals, Hexavalent Chromium, Phosphorus, TPH, PAHs, asbestos.
UXO	UXO

#: Reference: *Industry profiles*, NHBC RD66, etc.

**Table 3.3 On-Site to On-Site Source - Pathway - Receptor Model**

Source		Pathway	Receptor	Probability	Consequence	Potential Risk? & Ref
General	Hazard					
Total soils concentrations (e.g. heavy metals, asbestos and asbestos cement fragments and hydrocarbons as general impact from former site usage)	Contamination of groundwater	Migration of leachate through unsaturated zone; Then Migration through saturated zone/groundwater;	Groundwater and/or surface waters, and/or eco-system (i.e. nearby watercourse)	Unlikely	Mild	Very Low
	Human health	Ingestion of and dermal contact with soil & household dust; Inhalation of dust (indoor household and outdoor fugitive).	Human beings	Unlikely	Medium	Low
	Vegetation poisoning.	Uptake by plant roots	Plants	Unlikely	Mild	Very Low
Liquid contaminants Hotspot(s): Petrol, Diesel, Oils, Solvents, PCBs, etc	Contamination of groundwater	Migration through unsaturated zone to groundwater	Groundwater and/or ecosystem	Low Likelihood	Mild	Low
	Human health	Permeation into PE Water supply pipes	Human drinking water	Unlikely	Medium	Low
		Ingestion of and dermal contact with soil	Humans	Unlikely	Medium	Low
Gases from natural soils with organic content (e.g. peat, alluvium)  Gases from degradation of petroleum hydrocarbon hotspots  Hydrocarbon vapours  Gases from made ground with organic content	Explosion (accumulation of methane and volatiles)  Asphyxiation (resulting from elevated levels of carbon dioxide, methane etc).	Preferential flow paths into buildings through <b>unsaturated zone</b> , thus Inhalation of indoor vapours/gases and possible explosion.	Human beings	Unlikely	Medium	Low
		Preferential flow paths into buildings via <b>piled foundations vibro columns</b> , etc, thus Inhalation of indoor vapours/gases and possible explosion.		Unlikely	Medium	Low
		Inhalation of outdoor vapours/gases.		Unlikely	Medium	Low
Radon Gas from natural soils/rocks (radionuclides)	Damage to lung tissue and/or Carcinogenic effects	Preferential flow paths <b>into buildings</b> (e.g. drains, service runs, wall cavities, piles etc.); Inhalation of indoor gases	Human beings	Unlikely	Medium	Low
UXO	Explosion	Hit during excavations, piling or borehole drilling	Construction workers & drillers	Unlikely	Severe	A1- Low/moderate

**Table 3.4 On-Site to Off-Site Source - Pathway - Receptor Model**

Only on-site to on-site risks that are above "low" can pose a risk off site and thus are as follows:

Source		Pathway	Receptor	Probability	Consequence	Potential Risk? & Ref
General	Hazard					
None significant	-	-	-	-	-	None

**Table 3.5 Off-Site to On-Site Source - Pathway - Receptor Model**

Source		Pathway	Receptor	Probability	Consequence	Potential Risk? & Ref
General	Hazard					
Total soils concentrations on RAF land (e.g. heavy metals, asbestos and asbestos cement fragments and hydrocarbons as general impact from former site usage)	Human health	Ingestion of and dermal contact with soil & household dust;  Inhalation of dust (indoor household and outdoor fugitive).	Human beings	Low Likelihood	Medium	C1: Low/moderate



## 4.0 GEOTECHNICAL AND ENVIRONMENTAL CONSIDERATIONS

### 4.1 Proposed Development

The site is being considered for commercial development, plus a small caravan park.

### 4.2 Anticipated Ground Conditions

The anticipated ground conditions for the site are summarised in the table below and are based on the available geological information and previous site investigation data from nearby sites.

**Table 4.1 Geology**

Depth (m)	Brief Description
<b>East of Site B</b>	
0m to 0.3m	<b>TOPSOIL</b>
1m to 2-3m	SAND with occasional gravel, or firm to stiff CLAY with occasional gravel <b>(GLACIOFLUVIAL SHEET DEPOSITS)</b>
2-3m to 8m	Firm to stiff grey sandy gravelly CLAY, potentially with boulders <b>(TILL)</b>
8m to depth	SANDSTONE, weathered to very dense SAND for say the first 0.5m. <b>(WILMSLOW SANDSTONE FORMATION)</b>
<b>West of Site B</b>	
0m to 0.4m	<b>TOPSOIL.</b>
0.4m to 8m	Firm to stiff grey sandy gravelly CLAY, potentially with boulders <b>(TILL)</b>
8m to depth	SANDSTONE, weathered to very dense SAND for say the first 0.5m. <b>(WILMSLOW SANDSTONE FORMATION)</b>

There is a very slight risk that made ground historic made ground from RAF "site 4" could slightly encroach into the site (Area B). Such could contain occasional component fragments of bricks, concrete, cloth, tarmac, timber, asbestos cement and pottery.

Groundwater is only likely to be encountered as seepages.

### 4.3 Engineering Considerations

#### 4.3.1 General

From the information detailed herein and from our extensive experience, we consider that the following aspects should be considered (some of which could be **abnormal** development aspects specific to this site).

#### 4.3.2 Geotechnical Aspects

##### Abnormal Aspects

- Standard soakaway drainage may not be possible due to the majority of shallow soils potentially being cohesive and thus other Sustainable Urban Drainage solutions (SUDS) may be required. If considered, soakaway testing should be completed in line with BRE Digest 365: *Soakaway Design*, 2007.
- A slight risk from UXO could exist due to the proximity to the RAF base.

##### Normal Aspects

- Standard strip and pads foundations should be feasible founded at about 1m depth (or deeper near existing trees). An intrusive site investigation should be completed to confirm the soil profile across the site.
- Suspended floor slabs are now routinely used and such will provide protection to ground heave from what could be primarily cohesive soils.
- A number of semi-mature to mature trees have been observed on-site, giving the potential for localised soil desiccation of cohesive soils. Several of the species observed are classified by NHBC Standards Chapter 4.2, *Building Near Trees* (2016), as having high water demand. Natural moisture content and soil plasticity profiles should be defined at critical locations.
- Special measures for the protection of buried concrete may be required. Chemical analysis of the Drift should be completed and the grade of concrete assessed in line with BRE Special Digest 1, *Concrete in Aggressive Ground*, 2005, 3<sup>rd</sup> Edition.

The general geotechnical risk is considered to be **low**.

#### 4.3.3 Environmental Considerations

##### Abnormal Aspects

- None.

##### Normal Aspects

- The RAF brownfield land (Area A) lies immediately east of the site (Area B) and thus made ground from Area A could encroach slightly into the site. It's chemical composition is unknown, but it is likely to be the same as many brownfield sites and given the proposed commercial end usage, then any risks are unlikely to be significant and thus not warrant any remediation or risk-reduction measures.
- **Radon**: No protection is required.
- Invasive species may be present on site.

The general risk of significant contamination is considered to be **low**.

#### 4.4 Recommendations for Further Investigation

##### ***Environmental/Contamination Type Risks***

Based on the desk study completed to date there is no significant risk of contamination and thus no ground investigation for such is required (but see investigation below).

##### ***Geotechnical Type Risks***

The following broad scope of investigation is recommended to inform foundation design etc:

- Cable percussion boreholes.
- Trial pitting (potentially with soakaway testing).
- In situ CBR testing
- Geotechnical laboratory testing that is recommended includes pH and water soluble sulphate, Atterberg limits, gradings and natural moisture content.
- An *Express UXO risk assessment* is recommended

This work can be used to prove if any made ground exists along the very eastern edge of Area B (the site). If any were to be found then samples would be taken and any risks assessed.

#### 4.5 Outline Recommendations for Remediation and Risk Reduction

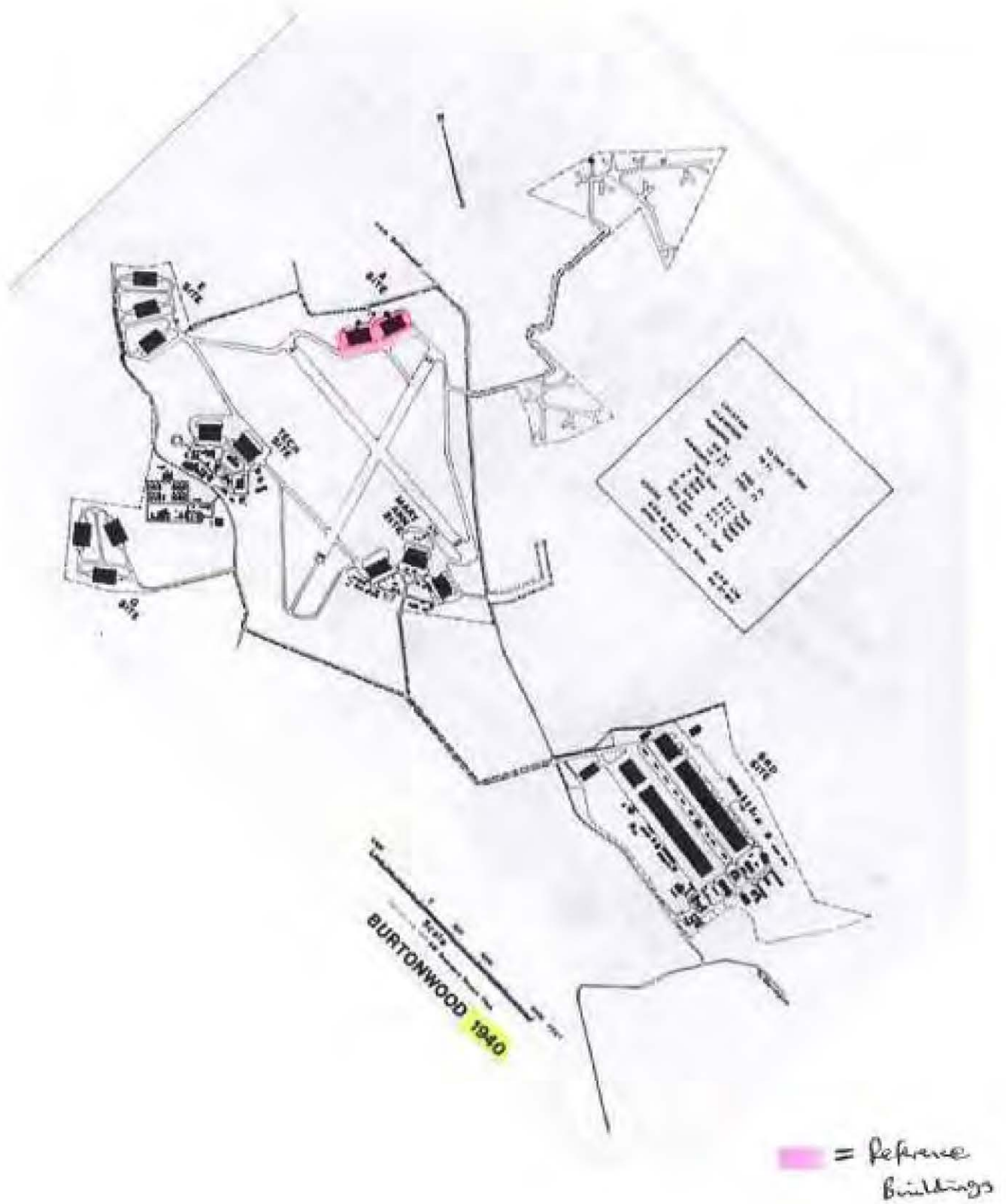
Based on the findings of this report, we do not envisage any “remediation” as such, but some routine risk-reduction measures are required as follows:

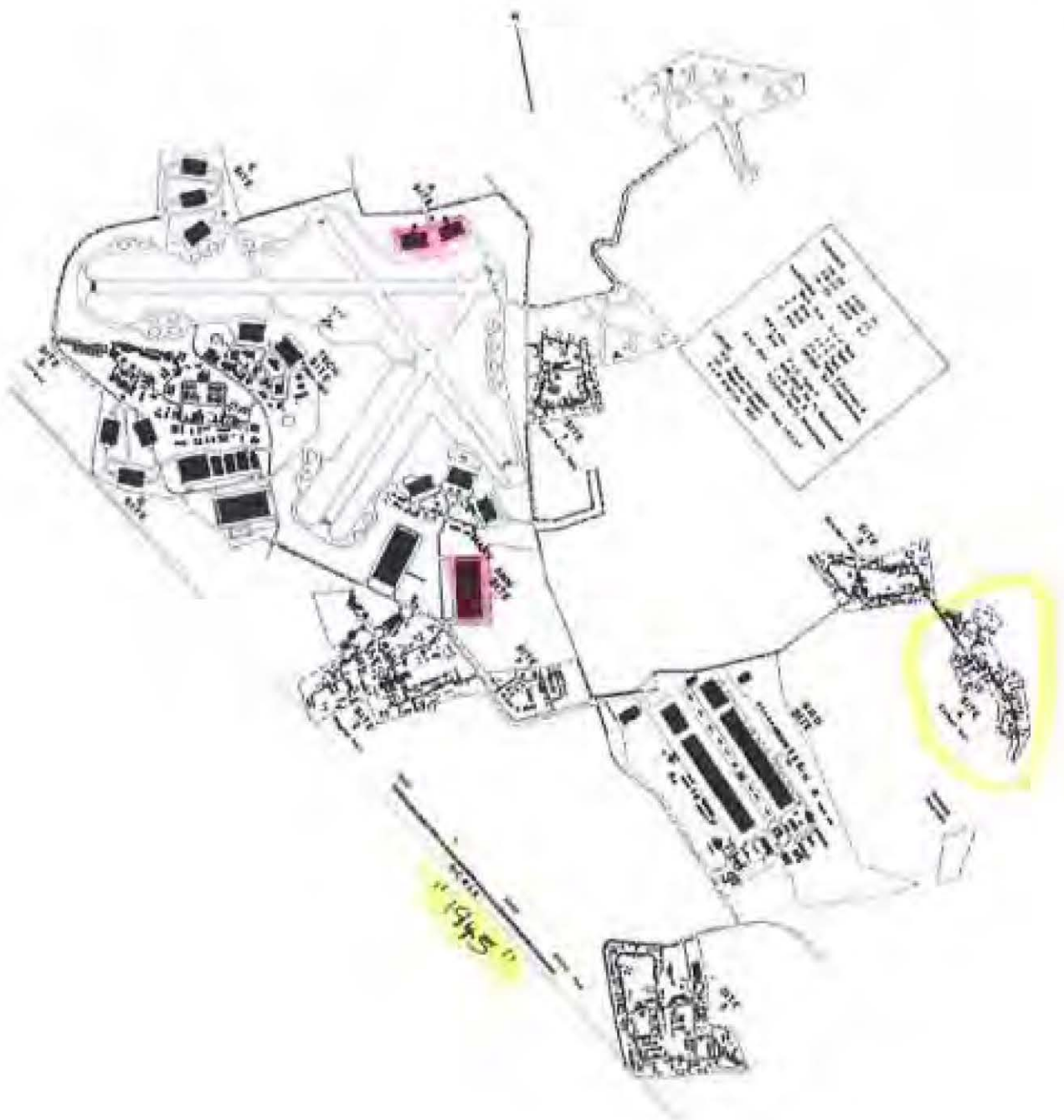
- All imported topsoils and subsoils should be tested to prove that they do not contain any unacceptable (including naturally occurring) contamination.
- A survey should be undertaken for invasive species such as Japanese Knotweed.

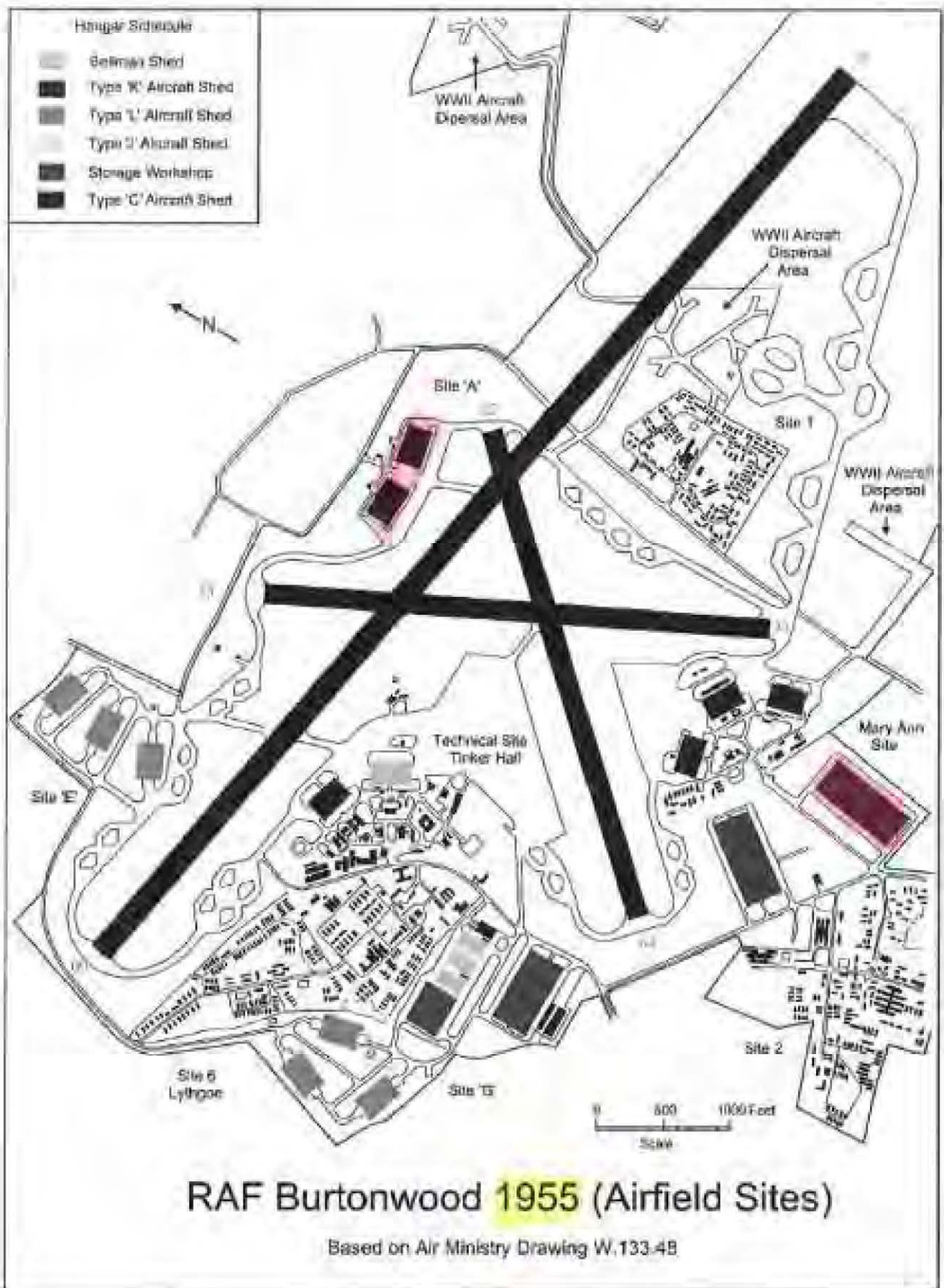
## **APPENDICES**

- A – Site Location & RAF Burtonwood Location Plans & Aerial Photographs**
- B – GroundSure Reports**
- C – Historic Maps**
- D – Planning History**
- E – Clarkebond Ground Engineering Capabilities**

**A – Site Location & RAF Burtonwood Location Plans & Aerial Photographs**

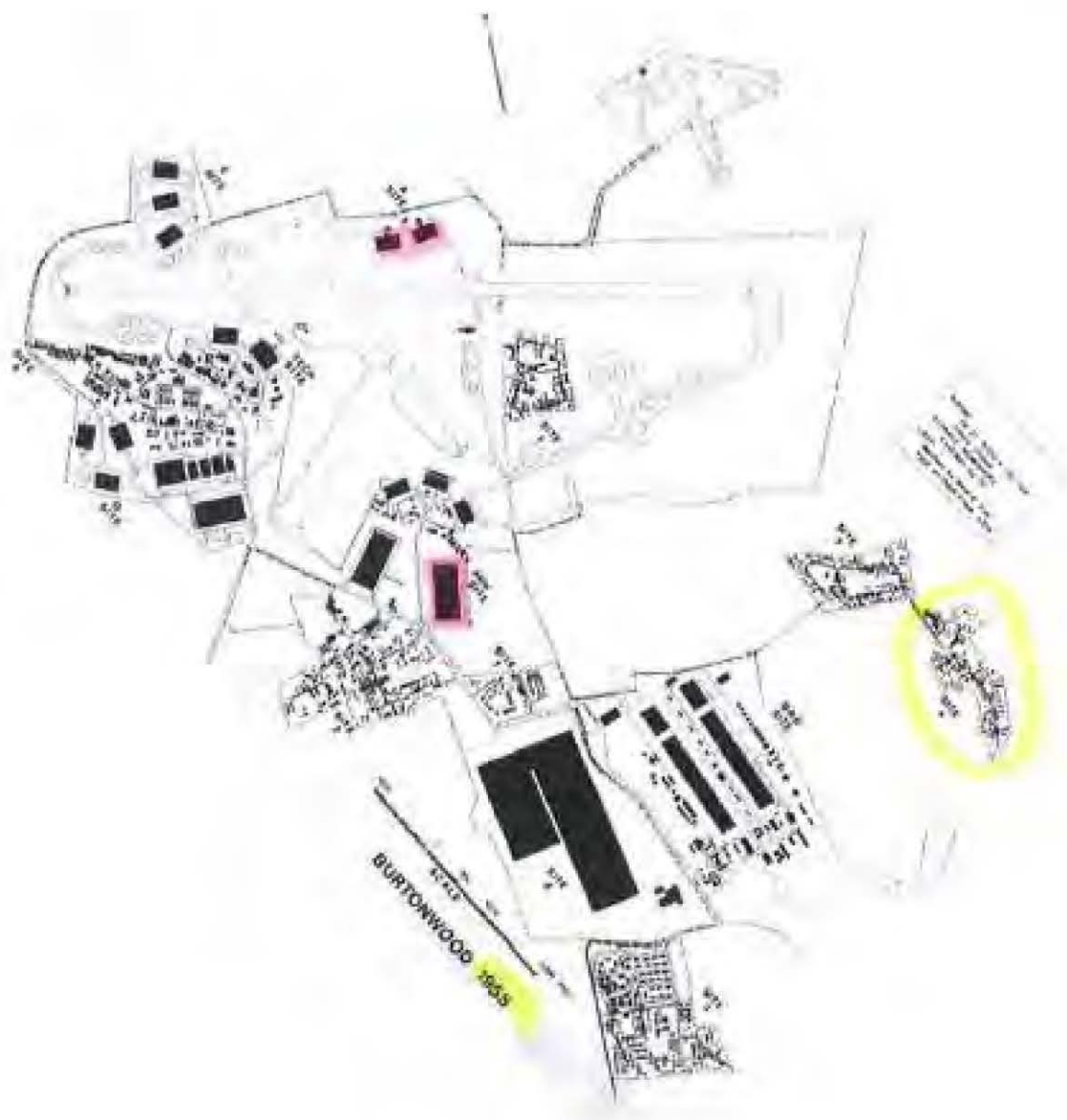


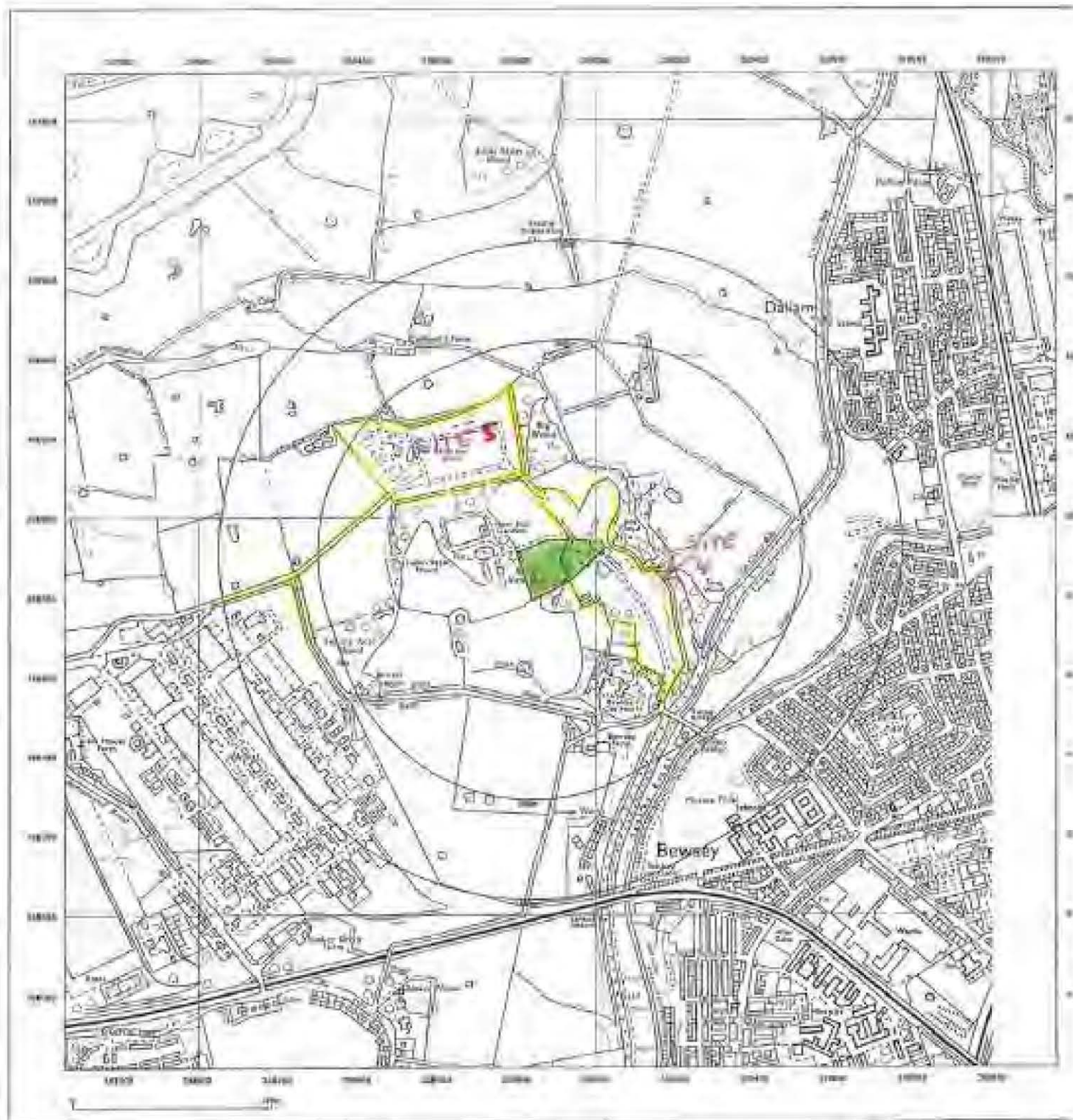




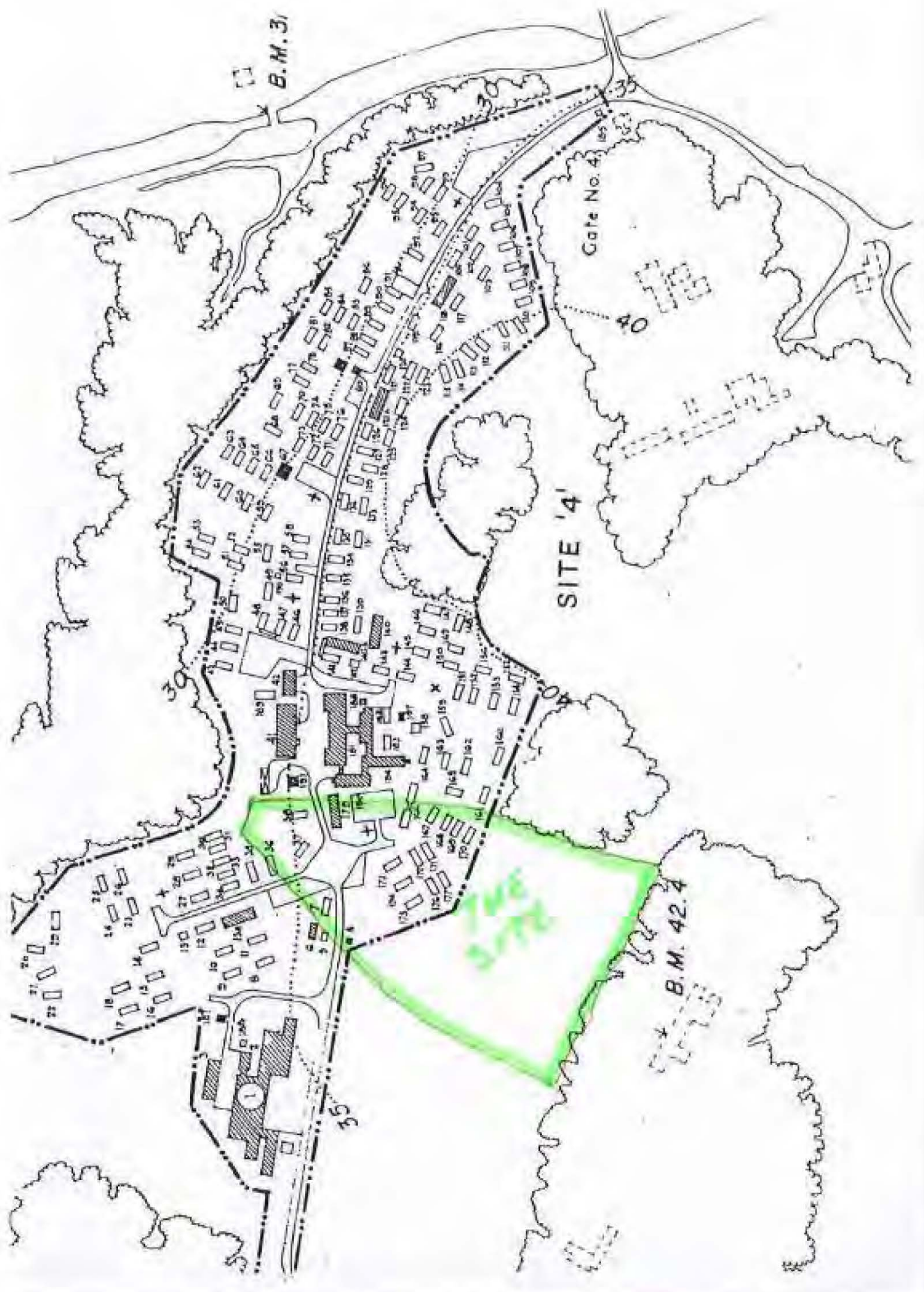
*Remained until 2005*







1975-1978







**B – GroundSure Reports**



Clarkebond UK Limited

The Cocoa House, 129 Cumberland Road,  
Bristol, BS1 6UY

Report Reference: EMS-384186\_514241

Your Reference: EMS\_384186\_514241

Report Date 22 Sep 2016

Report Delivery Method: Email - pdf

## Groundsure Geo Insight

Address: Warrington,

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight** as requested.

If you would like further assistance regarding this report then please contact the emapsite customer services team on 0118 9736883 quoting the above report reference number.

Yours faithfully,

emapsite customer services team

Enc.

Groundsure Geoinsight

# Groundsure Geo Insight

Address: Warrington,  
Date: 22 Sep 2016  
Reference: EMS-384186\_514241  
Client: Clarkebond UK Limited

NW N NE

W E



SW S SE

Aerial Photograph Capture date: 24-Jun-2009  
Grid Reference: 358900,389886  
Site Size: 1.98ha



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# Overview of Findings

The Groundsure Geo Insight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

## Section 1:Geology

1.1 Artificial Ground	1.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?	Yes
	1.2.2 Are there any records relating to permeability of superficial geology within the study site boundary?	Yes
	1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	1.2.4 Are there any records relating to permeability of landslips within the study site boundary?	No
1.3 Bedrock, Solid Geology & Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records relating to permeability of bedrock within the study site boundary?	Yes
	1.3.3 Are there any records of faults within 500m of the study site boundary?	No
1.4 Radon data	1.4.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level
	1.4.2 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary

Section 2:Ground Workings	On-site	0-50m	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	24	Not Searched	Not Searched
2.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
2.3 Current Ground Workings	0	0	0	0	0

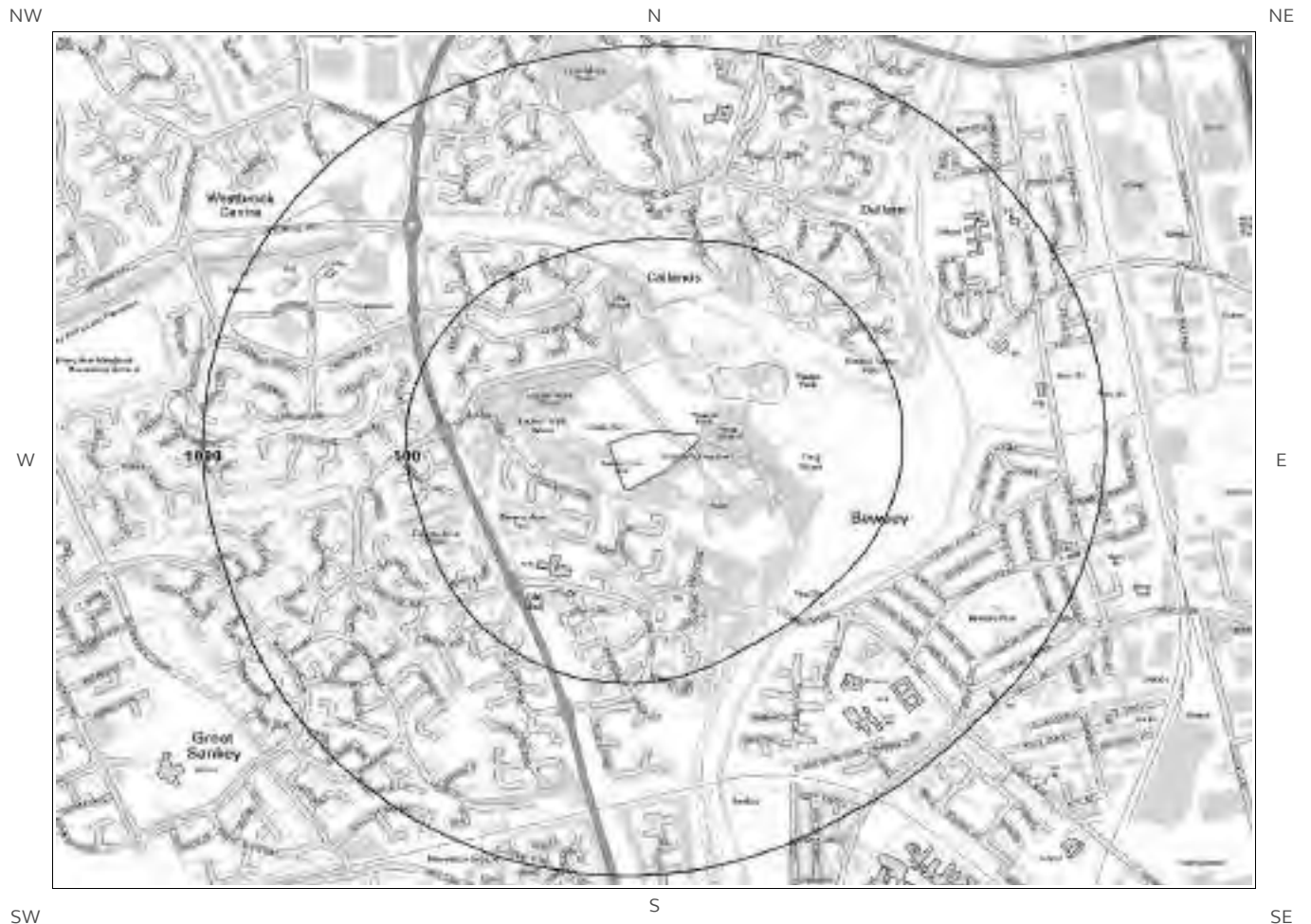
Section 3: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0
3.2 Coal Mining	1	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	2	0	2	0	4
3.4 Non-Coal Mining	0	0	0	0	0
3.5 Non-Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0
<hr/>					
Section 4: Natural Ground Subsidence	On-site				
4.1 Shrink Swell Clay	Very Low				
4.2 Landslides	Very Low				
4.3 Ground Dissolution of Soluble Rocks	Negligible				
4.4 Compressible Deposits	Negligible				
4.5 Collapsible Deposits	Very Low				
4.6 Running Sand	Very Low				
<hr/>					
Section 5: Borehole Records	On-site	0-50m	51-250		
5 BGS Recorded Boreholes	0	2	8		
<hr/>					
Section 6: Estimated Background Soil Chemistry	On-site	0-50m	51-250		
6 Records of Background Soil Chemistry	3	0	3		
<hr/>					
Section 7: Railways and Tunnels	On-site	0-50m	51-250	251-500	
7.1 Tunnels	0	0	0	Not Searched	
7.2 Historical Railway and Tunnel Features	0	0	0	Not Searched	
7.3 Historical Railways	0	0	0	Not Searched	
7.4 Active Railways	0	0	2	Not Searched	

Section 7:Railways and Tunnels	On-site	0-50m	51-250	251-500
7.5 Railway Projects	0	0	0	0

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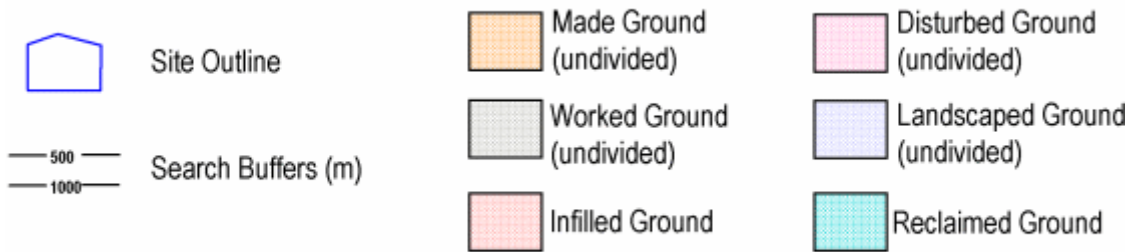
# 1 Geology

## 1.1 Artificial Ground Map



Artificial Ground Legend

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# 1 Geology

## 1.1 Artificial Ground

### 1.1.1 Artificial/ Made Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:097

Are there any records of Artificial/Made Ground within 500m of the study site boundary? No

Database searched and no data found.

---

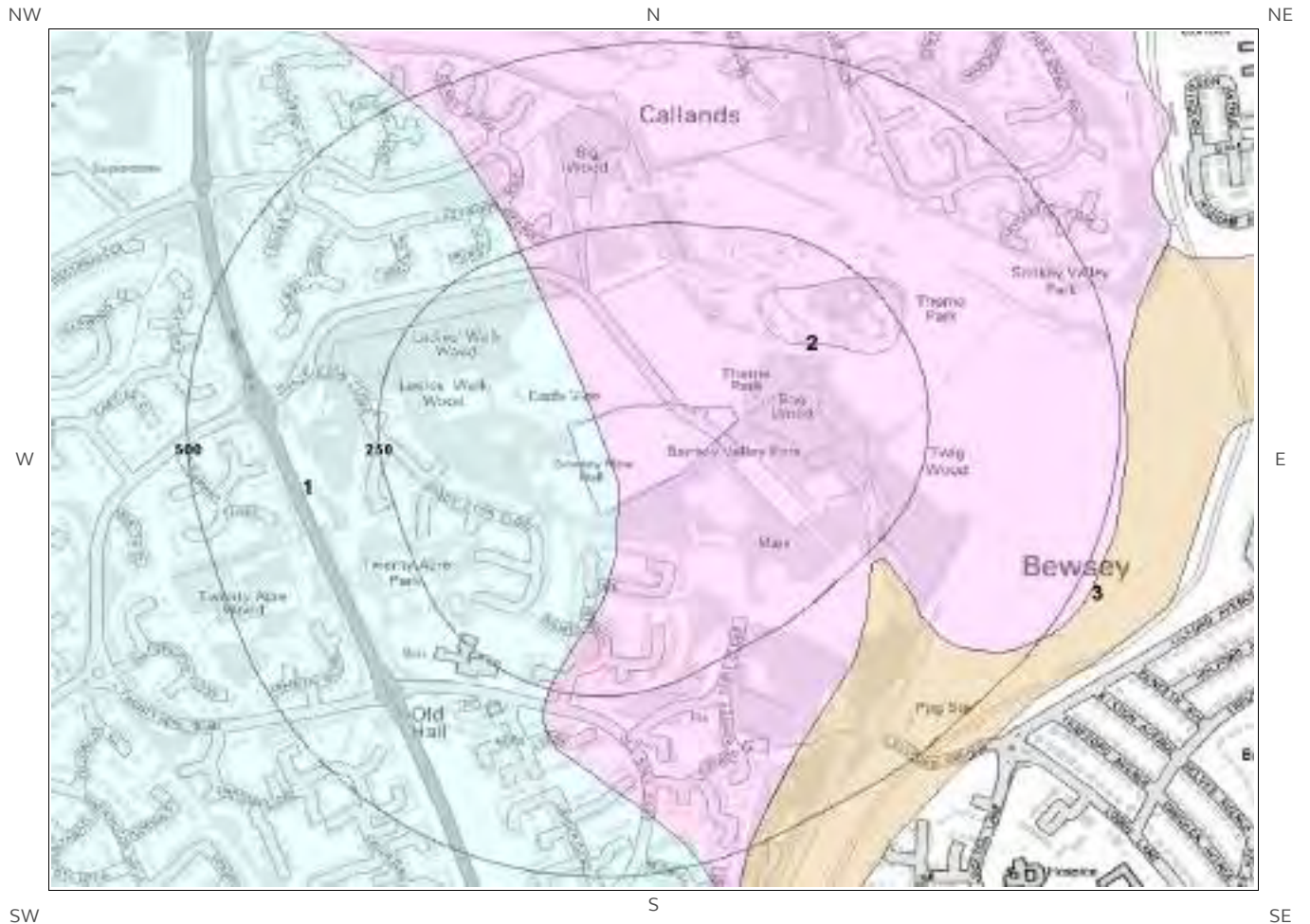
### 1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

Database searched and no data found.



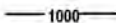
---

# 1.2 Superficial Deposits and Landslips Map



**Superficial Deposits and Landslips Legend**

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-  Site Outline
-  500
-  1000
- Search Buffers (m)



# 1.2 Superficial Deposits and Landslips

## 1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	TILLD	TILL, DEVENSIAN	DIAMICTON
2	0.0	On Site	GFSDD	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
3	265.0	SE	ALV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]

## 1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	Low
0.0	On Site	Intergranular	Very High	High

## 1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

### 1.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site\*\* boundary? No

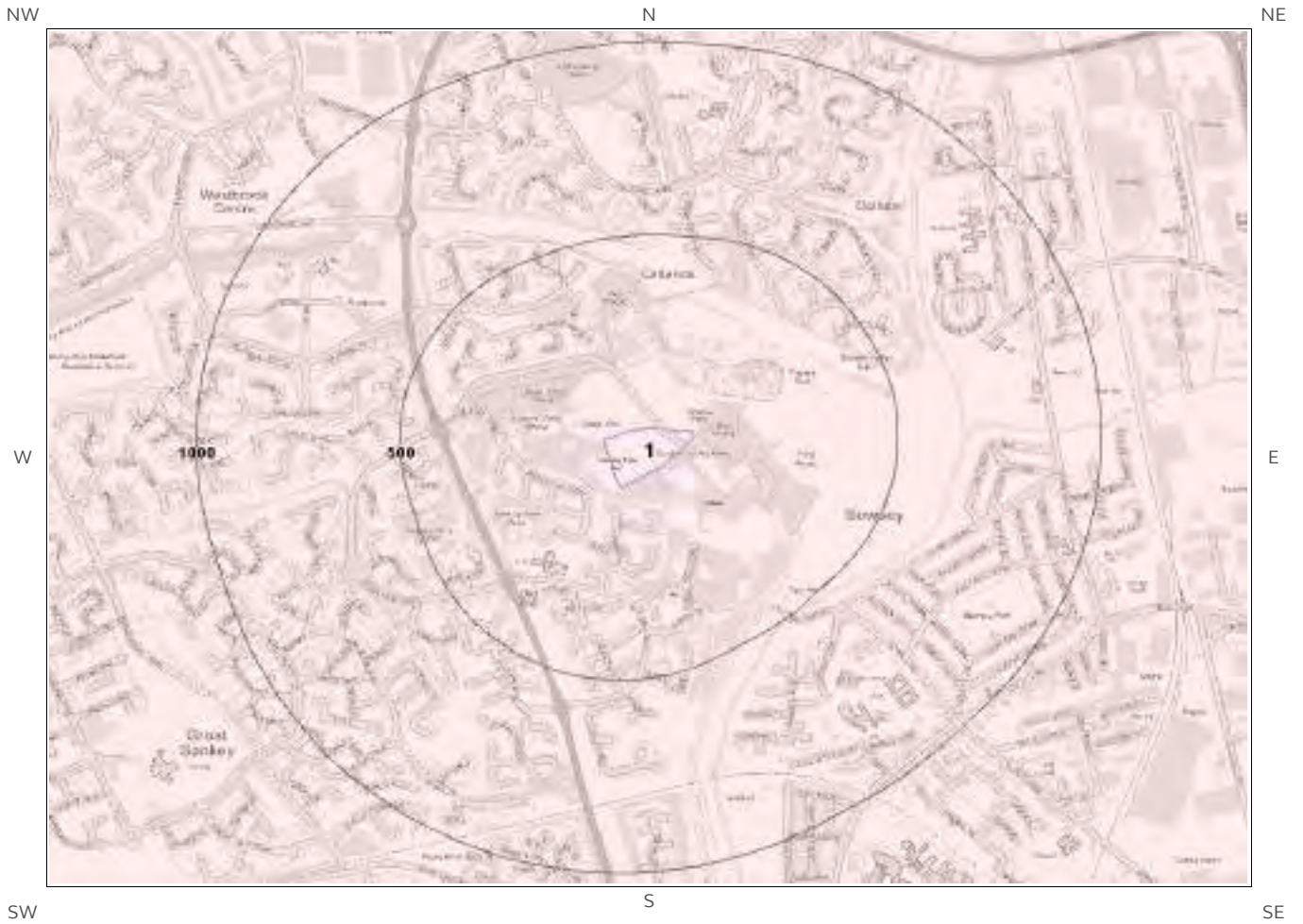
Database searched and no data found.

---

---




\* This includes an automatically generated 50m buffer zone around the site

# 1.3 Bedrock and Faults Map



**Bedrock and Faults Legend**

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-  Site Outline
-  500
-  1000
- Search Buffers (m)

# 1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:097

## 1.3.1 Bedrock/ Solid Geology

Records of Bedrock/ Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	WLSF-SDST	Wilmslow Sandstone Formation - Sandstone	No Details

## 1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site\* boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	High	High

## 1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

\* This includes an automatically generated 50m buffer zone around the site

# 1.4 Radon Data

## 1.4.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?      The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level

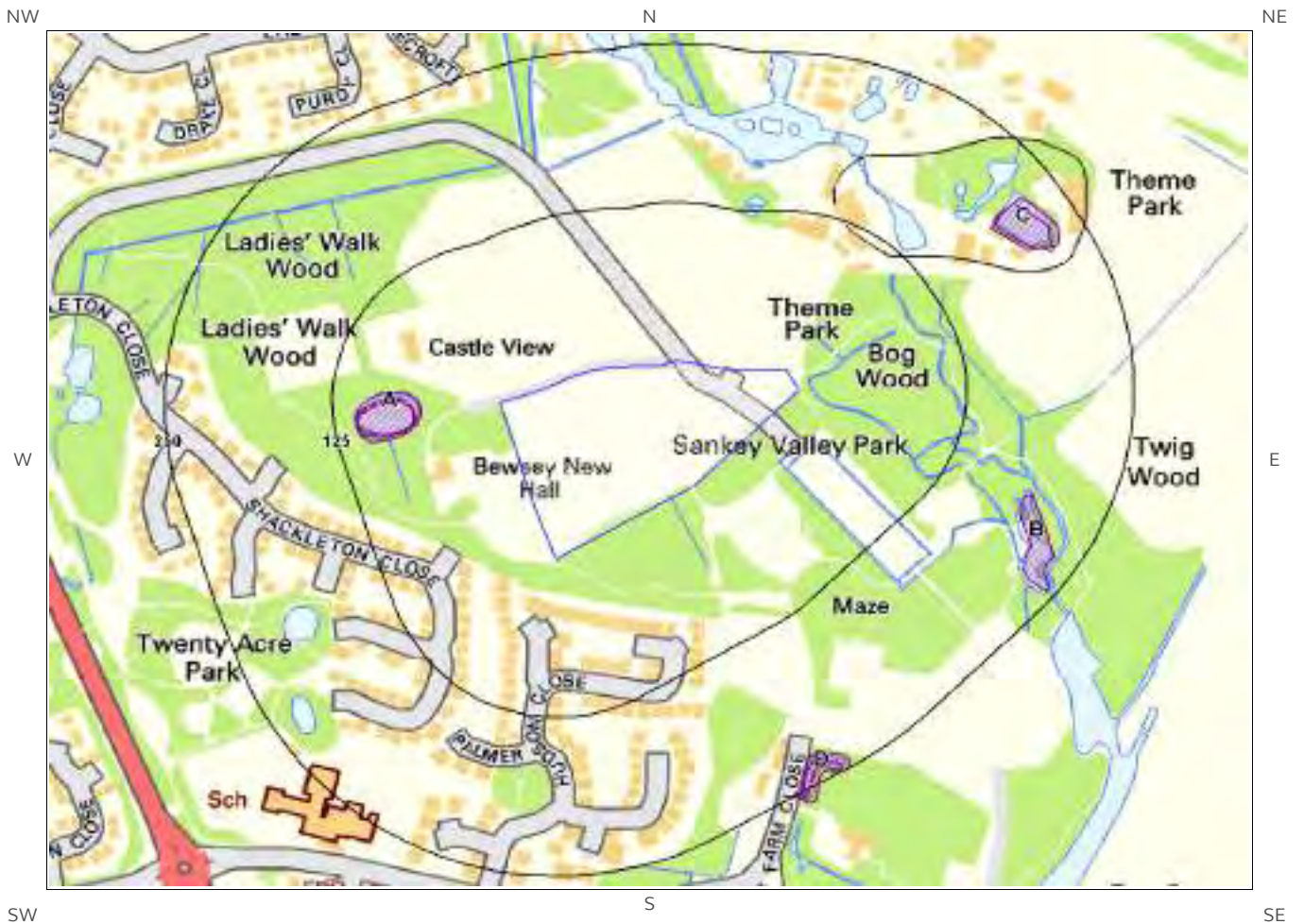
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## 1.4.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?      No radon protective measures are necessary



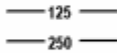


---

# 2 Ground Workings Map



Ground Workings Legend

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- |   |                    |   |                                  |
|---|--------------------|---|----------------------------------|
|  | Site Outline       |  | Historic Surface Ground Workings |
|  | Search Buffers (m) |  | Historic Underground Workings    |
|   |                    |  | Current Ground Workings          |

## 2 Ground Workings

### 2.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

The following Historical Surface Ground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
1A	59.0	W	358718 389907	Pond	1973
2A	59.0	W	358718 389907	Pond	1987
3A	59.0	W	358718 389907	Pond	1970
4A	59.0	W	358718 389907	Pond	1993
5A	64.0	W	358716 389900	Pond	1937
6A	64.0	W	358716 389900	Pond	1891
7A	64.0	W	358716 389900	Pond	1926
8A	64.0	W	358716 389900	Pond	1905
9A	65.0	W	358715 389903	Pond	1949
10B	188.0	SE	359203 389804	Pond	1987
11B	188.0	SE	359203 389804	Pond	1993
12C	190.0	NE	359192 390053	Pond	1937
13C	190.0	NE	359192 390053	Pond	1891
14C	190.0	NE	359192 390053	Pond	1905
15C	190.0	NE	359192 390053	Pond	1926
16C	194.0	NE	359195 390056	Pond	1976
17C	194.0	NE	359195 390056	Pond	1965
18C	194.0	NE	359195 390056	Pond	1989
19C	194.0	NE	359195 390056	Pond	1949
20D	228.0	SE	359034 389620	Pond	1993

ID	Distance (m)	Direction	NGR	Use	Date
21D	228.0	SE	359034 389620	Pond	1973
22D	228.0	SE	359034 389620	Pond	1987
23D	228.0	SE	359034 389620	Pond	1970
24D	232.0	SE	359032 389620	Pond	1949

---

## 2.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

---

## 2.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

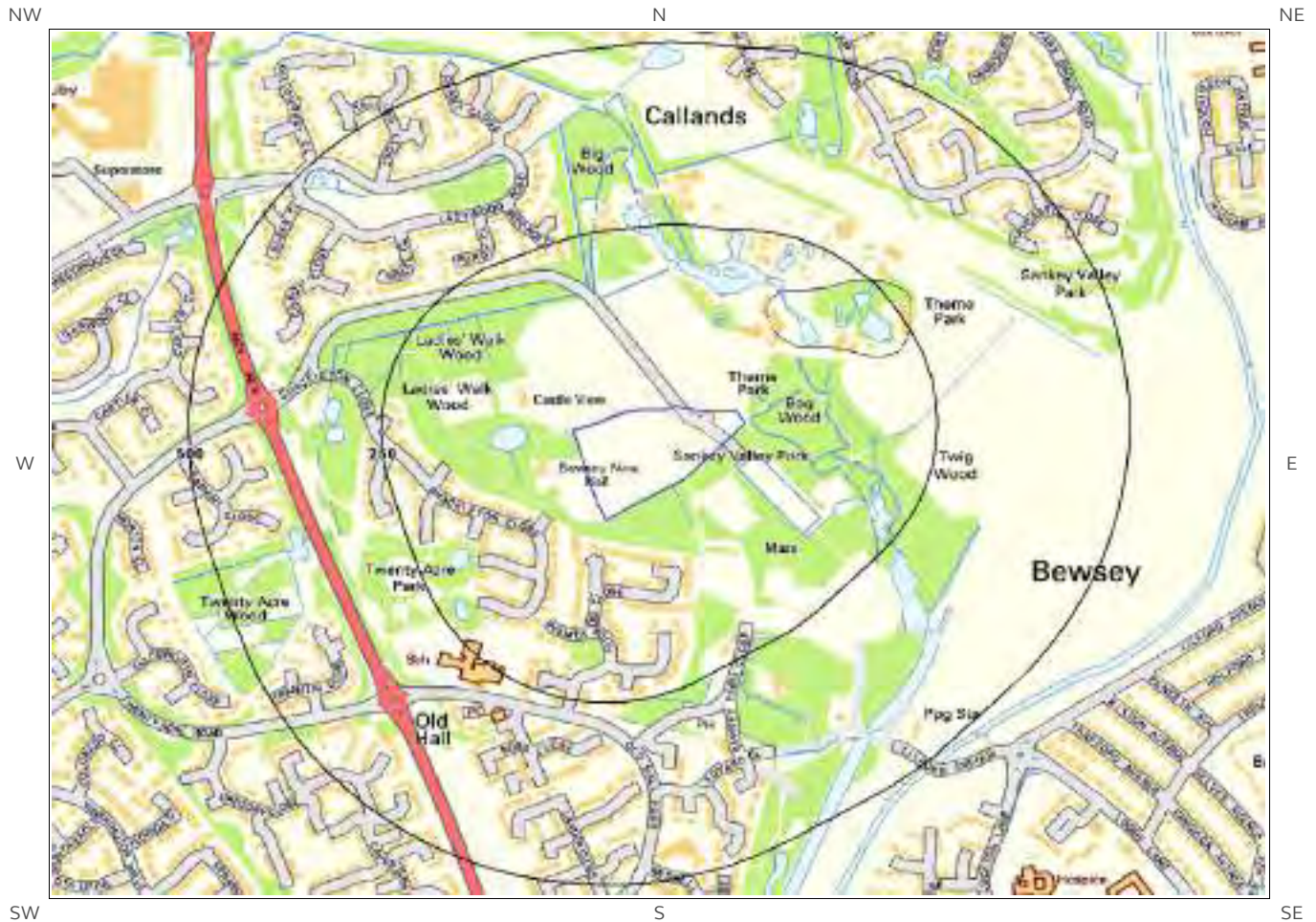
Are there any BGS Current Ground Workings within 1000m of the study site boundary? No

Database searched and no data found.

---



# 3 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

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# 3 Mining, Extraction & Natural Cavities

## 3.1 Historical Mining

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

## 3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? Yes

The following Coal Mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

---

## 3.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? Yes

The following information provided by JPB is not represented on mapping: In addition to being located inside an area where The Coal Authority have information on coal mining activities, Johnson Poole & Bloomer (JPB) have information such as mining plans and maps held within their archive of mining activities that have occurred within 1km of this property which may supplement this information. Further details and a quote for services can be obtained by emailing this report to [enquiries.gs@jpb.co.uk](mailto:enquiries.gs@jpb.co.uk).

---

### 3.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

### 3.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled “Review of mining instability in Great Britain, 1990” PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

---

### 3.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

---

### 3.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

---

### 3.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

---

### 3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level.

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

### 3.10 Clay Mining

This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

---

# 4 Natural Ground Subsidence

## 4.1 Shrink-Swell Clay Map

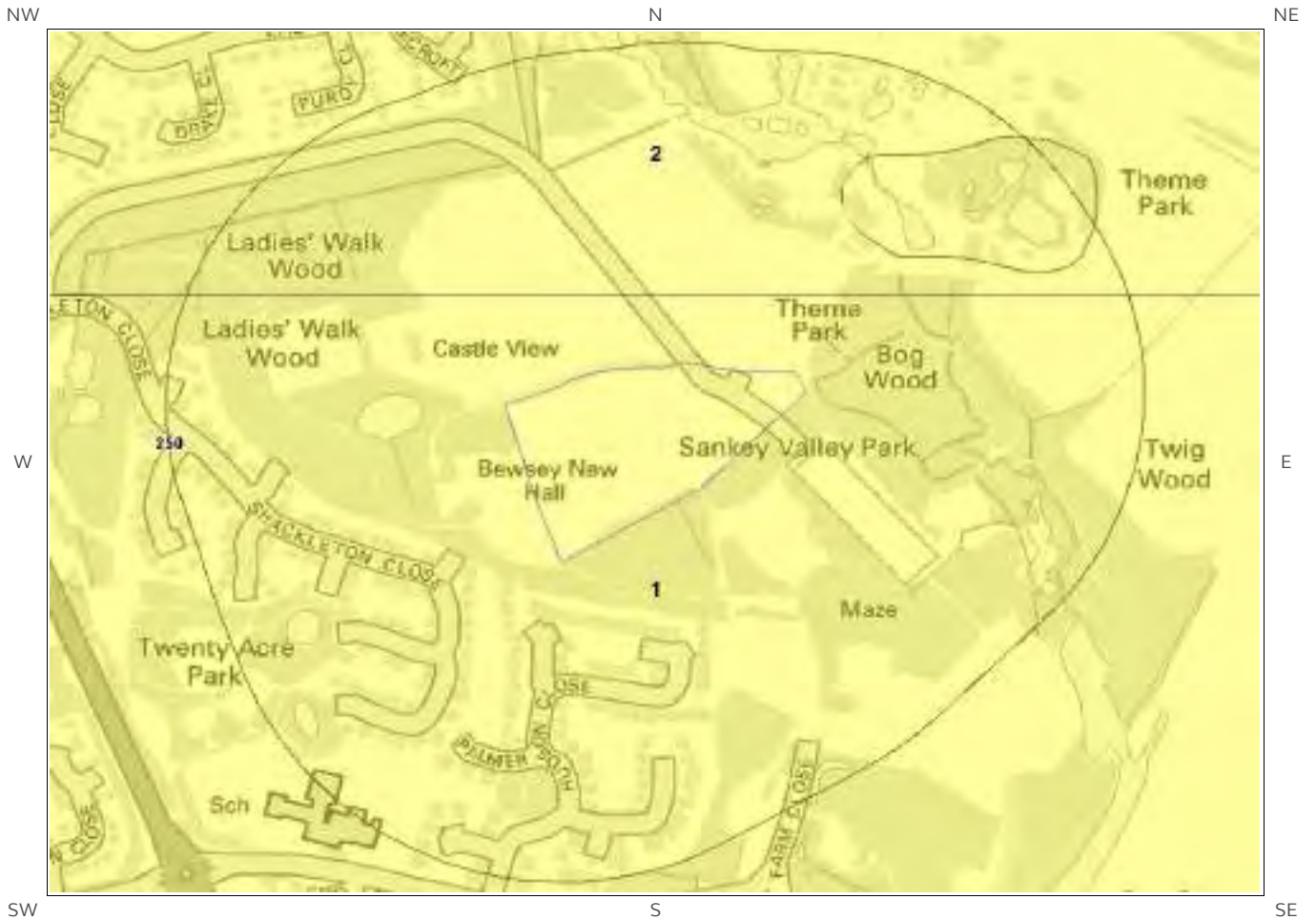


Shrink Swell Clay Legend

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# 4.2 Landslides Map

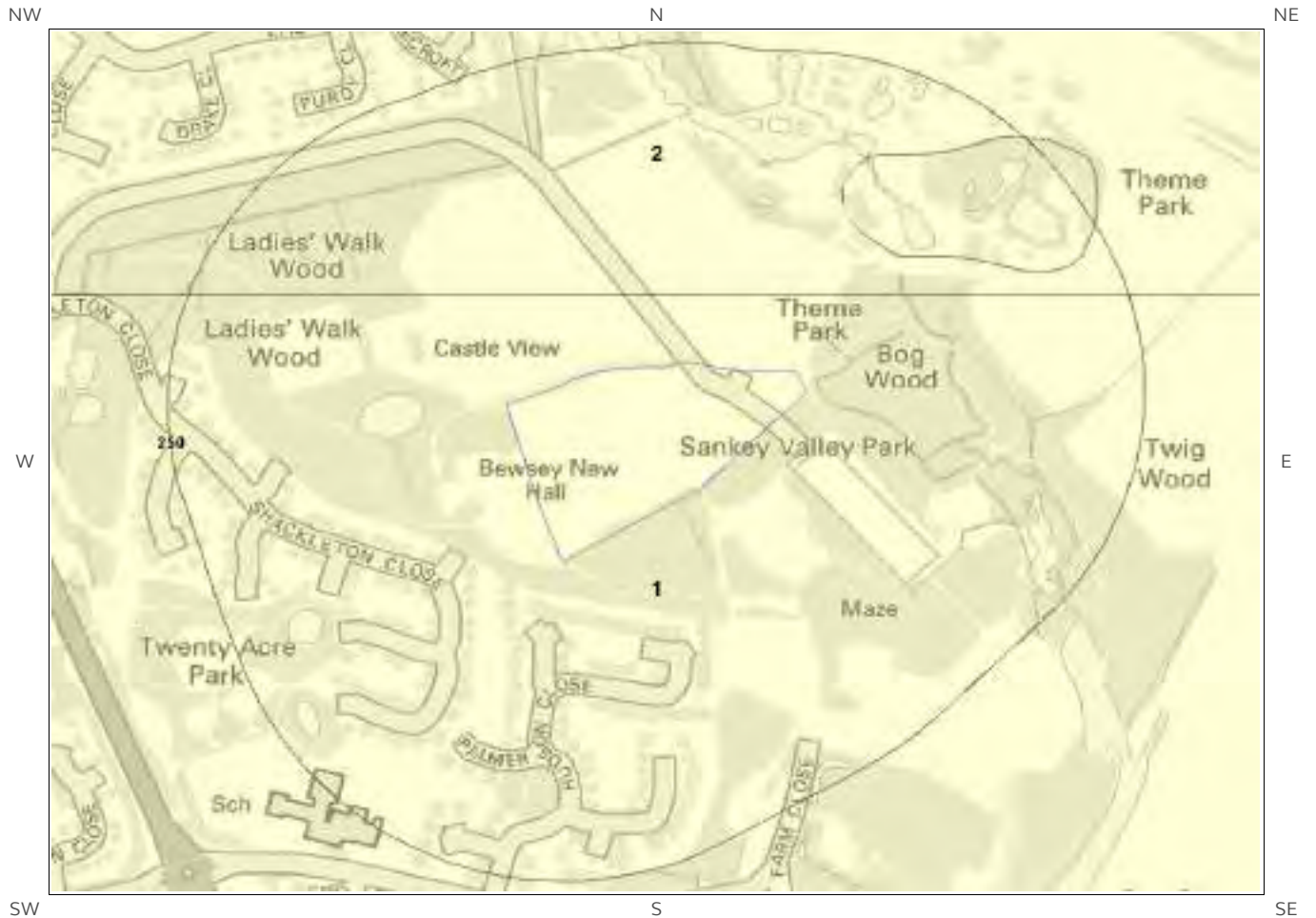


Landslides Legend

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# 4.3 Ground Dissolution Soluble Rocks Map

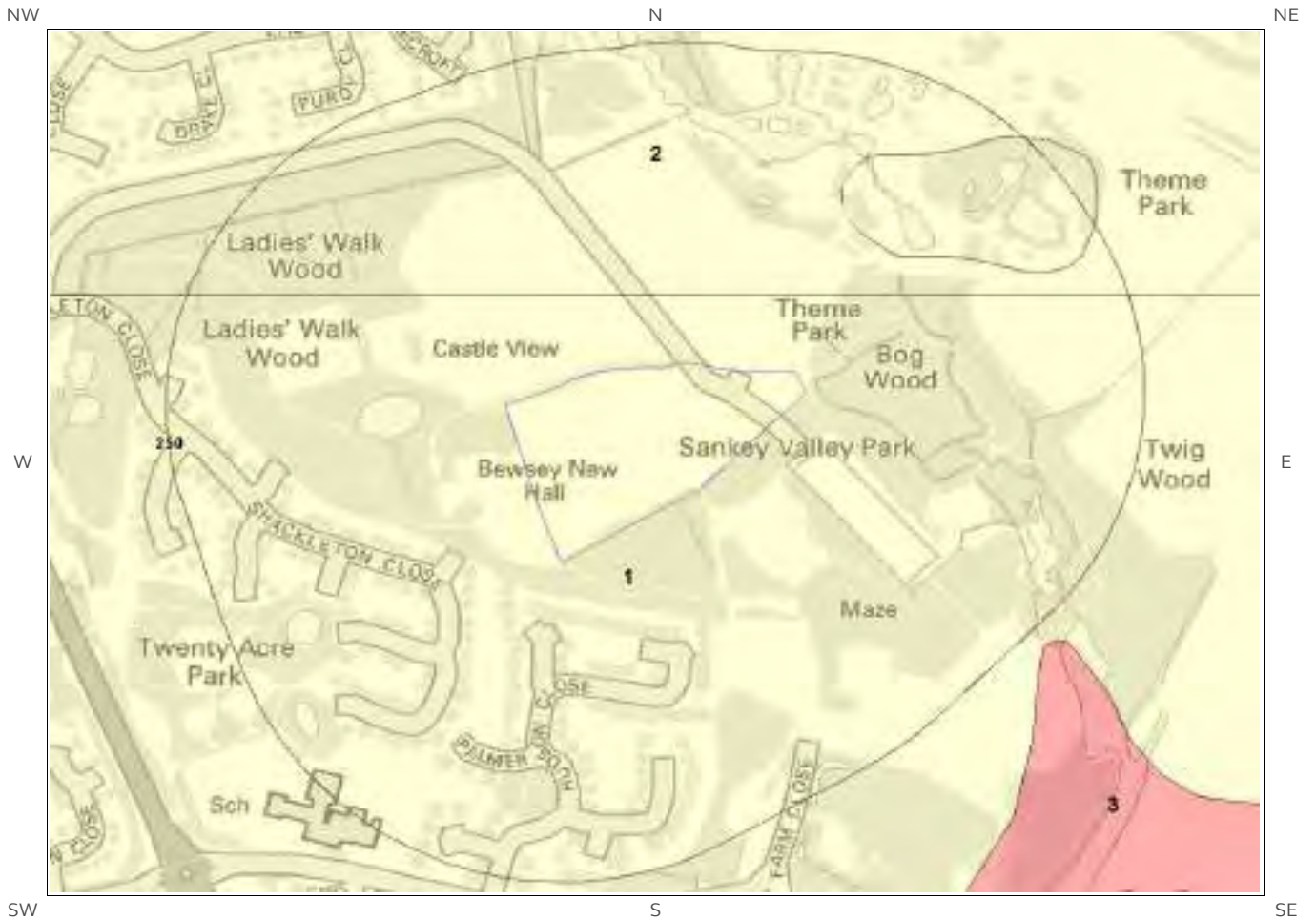


Ground Dissolution Soluble Rocks Legend

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# 4.4 Compressible Deposits Map



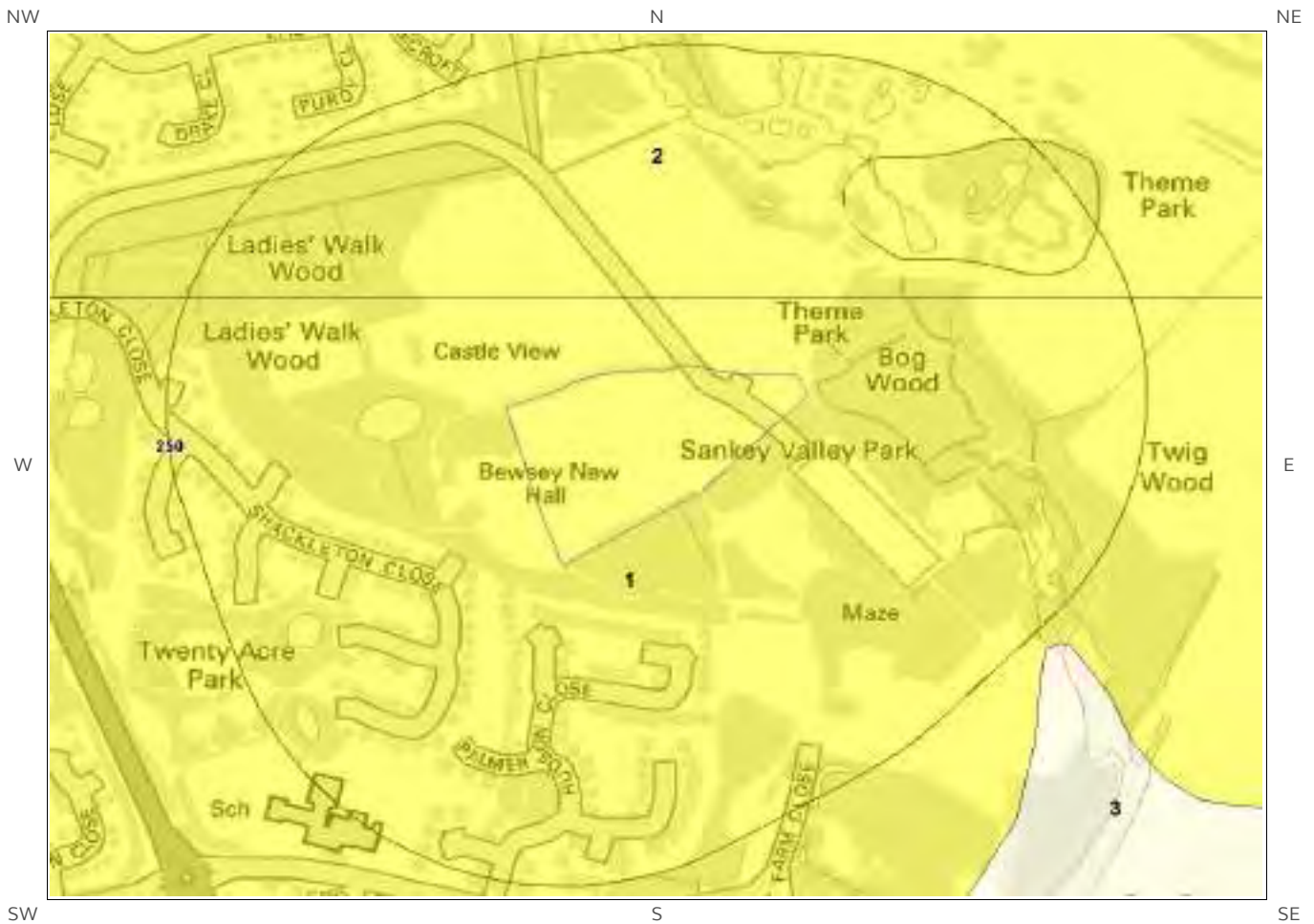
Compressible Deposits Legend

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# 4.5 Collapsible Deposits Map

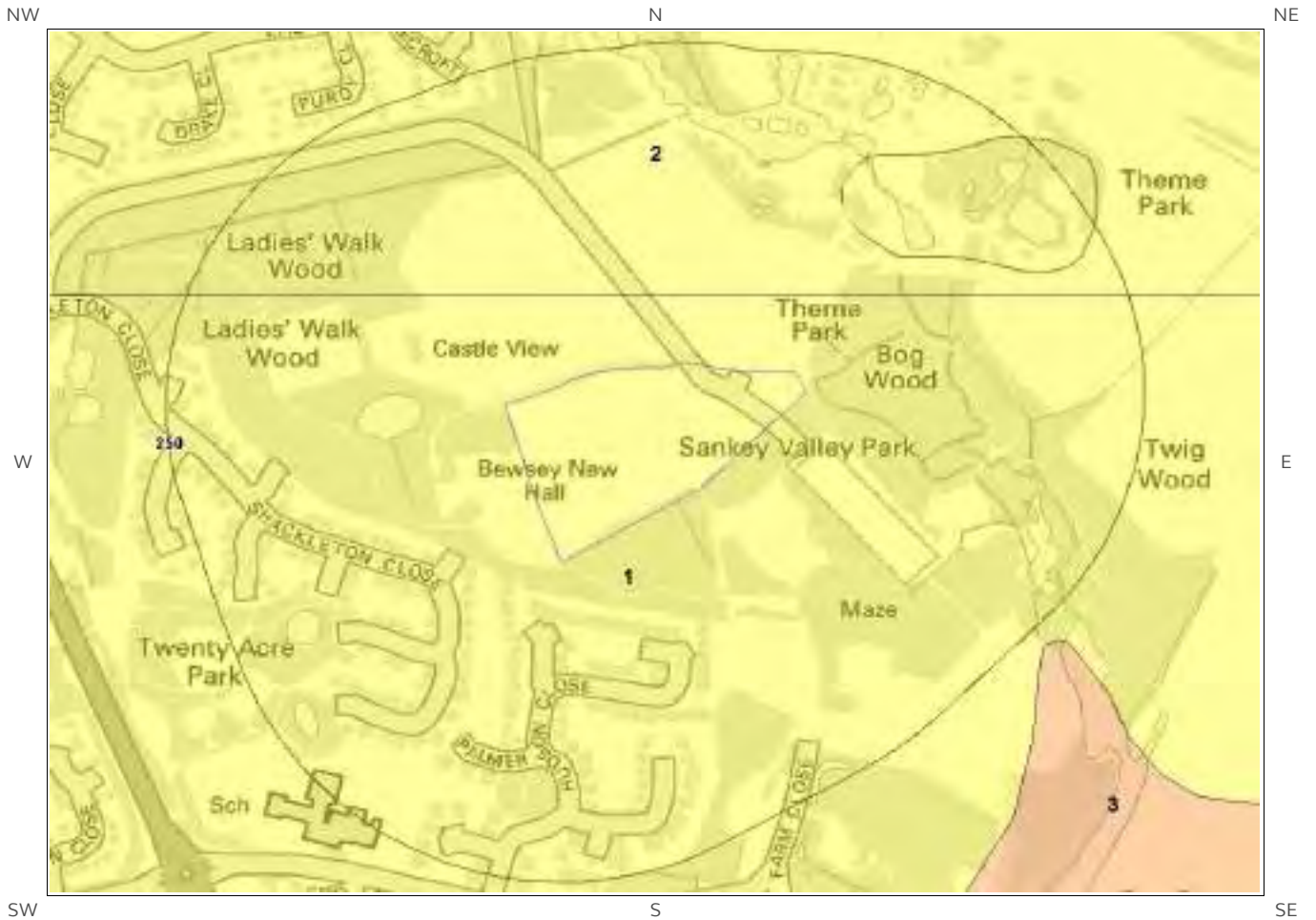


Collapsible Deposits Legend

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# 4.6 Running Sand Map



Running Sand Legend

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## 4 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site\*\* boundary? **Very Low**

### 4.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
2	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

### 4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

### 4.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

\* This includes an automatically generated 50m buffer zone around the site

---

## 4.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible ground identified. No special actions required to avoid problems due to compressible ground. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible ground.

---

## 4.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

---

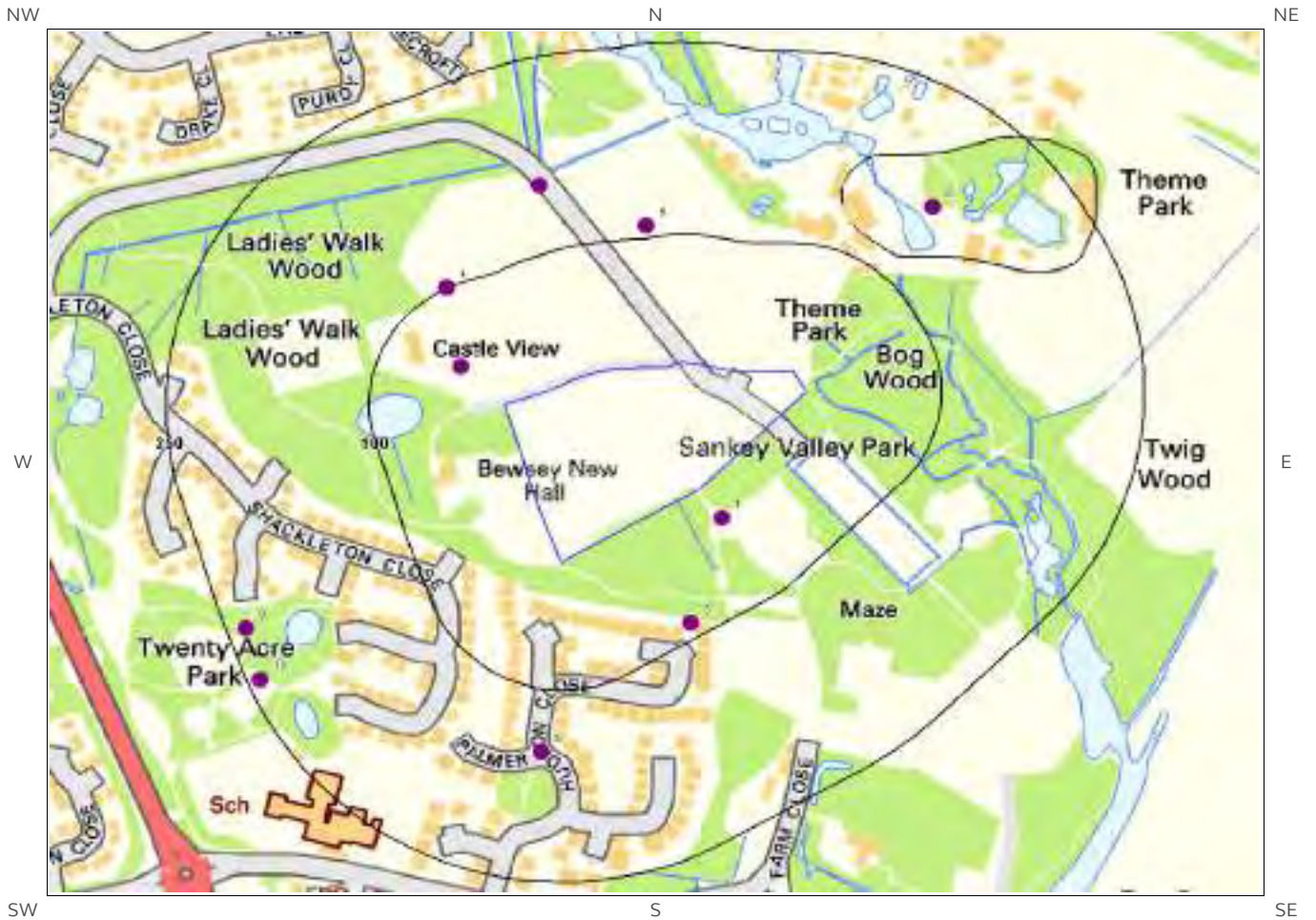
## 4.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

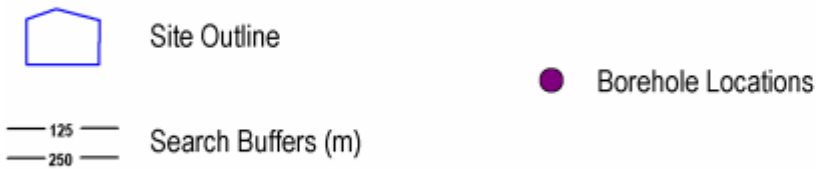
---

# 5 Borehole Records Map



Borehole Records Legend

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## 5 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: 10

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	28.0	SE	358962 389826	SJ58NE633	-1.0	SANKEY VALLEY 2310
2	43.0	NW	358769 389944	SJ58NE216	-1.0	OLD HALL HOUSING TP 2424
3	88.0	SE	358939 389744	SJ58NE220	-1.0	OLD HALL HOUSING 2428
4	101.0	NW	358758 390006	SJ59SE573	-1.0	SANKEY VALLEY 2309
5	109.0	N	358906 390054	SJ59SE574	-1.0	SANKEY VALLEY 2311
6	150.0	S	358828 389643	SJ58NE222	-1.0	OLD HALL HOUSING TP 2430
7	152.0	N	358827 390086	SJ59SE230	-1.0	OLD HALL HOUSING 2421
8	164.0	NE	359118 390069	SJ59SE581	-1.0	SANKEY VALLEY 2318
9	236.0	W	358610 389740	SJ58NE446	-1.0	OLD HALL AREA DRAINAGE 3756
10	241.0	SW	358620 389700	SJ58NE445	-1.0	OLD HALL AREA DRAINAGE 3755

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

# 6 Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

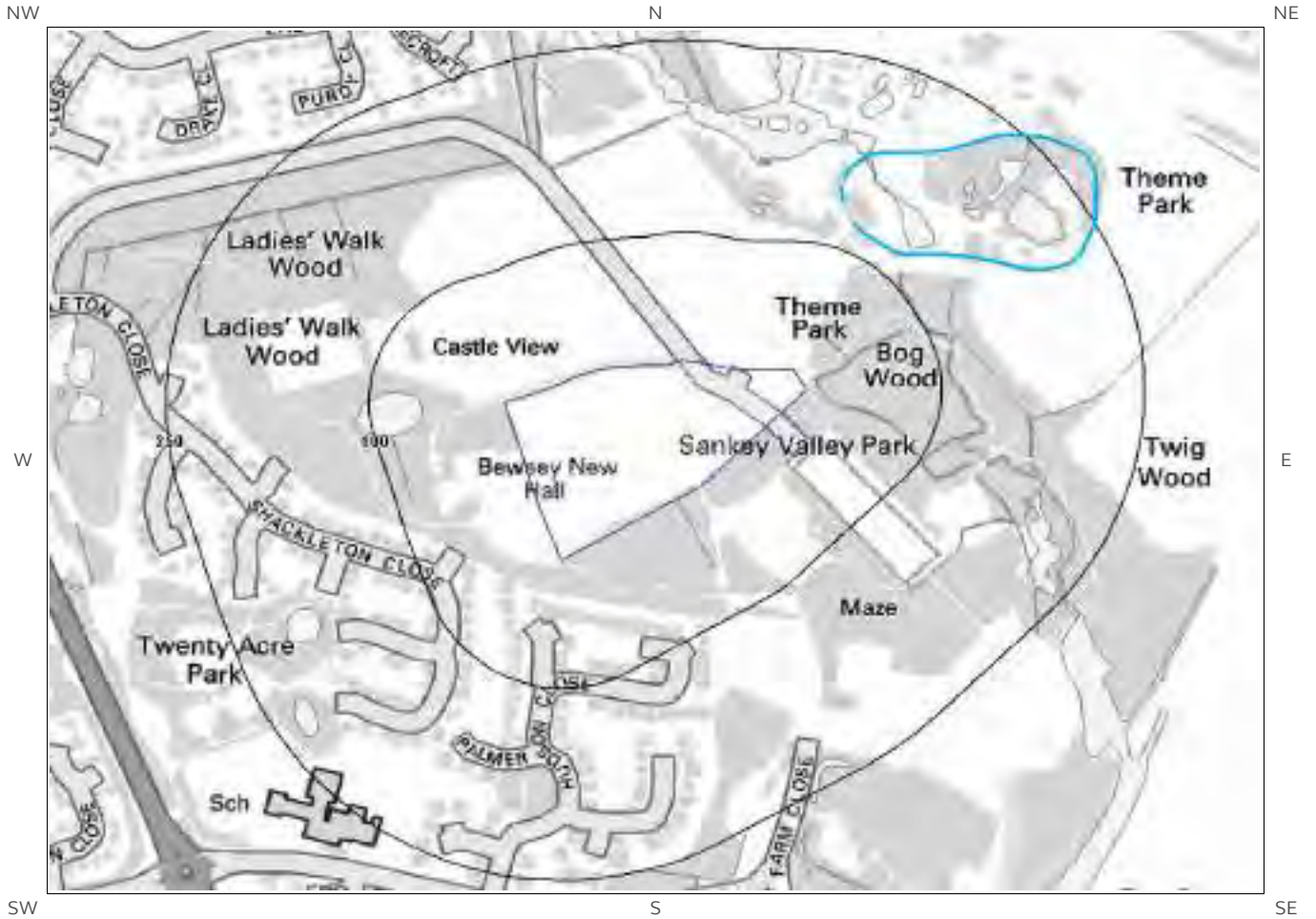
6

For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
52.0	N	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
59.0	N	RuralSoil	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
78.0	NW	RuralSoil	<15 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<100 mg/kg

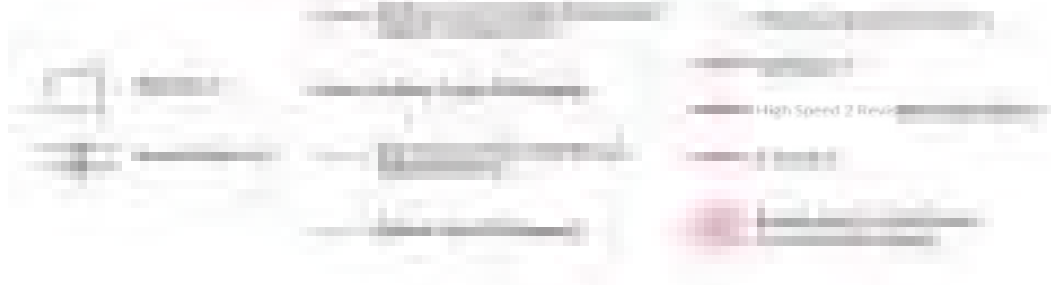
\*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

# 7 Railways and Tunnels Map



Railways and Tunnels Legend

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# 7 Railways and Tunnels

## 7.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

*Any records that have been identified are represented on the Railways and Tunnels Map.*

---

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

*Any records that have been identified are represented on the Railways and Tunnels Map.*

---

## 7.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? No

Have any historical railway or tunnel features been identified within 250m of the study site boundary? No

Database searched and no data found.

*Any records that have been identified are represented on the Railways and Tunnels Map.*

---

### 7.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

- Have any historical railway lines been identified within the study site boundary? No
- Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Note: multiple sections of the same track may be listed in the detail above

*Any records that have been identified are represented on the Railways and Tunnels Map.*

---

### 7.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

- Have any active railway lines been identified within the study site boundary? No
- Have any active railway lines been identified within 250m of the study site boundary? Yes

Distance (m)	Direction	Name	Type
117	NE	Not given	Multi Track
136	N	Not given	Multi Track

Note: multiple sections of the same track may be listed in the detail above

*Any records that have been identified are represented on the Railways and Tunnels Map.*

---

### 7.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

- Is the study site within 5km of the route of the High Speed 2 rail project? No
- Is the study site within 5km of the proposed alternative route of the High Speed 2 rail project? No
- Is the study site within 500m of the route of the Crossrail 1 rail project? No

*Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a Groundsure HS2 and Crossrail 1 Report.*

---

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

# Contact Details

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BGS Geological Hazards Reports and general geological enquiries

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---

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<https://www.groundsure.com/terms-and-conditions-sept-2016/>



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Bristol, BS1 6UY

Groundsure Reference: EMS-384186\_514242

Your Reference: EMS\_384186\_514242

Report Date 22 Sep 2016

Report Delivery Method: Email - pdf

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Yours faithfully,

emapsite customer services team

Enc.  
Groundsure Enviroinsight



# Groundsure Enviro Insight

Address: Warrington,  
Date: 22 Sep 2016  
Reference: EMS-384186\_514242  
Client: Clarkebond UK Limited



Aerial Photograph Capture date: 24-Jun-2009  
Grid Reference: 358900,389886  
Site Size: 1.98ha

Report Reference: EMS-384186\_514242  
Client Reference: EMS\_384186\_514242

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# Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

<b>Section 1: Historical Industrial Sites</b>	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	0	0	0	16
1.2 Additional Information – Historical Tank Database	0	0	2	0
1.3 Additional Information – Historical Energy Features Database	0	0	5	11
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	0	0	0
1.6 Potentially Infilled Land	0	0	29	87
<b>Section 2: Environmental Permits, Incidents and Registers</b>	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	0	3
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	0	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
<b>3.1 Landfill Sites</b>						
3.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency Historic Landfill Sites	0	0	0	1	0	1
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	1
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	1	6
<b>3.2 Landfill and Other Waste Sites Findings</b>						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency Licensed Waste Sites	0	0	0	0	0	15

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	0	7	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m					
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	4
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	4
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2
6.6 Source Protection Zones (within 500m of the study site)	1	0	1	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	1	2	2	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500

## Section 6: Hydrogeology and Hydrology

0-500m

6.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	Yes
6.10 Detailed River Network entries within 500m of the site	0	0	31	38	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	Yes	Yes	Not searched	Not searched	Not searched

## Section 7: Flooding

7.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	Yes
7.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site	Yes
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Limited potential
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low

## Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	1	0	0	0	0
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0



Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	1	0	1	0	2	2
8.14 Records of Green Belt land	0	0	0	0	0	1

## Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Very Low
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Very Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

## Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	Yes
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	No
10.3 Are there any brine affected areas within 75m of the study site?	No

# Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

## 1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

## 2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

## 3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

## 4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

## 5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

## 6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

## 7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

## 8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

## 9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

## 10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

## 11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

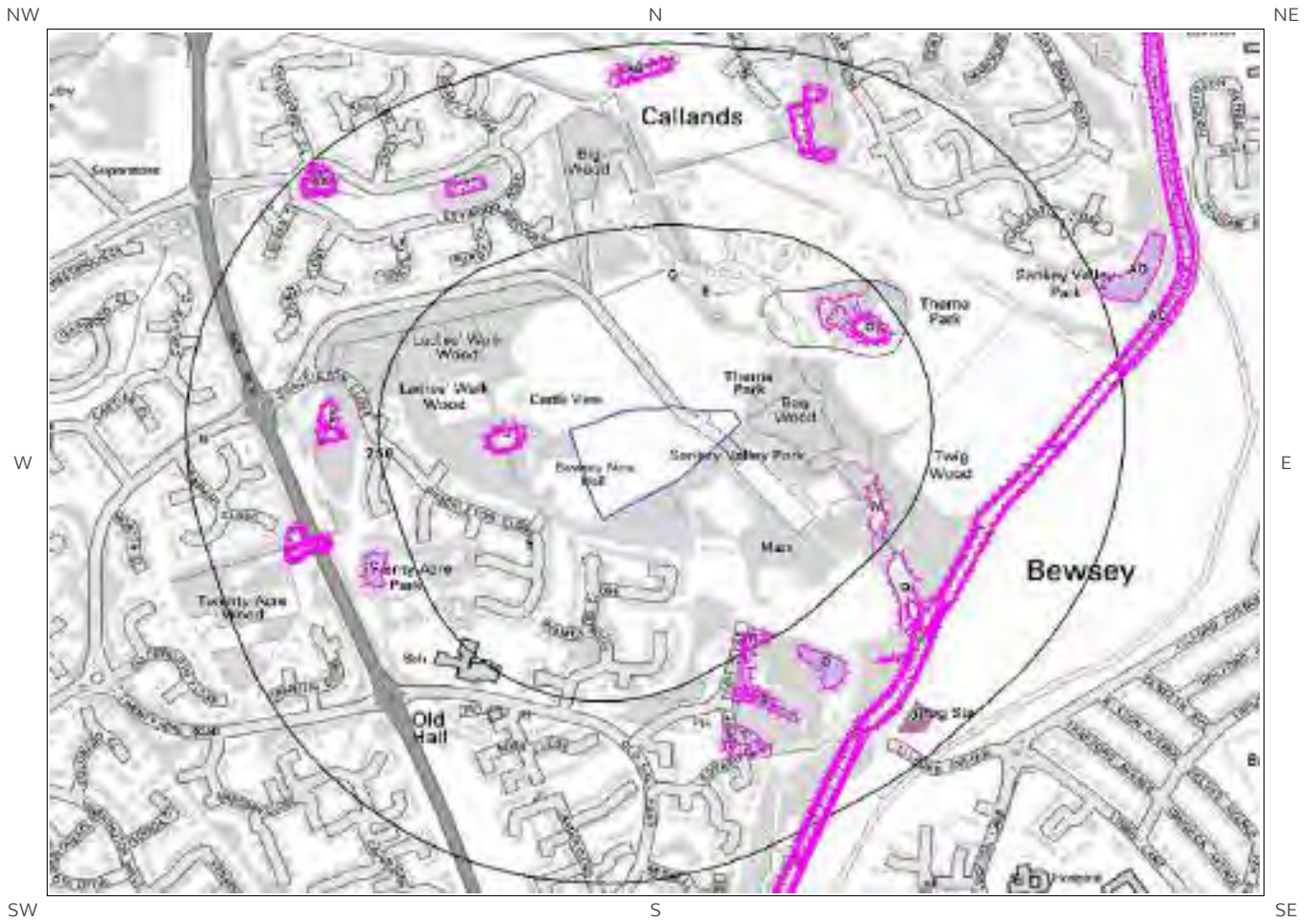
### Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

# 1. Historical Land Use



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# 1. Historical Industrial Sites

## 1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 16

ID	Distance [m]	Direction	Use	Date
1A	267	SE	Unspecified Ground Workings	1993
2A	267	SE	Unspecified Ground Workings	1987
3B	278	SE	Unspecified Pit	1953
4B	278	SE	Unspecified Pit	1993
5B	278	SE	Unspecified Pit	1973
6B	278	SE	Unspecified Pit	1987
7B	278	SE	Unspecified Pit	1970
8C	280	W	Unspecified Ground Workings	1993
9C	280	W	Unspecified Ground Workings	1987
10A	286	SE	Pump	1849
11A	288	SE	Unspecified Ground Workings	1973
12R	291	SE	Unspecified Ground Workings	1953
13AC	491	E	Unspecified Pit	1989
14D	491	E	Disused Canal	1976
15D	491	E	Disused Canal	1965
16AD	500	E	Unspecified Heap	1989

## 1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 2

ID	Distance (m)	Direction	Use	Date
17E	156	N	Unspecified Tank	1996
18E	168	N	Unspecified Tank	1996

### 1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 16

ID	Distance (m)	Direction	Use	Date
19F	99	SW	Electricity Substation	1995
20F	99	SW	Electricity Substation	1988
21G	173	N	Electricity Substation	1996
22G	173	N	Electricity Substation	1994
23G	173	N	Electricity Substation	1994
24H	290	S	Gas Governor	1988
25H	290	S	Gas Governor	1995
26I	302	NW	Electricity Substation	1994
27I	302	NW	Electricity Substation	1996
28I	302	NW	Electricity Substation	1994
29J	394	S	Electricity Substation	1988
30J	395	S	Electricity Substation	1988
31	434	SE	Electricity Substation	1985
32K	475	W	Electricity Substation	1988
33K	476	W	Electricity Substation	1999
34K	477	W	Electricity Substation	1988

### 1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

### 1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 0

Database searched and no data found.

## 1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 116

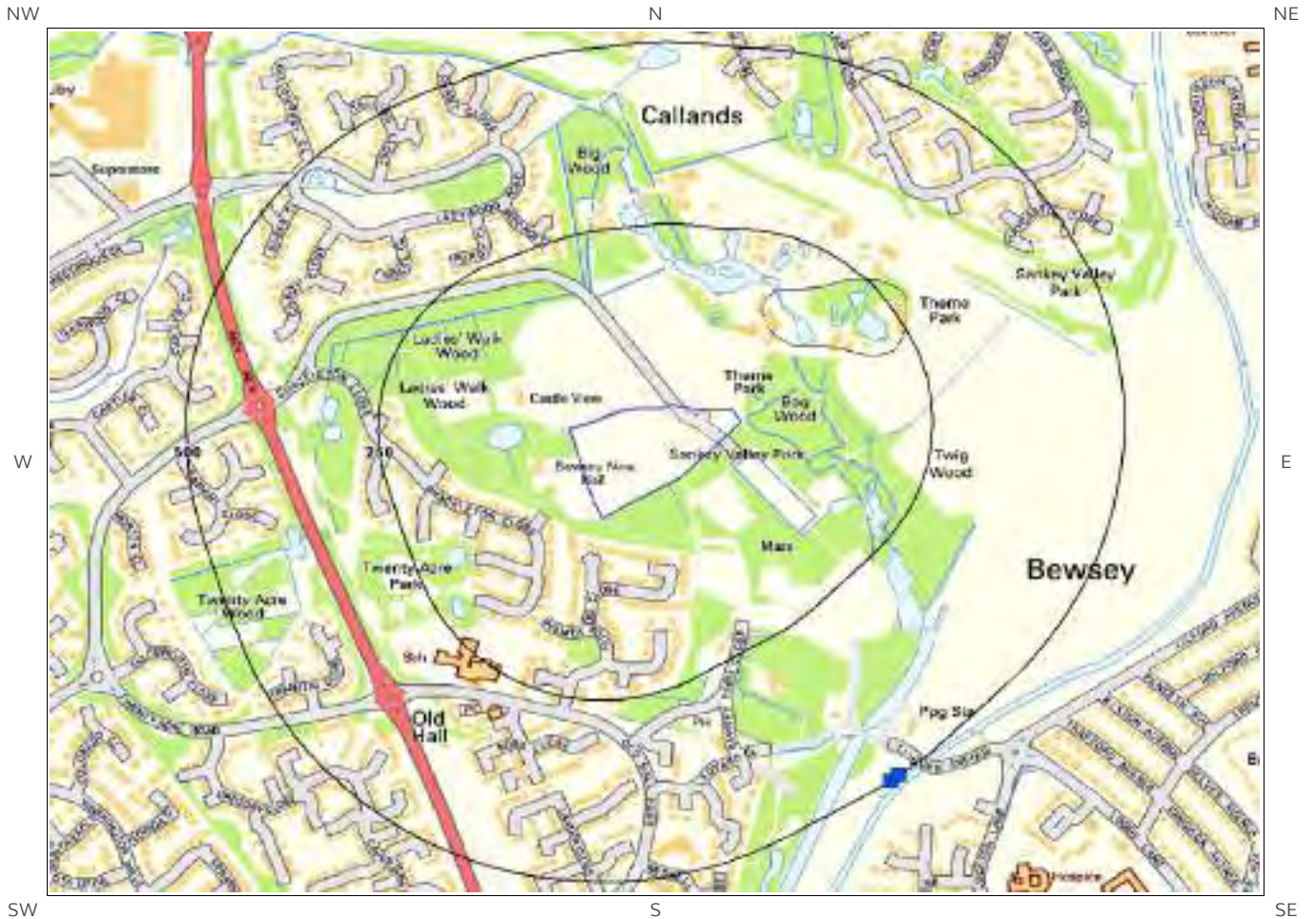
The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
35L	59	W	Pond	1970
36L	59	W	Pond	1973
37L	59	W	Pond	1993
38L	59	W	Pond	1987
39L	64	W	Pond	1926
40L	64	W	Pond	1949
41L	64	W	Pond	1905
42L	64	W	Pond	1891
43L	65	W	Pond	1953
44L	68	W	Pond	1938
45L	68	W	Pond	1926
46N	166	NE	Ponds	1849
47M	188	SE	Pond	1993
48M	188	SE	Pond	1987
49N	189	NE	Pond	1926
50O	190	NE	Pond	1905
51O	190	NE	Pond	1926
52O	190	NE	Pond	1949
53O	190	NE	Pond	1891
54O	190	NE	Pond	1938
55O	194	NE	Pond	1976
56O	194	NE	Pond	1955
57O	194	NE	Pond	1965
58O	194	NE	Pond	1989
59P	228	SE	Pond	1987
60P	228	SE	Pond	1993
61P	228	SE	Pond	1973
62P	228	SE	Pond	1970
63P	232	SE	Pond	1953
64A	267	SE	Unspecified Ground Workings	1993
65A	267	SE	Unspecified Ground Workings	1987
66Q	271	SE	Pond	1987
67Q	271	SE	Pond	1993
68B	278	SE	Unspecified Pit	1987
69B	278	SE	Unspecified Pit	1993
70B	278	SE	Unspecified Pit	1973

71B	278	SE	Unspecified Pit	1970
72B	278	SE	Unspecified Pit	1953
73C	280	W	Unspecified Ground Workings	1993
74C	280	W	Unspecified Ground Workings	1987
75A	288	SE	Unspecified Ground Workings	1973
76R	291	SE	Unspecified Ground Workings	1953
77S	294	W	Ponds	1970
78S	294	W	Ponds	1973
79S	294	W	Ponds	1987
80S	294	W	Ponds	1993
81S	294	W	Ponds	1953
82S	297	W	Ponds	1938
83S	299	W	Pond	1905
84S	299	W	Pond	1926
85S	299	W	Pond	1949
86T	325	SE	Pond	1926
87T	325	SE	Pond	1891
88T	325	SE	Pond	1905
89U	326	SE	Canal	1905
90U	326	SE	Canal	1905
91V	328	SE	Canal	1926
92V	331	SE	Canal	1905
93V	331	SE	Canal	1949
94V	331	SE	Canal	1891
95V	331	SE	Canal	1926
96V	331	SE	Canal	1938
97U	332	SE	Canal	1905
98U	332	SE	Canal	1949
99W	333	SE	Canal	1970
100W	333	SE	Canal	1953
101W	333	SE	Canal	1987
102W	333	SE	Canal	1973
103W	333	SE	Canal	1993
104X	341	W	Ponds	1910
105X	342	W	Pond	1970
106X	342	W	Pond	1973
107T	345	SE	Pond	1849
108X	346	W	Ponds	1905
109X	346	W	Ponds	1891
110X	346	W	Ponds	1953
111X	348	W	Ponds	1926
112X	348	W	Ponds	1949
113X	349	W	Ponds	1938

114Y	350	N	Ponds	1905
115Y	350	N	Ponds	1891
116Y	350	N	Ponds	1926
117Y	350	N	Ponds	1949
118Y	352	N	Ponds	1938
119Z	361	N	Ponds	1938
120Z	362	N	Ponds	1926
121Z	362	N	Ponds	1949
122Z	362	N	Ponds	1891
123Z	362	N	Ponds	1905
124Z	363	N	Ponds	1955
125Z	363	N	Ponds	1976
126Z	363	N	Ponds	1965
127X	375	W	Pond	1987
128X	375	W	Pond	1993
129AA	446	NW	Ponds	1926
130AA	446	NW	Ponds	1949
131AA	446	NW	Ponds	1905
132AA	446	NW	Ponds	1891
133AB	447	N	Pond	1849
134AB	448	N	Pond	1938
135AA	449	NW	Ponds	1938
136AB	450	N	Pond	1926
137AB	450	N	Pond	1949
138AB	450	N	Pond	1926
139AB	451	N	Pond	1976
140AB	451	N	Pond	1955
141AB	451	N	Pond	1965
142AA	451	NW	Ponds	1955
143AA	453	NW	Pond	1976
144AA	453	NW	Pond	1965
145AA	453	NW	Pond	1926
146AC	491	E	Unspecified Pit	1989
147D	491	E	Disused Canal	1965
148D	491	E	Disused Canal	1976
149D	491	E	Canal	1955
150AD	500	E	Unspecified Heap	1989

# 2. Environmental Permits, Incidents and Registers Map



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# 2. Environmental Permits, Incidents and Registers

## 2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

### 2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

---

### 2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

---

### 2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

### 2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

---

### 2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

---

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

3

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
1A	498	SE	359230 389440	<p>Address: BEWSEY BRIDGE PUMPING STN, LODGE LANE, BEWSEY, WARRINGTON, CHESHIRE</p> <p>Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY</p> <p>Permit Number: 01WAR0034</p> <p>Permit Version: 1</p> <p>Receiving Water: Status: POST NRA LEGISLATION WHERE ISSUE DATE &gt; 31-AUG-89 (HISTORIC ONLY)</p> <p>Issue date: -</p> <p>Effective Date: 01-Jan-1995</p> <p>Revocation Date: 13/04/2009</p>
2A	498	SE	359230 389440	<p>Address: BEWSEY BRIDGE PUMPING STN, LODGE LANE, BEWSEY, WARRINGTON, CHESHIRE</p> <p>Effluent Type: SEWAGE DISCHARGES - PUMPING STATION - WATER COMPANY</p> <p>Permit Number: 01WAR0034</p> <p>Permit Version: 2</p> <p>Receiving Water: Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995)</p> <p>Issue date: 14/04/2009</p> <p>Effective Date: 14-Apr-2009</p> <p>Revocation Date: 20/07/2009</p>
3A	500	SE	359220 389431	<p>Address: BEWSEY BRIDGE PUMPING STN, LODGE LANE, BEWSEY, WARRINGTON, CHESHIRE</p> <p>Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY</p> <p>Permit Number: NPSWQD006951</p> <p>Permit Version: 1</p> <p>Receiving Water: Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995)</p> <p>Issue date: 08/07/2009</p> <p>Effective Date: 08-Jul-2009</p> <p>Revocation Date: -</p>

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.



2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

---

## 2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

0

Database searched and no data found.

---

## 2.3 Environment Agency Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

0

Database searched and no data found.

---

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

---

## 2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

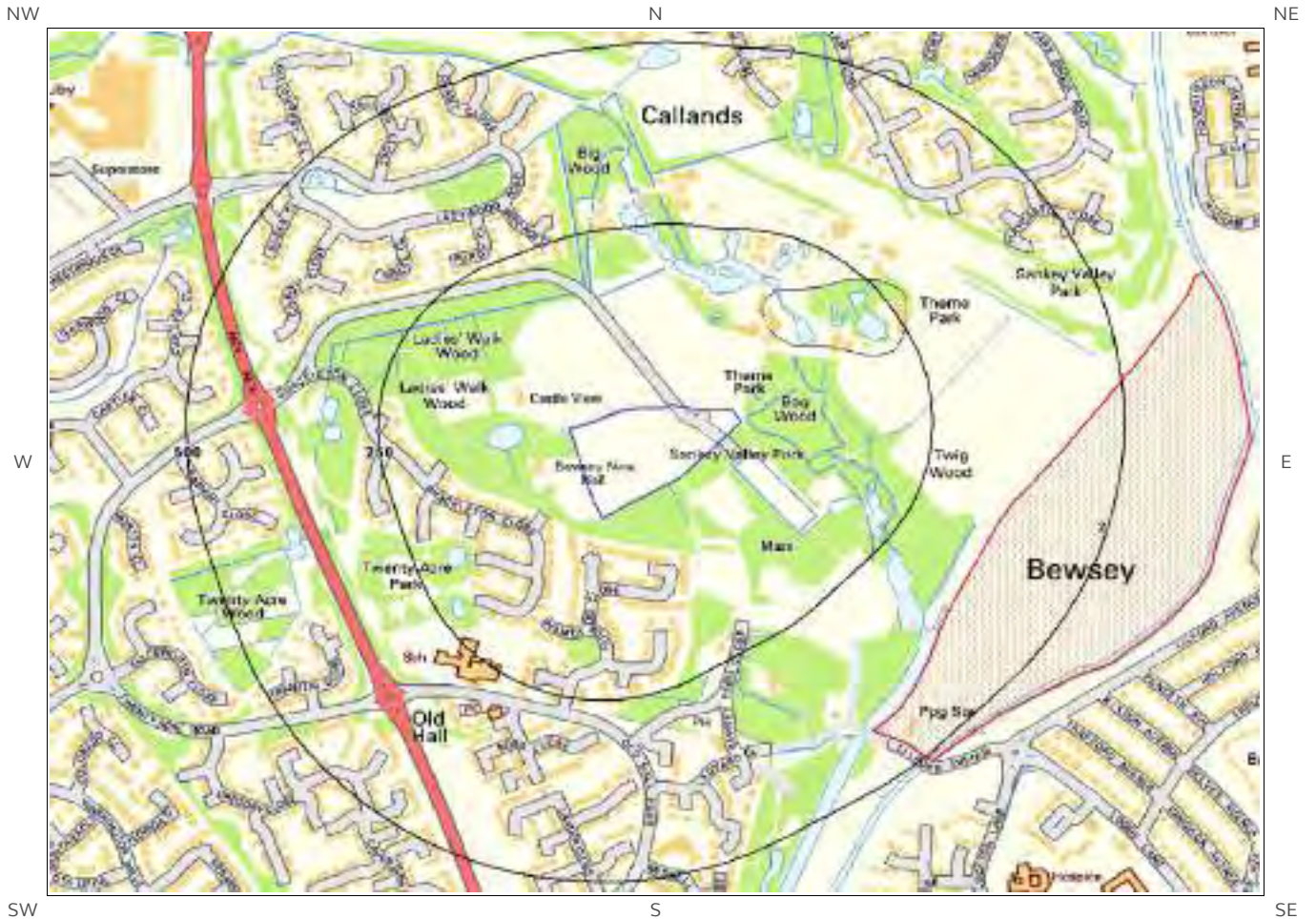
How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0

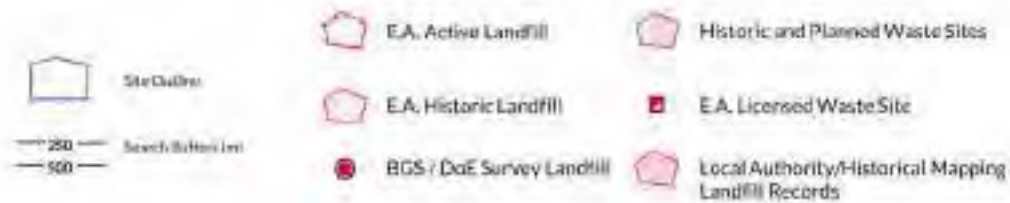
Database searched and no data found.

---

# 3. Landfill and Other Waste Sites Map



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# 3. Landfill and Other Waste Sites

## 3.1 Landfill Sites

### 3.1.1 Records from Environment Agency landfill data within 1000m of the study site:

0

Database searched and no data found.

### 3.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

2

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
2	361	SE	359400 389700	Site Address: Land Off Lodge Lane, Bewsey, Warrington Waste Licence: Yes Site Reference: 60460A Waste Type: Inert, Industrial, Special Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 19-Mar-1980 Licence Surrendered: 31-Dec-1990 Licence Holder Address: Wilson Patten Street, Warrington, Cheshire Operator: Walker J Wallington Limited Licence Holder: Walker J Wallington Limited First Recorded: 30-Apr-1983 Last Recorded: 31-Dec-1989
Not shown	1393	NE	360000 391100	Site Address: Warrington Rural District Council, Mill Lane, Winwick, Warrington, Cheshire Waste Licence: - Site Reference: - Waste Type: Commercial Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: Warrington Rural District Council Licence Holder: - First Recorded: 06-Apr-1956 Last Recorded: -

### 3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

1

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1446	NE	360000.0 391000.0	Address: Warrington RDC, Mill Lane Tip, Winwick, Warrington BGS Number: 1841.0	Risk: No risk to aquifer Waste Type: N/A

### 3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

7

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	924	S	359135 388900	Refuse Tip	1961 mapping	Polygon
Not shown	1074	E	360106 389760	Refuse Tip	1962 mapping	Polygon
Not shown	1075	E	360106 389760	Refuse Tip	1962 mapping	Polygon
Not shown	1287	E	360320 390004	Refuse Tip	1969 mapping	Polygon
Not shown	1288	E	360321 390004	Refuse Tip	1969 mapping	Polygon
Not shown	1446	NE	360094 390930	Refuse Tip	1971 mapping	Polygon
Not shown	1469	NE	360061 391069	Refuse Tip	1966 mapping	Polygon

## 3.2 Other Waste Sites

### 3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

Database searched and no data found.

3.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

15

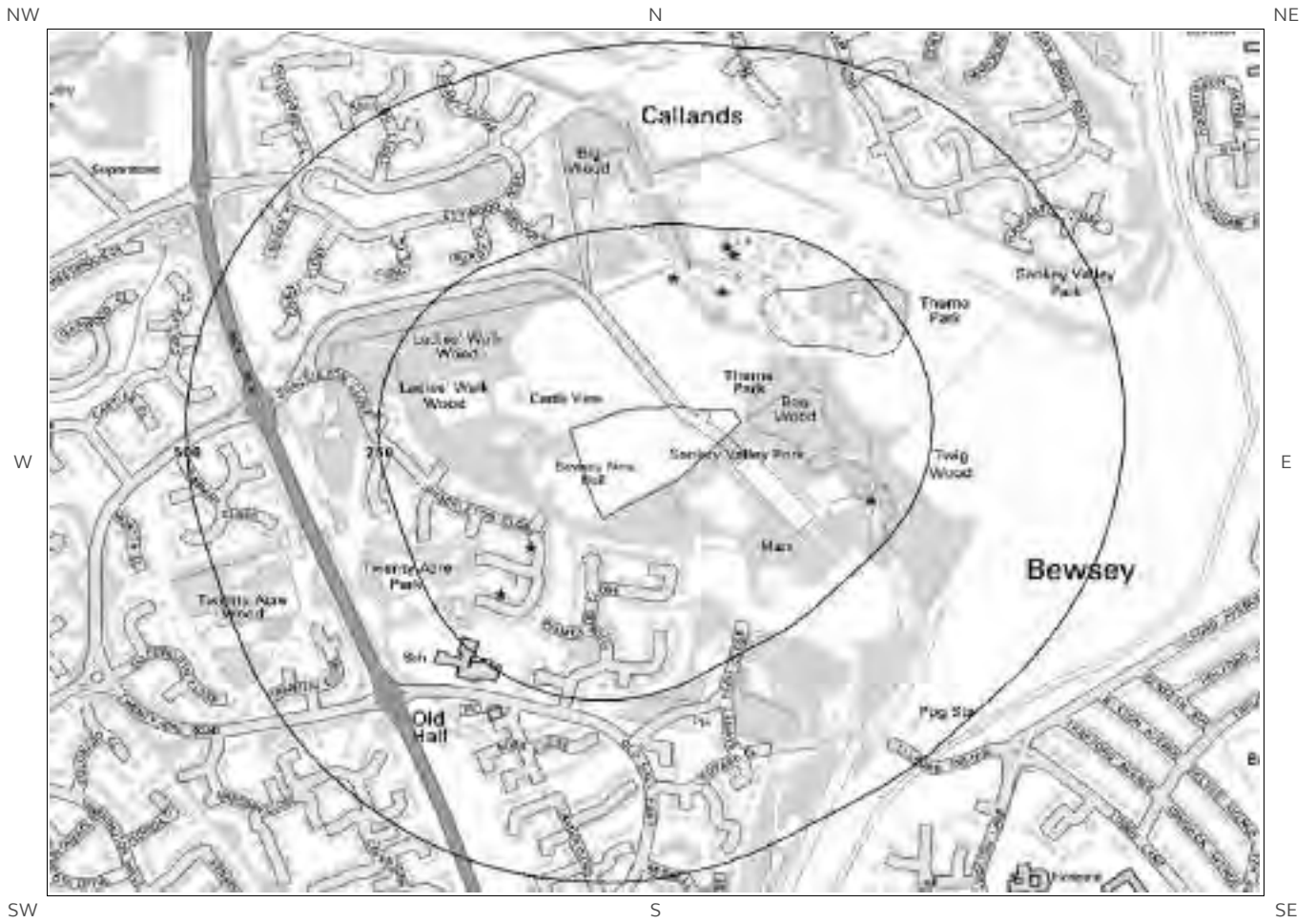
The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
Not shown	1149	SE	360081 389472	<p>Site Address: 94, Folly Lane, Warrington, Cheshire, WA5 0NG            Type: 75kte HCI Waste TS + treatment            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: HOW050            EPR reference: EA/EPR/GP3490LE/S002            Operator: Howards Environmental Services Ltd            Waste Management licence No: 100896            Annual Tonnage: 0.0</p> <p>Issue Date: 29/04/2009            Effective Date: 30/04/2010            Modified: -            Surrendered Date: 16/04/2013            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: Howards Environmental Services            Correspondence Address: -</p>
Not shown	1156	E	360100 389500	<p>Site Address: 94, Folly Lane, Warrington, Cheshire, WA5 5NG            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: GHL001            EPR reference: EA/EPR/LP3391CF/S002            Operator: George Howard Ltd            Waste Management licence No: 53942            Annual Tonnage: 0.0</p> <p>Issue Date: 07/12/1989            Effective Date: -            Modified: -            Surrendered Date: 15/03/2008            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: George Howard Ltd            Correspondence Address: -</p>
Not shown	1275	E	360300 389900	<p>Site Address: 282, Winwick Road, Warrington, Cheshire, WA2 8JB            Type: Metal Recycling Site (mixed MRS's)            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: WML001            EPR reference: EA/EPR/FP3596CR/A001            Operator: Warrington Metals Ltd            Waste Management licence No: 53766            Annual Tonnage: 30000.0</p> <p>Issue Date: 21/10/1993            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: 21/10/1998            Cancelled Date: -            Status: Revoked            Site Name: Warrington Metals Ltd.            Correspondence Address: -</p>
Not shown	1275	E	360300 389900	<p>Site Address: 282, Winwick Road, Warrington, Cheshire, WA2 8JB            Type: Metal Recycling Site (mixed MRS's)            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: WML001            EPR reference: -            Operator: Warrington Metals Ltd.            Waste Management licence No: 53766            Annual Tonnage: 0.0</p> <p>Issue Date: 21/10/1993            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: 21/10/1998            Cancelled Date: -            Status: Revoked            Site Name: Warrington Metals Ltd.            Correspondence Address: 282, Winwick Road, Warrington, Cheshire, WA2 8JB</p>
Not shown	1275	E	360300 389900	<p>Site Address: 282, Winwick Road, Warrington, Cheshire, WA2 8JB            Type: Metal Recycling Site (mixed MRS's)            Size: Unknown            Environmental Permitting Regulations (Waste) Licence Number: WML001            EPR reference: -            Operator: Warrington Metals Ltd.            Waste Management licence No: 53766            Annual Tonnage: 0.0</p> <p>Issue Date: 21/10/1993            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: 21/10/1998            Cancelled Date: -            Status: Revoked            Site Name: Warrington Metals Ltd.            Correspondence Address: 282, Winwick Road, Warrington, Cheshire, WA2 8JB</p>

ID	Distance (m)	Direction	NGR	Details	
Not shown	1276	E	360301 389930	<p>Site Address: 282, Winwick Road, Warrington, Cheshire, WA2 8HJ  Type: 75kte HCI Waste Transfer Station  Size: &lt; 25000 tonnes  Environmental Permitting Regulations (Waste) Licence Number: DML001  EPR reference: EA/EPR/DP3093LH/V002  Operator: D M L Recycling Ltd  Waste Management licence No: 100709  Annual Tonnage: 24999.0</p>	<p>Issue Date: 27/04/2009  Effective Date: -  Modified: 24/05/2012  Surrendered Date: -  Expiry Date: -  Cancelled Date: -  Status: Modified  Site Name: D M L Recycling Ltd  Correspondence Address: -</p>
Not shown	1276	E	360301 389930	<p>Site Address: 282, Winwick Road, Warrington, Cheshire, WA2 8HJ  Type: 75kte HCI Waste TS + treatment  Size: &lt; 25000 tonnes  Environmental Permitting Regulations (Waste) Licence Number: DML001  EPR reference: EA/EPR/DP3093LH/V003  Operator: D M L Recycling Ltd  Waste Management licence No: 100709  Annual Tonnage: 75000.0</p>	<p>Issue Date: 27/04/2009  Effective Date: -  Modified: 17/09/2014  Surrendered Date: -  Expiry Date: -  Cancelled Date: -  Status: Modified  Site Name: D M L Recycling Ltd  Correspondence Address: -</p>
Not shown	1324	NE	360100 390700	<p>Site Address: Land/premises At, Antrim Road, Warrington, Cheshire, WA2 8JT  Type: Household, Commercial &amp; Industrial Waste T Stn  Size: &lt; 25000 tonnes  Environmental Permitting Regulations (Waste) Licence Number: BOH001  EPR reference: EA/EPR/XP3896CR/A001  Operator: O' Halloran B  Waste Management licence No: 53715  Annual Tonnage: 2083.33</p>	<p>Issue Date: 08/09/1994  Effective Date: -  Modified: -  Surrendered Date: -  Expiry Date: -  Cancelled Date: -  Status: Issued  Site Name: B &amp; T Skip Hire  Correspondence Address: -</p>
Not shown	1344	SE	360000 389000	<p>Site Address: 94, Folly Lane, Warrington, Cheshire, WA5 0NG  Type: 75kte HCI Waste TS + treatment  Size: &lt; 25000 tonnes  Environmental Permitting Regulations (Waste) Licence Number: HOW041  EPR reference: BP3697EY/A001  Operator: George Howard Ltd  Waste Management licence No: 100896  Annual Tonnage: 0.0</p>	<p>Issue Date: 29/04/2009  Effective Date: -  Modified: -  Surrendered Date: -  Expiry Date: -  Cancelled Date: -  Status: Issued  Site Name: George Howard Ltd  Correspondence Address: -</p>
Not shown	1402	E	360400 390200	<p>Site Address: Athlone Road, Longford, Warrington, WA2 8JJ  Type: Metal Recycling Site (Vehicle Dismantler)  Size: &lt; 25000 tonnes  Environmental Permitting Regulations (Waste) Licence Number: JHI001  EPR reference: -  Operator: Hickman J  Waste Management licence No: 53756  Annual Tonnage: 0.0</p>	<p>Issue Date: 03/02/1994  Effective Date: -  Modified: -  Surrendered Date: -  Expiry Date: 03/02/1999  Cancelled Date: -  Status: Issued  Site Name: J Hickman &amp; Son  Correspondence Address: J Hickman &amp; Son, Athlone Road, Longford, Warrington, WA2 8JJ</p>
Not shown	1402	E	360400 390200	<p>Site Address: J Hickman &amp; Son, Athlone Road, Longford, Warrington, Cheshire, WA2 8JJ  Type: Metal Recycling Site (Vehicle Dismantler)  Size: &lt; 25000 tonnes  Environmental Permitting Regulations (Waste) Licence Number: JHI001  EPR reference: EA/EPR/HP3896CL/V002  Operator: Hickman J  Waste Management licence No: 53756  Annual Tonnage: 2500.0</p>	<p>Issue Date: 03/02/1994  Effective Date: -  Modified: 21/06/2007  Surrendered Date: -  Expiry Date: 03/02/1999  Cancelled Date: -  Status: Modified  Site Name: Warrington Vehicle Dismantlers Ltd  Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details	
Not shown	1443	NE	360300 390600	Site Address: Land/premises At, Antrim Road, Warrington, Cheshire, WA2 8JT Type: Metal Recycling Site (Vehicle Dismantler) Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: KFO001 EPR reference: EA/EPR/RP3696CT/A001 Operator: Foy K Waste Management licence No: 53860 Annual Tonnage: 5000.0	Issue Date: 07/05/1992 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Dallam Car Spares Correspondence Address: -
Not shown	1481	NE	359908 391122	Site Address: West Quay Road, Winwick, Warrington, Cheshire, WA2 8TL Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: OHA001 EPR reference: - Operator: O' Halloran Brendan Waste Management licence No: 53796 Annual Tonnage: 25000.0	Issue Date: 25/03/1993 Effective Date: 19/03/2004 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: B & T Recovery And Skip Hire Correspondence Address: Spawell House, Delph Lane, Winwick, Warrington, Cheshire, WA2 ORG
Not shown	1481	NE	359908 391122	Site Address: West Quay Road, Winwick, Warrington, Cheshire, WA2 8TL Type: 75kte HCI Waste TS + treatment + asbestos Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: OHA001 EPR reference: EA/EPR/NP3396CQ/V004 Operator: Brendan O' Halloran Waste Management licence No: 53796 Annual Tonnage: 74999.0	Issue Date: 25/03/1993 Effective Date: 19/03/2004 Modified: 13/08/2010 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: B & T Recovery And Skip Hire Correspondence Address: -
Not shown	1481	NE	359908 391122	Site Address: West Quay Road, Winwick, Warrington, Cheshire, WA2 8TL Type: 75kte HCI Waste TS + treatment + asbestos Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BTS001 EPR reference: EA/EPR/BB3305UN/V002 Operator: B & T Skip Hire Limited Waste Management licence No: 53796 Annual Tonnage: 74999.0	Issue Date: 25/03/1993 Effective Date: 06/03/2014 Modified: 04/07/2014 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: West Quay Road Correspondence Address: -

# 4. Current Land Use Map



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- |   |                    |   |                          |  |                                 |
|---|--------------------|---|--------------------------|--|---------------------------------|
|  | Site Outline       |  | Current Industrial Sites |  | Electricity Transmission Cables |
|  | Search Buffers (m) |  | Petrol & Fuel Sites      |  | Gas Transmission Pipelines      |



# 4. Current Land Uses

## 4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

7

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	101	SW	Electricity Sub Station	358750 389753	WA5	Electrical Features	Infrastructure and Facilities
2	164	N	Jetty	359001 390105	WA5	Moorings and Unloading Facilities	Water
3	169	SW	Carey Scientific Ltd	358710 389688	169, Shackleton Close, Old Hall, Warrington, WA5 9QG	Measurement and Inspection Equipment	Industrial Products
4	176	N	Electricity Sub Station	358936 390124	WA5	Electrical Features	Infrastructure and Facilities
5	200	SE	Jetty	359194 389818	WA5	Moorings and Unloading Facilities	Water
6A	215	N	Jetty	359016 390156	WA5	Moorings and Unloading Facilities	Water
7A	226	N	Jetty	359005 390167	WA5	Moorings and Unloading Facilities	Water

## 4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

0

Database searched and no data found.

## 4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site:

0

Database searched and no data found.

#### 4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

---

# 5. Geology

## 5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

---

## 5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TILLD	TILL, DEVENSIAN	DIAMICTON
GFSDD	GLACIOFLUVIAL SHEET DEPOSITS, DEVENSIAN	SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]

---

## 5.3 Bedrock and Solid Geology

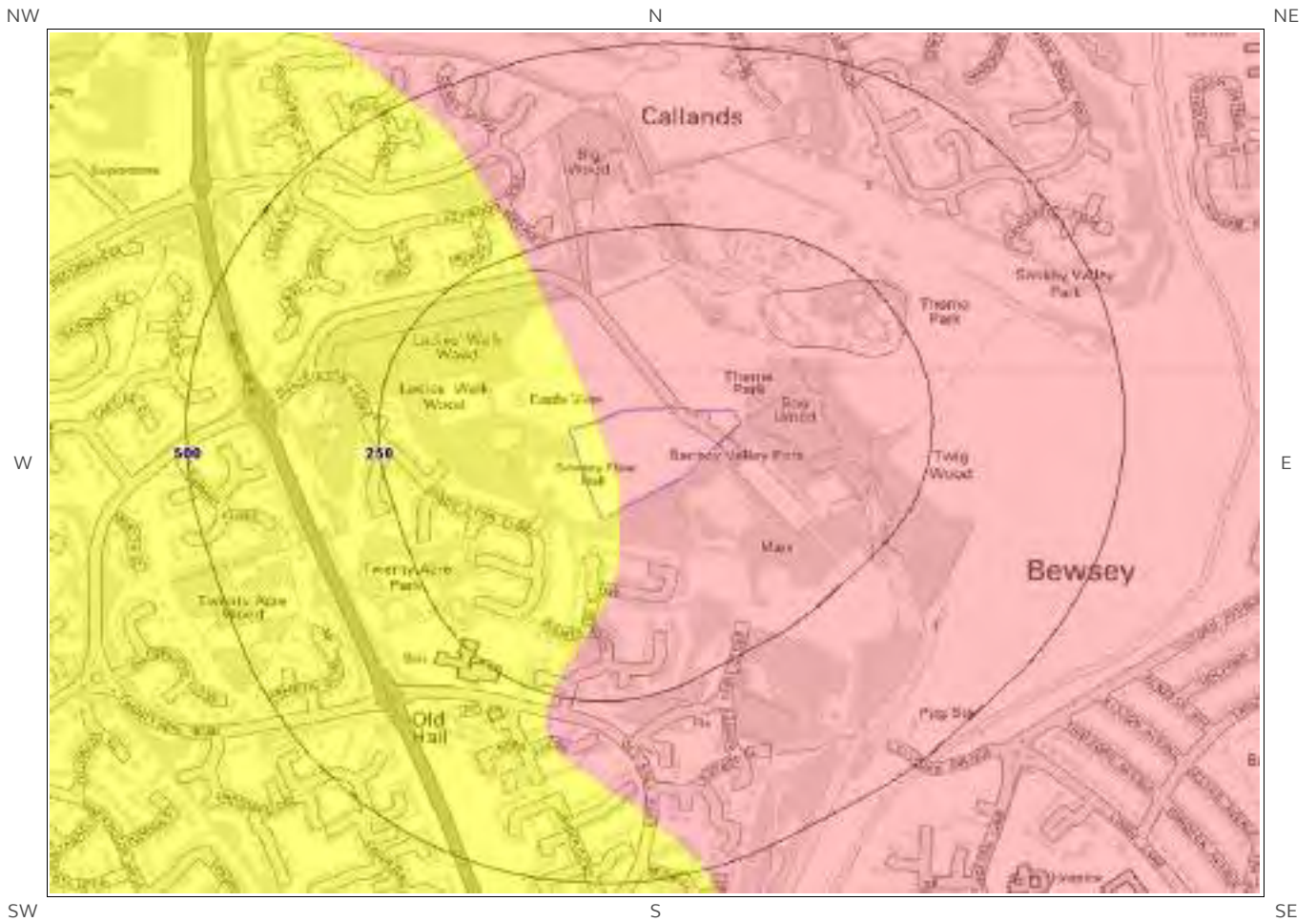
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
WLSF-SDST	WILMSLOW SANDSTONE FORMATION	SANDSTONE

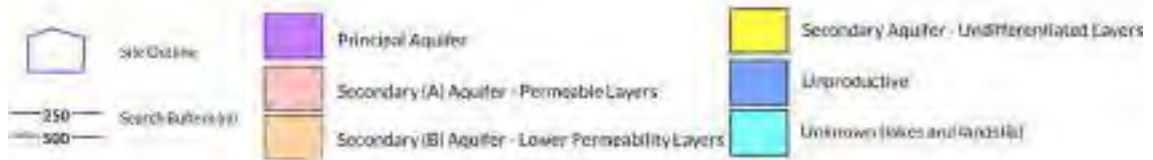
(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

# 6 Hydrogeology and Hydrology

## 6a. Aquifer Within Superficial Geology



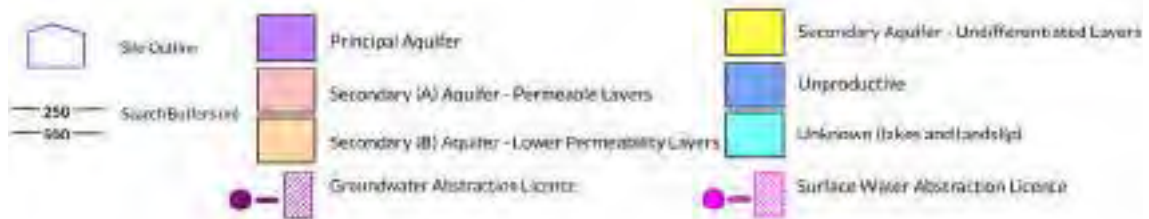
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# 6b. Aquifer Within Bedrock Geology and Abstraction Licenses



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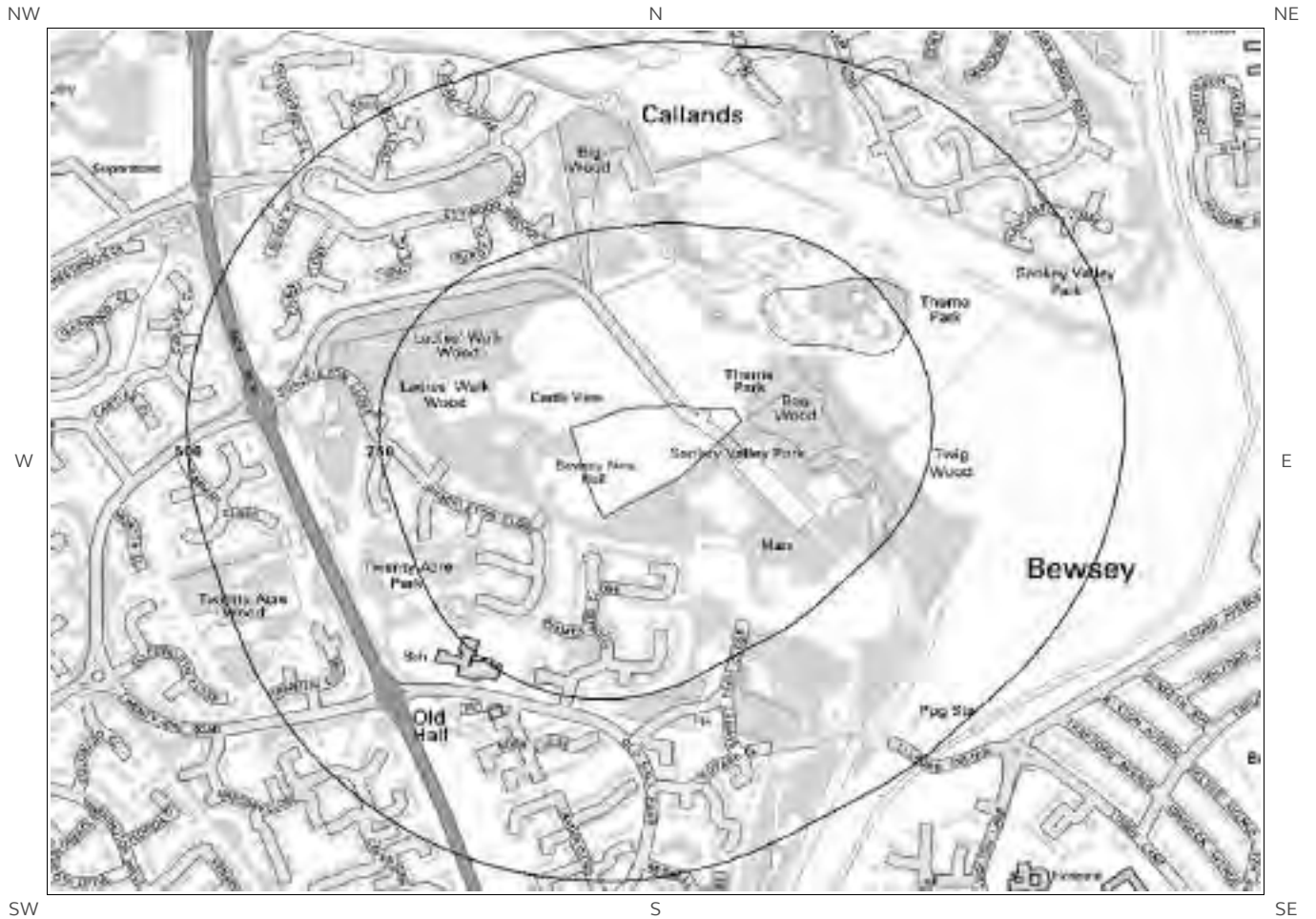
# 6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



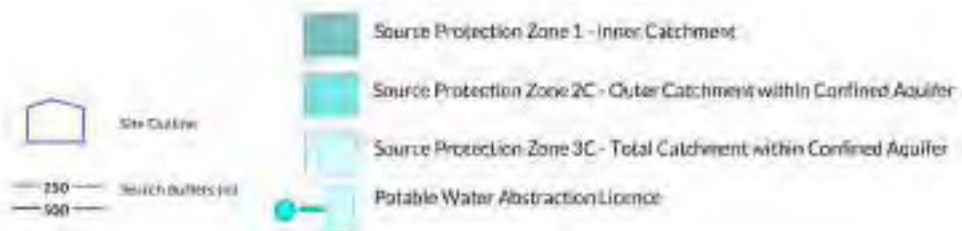
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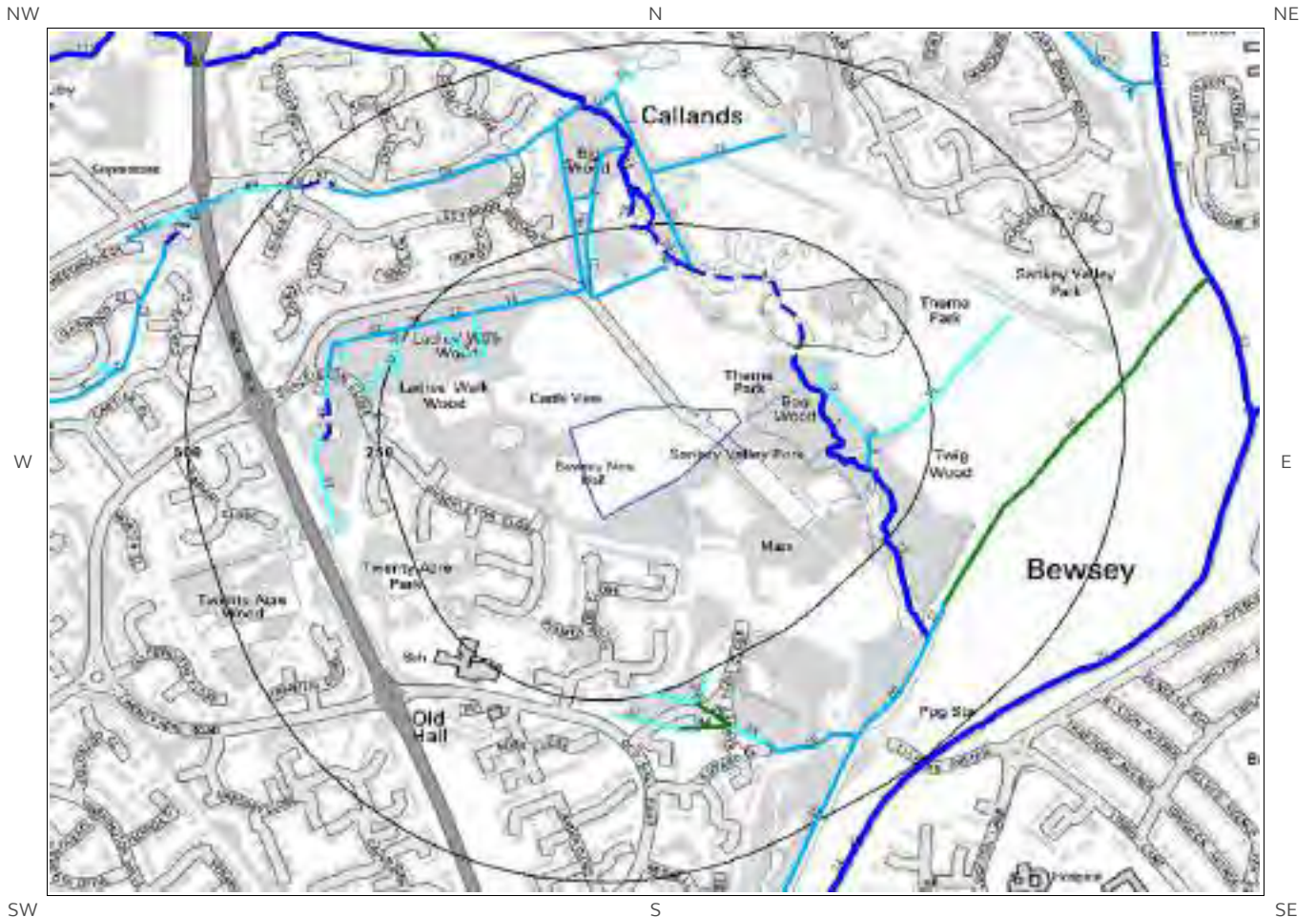
# 6d. Hydrogeology – Source Protection Zones within confined aquifer



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# 6e. Hydrology – Detailed River Network and River Quality



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# 6. Hydrogeology and Hydrology

## 6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
5	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	52	N	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
6	78	NW	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

## 6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
2	52	N	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

## 6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site?

Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1902	SE	360574 388822	Status: Historical Licence No: NW0690025001 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: Warrington Wolves Borehole Data Type: Point Name: The Warrington Football Club Limited	Annual Volume (m <sup>3</sup> ): 18125 Max Daily Volume (m <sup>3</sup> ): 190 Original Application No: 7625 Original Start Date: 13/3/2009 Expiry Date: 31/3/2016 Issue No: 1 Version Start Date: 13/3/2009 Version End Date:
Not shown	1902	SE	360574 388822	Status: Historical Licence No: NW0690025001 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Warrington Wolves Borehole Data Type: Point Name: The Warrington Football Club Limited	Annual Volume (m <sup>3</sup> ): 18125 Max Daily Volume (m <sup>3</sup> ): 190 Original Application No: 7625 Original Start Date: 13/3/2009 Expiry Date: 31/3/2016 Issue No: 1 Version Start Date: 13/3/2009 Version End Date:
Not shown	1902	SE	360574 388822	Status: Historical Licence No: NW/069/0025/001 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Warrington Wolves Borehole Data Type: Point Name: The Warrington Football Club Limited	Annual Volume (m <sup>3</sup> ): 18125 Max Daily Volume (m <sup>3</sup> ): 190 Original Application No: 7625 Original Start Date: 13/3/2009 Expiry Date: 31/3/2016 Issue No: 1 Version Start Date: 13/3/2009 Version End Date:
Not shown	1902	SE	360574 388822	Status: Historical Licence No: NW/069/0025/001 Details: Spray Irrigation - Direct Direct Source: Ground Water - North West Region Point: Warrington Wolves Borehole Data Type: Point Name: The Warrington Football Club Limited	Annual Volume (m <sup>3</sup> ): 18125 Max Daily Volume (m <sup>3</sup> ): 190 Original Application No: 7625 Original Start Date: 13/3/2009 Expiry Date: 31/3/2016 Issue No: 1 Version Start Date: 13/3/2009 Version End Date:

## 6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site?

Yes

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1436	NE	358738 392219	Status: Active Licence No: 2569025066 Details: Spray Irrigation - Direct Direct Source: Surface, Non-tidal - North West Region Point: Sankey Brook At Burtonwood Warrington Data Type: Line Name: H & H FAIRCLOUGH & SONS	Annual Volume (m <sup>3</sup> ): 4545 Max Daily Volume (m <sup>3</sup> ): 778.54 Application No: NPS/WR/012154 Original Start Date: 9/9/1985 Expiry Date: - Issue No: 101 Version Start Date: 11/2/2013 Version End Date:
Not shown	1443	NE	358740 392200	Status: Historical Licence No: 2569025066 Details: Spray Irrigation - Direct Direct Source: Surface, Non-tidal - North West Region Point: Sankey Brook At Burtonwood Warrington Data Type: Line Name: H & H FAIRCLOUGH & SONS	Annual Volume (m <sup>3</sup> ): 18184 Max Daily Volume (m <sup>3</sup> ): 778.54 Application No: 2711 Original Start Date: 9/9/1985 Expiry Date: - Issue No: 100 Version Start Date: 9/8/1995 Version End Date:
Not shown	1443	NE	358740 392200	Status: Historical Licence No: 2569025066 Details: Spray Irrigation - Direct Direct Source: Surface, Non-tidal - North West Region Point: Sankey Brook At Burtonwood, Warrington \$200 Data Type: Line Name: H & H FAIRCLOUGH & SONS	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Application No: 2711 Original Start Date: 9/9/1985 Expiry Date: - Issue No: 100 Version Start Date: 9/8/1995 Version End Date:
Not shown	1443	NE	358740 392200	Status: Historical Licence No: 2569025066 Details: Spray Irrigation - Direct Direct Source: "surface, Non-tidal - North West Region" Point: "sankey Brook At Burtonwood, Warrington \$200" Data Type: Line Name: H & H FAIRCLOUGH & SONS	Annual Volume (m <sup>3</sup> ): - Max Daily Volume (m <sup>3</sup> ): - Application No: 2711 Original Start Date: 9/9/1985 Expiry Date: - Issue No: 100 Version Start Date: 9/8/1995 Version End Date:

## 6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site?

Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (6c):

ID	Distance (m)	Direction	NGR	Details
Not shown	1902	SE	360574 388822	Status: Historical Licence No: NW0690025001 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Warrington Wolves Borehole Data Type: Point Name: The Warrington Football Club Limited Annual Volume (m <sup>3</sup> ): 18125 Max Daily Volume (m <sup>3</sup> ): 190 Original Application No: 7625 Original Start Date: 13/3/2009 Expiry Date: 31/3/2016 Issue No: 1 Version Start Date: Version End Date:
Not shown	1902	SE	360574 388822	Status: Historical Licence No: NW/069/0025/001 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Warrington Wolves Borehole Data Type: Point Name: The Warrington Football Club Limited Annual Volume (m <sup>3</sup> ): 18125 Max Daily Volume (m <sup>3</sup> ): 190 Original Application No: 7625 Original Start Date: 13/3/2009 Expiry Date: 31/3/2016 Issue No: 1 Version Start Date: Version End Date:

## 6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site?

Yes

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map (6c):

ID	Distance (m)	Direction	Zone	Description
1	0	On Site	3	Total catchment
2	52	N	3	Total catchment

## 6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

## 6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
5	W	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
52	N	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
86	N	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
409	N	Major Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.
409	N	Minor Aquifer/Low Leaching Potential	L	Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.

## 6.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? Yes

### 6.9.1 Biological Quality:

Database searched and no data found.

### 6.9.2 Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAHI). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

The following Chemical Quality records are shown on the Hydrology Map (6e):

ID	Distance (m)	Direction	NGR	River Quality Grade	Chemical Quality Grade				
					2005	2006	2007	2008	2009
Not shown	1188	NE	359640 390951	River Name: Sankey Bk. Reach: Rainford Bk. To Fwl At A57 End/Start of Stretch: Sample Point NGR	F	E	D	C	C

## 6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details	
1	99	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
2	110	NE	River Name: North Park Brook Welsh River Name: - Alternative Name: -	River Type: Multiple Channel Culvert Main River Status: Currently Undefined
3	117	NE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
4	129	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
5	147	NW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
6	155	NW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
7	160	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
8	164	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
9	167	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
10	167	E	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
11	173	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
12	173	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
13B	174	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
14	174	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
15	186	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
16A	191	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
17A	191	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
18A	191	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
19A	195	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
20	196	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
21C	197	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
22	204	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
23B	218	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
24	225	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
25	234	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
26D	239	W	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
27C	245	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
28	245	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
29D	248	NW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
30	248	NW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
31F	249	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
32E	252	SE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
33	259	NW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
34G	262	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
35E	266	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
36F	266	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
37	273	S	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
38	278	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
39	281	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
40G	290	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
41H	297	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
42H	298	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
43	299	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
44	299	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined



ID	Distance (m)	Direction	Details	
45	305	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
46	306	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
47I	310	W	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
48	313	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
49I	316	NW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
50	320	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
51J	320	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
52	322	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
53	322	W	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
54	332	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
55	355	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
56J	357	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
57	365	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
58	374	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
59	381	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
60	384	SE	River Name: St Helens Canal Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
61	404	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
62K	410	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
63K	410	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
64	424	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
65	424	SE	River Name: St Helens Canal Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
66	437	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
67	453	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Lake/Reservoir Main River Status: Currently Undefined
68	482	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
69	497	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined

## 6.11 Surface Water Features

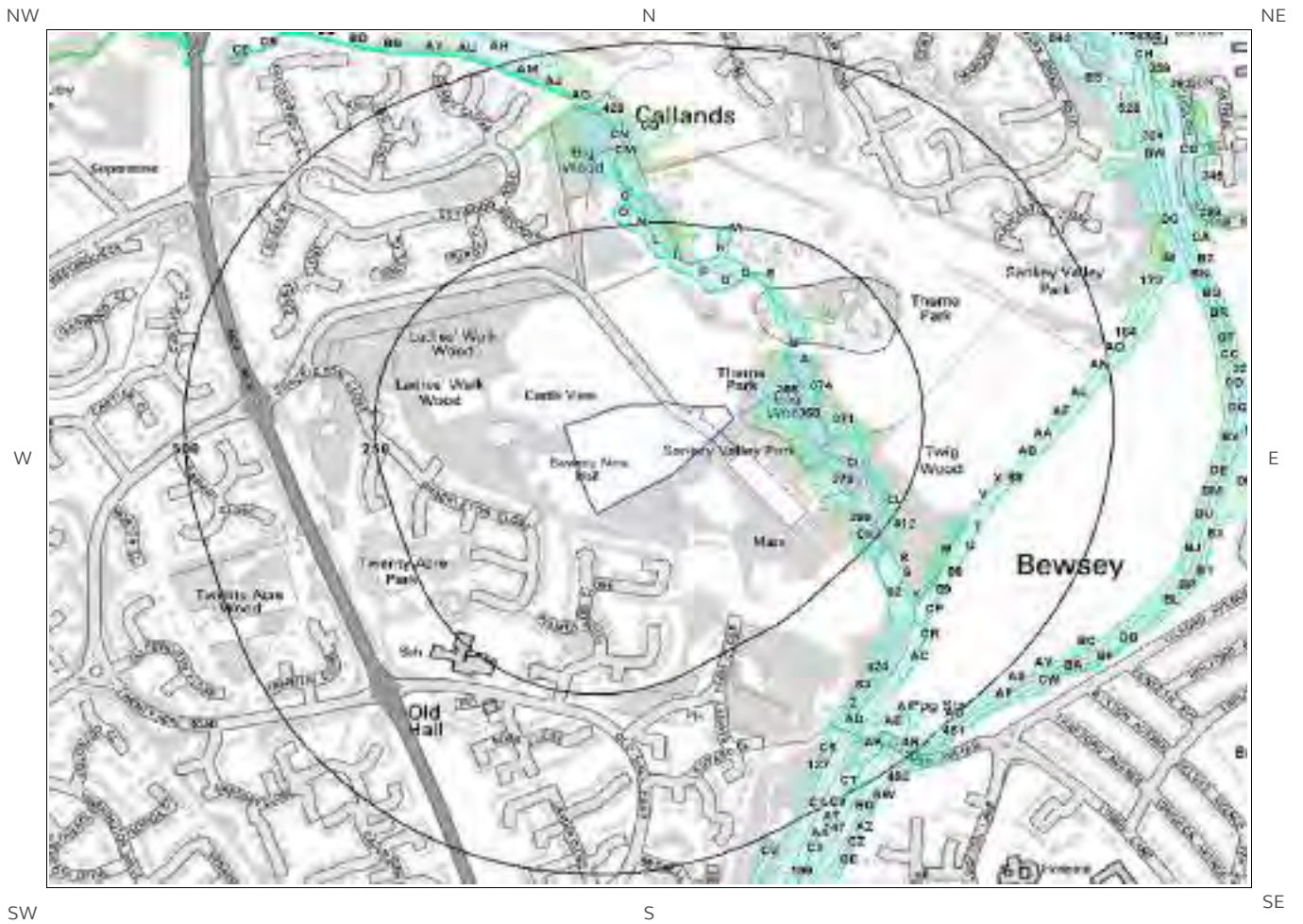
Are there any surface water features within 250m of the study site?

Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
0	On Site
9	NE
34	SE
36	SE
60	W
87	W
99	NE
117	NE
129	NE
144	SE
147	NW
155	NW
159	N
161	N
165	SE
168	E
175	N
176	NE
180	NE
181	SE
186	NW
191	N
196	NE
204	N
225	N
228	NW
230	SE
231	E
236	NE
239	W
248	NW
249	NW
249	S

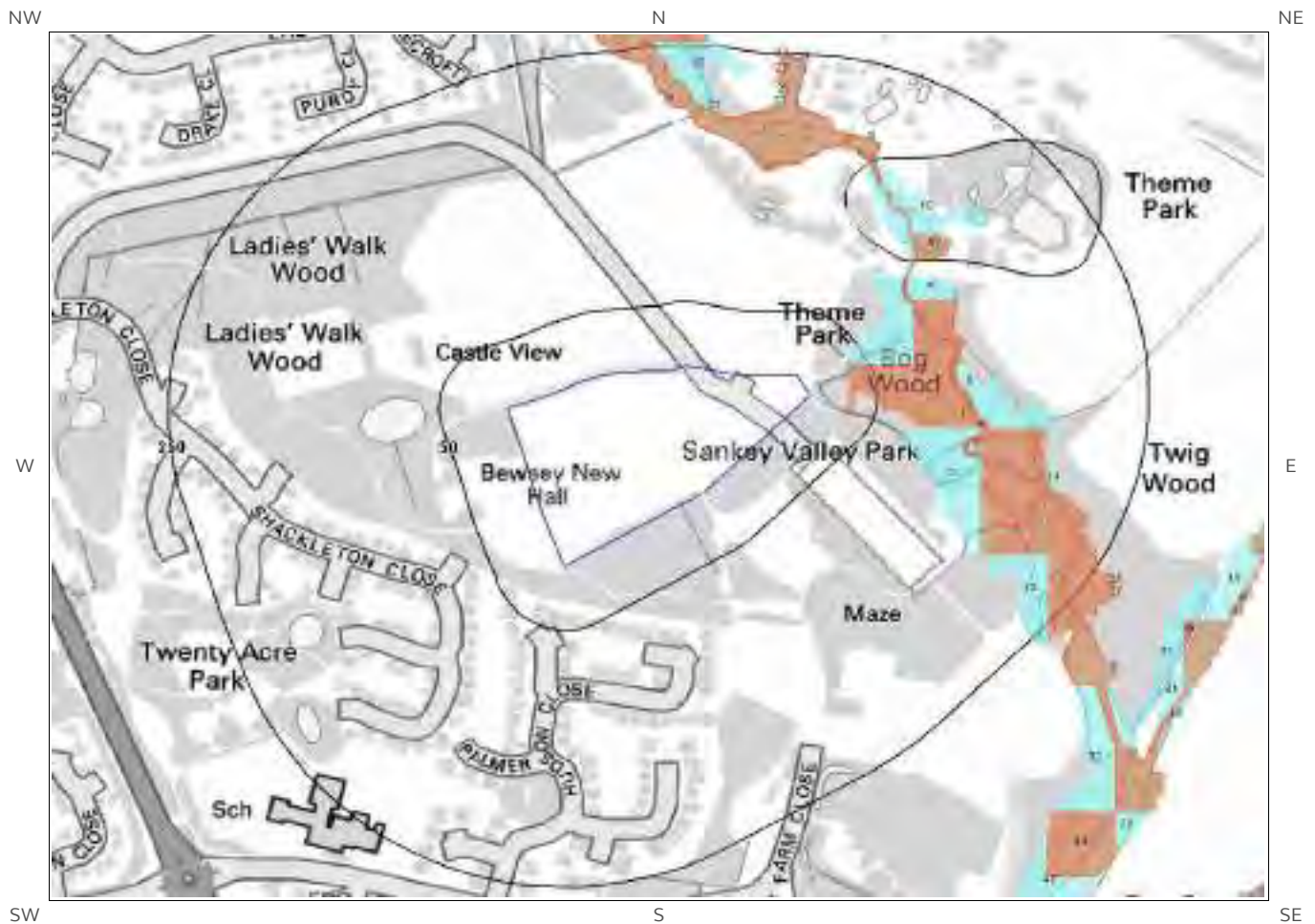
# 7a. Environment Agency Flood Map for Planning (from rivers and the sea)



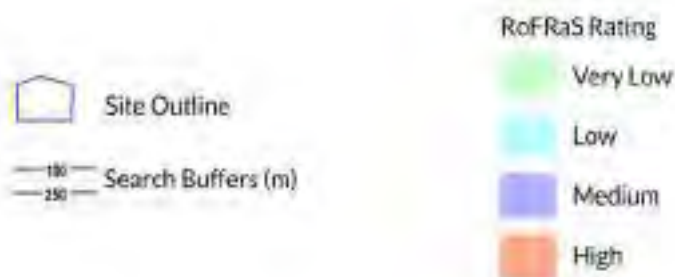
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# 7b. Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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# 7 Flooding

## 7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency Zone 2 floodplain?

Yes

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Type
1CJ	29	E	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
2CI	37	NE	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
3A	96	NE	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
4A	106	NE	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
5B	111	NE	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
6B	114	NE	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
7C	114	NE	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
8B	116	NE	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
9C	126	NE	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
10D	159	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
11E	159	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
12H	160	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
13D	162	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
14F	165	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
15D	169	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
16G	170	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
17E	175	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
18E	177	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
19F	178	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)

20E	180	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
21G	180	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
22E	181	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
23E	181	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
24G	182	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
25H	188	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
26I	190	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
27J	192	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
28I	195	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
29H	197	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
30H	197	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
31H	198	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
32CM	198	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
33I	200	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
34J	203	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
35K	206	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
36I	206	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
37J	207	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
38I	207	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
39CK	208	SE	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
40K	210	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
41K	212	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
42L	213	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
43K	215	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
44K	217	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
45L	218	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
46M	222	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
47M	227	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)

48N	237	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
49M	241	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
50M	244	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
51N	246	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)
52M	250	N	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)

## 7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency Zone 3 floodplain?

Yes

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

ID	Distance (m)	Direction	Update	Type
1CJ	30	E	09-Sep-2016	Zone 3 - (Fluvial Models)
2CI	37	NE	09-Sep-2016	Zone 3 - (Fluvial Models)
3A	81	E	09-Sep-2016	Zone 3 - (Fluvial Models)
4A	92	E	09-Sep-2016	Zone 3 - (Fluvial Models)
5B	101	NE	09-Sep-2016	Zone 3 - (Fluvial Models)
6B	107	E	09-Sep-2016	Zone 3 - (Fluvial Models)
7C	108	NE	09-Sep-2016	Zone 3 - (Fluvial Models)
8B	110	NE	09-Sep-2016	Zone 3 - (Fluvial Models)
9C	110	E	09-Sep-2016	Zone 3 - (Fluvial Models)
10D	119	NE	09-Sep-2016	Zone 3 - (Fluvial Models)
11E	121	NE	09-Sep-2016	Zone 3 - (Fluvial Models)
12H	130	NE	09-Sep-2016	Zone 3 - (Fluvial Models)
13D	134	NE	09-Sep-2016	Zone 3 - (Fluvial Models)
14F	134	SE	09-Sep-2016	Zone 3 - (Fluvial Models)
15D	140	E	09-Sep-2016	Zone 3 - (Fluvial Models)
16G	147	NE	09-Sep-2016	Zone 3 - (Fluvial Models)



17E	149	NE	09-Sep-2016	Zone 3 - (Fluvial Models)
18E	152	NE	09-Sep-2016	Zone 3 - (Fluvial Models)
19F	160	N	09-Sep-2016	Zone 3 - (Fluvial Models)
20E	160	N	09-Sep-2016	Zone 3 - (Fluvial Models)
21G	161	N	09-Sep-2016	Zone 3 - (Fluvial Models)
22E	165	N	09-Sep-2016	Zone 3 - (Fluvial Models)
23E	166	N	09-Sep-2016	Zone 3 - (Fluvial Models)
24G	171	N	09-Sep-2016	Zone 3 - (Fluvial Models)
25H	174	E	09-Sep-2016	Zone 3 - (Fluvial Models)
26I	176	N	09-Sep-2016	Zone 3 - (Fluvial Models)
27J	178	N	09-Sep-2016	Zone 3 - (Fluvial Models)
28I	179	N	09-Sep-2016	Zone 3 - (Fluvial Models)
29H	188	E	09-Sep-2016	Zone 3 - (Fluvial Models)
30H	200	N	09-Sep-2016	Zone 3 - (Fluvial Models)
31H	202	N	09-Sep-2016	Zone 3 - (Fluvial Models)
32CM	202	N	09-Sep-2016	Zone 3 - (Fluvial Models)
33I	207	N	09-Sep-2016	Zone 3 - (Fluvial Models)
34J	208	SE	09-Sep-2016	Zone 3 - (Fluvial Models)
35K	221	N	09-Sep-2016	Zone 3 - (Fluvial Models)
36I	228	N	09-Sep-2016	Zone 3 - (Fluvial Models)
37J	229	SE	09-Sep-2016	Zone 3 - (Fluvial Models)
38I	231	N	09-Sep-2016	Zone 3 - (Fluvial Models)
39CK	234	SE	09-Sep-2016	Zone 3 - (Fluvial Models)
40K	242	SE	09-Sep-2016	Zone 3 - (Fluvial Models)
41K	243	SE	09-Sep-2016	Zone 3 - (Fluvial Models)
42L	244	SE	09-Sep-2016	Zone 3 - (Fluvial Models)
43K	244	N	09-Sep-2016	Zone 3 - (Fluvial Models)
44K	246	N	09-Sep-2016	Zone 3 - (Fluvial Models)

### 7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? Very Low

The Environment Agency RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRaS flood Risk
1	29.0	E	High
2	38.0	NE	Low

### 7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No  
Database searched and no data found.

### 7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

### 7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

### 7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Clearwater Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

### 7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Limited potential

Where limited potential for groundwater flooding to occur is indicated, this means that although given the geological conditions there may be a groundwater flooding hazard, unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area, you need take no further action in relation to groundwater flooding hazard.

---

## 7.8 Groundwater Flooding Confidence Areas

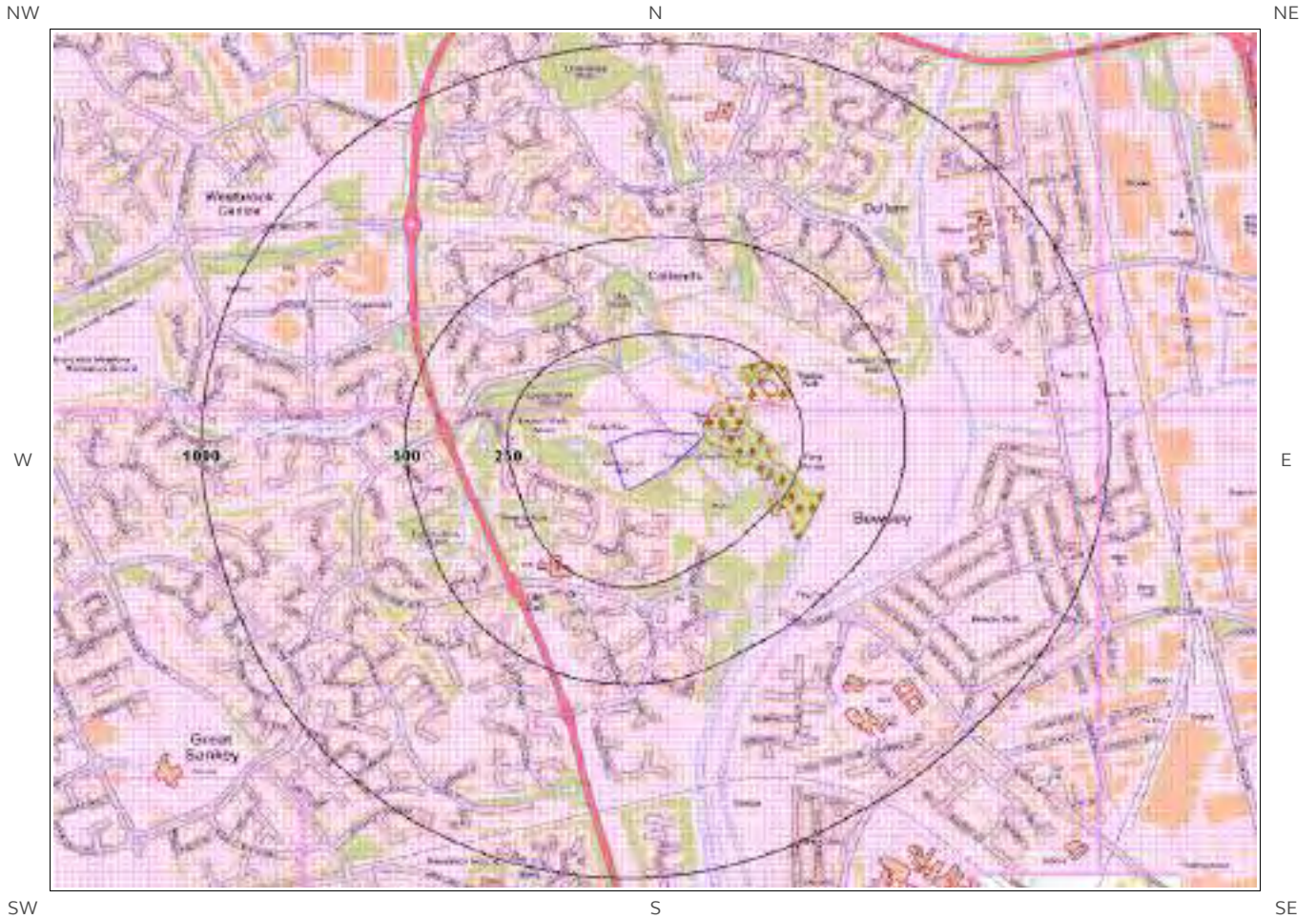
What is the British Geological Survey confidence rating in this result?

Low

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

# 8. Designated Environmentally Sensitive Sites Map



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# 8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

---

## 8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

---

## 8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

---

## 8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

---

## 8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

---

## 8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

---

## 8.6 Records of Ancient Woodland within 2000m of the study site:

1

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
7	9	NE	UNKNOWN	Ancient and Semi-Natural Woodland

## 8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

## 8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

## 8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

## 8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

## 8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

## 8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

---

## 8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

6

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
1	0	On Site	Existing	DEFRA
2	52	N	Existing	DEFRA
3	975	E	Existing	DEFRA
4	978	E	Existing	DEFRA
5	1087	SW	Existing	DEFRA
Not shown	1603	W	Existing	DEFRA

---

## 8.14 Records of Green Belt land within 2000m of the study site:

1

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015].

ID	Distance	Direction	Green Belt Name	Local Authority Name
Not shown	1660	N	Liverpool, Manchester and West Yorks Greenbelt	Warrington (B)

---

# 9. Natural Hazards Findings

## 9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a **Groundsure Geo Insight**, available from our [website](#). The following information has been found:

### 9.1.1 Shrink Swell

What is the maximum Shrink-Swell\* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

### 9.1.2 Landslides

What is the maximum Landslide\* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

### 9.1.3 Soluble Rocks

What is the maximum Soluble Rocks\* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

\* This indicates an automatically generated 50m buffer and site.



### 9.1.4 Compressible Ground

What is the maximum Compressible Ground\* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

---

### 9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks\* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

---

### 9.1.6 Running Sand

What is the maximum Running Sand\*\* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

---

## 9.2 Radon

### 9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

---



---

\* This indicates an automatically generated 50m buffer and site.

### 9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing

ones as described in publication BR211 by the Building Research Establishment?

No radon protective measures are necessary.

# 10. Mining

## 10.1 Coal Mining

Are there any coal mining areas within 75m of the study site?

Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

## 10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary?

No

Database searched and no data found.

## 10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site?

No

Guidance: No Guidance Required.

# Contact Details

**EmapSite**  
Telephone: 0118 9736883  
sales@emapsite.com

## **British Geological Survey Enquiries**

Kingsley Dunham Centre  
Keyworth, Nottingham NG12 5GG  
Tel: 0115 936 3143.  
Fax: 0115 936 3276.  
Email:

Web:[www.bgs.ac.uk](http://www.bgs.ac.uk)

BGS Geological Hazards Reports and general geological enquiries:  
[enquiries@bgs.ac.uk](mailto:enquiries@bgs.ac.uk)

## **Environment Agency**

National Customer Contact Centre, PO Box 544  
Rotherham, S60 1BY  
Tel: 08708 506 506

Web:[www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Email:[enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)

## **Public Health England**

Public information access office  
Public Health England, Wellington House  
133-155 Waterloo Road, London, SE1 8UG  
[www.gov.uk/phe](http://www.gov.uk/phe)

Email:[enquiries@phe.gov.uk](mailto:enquiries@phe.gov.uk)

Main switchboard: 020 7654 8000

## **The Coal Authority**

200 Lichfield Lane  
Mansfield  
Notts NG18 4RG  
Tel: 0345 7626 848  
DX 716176 Mansfield 5  
[www.coal.gov.uk](http://www.coal.gov.uk)

## **Ordnance Survey**

Adanac Drive, Southampton  
SO16 0AS  
Tel: 08456 050505

## **Local Authority**

Authority: Warrington Borough Council  
Phone: 01925 443322

Web: <http://www.warrington.gov.uk/>

Address: Contact Warrington, Horsemarket Street, Warrington,

## **Gemapping PLC**

Virginia Villas, High Street, Hartley Witney,  
Hampshire RG27 8NW  
Tel: 01252 845444

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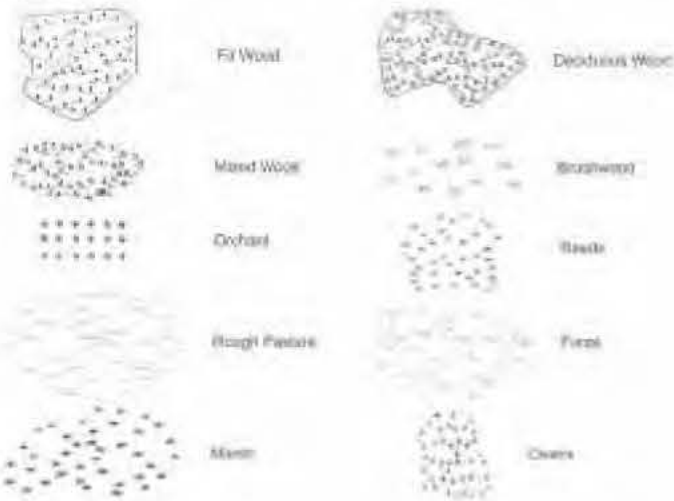
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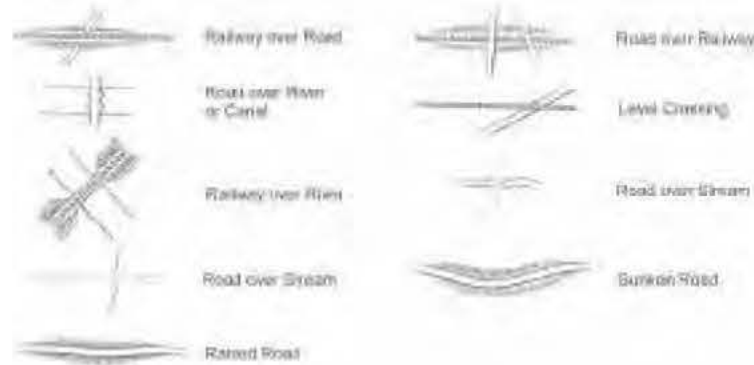
**C – Historical Maps**

# County Series 1:10,560 scale

## VEGETATION



## ROADS



## RAILWAYS



## GENERAL FEATURES



## BOUNDARIES



# National Grid 1:10,000 scale

## HEIGHTS (METRES)

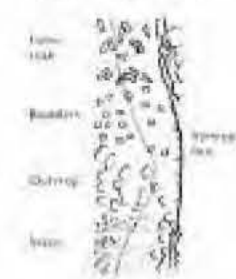
Values are given in metres above mean sea level or height above datum.

Surface heights given on maps are determined by ground survey or by levelling.

Both marks and their values are shown on large scale maps, but bench marks less conspicuous than and possibly later levelling information are obtainable from the Director General, Ordnance Survey.

Contours are at 5 metres vertical interval.

## ROCK FEATURES



## CONVERSION SCALE

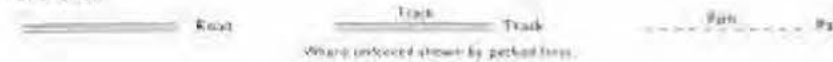
Metres - Feet



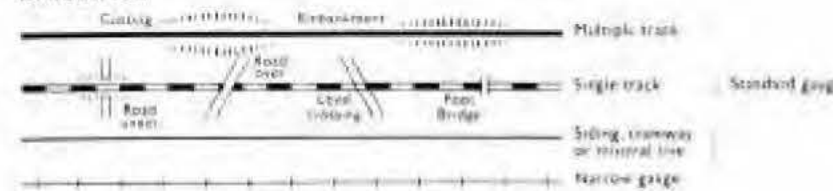
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BP, BS	Boundary Pill or Stone	FO	Foot Office
CH	Church	PC	Public Convenience
CH	Club House	PH	Public House
F St.	Fire Station	S	Sign
FB	Foot Bridge	SP	Spring
RI	Railway	TCB	Telephone Call Box
GP	Guide Post	TCF	Telephone Call Post
MP, MS	Mail Post or Stone	TH	Town Hall
P	Post or Post Office	W	Well
PS	Police Station	T	Tooth

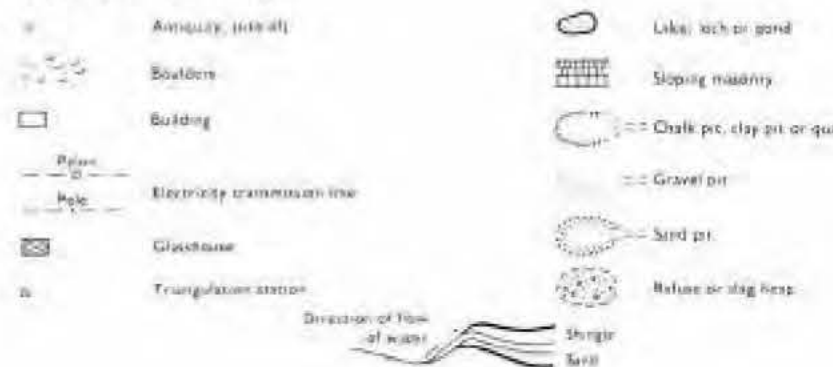
## ROADS



## RAILWAYS



## GENERAL FEATURES



## VEGETATION



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## County Series & National Grid

## 1:10,560 scale

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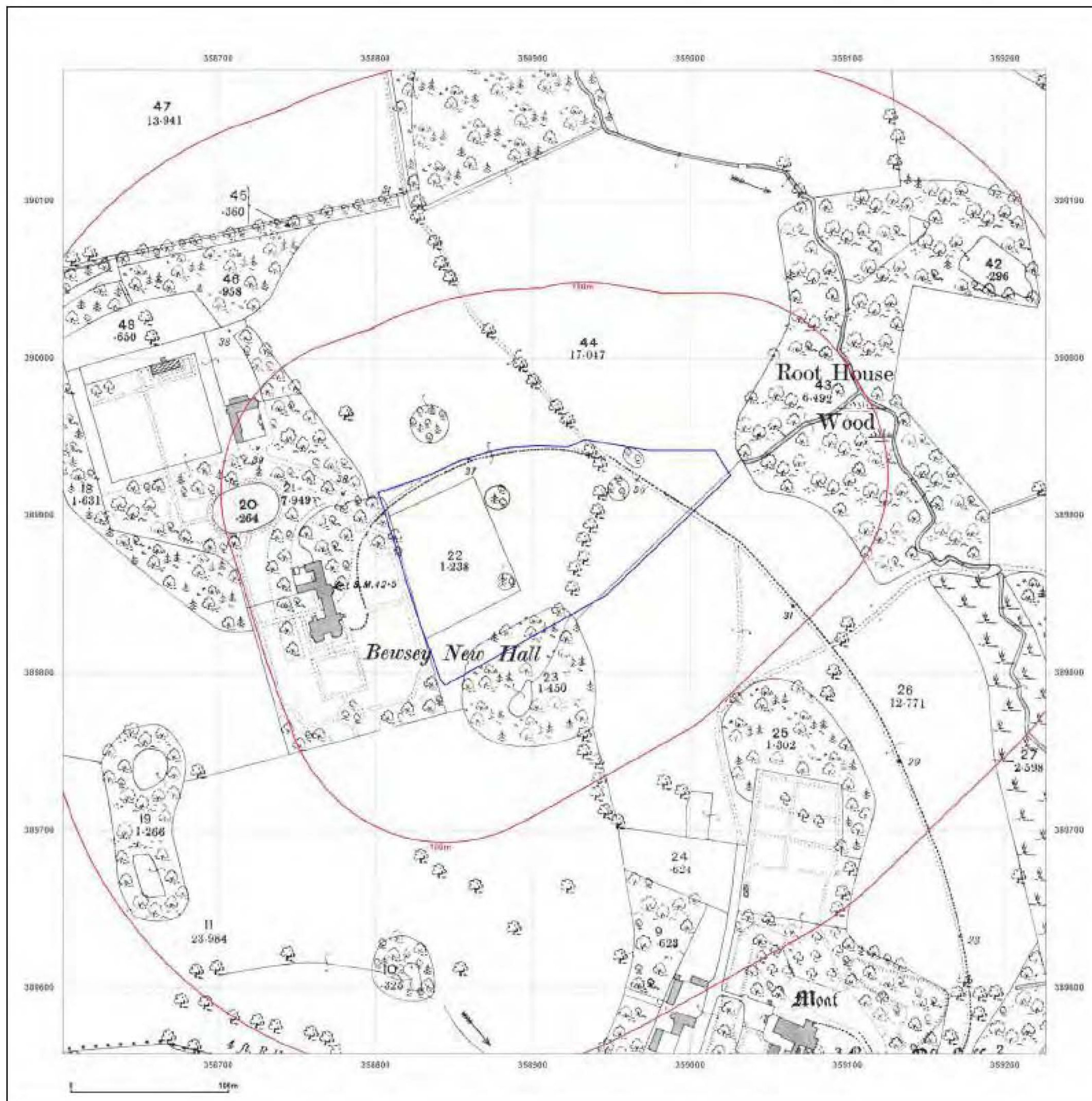


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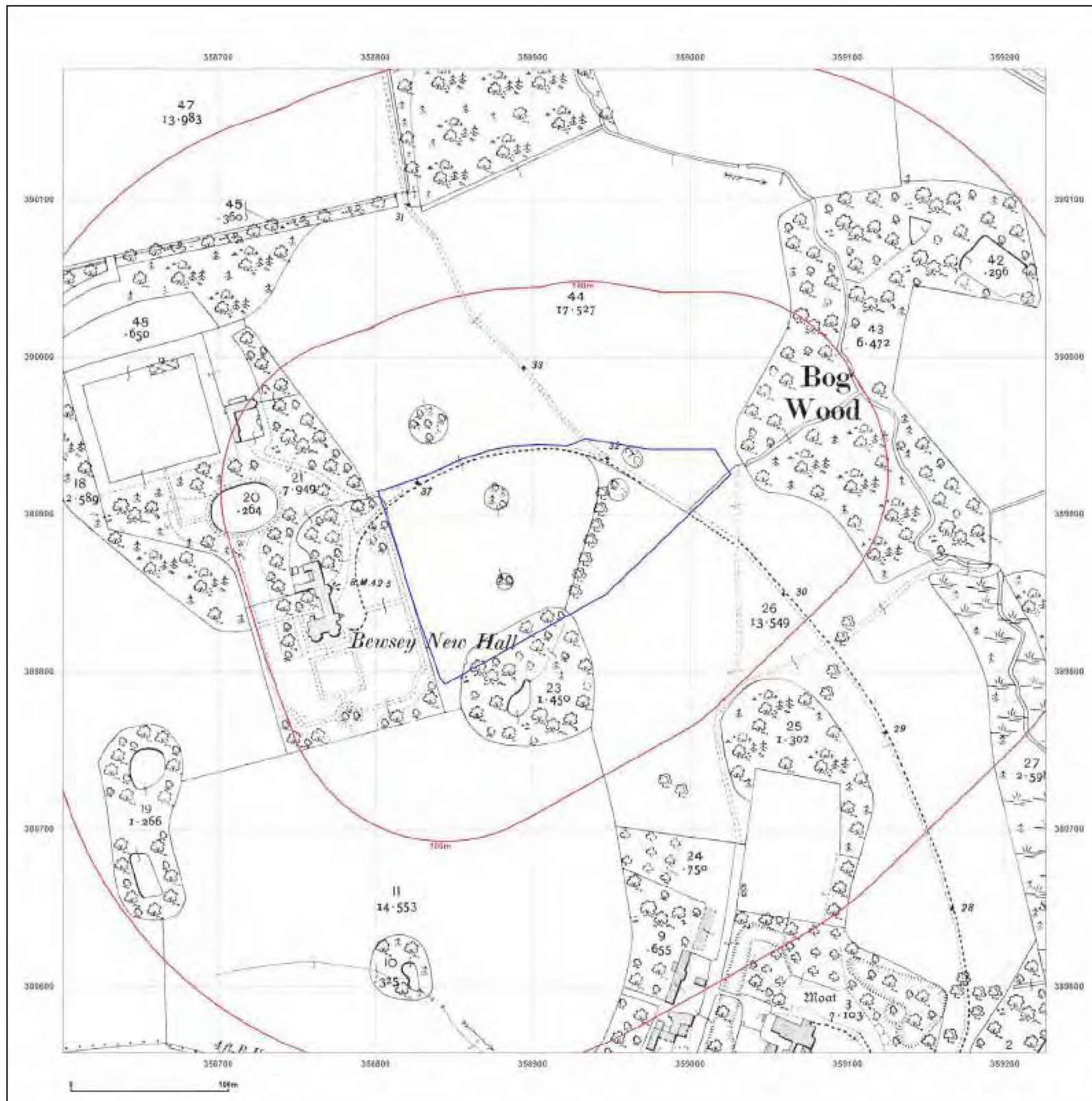


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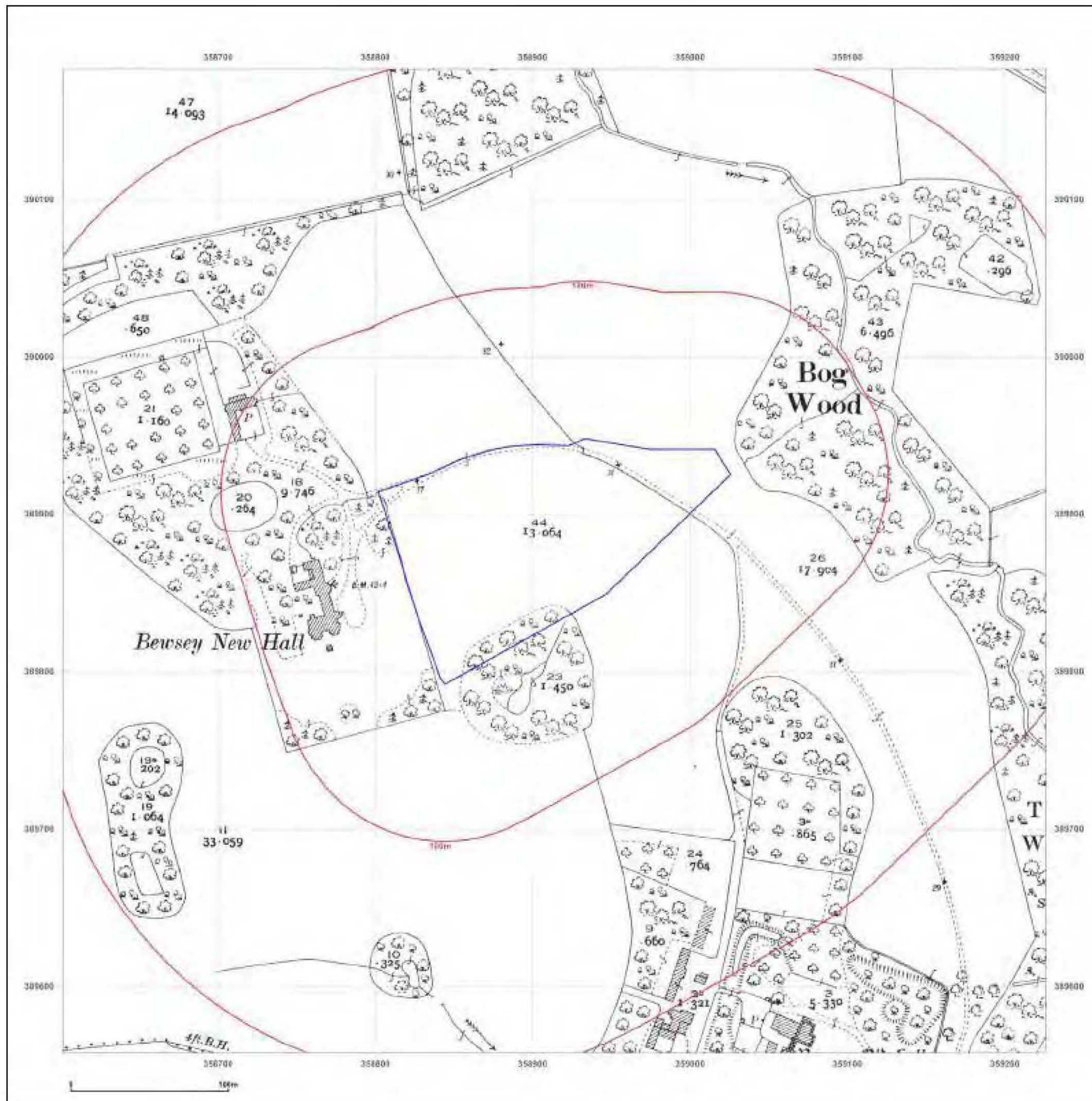


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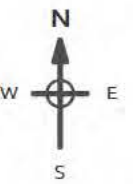
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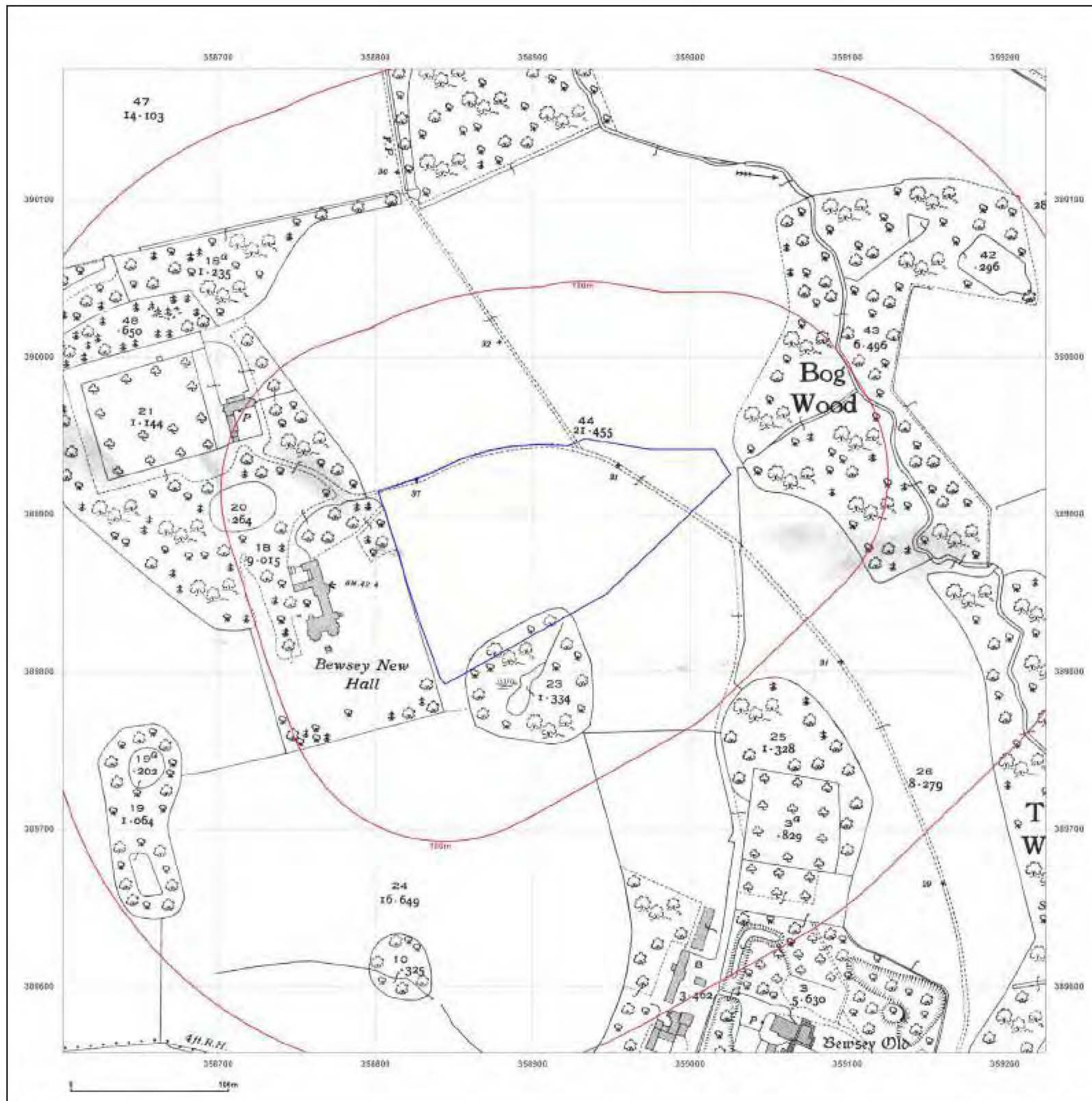


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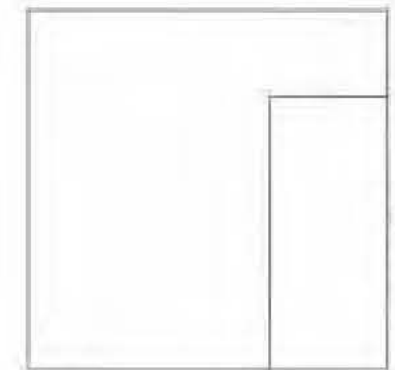
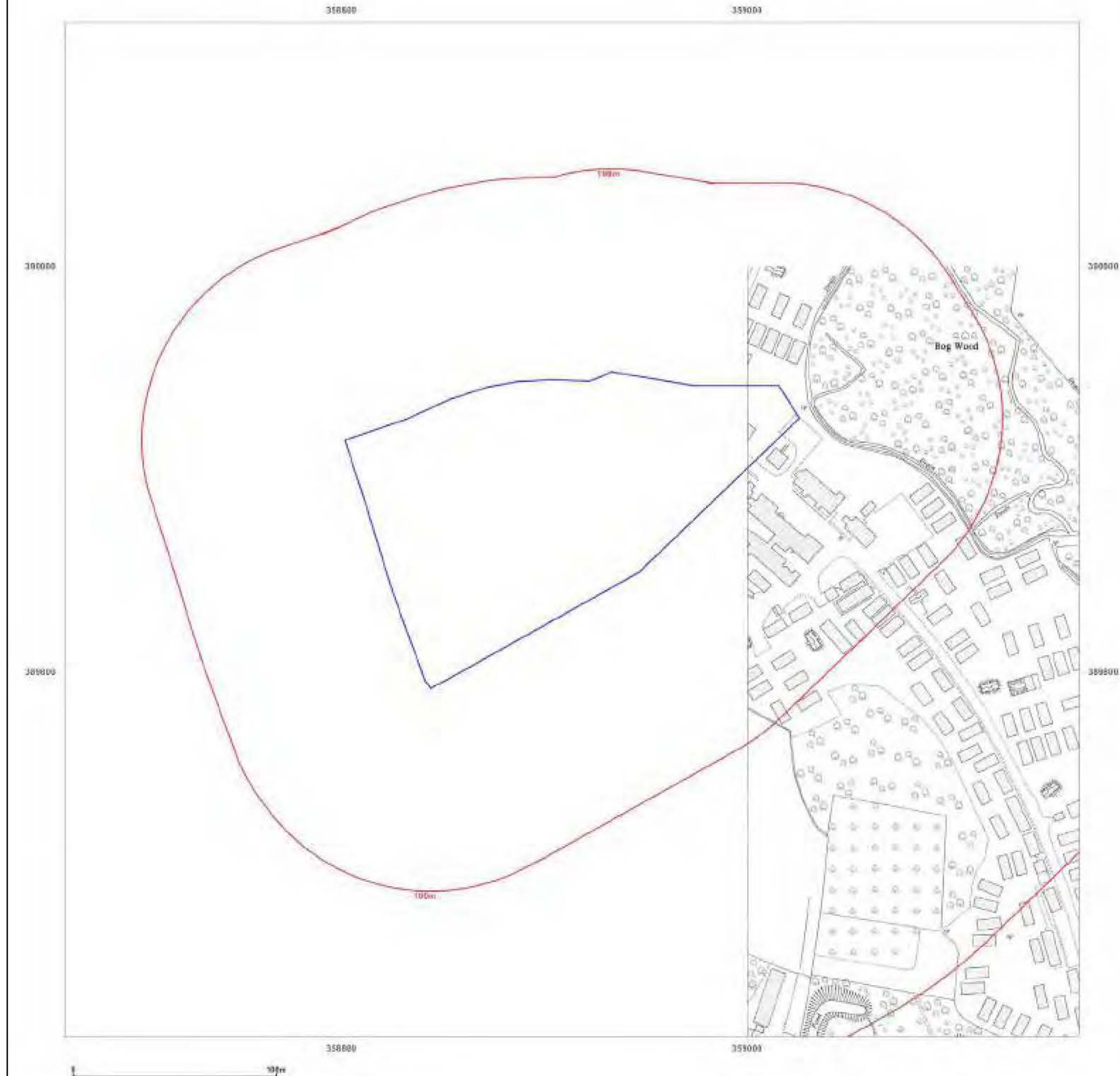
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**Grid Ref:** 358913, 389870

**Map Name:** National Grid

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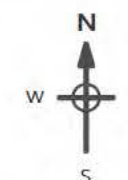
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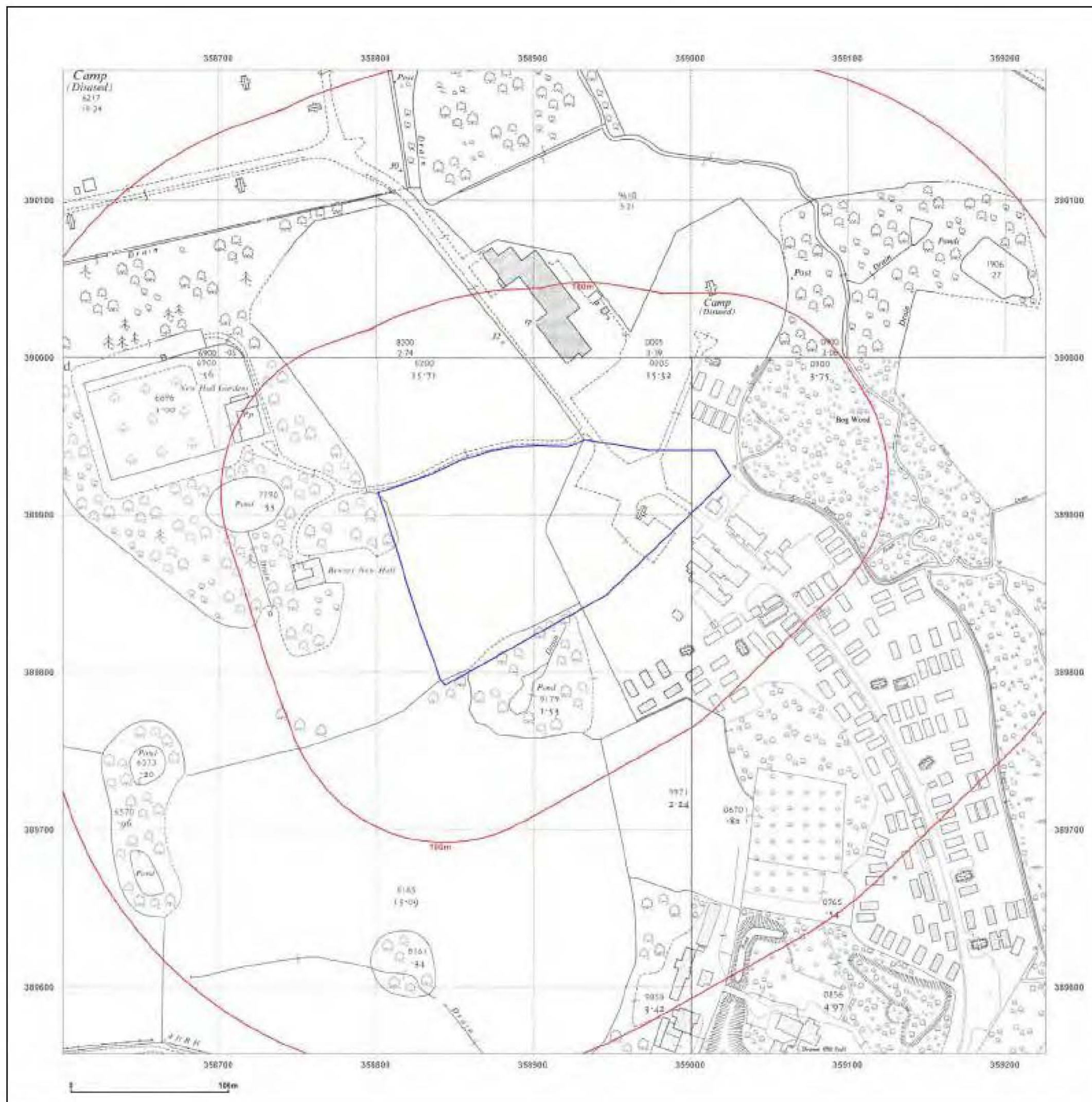


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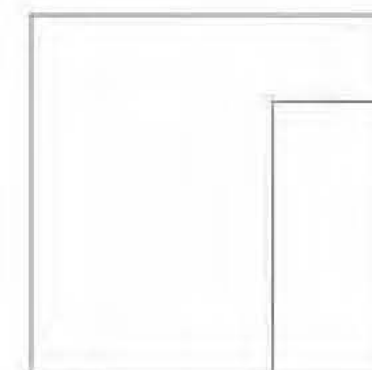
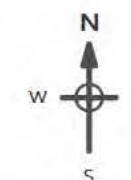
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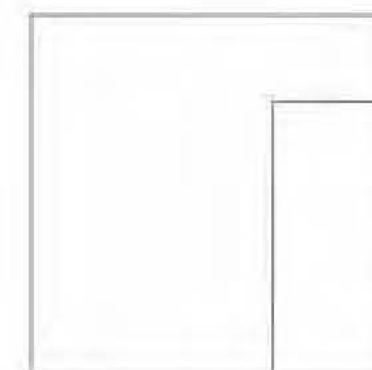
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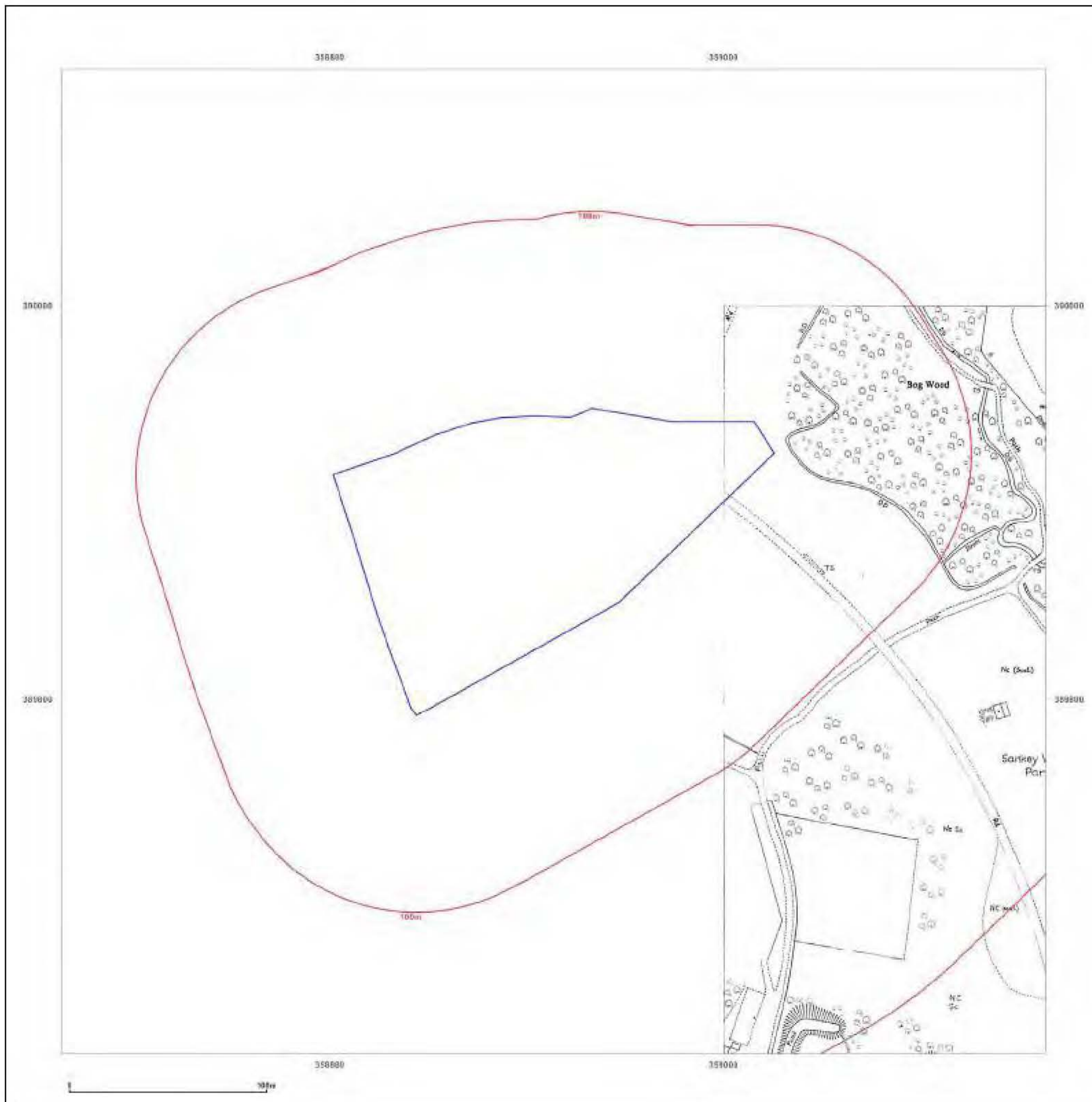


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**Grid Ref:** 358913, 389870

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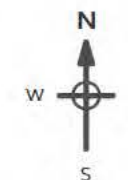
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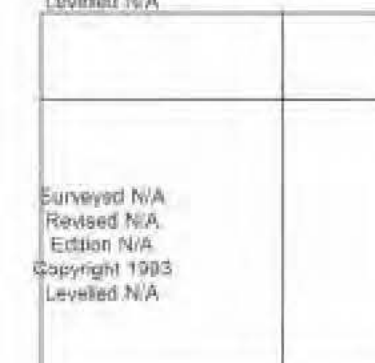
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**Map Name:** National Grid

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**Scale:** 1:1,250

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**Grid Ref:** 358913, 389870

**Map Name:** County Series

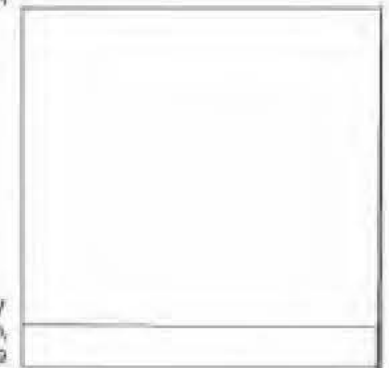
**Map date:** 1849

**Scale:** 1:10,560

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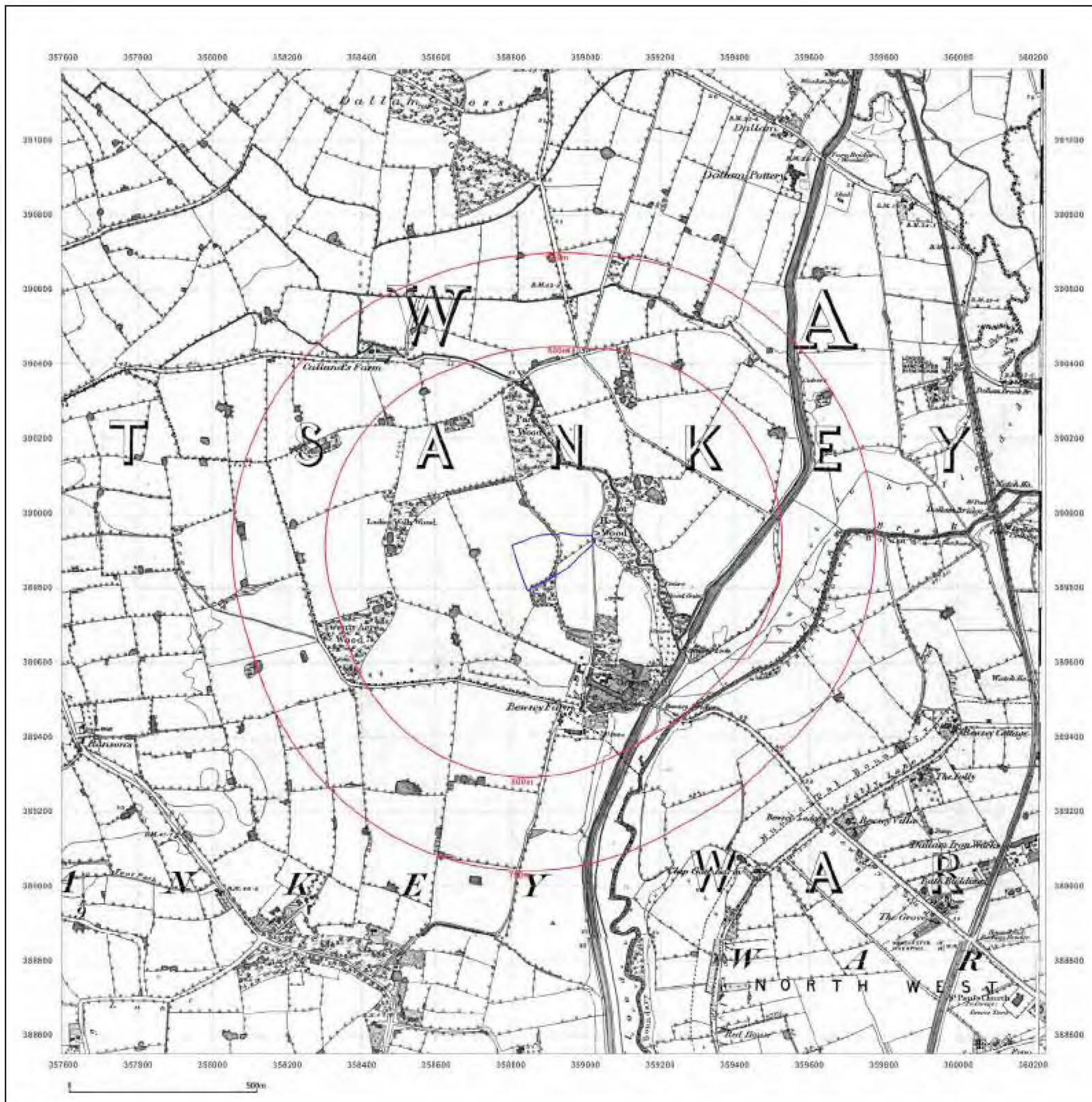


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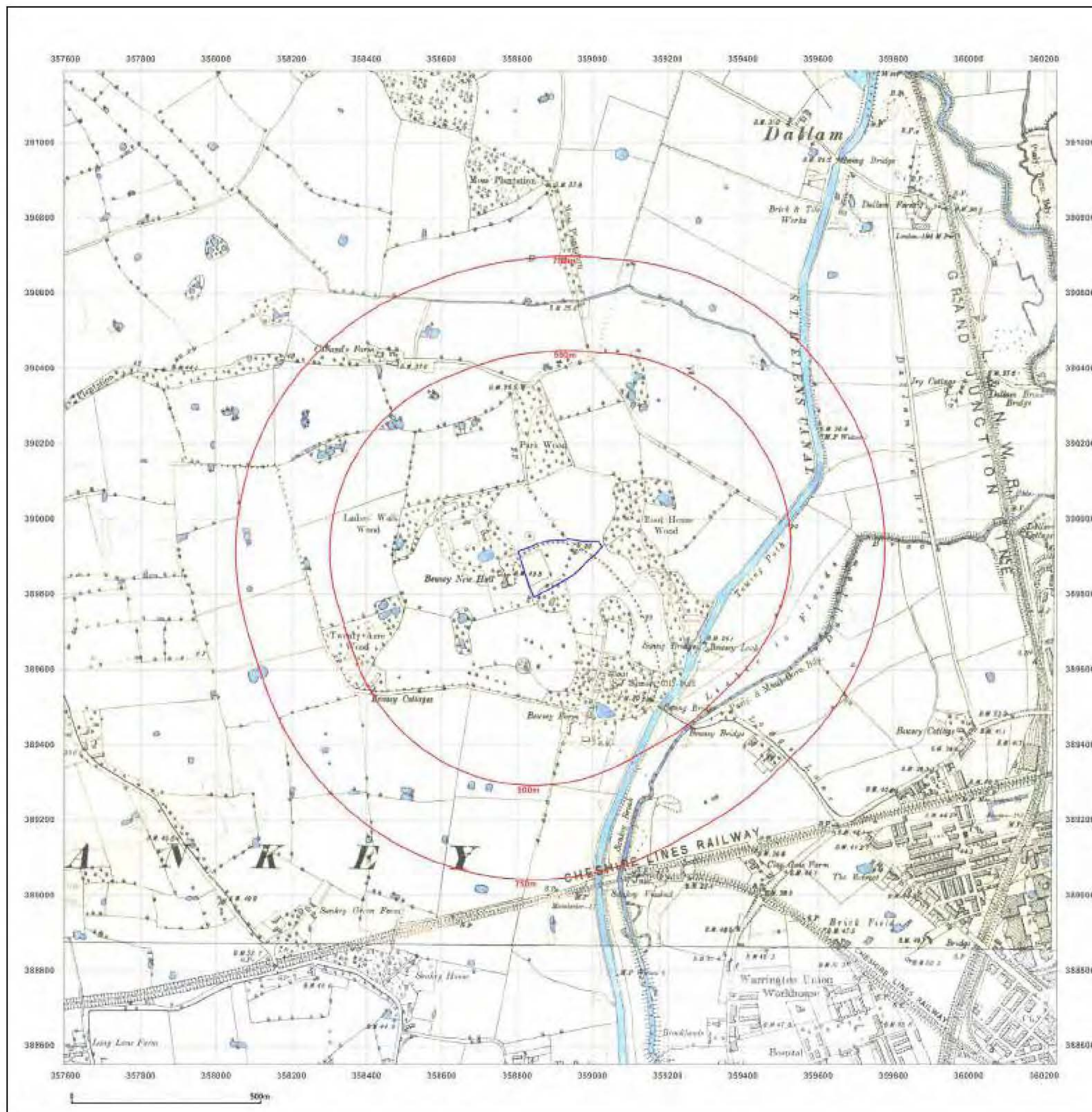


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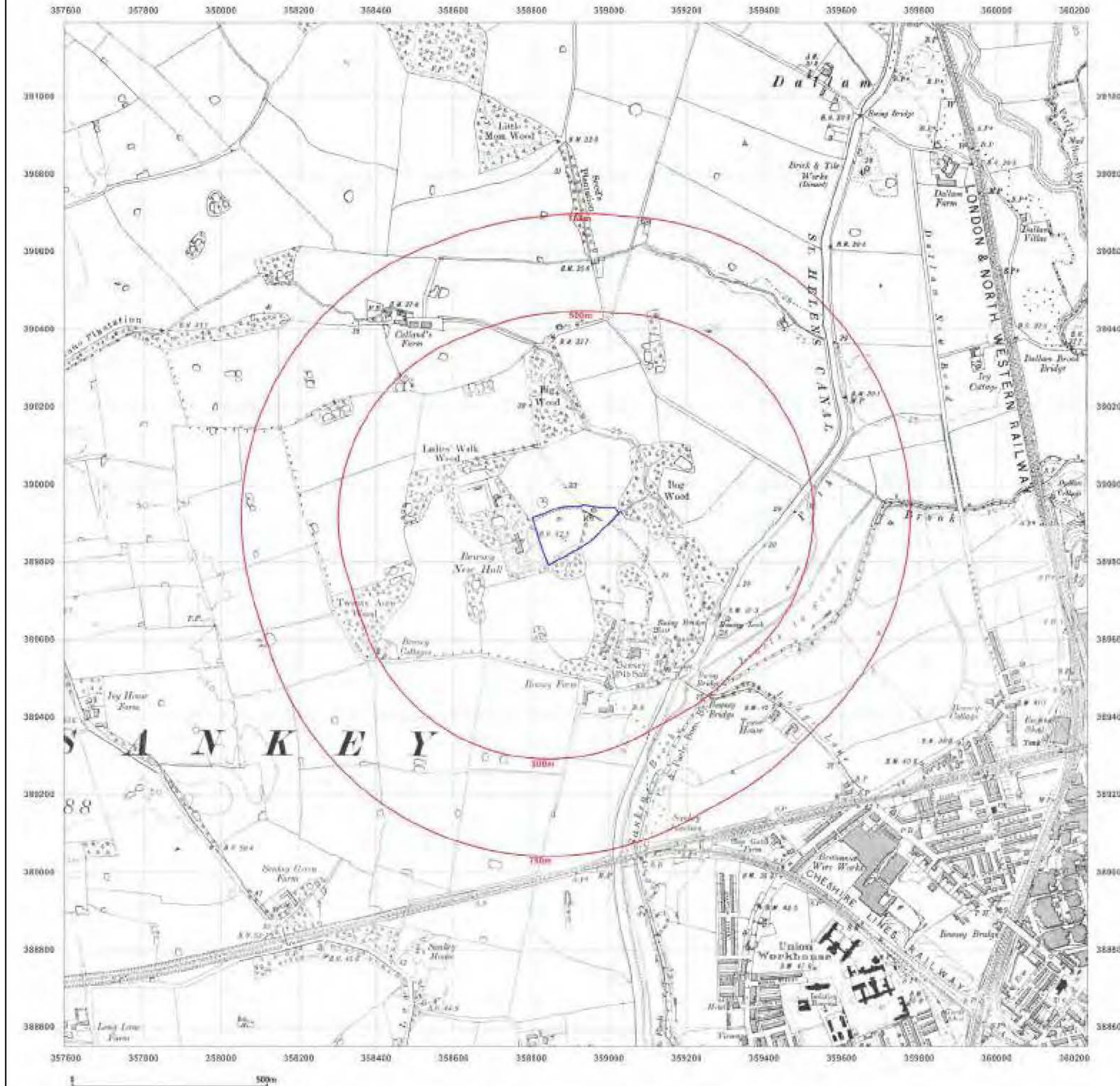
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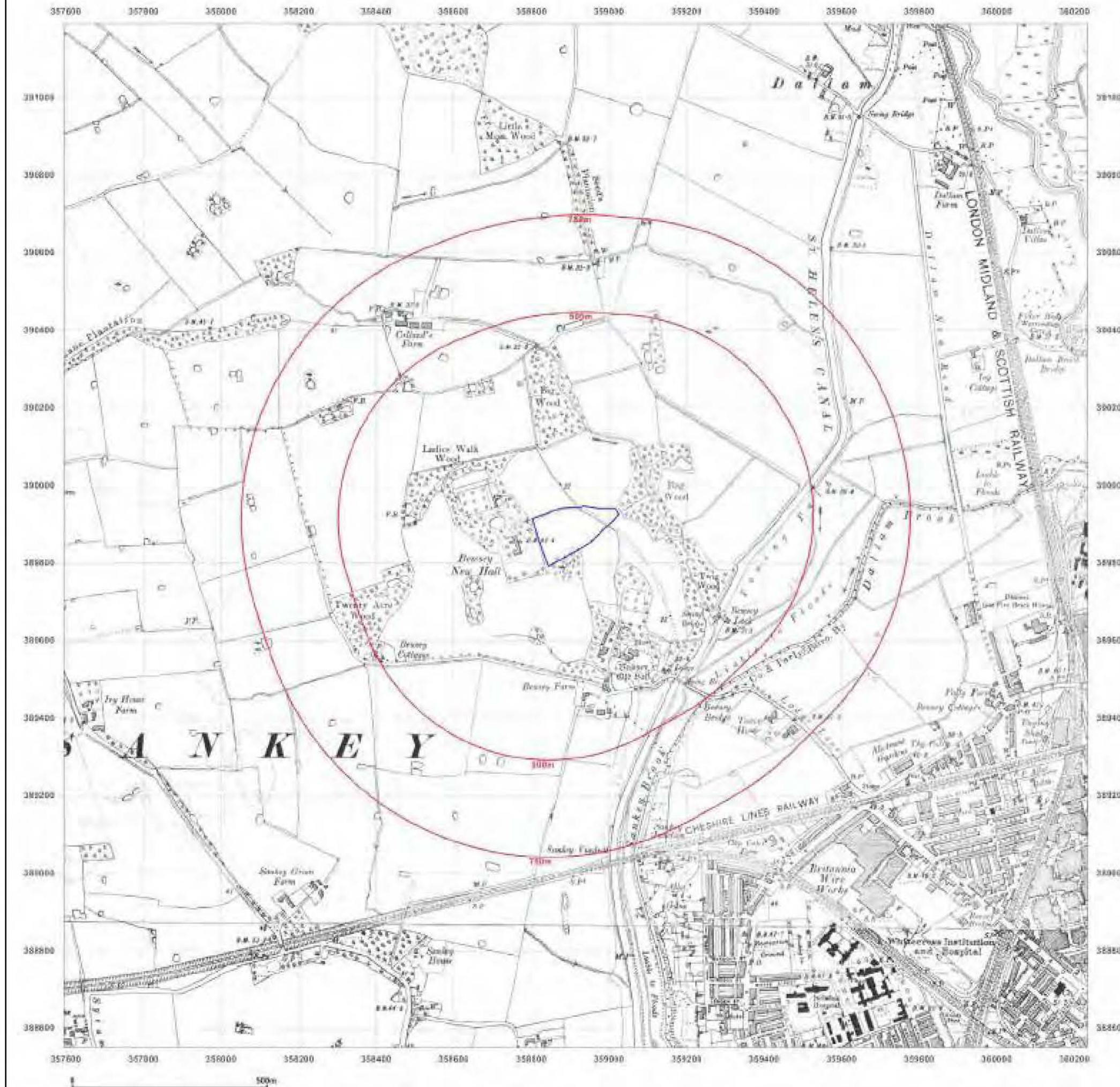
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**Map Name:** County Series

**Map date:** 1926

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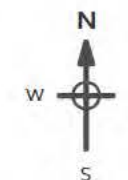
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Map Name: County Series

Map date: 1938

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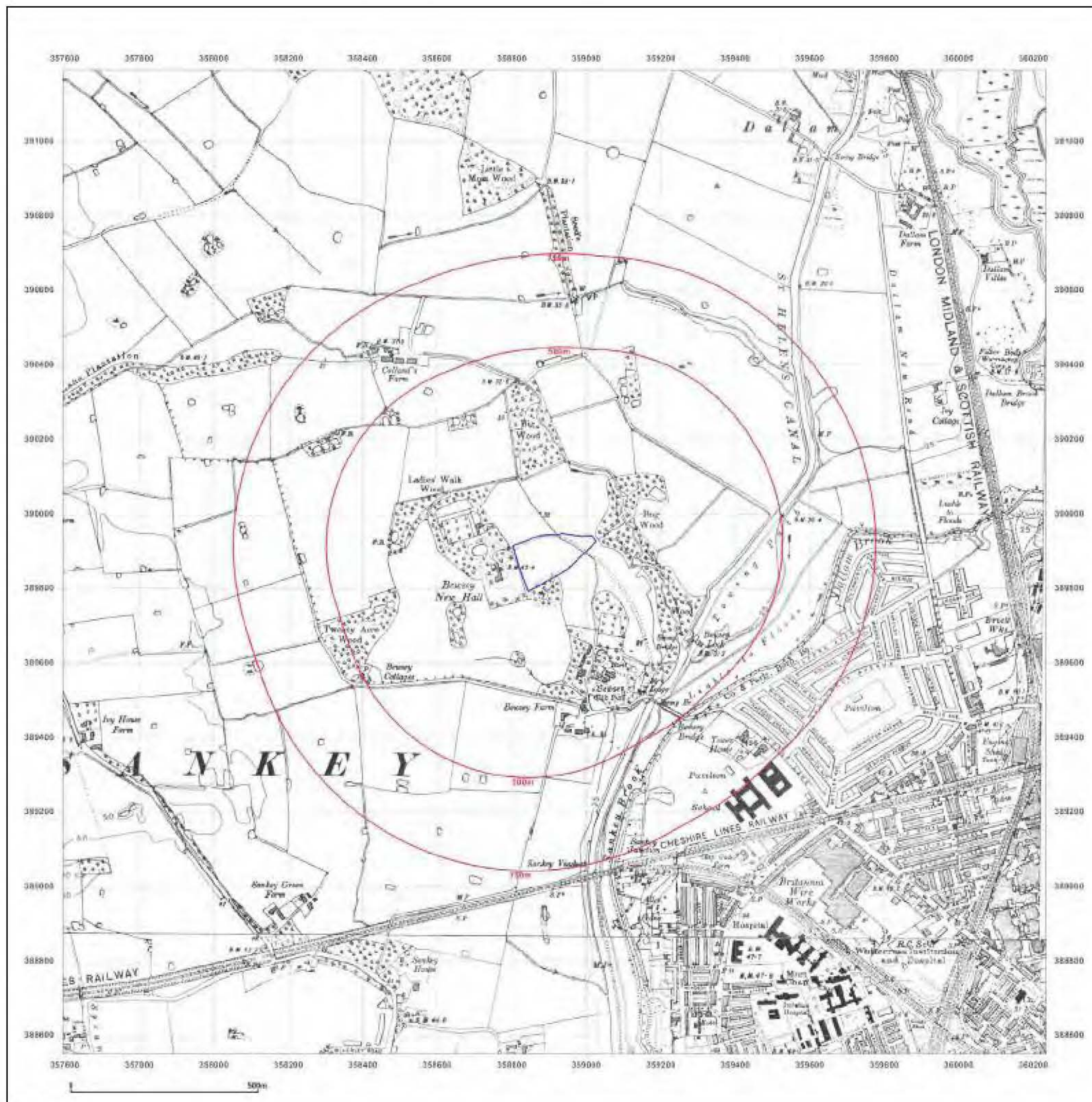


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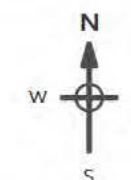
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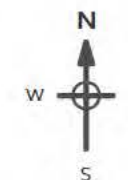
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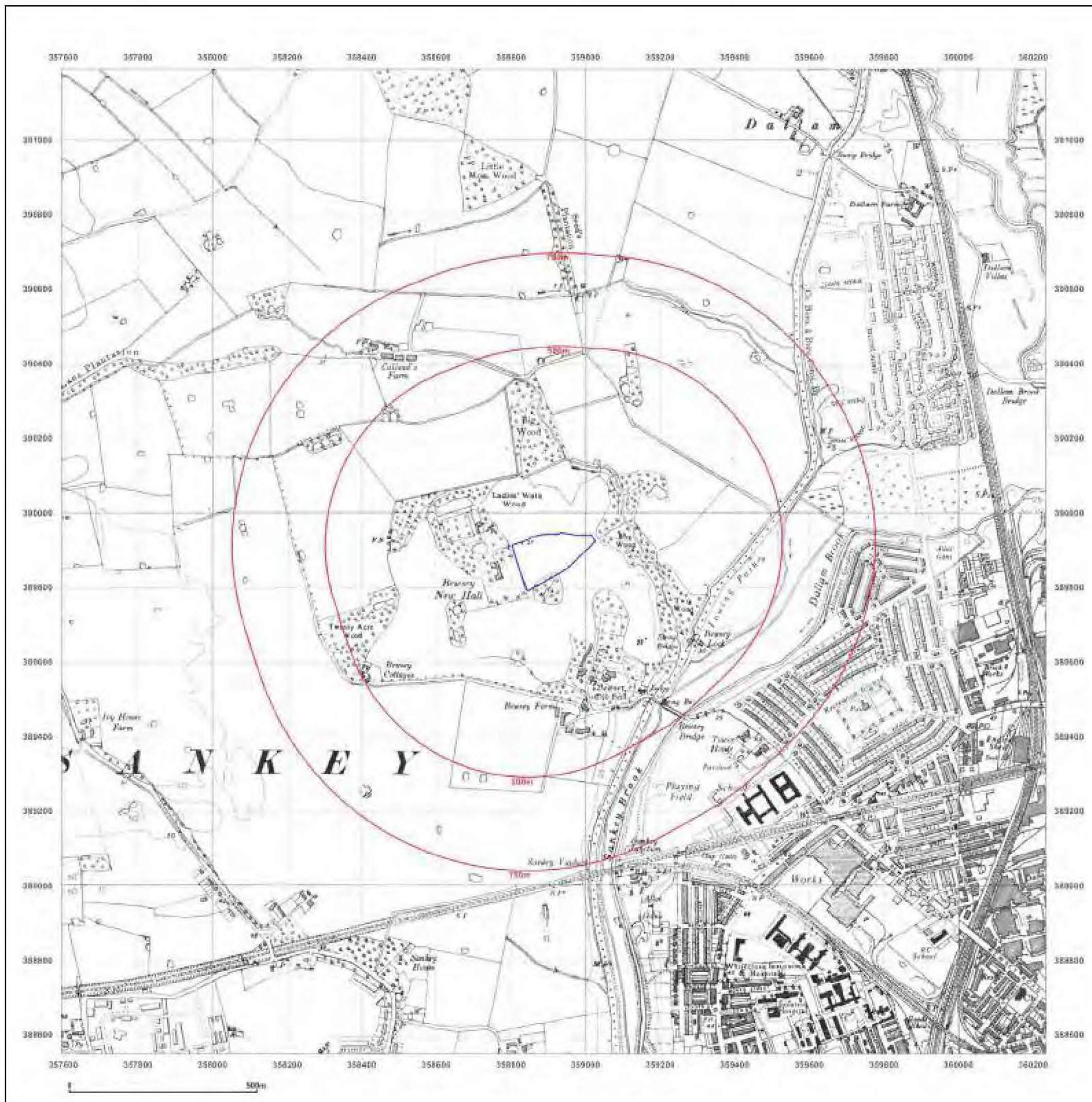


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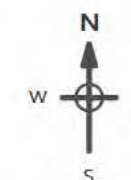
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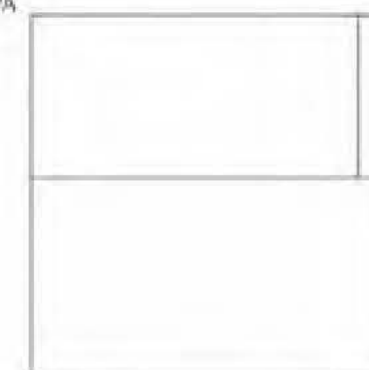
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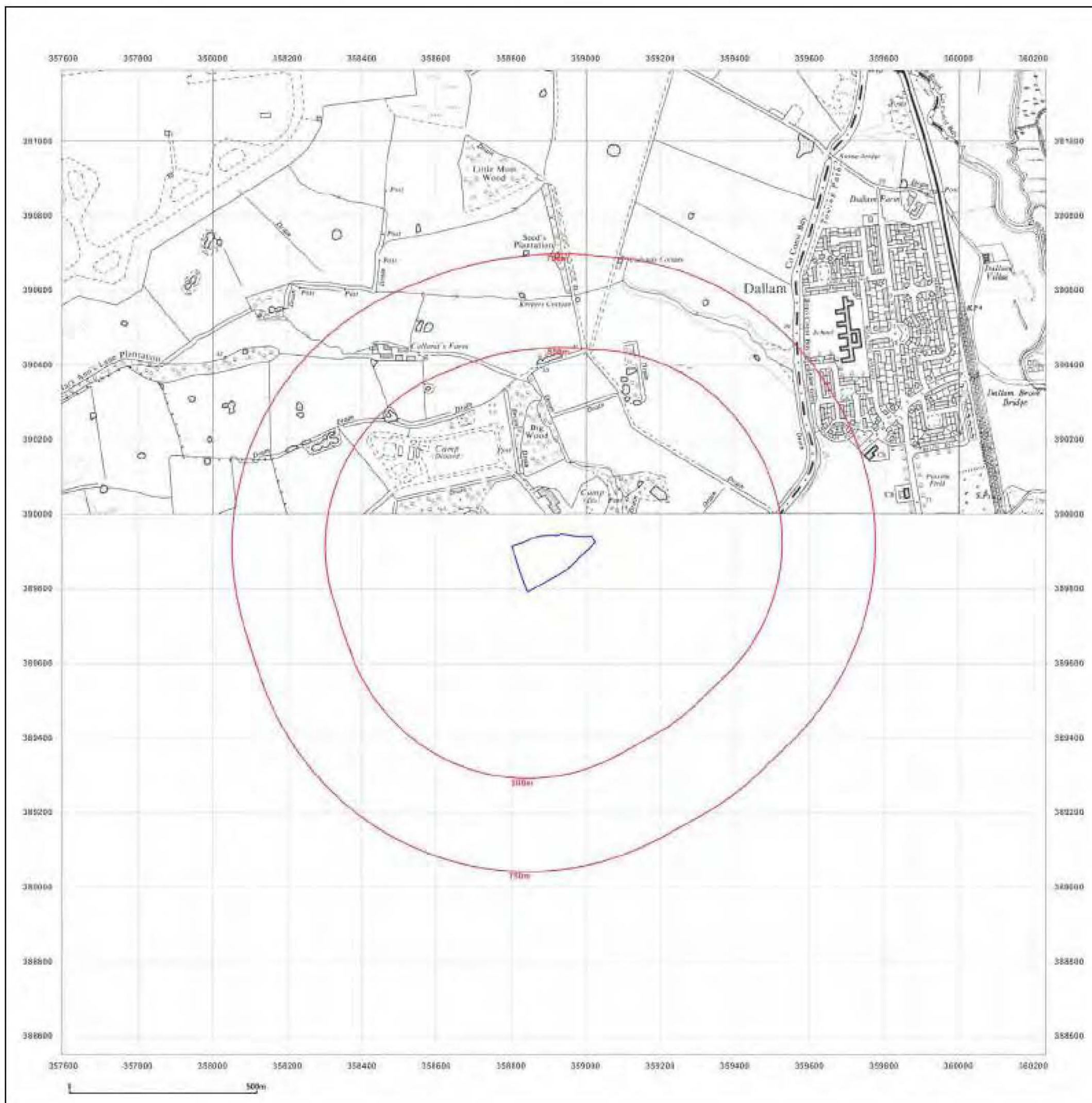


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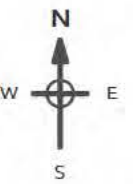
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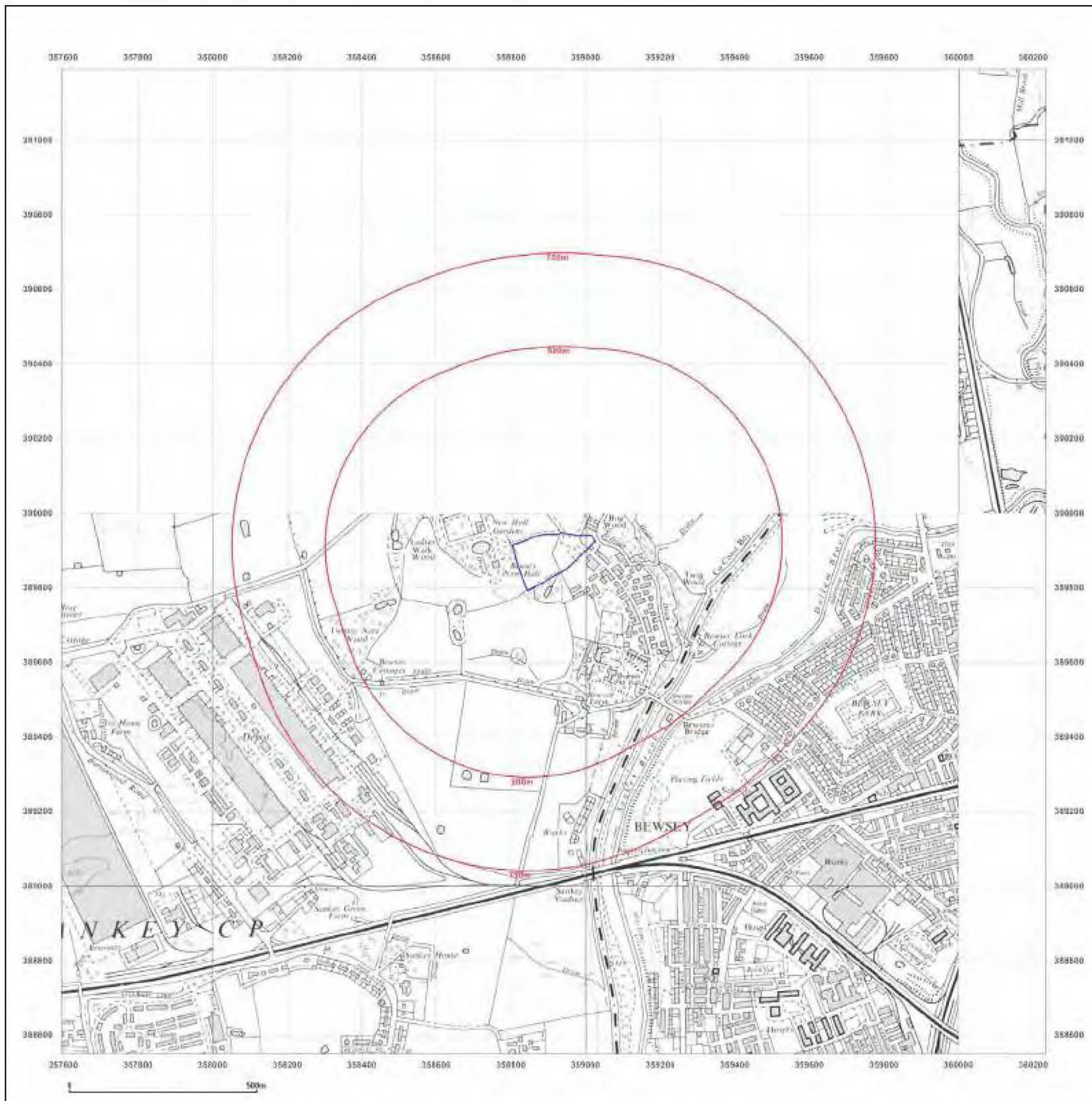


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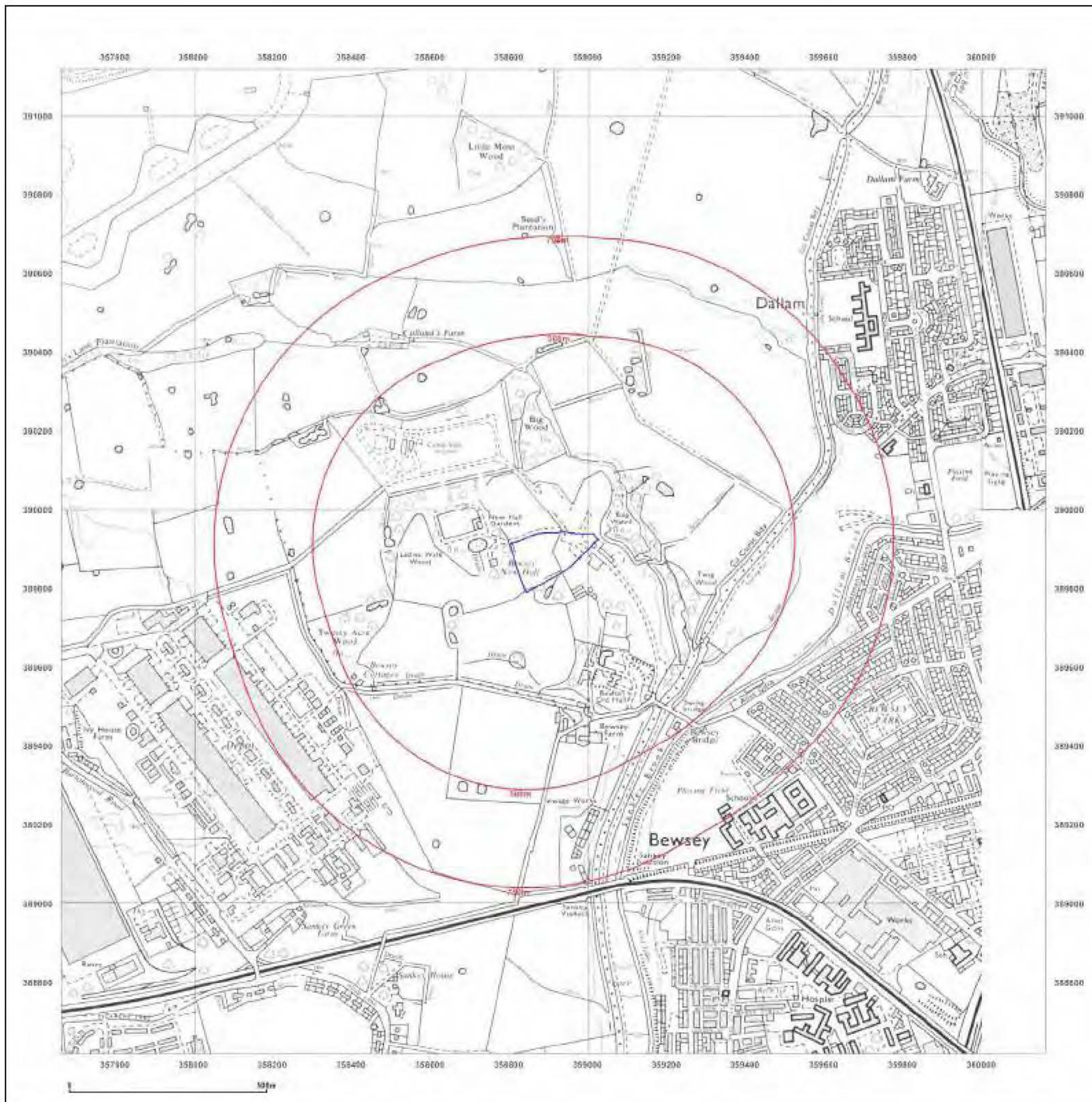


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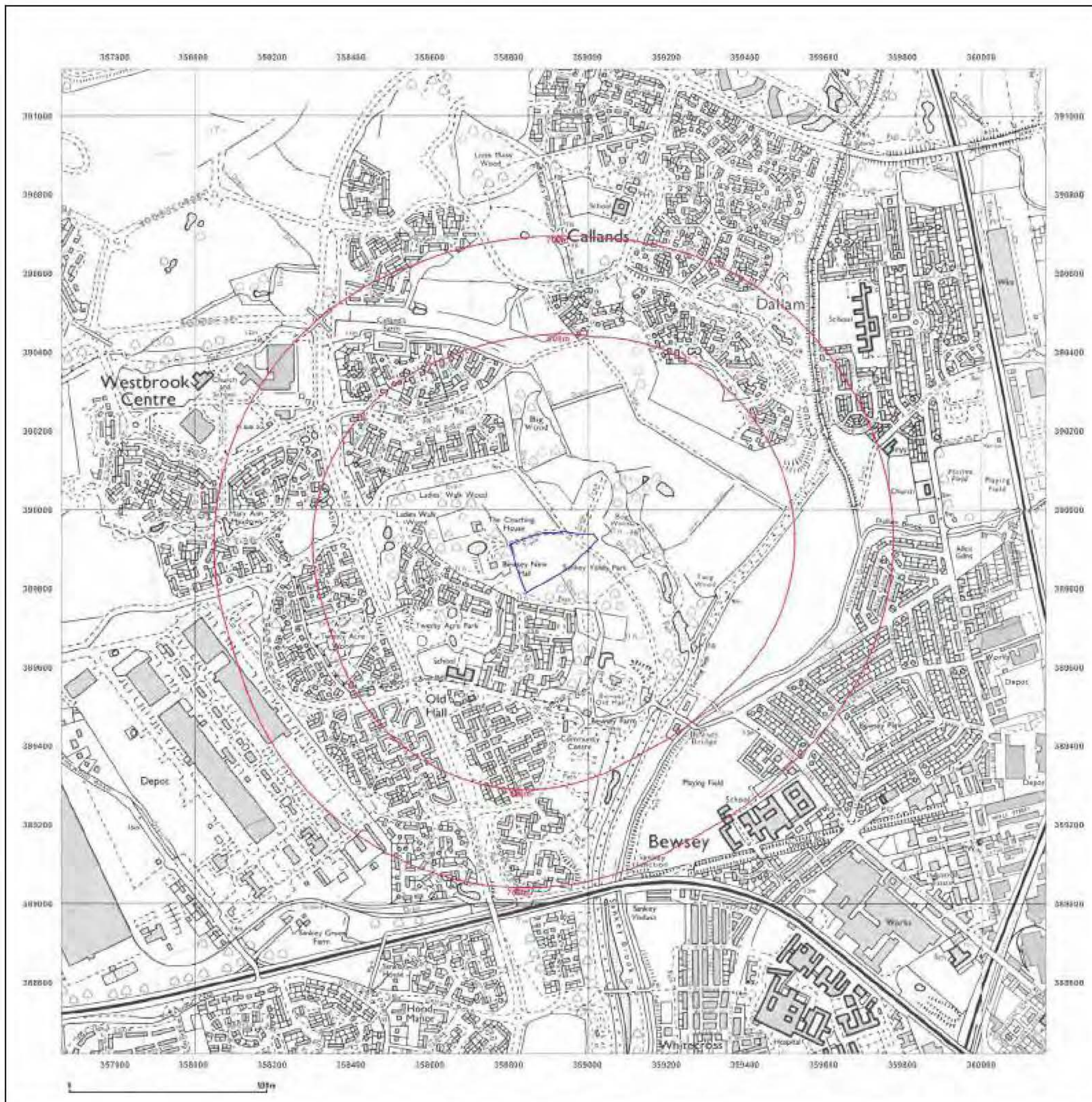


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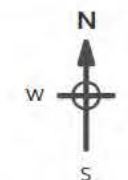
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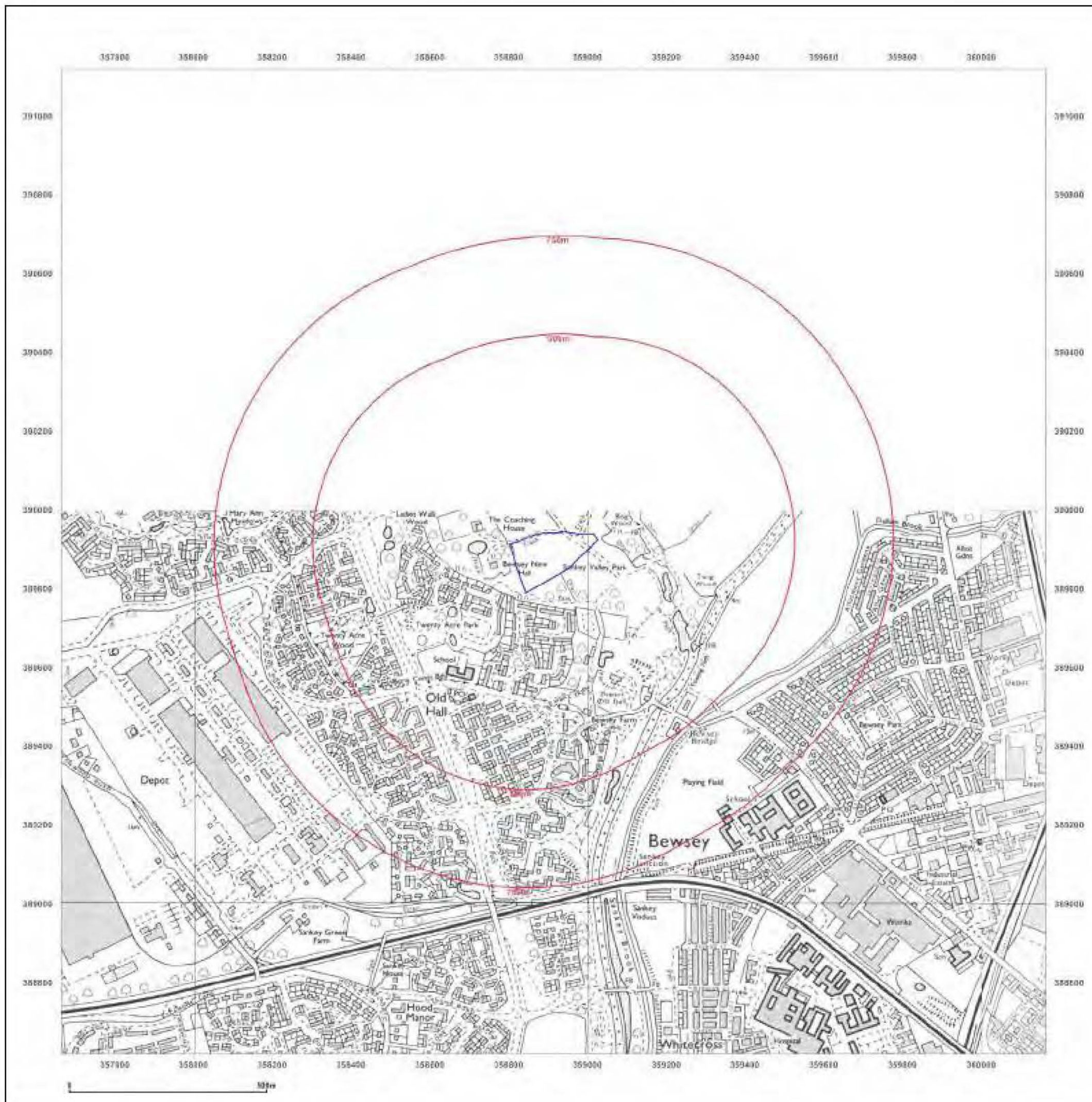


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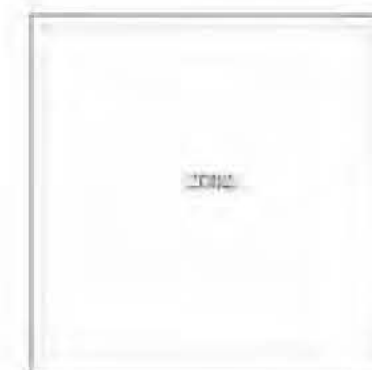
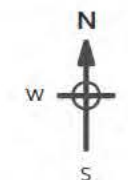
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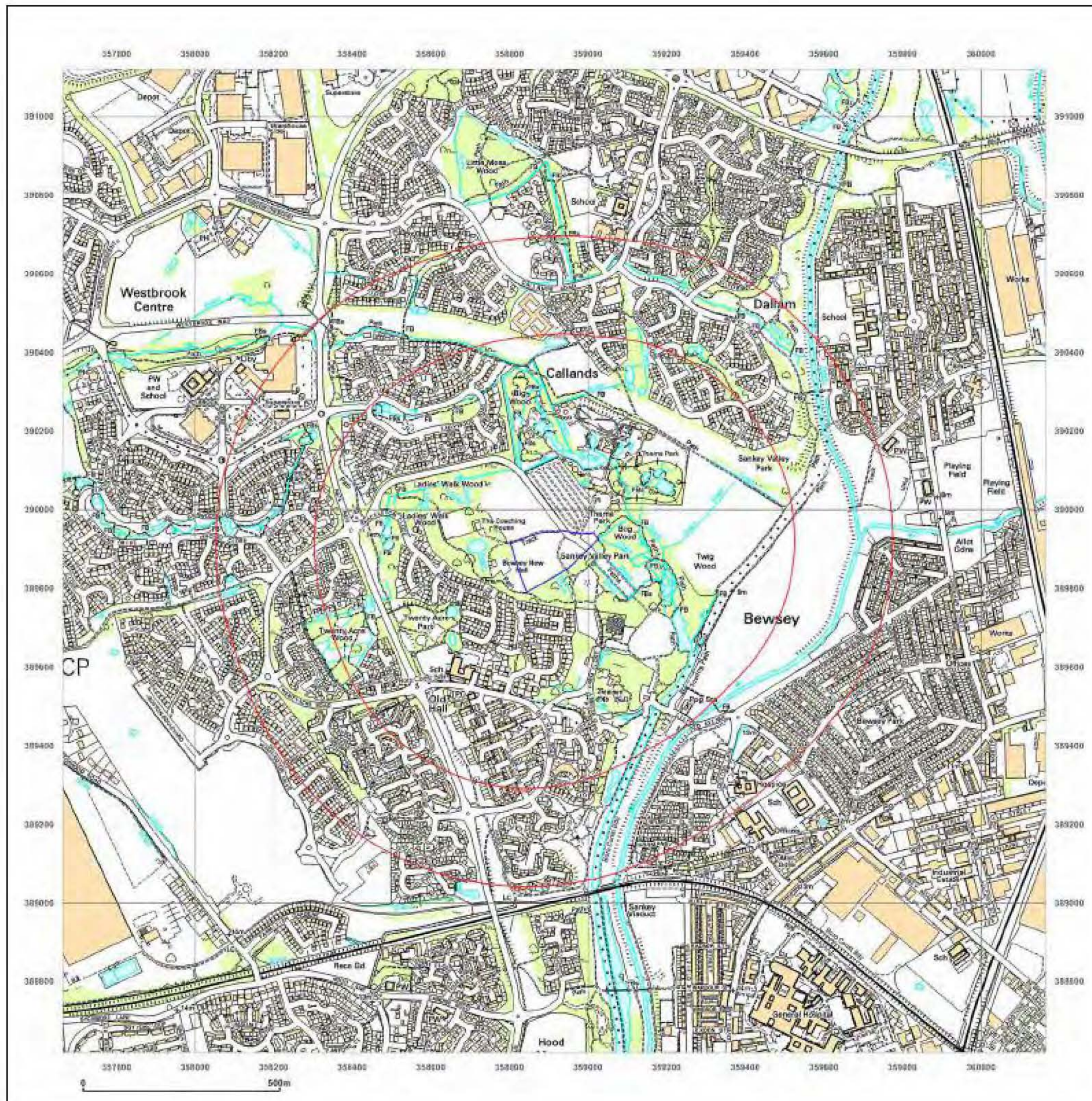


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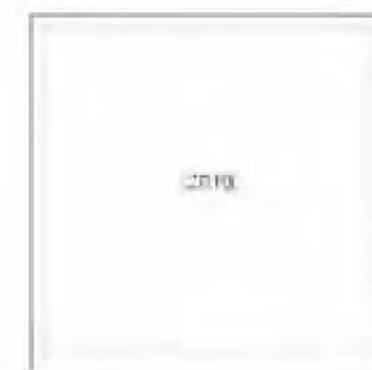
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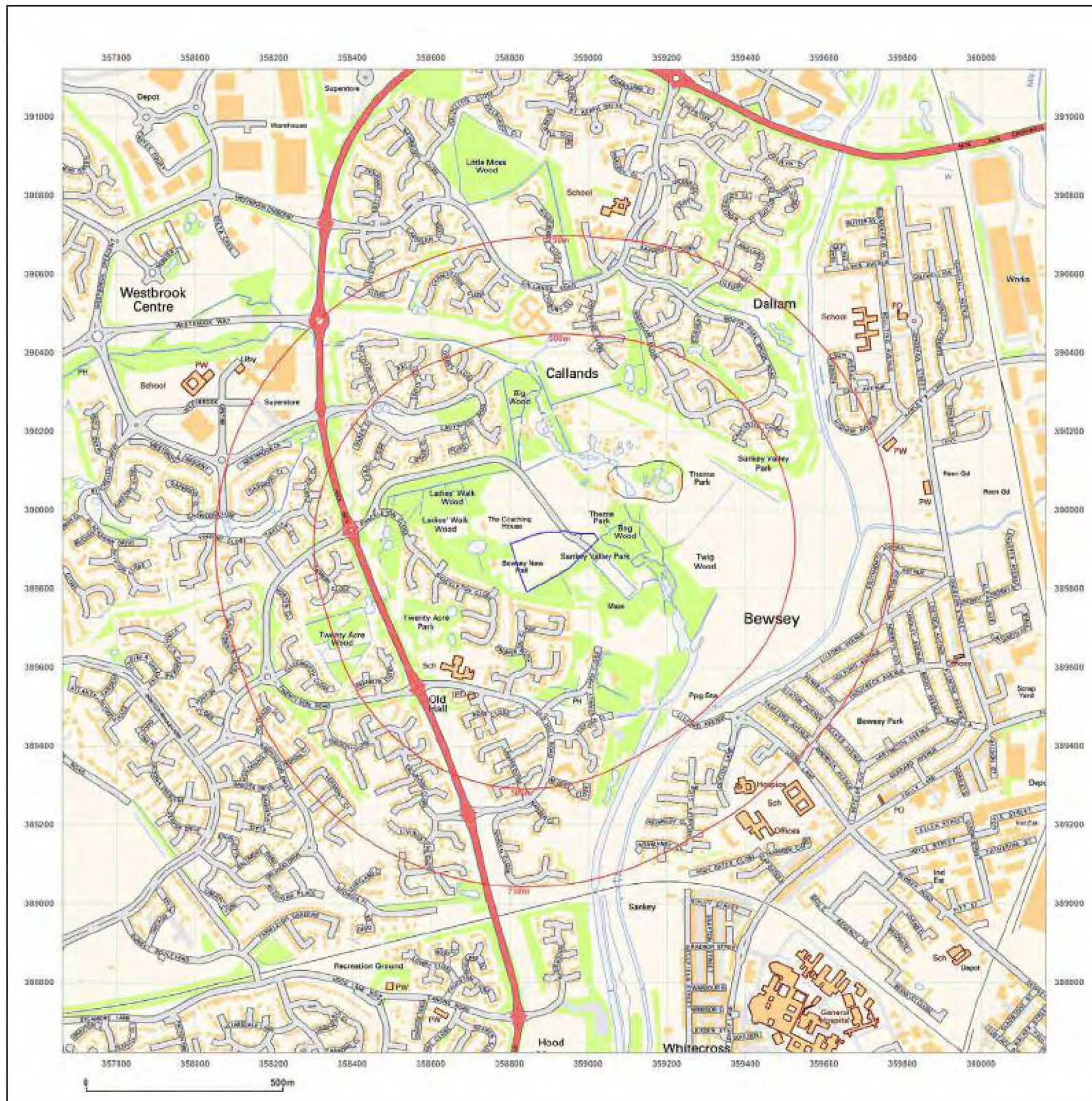


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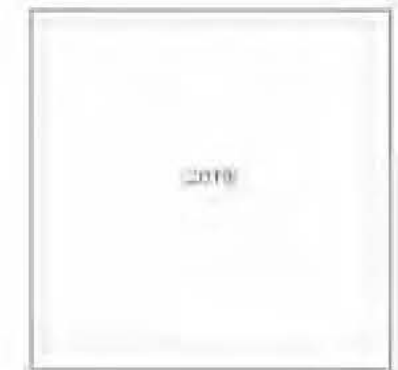
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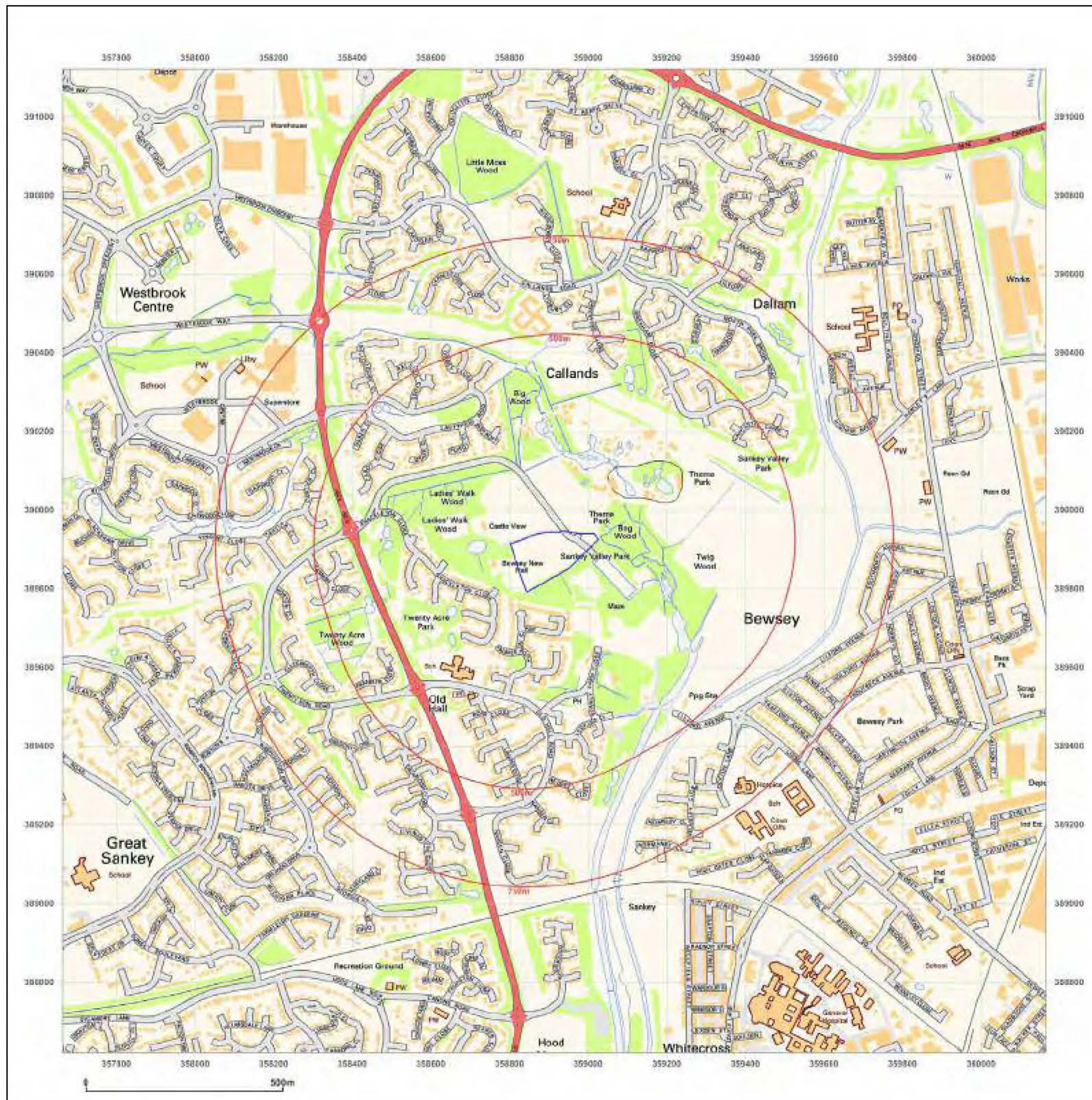


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**Gulliver's World Limited**

**Preliminary Geoenvironmental  
Investigation and Drainage Assessment  
Land at Gulliver's World Theme Park, Warrington,  
WA5 9YZ**

**January 2019**

---

**Prepared for**

**Gulliver's World Ltd.  
Shackleton Close  
Warrington  
WA5 9YZ**

**Prepared by**

**Egnol Environmental Ltd.  
Suite E  
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## Document Review

Version No.	Date of Review	Prepared By	Reviewed By	Approved By
1.0	01/11/2018	Owen Stevens	Steve Lowe	Owen Stevens
2.0	12/11/2018	Owen Stevens	Steve Lowe	Owen Stevens
3.0	04/01/2019	Owen Stevens	Steve Lowe	Owen Stevens

## EXECUTIVE SUMMARY

<b>Site Address</b>	Land Adjacent to hotel, Gullivers World, Shackleton Close, Warrington, WA5 9YZ
<b>National Grid Reference</b>	358850E 389950N
<b>Site Area</b>	0.95 ha
<b>Background</b>	
<p>Egniol Environmental Consultants Ltd. (EEL) has been commissioned by Gullivers World Ltd (the client) through their agents, to provide a preliminary ground investigation and comments on the drainage design for a proposed development of themed accommodation for the Gullivers World site in Warrington.</p> <p>It is understood that the client intends to develop the site for themed visitor and overnight tourist accommodation comprising walkways, static modular units sited on concrete slabs and lightly loaded themed terraces with a central portal framed structure and water features. The site has already undergone Phase I investigation by third party consultants and the report has been made available to us. The Phase I investigation highlighted the requirement for further UXO research and a basic appraisal of potential contamination risks and indication of the geotechnical properties of the ground. In addition, we have provided comments on possible drainage solutions</p>	
<b>Contaminated Land Risk Assessment</b>	
<p>The UXO risk assessment indicated no risk from large scale air raid UXO with a low risk from allied small arms storage. The third party advice recommended further historical research but examination of the Phase I historical plans indicated that allied billeting and main storage areas were not located on the area under investigation</p> <p>An initial investigation has been completed with seven follow up trial pits with six tests carried out for contamination levels. The results have shown elevated levels of Total Petroleum Hydrocarbons associated with surface road planings in the location of TP1 which would be expected. It should be noted that the TOC level for this sample was 4.29% (7.4% SOM equivalent) which raises the S4UL to 1700mg/kg. Therefore, in this case a level of 1330mg/kg does not pose a risk to end users of the site.</p> <p>No further areas of elevated contaminants have been detected on site. No groundwater has been encountered on the site and each trial pit was terminated in cohesive firm to stiff natural clay. Based on the results no remedial measures are required. The use of road planings on paths and as hard standing should be assessed during the construction phase; although it is expected that sealed compacted tarmac will be used in all publicly assessable areas.</p> <p>No indication of sources of ground gas or putrescible or organic ground was encountered and therefore we do not consider there to be a risk from ground gases on the site.</p>	
<b>Preliminary Drainage comments</b>	
<p>It is proposed to discharge foul sewage into the existing drainage infrastructure on site, installed as part of a previous planning approval. The site is connected to the mains sewer network. Assuming the statutory undertaker (United Utilities) agree there is sufficient capacity, there is no in-principle concern about this method of disposal.</p> <p>It is recommended that surface water is dealt with via soakaways. Further infiltration testing will be required in specific areas but initial permeability tests have indicated that soakaways is likely to be feasible. A network of infiltration ditches/swales could be installed along the southern boundary of the site. The pond feature</p>	

that is proposed as “Gully Bay Accommodation” could also potentially be used as in infiltration feature. See attached concept drawing mark-up.

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Appendix A—Continued

Appendix B—Continued

Appendix C—Continued

Appendix D—Continued

Appendix E—Continued

#### APPENDICES

Appendix A—Continued

Appendix B—Continued

## 1.0 INTRODUCTION

Egniol Environmental Ltd. (EEL) has been instructed by Gullivers World Ltd to prepare a preliminary Phase II investigation and drainage comments in relation to the proposed development of a themed accommodation area and leisure development on land to the west of the recently constructed Gullivers Hotel. A Site location plan is contained in the Appendix and details of the investigation are detailed in this report.

EEL has been provided with the following information in order to prepare the report:

- Clarkebond: Phase I Preliminary Risk Assessment (Desk Study; 12/1017; WB04362/R1)
- Indicative sketch proposals for the site layout; and building foundations (cross-section)
- Indicative sketch proposals for the drainage layout.

A Site Location Plan, Trial Pit Location Plan, Proposed Development and marked up drainage concept are presented in Appendix I, Figures.

### 1.1 Report Objectives

The purpose of the Preliminary Phase II and Drainage Comments is to provide information on potential contamination aspects of the site and provide an indication of foundation conditions. In addition, preliminary comments on drainage solutions will be provided. This is in accordance with recommendations made in Clarkebond report WB04362 stating:

*“The proximity to the RAF land warrants nominal investigation”*

### 1.2 Scope of Works

With regard to the proposed development of the site an initial Unexploded Ordnance (UXO) Risk Assessment is to be carried out to determine the potential for UXO to be present. Following this a series of trial pits are proposed to be excavated across the site to provide coverage across the proposed development site. Samples will be taken to assess levels of chemical contamination and in-situ tests will be carried out to determine the infiltration rates and basic geotechnical properties of the soils. The following was carried out:

- Specialist UXO Desk Based Risk Assessment
- Seven Trial Pits excavated to a maximum depth of 2.30mbgl;
- Two soakaway tests to BRE Digest 365;
- Laboratory Geotechnical testing (Atterberg and remoulded CBR)
- In-situ hand shear vane testing; and
- Seven Contamination tests comprising of a combination of As, Cd, Cr (III, IV), Hg, Ni, Se, Cu, Zn, Asbestos, 16 EPA PAH, Phenols, TPHCWG and BTEX+MTBE.

### 1.3 Redevelopment Plan

EEL understands that the proposal is to construct on the site, leisure and tourist resort accommodation comprising:

- o Themed accommodation of a 'fairytale castle' and 'pirate ship' set around a water feature, together with a café, crèche and craft centre;
- o Ancillary housekeeping/maintenance building and reception;
- o Timber lodges/chalets sited on the land .

All the units of accommodation are to be prefabricated self-contained units constructed off-site and sited on poured concrete bases. They will have a separate water and electricity supply with foul and sewage waste directed to mains disposal.

### 1.4 Summary of Parties Involved

Name of Party	Function / Interest
Gulliver's World Ltd	Land Owner / Developer
EEL Ltd	Geo-Environmental Consultant
County Planning Ltd	Planning Consultants
Warrington Metropolitan Borough Council	Human Health Regulator / Local Planning Authority
Environment Agency	Controlled Waters Regulator

### 1.5 Confidentiality

EEL 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 EEL; a charge may be levied against such approval.

## 2.0 SITE CHARACTERISTICS

### 2.1 Site Location and Description

<b>Site Address</b>	Land Adjacent to hotel, Gullivers World, Shackleton Close, Warrington, WA5 9YZ
<b>National Grid Reference</b>	358850E 389950N
<b>Site Area</b>	0.95 ha

The site is relatively flat with a slight western incline. Mature trees are present along the western and southern boundaries of the site as well as some sporadically found across the site. The site is currently used as an overflow carpark with an area surfaced with road planings and a stockpile of planings used for path maintenance. The northern boundary is defined by an internal road, the western by a tree line, the eastern by the main Gulliver's World car park and hotel, and the southern by woodland.

### 2.2 Geology & Ground Conditions

The eastern portion of the site is noted to be underlain by Glaciofluvial Sheet Deposits comprising sand and gravel with the western portion underlain by Glacial Till, extending to greater than 8mbgl. The solid geology comprises sandstone of the Wilmslow Sand Formation

### 2.3 Hydrogeology and Hydrology

#### Groundwater

Groundwater is noted at shallow depth at approximately 0.5mbgl

#### Surface Waters

No surface water features are noted on site however a number of drains are noted in the surrounding. The nearest water feature is a secondary river approximately 200m north of the site.

### **3.0 SITE INVESTIGATION**

#### **3.1 General**

All exploratory hole work and associated sampling, and logging was carried out in accordance with techniques outlined in 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. These are shown on the exploratory hole location plan contained in Appendix I.

A ground investigation has been designed based on the findings of the desk study with exploratory holes advanced to provide information on baseline conditions across the site. The investigation has also been used to collect Geoenvironmental information on the former use of the site.

Exploratory fieldwork was finalised on the 17<sup>th</sup> September 2018.

#### **3.2 Exploratory Holes**

The depths of all exploratory holes, descriptions of the materials encountered, samples taken together with any other relevant information can be found in the exploratory hole logs, Appendix II.

Seven machine excavated trial pits were advanced to between 1.40m and 2.30m bgl to investigate ground conditions in the proposed development area.

#### **3.3 Samples**

Samples for Contamination testing were obtained from the exploratory holes and taken to Socotec Ltd for selected testing as scheduled by EEL. Selected soil samples were submitted for a range of chemical analysis comprising, As, Cd, Cr (III, IV), Hg, Ni, Se, Cu, Zn, Asbestos, 16 EPA PAH, Phenols, TPHCWG and BTEX+MTBE. Results of the chemical laboratory testing are reproduced in Appendix III.

#### **3.4 Soakaway Testing**

Trial Pits 1 and 2 were utilised to carry out soakaway testing in accordance with BRE Digest 365. The results are included in Appendix II

#### **3.5 Hand Shear Vanes**

Hand shear vane testing was carried out in cohesive deposits in all Trial Pits. The results are noted on the Trial Pit Logs in Appendix II.

#### **3.6 Ground Conditions**

##### **3.6.1 Summary of Ground Conditions**

The ground investigation generally confirms the published geology and identifies the strata set out in Table 3.1 below.

**Table 3.6 Summary of Strata**

Strata	Typical Description	Min Depth to Top of Strata (m)	Max Depth to Top of Strata (m)	Max Thickness (m)
Made Ground/Topsoil	Soft dark brown silty sand clay with occasional roots and brick fragments.	0.00	0.60	0.50
SAND	Fine medium dense slightly silty yellowish brown SAND	0.50	0.60	0.76
CLAY	Firm medium to high strength orangish brown light brown silty CLAY	0.65	1.26	1.00

### 3.6.2 Groundwater Conditions

Groundwater was not encountered in any Trial Pit.

### 3.6.3 Ground Gas

No organic soils or putrescible matter was encountered during the investigation and the low permeability clay would limit the possibility of gas migration onto site. We consider that no risk is posed to the site development from ground gas.

## 4.0 RESULTS AND INTERPRETATION

### 4.1 Preliminary UXO Appraisal

An Express UXO Appraisal was commissioned by 1<sup>st</sup> Line Defence to assess the risk of UXO associated with the use of the site. The Appraisal recommended a detailed UXO risk assessment to examine risk associated with the former use of the surrounding Airbase land and the possibility of the land having been targeted during WWII. The overall risk was determined to be low with the main risk being from the presence of the former Auxiliary Camp. Historical map records within the Phase I desk study indicated that the main Auxiliary Camp was not located on the land under consideration (being outside the application site boundary) and as such this further appraisal is deemed to have been completed and no further assessment is necessary. The report is included as Appendix IV.

### 4.2 Tier II Generic Quantitative Contaminated Land Risk Assessment

EEL has undertaken a Tier II qualitative risk assessment to determine if any potential contaminants within the underlying soils pose an unacceptable level of risk to the identified receptors.

At a Tier II stage, the long term (chronic) toxicity risk to human health is assessed by utilising appropriate and conservative Generic Assessment Criteria (GAC) to determine whether there are actual or potential unacceptable risks at the site and if any viable pollutant linkages are present.

To undertake the Tier II assessment within the context of the development proposal, EEL has determined that the most appropriate GAC values available will be those based upon a residential land use with the cultivation and ingestion of home-grown produce taken into account. Although this is not the proposed land use it is the most conservative and takes account of child receptors.

The following assessment, summarised below in Table 3.1, has primarily adopted the S4UL (Suitable for Use Levels reference values published by LQM/CIEH in 2015, the S4ULs). Currently, no published GAC value is available for cyanide and therefore EEL has utilised the Environmental Agency Contaminated Land Exposure Assessment Tool (CLEA v1.06) to derive the relevant GAC for this proposed land use. 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, bioaccessibility and exposure modelling research to date.

Table 4.2 Summary of Generic Human Health Toxicity Assessment for a Residential End Use

Determinand	Units	GAC	GAC Source	n	[mc]	Location / Strata	Primary Pathways	Assessment
<b>Inorganics</b>								
Boron	mg/kg			4	0.8			No Further Action
Arsenic	mg/kg	37	(i)		10.9		1	
Cadmium	mg/kg	11	(i)		0.3		1, 2	
Chromium (VI)	mg/kg	6	(i)		<0.1		1, 2, 3	
Lead	mg/kg	200	(iv)		64.2		1, 2	
Mercury [Inorganic]	mg/kg	40	(i)		0.13		1, 2	
Nickel	mg/kg	130	(i)		35.6		1	
Selenium	mg/kg	250	(i)		<0.5		1, 2	
Copper	mg/kg	2,400	(i)		35.1		1, 2	

Determinand	Units	GAC	GAC Source	n	[mc]	Location / Strata	Primary Pathways	Assessment
Zinc	mg/kg	3,700	(i)		83.4		1, 2	
TOC	%	N/A	(v)		4.29		1	
Asbestos	-	D.	-		N.D		3	
<b>Organics – PAHs and Phenol</b>								
Phenols	mg/kg	280	(ii)		<0.5		2	
Naphthalene	mg/kg	2.3	(ii)		<0.08		4	
Acenaphthylene	mg/kg	170	(ii)		<0.08		2	
Acenaphthene	mg/kg	210	(ii)		<0.08		2	
Fluorene	mg/kg	170	(ii)		<0.08		2	
Phenanthrene	mg/kg	95	(ii)		0.16		2	
Anthracene	mg/kg	2,400	(ii)		<0.08		2	
Fluoranthene	mg/kg	280	(ii)		0.89		1, 2	
Pyrene	mg/kg	620	(ii)		0.74		1, 2	
Benzo(a) Anthracene	mg/kg	7.2	(ii)		0.43		1	
Chrysene	mg/kg	15	(ii)	4	0.44	N/A	1	No Further Action
Benzo(b) Fluoranthene	mg/kg	2.6	(ii)		0.46		1	
Benzo(k) Fluoranthene	mg/kg	7.7	(ii)		0.20		1	
Benzo(a)Pyrene	mg/kg	2.2	(ii)		0.39		1	
Indeno (123-cd)Pyrene	mg/kg	27	(ii)		0.29		1	
Dibenzo(a,h) Anthracene	mg/kg	0.24	(ii)		0.11		1	
Benzo(ghi) Perylene	mg/kg	320	(ii)		0.43		1	
Benzene	mg/kg		(ii)		<0.01		4	
Toluene	mg/kg		(ii)		<0.01		4	
Ethyl Benzene	mg/kg		(ii)	3	<0.01		4	No Further Action
Xylene	mg/kg		(ii)		<0.03		4	
MTBE	mg/kg		(ii)		<0.02		4	
<b>Organics – TPHs</b>								
TPH C <sub>5</sub> -C <sub>6</sub>	mg/kg	42	(iii)		<0.20		4	
TPH C <sub>6</sub> -C <sub>8</sub>	mg/kg	100	(iii)		<0.20		4	
TPH C <sub>8</sub> -C <sub>10</sub>	mg/kg	27	(iii)		<0.20		4	No Further Action
TPH C <sub>10</sub> -C <sub>12</sub>	mg/kg	74	(iii)		<sup>(9,13)</sup> <4.0	N/A	4	
TPH C <sub>12</sub> -C <sub>16</sub>	mg/kg	140	(iii)		<sup>(13)</sup> 4.30		1, 4	
TPH C <sub>16</sub> -C <sub>21</sub>	mg/kg	260	(iii)		<sup>(13)</sup> 48.5		1	
TPH C <sub>21</sub> -C <sub>35</sub>	mg/kg	1,100	(iii)		<sup>(13)</sup> 1330	TP1 (0.3m)	1	Road Planings surfacing



Determinand	Units	GAC	GAC Source	n	[mc]	Location / Strata	Primary Pathways	Assessment
<b>Key</b>								
[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)	S4UL – Conservative Assessment Approach of 1% SOM;							
(iii)	S4UL –1% SOM and assumed worst case aliphatic / aromatic compound;							
(iv)	Defra Category 4 Screening Level (2014);							
(v)	CLEA 1.06 Derived Value.							

Referring to Table 4.1, the results of this direct comparison indicates that the screening values have been exceeded for the following determinands:

**TPH C21-C35** This was located in an area of road planings and should be taken account of during any site strip. No other elevated levels have been detected and during the ground investigation no visual and olfactory evidence of contamination was observed or encountered. It should be noted that the TOC level for this sample was 4.29% (7.4% SOM equivalent) which raises the S4UL to 1700mg/kg. Therefore, in this case a level of 1330mg/kg does not pose a risk to end users of the site, however, given the nature of the material it should not be overlooked or incorporated into natural materials on the site.

We consider that no remediation is required.

## 5.0 SITE DRAINAGE COMMENTS

The proposed expansion of the Gulliver's World site to the west of the existing hotel consists of a mix of accommodation blocks and supporting facilities. A drainage system is understood to have been provided with the construction of the hotel, but it is unclear whether the as-built foul and surface water sewerage is separate or combined.

There is limited information available regarding the existing drainage system and it is recommended that a sewer tracing/CCTV survey is undertaken to establish more details.

Information within the affidavit of Julie Hilary Dalton dated May 2016 implies that the largest pipework that was installed for the hotel is 100mm diameter.

If the local system is a combined sewer (i.e. foul and surface water drain into the same network) of pipe diameter no greater than 100mm then it is unlikely that there will be any spare capacity for the expansion proposals. It is therefore likely that a new foul water system may be required to connect to the downstream public sewerage. A 1350mm diameter public combined sewer is located to the east of the existing Gullivers World park, within Sankey Valley Park.

If the local system is separated into foul and surface water then there may be capacity within the foul network to take the expanded site. This would need to be assessed following receipt of more information on the existing drainage system installed on site.

It is recommended that surface water is dealt with via soakaways. Further infiltration testing will be required in specific areas but initial permeability tests have indicated that soakaways could be feasible. A network of infiltration ditches/swales could be installed along the southern boundary of the site. The pond feature that is proposed as "Gully Bay Accommodation" could also potentially be used as an infiltration feature. See attached concept drawing mark-up.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

The Tier II Risk Assessment identified one elevated level of TPH in the Aliphatic C21-C35 band which was wholly associated with the road planing surfacing in TP1. The TOC level for this sample was 4.29% (7.4% SOM equivalent) which raises the S4UL to 1700mg/kg. Therefore, in this case a level of 1330mg/kg does not pose a risk to end users of the site, however, given the nature of the material it should not be overlooked or incorporated into natural materials on the site.

All other contaminants were found at levels below the GAC level for Residential with Plant Uptake. We consider that no further remedial measures are necessary. During redevelopment the area of road planings and stockpile should be segregated and not used as a construction material.

If the local system is a combined sewer (i.e. foul and surface water drain into the same network) of pipe diameter no greater than 100mm then it is unlikely that there will be any spare capacity for the expansion proposals. It is therefore likely that a new foul water system will be required to connect to the downstream public sewerage. A 1350mm diameter public combined sewer is located to the east of the existing Gullivers World park, within Sankey Valley Park.

It is recommended that surface water is dealt with via soakaways. Further infiltration testing will be required in specific areas but initial permeability tests have indicated that soakaways could be feasible. A network of infiltration ditches/swales could be installed along the southern boundary of the site. The pond feature that is proposed as "Gully Bay Accommodation" could also potentially be used as an infiltration feature.

## **7.0 CONTINGENCY PLAN**

### **7.1 Previously Unidentified Contaminants**

Should any significantly impacted material be encountered during the development, then it should be excavated and stockpiled on an impermeable material and sampled and tested for an appropriate range of determinants. In the event of asbestos the material should not be disturbed until such a time where an appropriate management plan can be implemented. We understand that there is a long standing asbestos avoidance and management plan already in operation by the client.

Depending on the nature of any contamination encountered, it may be necessary to undertake validation testing of the excavation faces and base in order to demonstrate that no such materials are left in-situ.

## 8.0 GLOSSARY

### TERMS

MMP	Material Management Plan
MM	Material Movement
FFL	Finished Floor Level
COP	Code of Practice
AST	Above ground Storage Tank
UST	Underground Storage Tank
EA	Environment Agency
CSM	Conceptual Site Model
GL	Ground Level
D	Not Detected
NR	Not Recorded
BSI	British Standards Institute
BGS	British Geological Survey
CLEA	Contaminated Land Exposure Assessment
SGV	Soil Guideline Value
GAC	General Assessment Criteria
CIEH	Chartered Institute of Environmental Health
PID	Photo Ionisation Detector
CIRIA	Construction Industry Research Association
GSV	Gas Screening Value
EQS	Environmental Quality Standard
DWS	Drinking Water Standard
PAH	Poly Aromatic Hydrocarbon
TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
VOC	Volatile Organic Compound
SVOC	Semi Volatile Organic Compound
SPT	Standard Penetration Test
VCCs	Vibro Concrete Columns
QA	Quality Assurance

### UNITS

m	Metres
km	Kilometres
%	Percent
%v/v	Percent volume in air
mb	Milli Bars (atmospheric pressure)
l/hr	Litres per hour
µg/l	Micrograms per Litre (parts per billion)
ppb	Parts Per Billion
mg/kg	Milligrams per kilogram (parts per million)
ppm	Parts Per Million
mg/m <sup>3</sup>	Milligram per metre cubed
m bgl	Metres Below Ground Level
m bcl	Metre Below Cover Level
mAOD	Metres Above Ordnance Datum (sea level)
kN/m <sup>2</sup>	Kilo Newtons per metre squared
µm	Micro meter

## 9.0 LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between EEL Ltd and the Client as indicated in Section 1.2.
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. 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 EEL Ltd 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.
7. 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.
8. Where mention has been made 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. 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. EEL can not 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 EEL 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 EEL in this connection without their explicit written agreement there to by EEL.
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.

## APPENDICES



## APPENDIX I- FIGURES



NOTES

REV	MODIFICATIONS	BY	CH	AP	DATE
-----	---------------	----	----	----	------

UBU Ltd.

GRIT RECOVERY SHED

Site Overview

DRAWN BY	AP	DATE	24.04.2014
CHECKED BY	AP	SCALE @ A1	NOT TO SCALE
APPROVED BY	DS	ISSUE	Dr
		REVISION	-

DRAWING NUMBER  
Figure 1





NOTES

REV	MODIFICATIONS	BY	CH	AP	DATE
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UBU Ltd.

GRIT RECOVERY SHED

Site Overview

DRAWN BY	AP	DATE	24.04.2014
CHECKED BY	AP	SCALE	AS NOT TO SCALE
APPROVED BY	DS	ISSUE	Dr
		REVISION	-

DRAWING NUMBER  
Figure 1





NOTES

REV	MODIFICATIONS	BY	CH	AP	DATE
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UBU Ltd.

GRIT RECOVERY SHED

Site Overview

DRAWN BY	AP	DATE	24.04.2014
CHECKED BY	AP	SCALE	# A1 NOT TO SCALE
APPROVED BY	DS	ISSUE	Dr
		REVISION	-

DRAWING NUMBER  
Figure 1



## APPENDIX II- EXPLORATORY HOLE LOGS AND INFILTRATION TESTING

ENGINEERING  
ENVIRONMENTAL  
HEALTH & SAFETY



r		LT	
F		TJT	
t			aLXa
s	TaHdHULTb		
f	f	f	
f	r p Vr		
s B C	u	s B C	s
LWL	aLFaLFVFXb	LXL	ost sFo J
LHL		LHX	o sFu F s F H p H
		UHL	r o Fu F F p F r H
			t H
r f			LT
f	H		



		r		LU	
		F		TJT	
t				aLXa	
s		TaHdHULTb			
t f		f		f	
f r p Vr					
s B C		u		s B C s	
LHX	LHXL	LHaa	LHXL	ost sF s H H	
			LHaa	o sFs p Fu F H	
			THUY	o sF p J Fu	
			THUY	r o Fu F F p J p F r H	
			UWV	t H	
			UWV		
LHBL	LHXL	LHaa	LHXL	ost sF s H H	
			LHaa	o sFs p Fu F H	
			THUY	o sF p J Fu	
			THUY	r o Fu F F p J p F r H	
			UWV	t H	
			UWV		
r f					
f		VWL			
		LU			

ENGINEERING  
ENVIRONMENTAL  
HEALTH & SAFETY



r				LV
		F		TJT
t				aLXa
s		TaHdHULTb		
t f		f		f
f r p Vr				
s B C		s B C		s
LWX  LHXL	bLFaLFXLFdX	LHL		
		LWX	ost	sF s H H
		LHXL	o sF p J Fu	
		LHXL	r o Fu F F p J p F	r H
		LHXL	t	H
r f				LV
f	H			



ENGINEERING  
ENVIRONMENTAL  
HEALTH & SAFETY



r				LW
		F		TJT
t				aLXa
s		TaHdHULTb		
t f		f		f
f r p Vr				
s B C		s B C		s
		LHL	ost sF s H	
		LHd	H	
		LHX	o sF p J p Fu	
	aLFYXFLFaX	THW	r o Fu F F p J p F r H	
			t H	
r f				LW
f	H			

ENGINEERING  
ENVIRONMENTAL  
HEALTH & SAFETY



r				LX
t		F		TJ
s		TaHdHULTb		aLXa
f	t f	f		f
s B C	r p Vr	u	s B C	s
LWL		TXLFTXLFTTLFdL	LHL	ost sF s H H
			LHL	
			THL	o sF p Fu
			THX	r o Fu F F p J p F r H
				t H
r f				LX
f	H			LX



ENGINEERING  
ENVIRONMENTAL  
HEALTH & SAFETY



r		a							
F		TJT							
t			aLXa						
s	TaHdHULTb								
t f	f		f						
f	r p Vr								
s B C	u	s B C	s						
LHL	ost sF s H H	LXL	r o J o s J o t u Fs r o H o s H o t FB GH						
				THL	r o Fu F F p F r H				
						UHL	t H		
								r	f
a									

bUFbVFavbY

## SOAKAWAY TEST - BRE DIGEST 365

**PROJECT:** Gullivers World  
**JOB REF:** 7057  
**DATE:** 03/10/2018  
**TEST REF:** TP1

**ENGINEERING  
 ENVIRONMENTAL  
 HEALTH & SAFETY**



Length of trial pit	=	L <sub>TP</sub>	=	2.20	m
Width of trial pit	=	W <sub>TP</sub>	=	0.70	m
Depth of trial pit	=	D	=	2.30	m
Pit Voids	=	PV	=	100	%

(Note - for open pits, PV = 100%. For stone filled pits, PV = 30%)

Water Depth at Start of Test, D <sub>TP</sub>	=	0.570	m
75% Effective Depth, D <sub>75</sub>	=	0.595	m
50% Effective Depth, D <sub>50</sub>	=	0.620	m
25% Effective Depth, D <sub>25</sub>	=	0.645	m

Time from 75% to 25% effective depth, T<sub>L</sub> = 8 mins

Volume of water escaping during this test between D<sub>75</sub> and D<sub>25</sub>

$$\begin{aligned}
 &= V_{tp75-25} \\
 &= (L_{TP} \times W_{TP} \times (D_{25} - D_{75}) \times PV) = 0.077 \text{ m}^3
 \end{aligned}$$

Mean surface area through which the above volume escapes, is the wetted area.  
 Only 50% of the effective depth is allowed in the calculation:

Hence:

$$\begin{aligned}
 A_{P50} &= \text{Wet Base Area} + \text{Wet Sides Area (from } D_{50} \text{ to base of pit)} \\
 A_{P50} &= (L_{TP} \times W_{TP}) + (2L_{TP} + 2W_{TP}) \times (D - D_{50}) \\
 A_{P50} &= 1.54 + 9.744 \\
 A_{P50} &= 11.28 \text{ m}^2
 \end{aligned}$$

$$\text{Soil Infiltration Rate} = f = \frac{V_{TP75-25}}{A_{P50} \times 60 \times T_L} \text{ m/s}$$

$$f = \frac{0.08}{11.28 \times 60 \times 8} \text{ m/s}$$

**Soil Infiltration Rate**      **f**      =      **1.42E-05**      **m/s**



## SOAKAWAY TEST - BRE DIGEST 365

**PROJECT:** Gullivers World  
**JOB REF:** 7057  
**DATE:** 03/10/2018  
**TEST REF:** TP2

**ENGINEERING  
 ENVIRONMENTAL  
 HEALTH & SAFETY**



Length of trial pit	=	L <sub>TP</sub>	=	2.20	m
Width of trial pit	=	W <sub>TP</sub>	=	0.70	m
Depth of trial pit	=	D	=	2.30	m
Pit Voids	=	PV	=	100	%

(Note - for open pits, PV = 100%. For stone filled pits, PV = 30%)

Water Depth at Start of Test, D <sub>TP</sub>	=	0.570	m
75% Effective Depth, D <sub>75</sub>	=	0.585	m
50% Effective Depth, D <sub>50</sub>	=	0.600	m
25% Effective Depth, D <sub>25</sub>	=	0.615	m

Time from 75% to 25% effective depth, T<sub>L</sub> = 18 mins

Volume of water escaping during this test between D<sub>75</sub> and D<sub>25</sub>

$$\begin{aligned}
 &= V_{tp75-25} \\
 &= (L_{TP} \times W_{TP} \times (D_{25} - D_{75}) \times PV) = 0.046 \text{ m}^3
 \end{aligned}$$

Mean surface area through which the above volume escapes, is the wetted area.  
 Only 50% of the effective depth is allowed in the calculation:

Hence:

$$\begin{aligned}
 A_{P50} &= \text{Wet Base Area} + \text{Wet Sides Area (from } D_{50} \text{ to base of pit)} \\
 A_{P50} &= (L_{TP} \times W_{TP}) + (2L_{TP} + 2W_{TP}) \times (D - D_{50}) \\
 A_{P50} &= 1.54 + 9.860 \\
 A_{P50} &= 11.40 \text{ m}^2
 \end{aligned}$$

$$\text{Soil Infiltration Rate} = f = \frac{V_{TP75-25}}{A_{P50} \times 60 \times T_L} \text{ m/s}$$

$$f = \frac{0.05}{11.4 \times 60 \times 18} \text{ m/s}$$

**Soil Infiltration Rate**      **f**      =      **3.75E-06**      **m/s**





### APPENDIX III- LABORATORY TESTING

Egniol Environmental Ltd.  
Llys Onnen  
Ffordd y Llyn  
Parc Menai  
Bangor  
LL57 4DF  
Contract: Gullivers

Date: 15 October 2018  
Test Report Ref: TR 622767

Page 1 of 1

### LABORATORY TEST REPORT

#### TEST REQUIREMENTS:

To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with  
BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.

#### SAMPLE DETAILS:

Certificate of sampling received:	Yes
Laboratory Ref. No:	S75491 / 278003
Client Ref. :	TP1 @ 0.9m
Date and Time of Sampling:	17/09/2018
Date of Receipt at Lab:	18/09/2018
Date of Start of Test:	14/10/2018
Sampling Location:	TP1 @ 0.9m
Name of Source:	Site Won
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	Egniol CQA Engineer
Soil Description:	Brown gravelly silty SAND
Target Specification:	N/A

#### RESULTS:

History of sample:	:	After wet sieving
% Materials passing 425µm	=	92
Plastic Limit	=	Non-Plastic
Liquid Limit	=	N/A
Plasticity Index	=	N/A

#### Comments:

None

Report checked and approved by:

  
Meical Owen  
Soils Team Manager



Egniol Environmental Ltd.  
Llys Onnen  
Ffordd y Llyn  
Parc Menai  
Bangor  
LL57 4DF  
Contract: Gullivers

Date: 15 October 2018  
Test Report Ref: TR 622769

Page 1 of 1

### LABORATORY TEST REPORT

#### TEST REQUIREMENTS:

To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with  
BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.

#### SAMPLE DETAILS:

Certificate of sampling received:	Yes
Laboratory Ref. No:	S75491 / 278003
Client Ref. :	TP1 @ 2.3m
Date and Time of Sampling:	17/09/2018
Date of Receipt at Lab:	18/09/2018
Date of Start of Test:	14/10/2018
Sampling Location:	TP1 @ 2.3m
Name of Source:	Site Won
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	Egniol CQA Engineer
Soil Description:	Brown sandy silty CLAY
Target Specification:	N/A

#### RESULTS:

History of sample:	:	After wet sieving
% Materials passing 425µm	=	92
Plastic Limit	=	14
Liquid Limit	=	27
Plasticity Index	=	13

#### Comments:

None

Report checked and approved by:

  
Meical Owen  
Soils Team Manager



Egniol Environmental Ltd.  
Llys Onnen  
Ffordd y Llyn  
Parc Menai  
Bangor  
LL57 4DF  
Contract: Gullivers

Date: 15 October 2018  
Test Report Ref: TR 622771

Page 1 of 1

### LABORATORY TEST REPORT

#### TEST REQUIREMENTS:

To determine the Plastic Limit, Liquid Limit, and Plasticity Index of sample in accordance with BS 1377:Part 2:1990 Clause 5.3, Clause 4.3, and Clause 5.4.

#### SAMPLE DETAILS:

Certificate of sampling received:	Yes
Laboratory Ref. No:	S75491 / 278003
Client Ref. :	TP6 @ 1.4m
Date and Time of Sampling:	17/09/2018
Date of Receipt at Lab:	18/09/2018
Date of Start of Test:	14/10/2018
Sampling Location:	TP6 @ 1.4m
Name of Source:	Site Won
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	Egniol CQA Engineer
Soil Description:	Brown sandy silty CLAY
Target Specification:	N/A

#### RESULTS:

History of sample:	:	After wet sieving
% Materials passing 425µm	=	91
Plastic Limit	=	24
Liquid Limit	=	25
Plasticity Index	=	11

#### Comments:

None

and approved by:

  
Meical Owen  
Soils Team Manager



Egniol Environmental Ltd  
 Llys Onnen  
 Ffordd y Llyn  
 Parc Menai  
 Bangor  
 LL57 4DF

Date: 12 October 2018  
 Test Report Ref. STR: 622776

Page 1 of 1

Contract: Gullivers

**LABORATORY TEST REPORT**

**TEST REQUIREMENTS:** To determine the Chemical Analysis of a sample as per BRE SD1 Suite.

**SAMPLE DETAILS:**

Certificate of sampling received:	<b>No</b>
Laboratory Ref. No:	<b>S75491 / 278003</b>
Client Ref. No:	<b>TP7 @ 1.5m</b>
Date and Time of Sampling:	<b>17/09/2018</b>
Date of Receipt at Lab:	<b>18/09/2018</b>
Date of Start of Test:	<b>26/09/2018</b>
Sampling Location:	<b>Trial Pit 7 @ 1.5m</b>
Name of Source:	<b>Site Won</b>
Method of Sampling:	<b>Disturbed Bulk Sample</b>
Sampled By:	<b>Egniol CQA Engineer</b>
Material Description:	<b>Brown sandy silty CLAY</b>
Target Specification:	<b>N/A</b>

**RESULTS:**

Tests	Units	Results
Magnesium Aqueous Extract	mg/l	<10
pH Value		7.6
Chloride Aqueous Extract	mg/l	6.2
Nitrate Aqueous Extract as NO <sub>3</sub>	mg/l	<1.0
Sulphate Aqueous Extract as SO <sub>4</sub>	mg/l	15

**Comments:**

The work was carried out by our accredited, competent, sub contracted laboratory.

Approved by:

  
 Meical Owen  
 Assistant Soils Manager

Egniol Environmental Ltd.  
Llys Onnen  
Ffordd y Llyn  
Parc Menai  
Bangor  
LL57 4DF

Date: 15 October 2018  
Test Report Ref: TR 622763

Page 1 of 2

Contract: Gullivers

**LABORATORY TEST REPORT**

**TEST REQUIREMENTS:**

To determine the Laboratory California Bearing Ratio of sample in accordance with BS 1377: Part 4: Clause 7: 1990

**SAMPLE DETAILS:**

Certificate of sampling received:	Yes
Laboratory Ref. No:	S75491 / 278003
Client Ref. No:	TP4 @ 0.1m
Date and Time of Sampling:	17/09/2018
Date of Receipt at Lab:	18/09/2018
Date of Start of Test:	10/10/2018
Sampling Location:	TP4 @ 0.1m
Name of Source:	Site Won
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	Egniol CQA Engineer
Material Description:	Brown sandy silty soil
Target Specification:	N/A

**RESULTS:**

See attached

**Comments:**

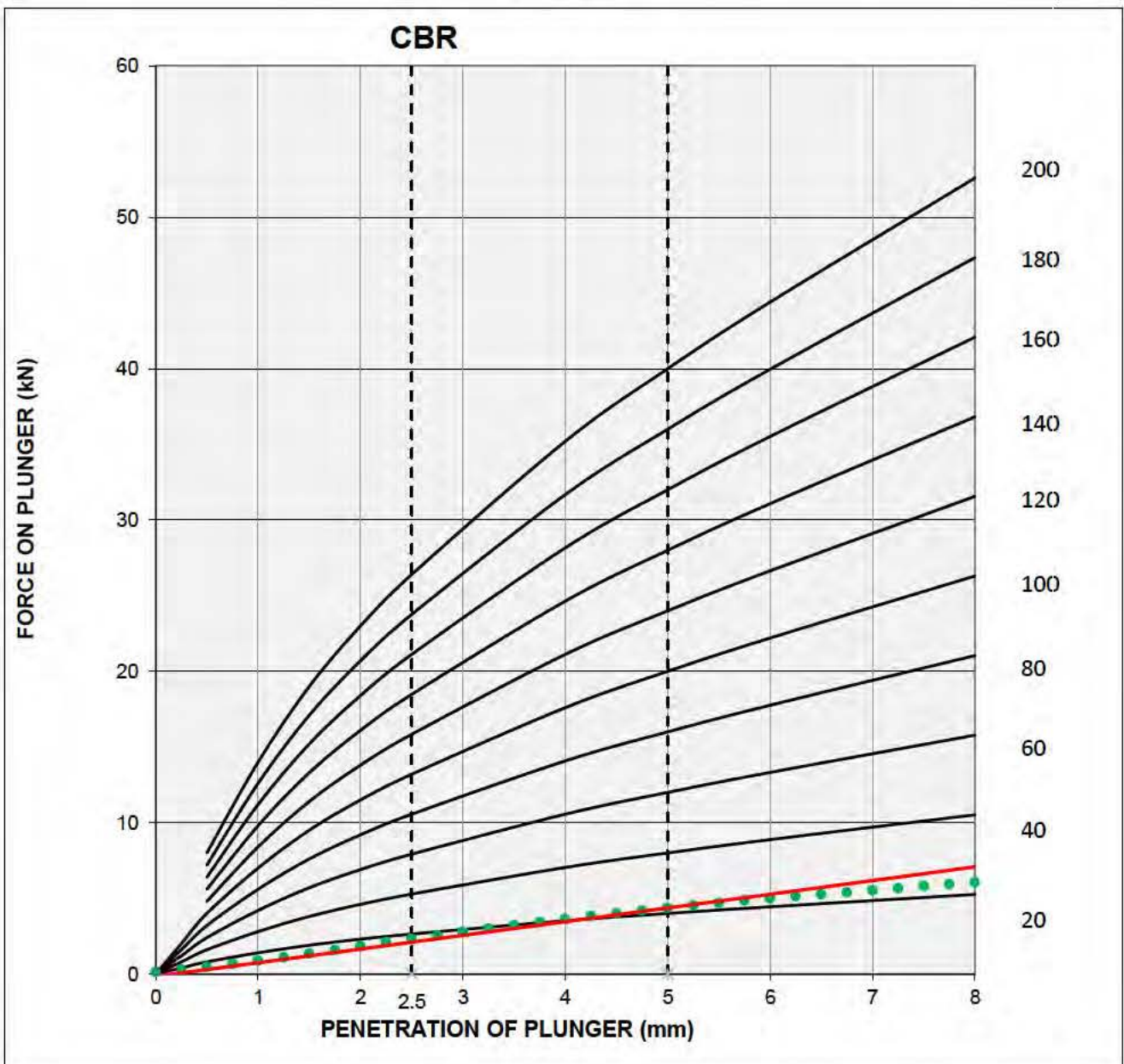
Corrections are carried out in accordance with BS 1377 : Part 4: Clause 7: 1990 if applicable

ed and approved by:

Meical Owen  
Soils Team Manager



Reference: TP4 @ 0.1m			
Unsoaked	Period of Soaking: N/A	Date of CBR Test: 10/10/2018	
Material: Brown sandy silty soil			
Compaction Method: 2.5 kg Rammer			
Presence of Particles 20mm+ beneath plunger: NONE		% Greater than 20mm: 0.2	
Moisture Content(%):	13.6	Dry Density (Mg/m3):	1.761
CBR Value / Top (%): 22 (2 Sig Figures)(Corrected)			
Swell: N/A			



Egniol Environmental Ltd.  
Llys Onnen  
Ffordd y Llyn  
Parc Menai  
Bangor  
LL57 4DF

Date: 15 October 2018  
Test Report Ref: TR 622766

Page 1 of 2

Contract: Gullivers

### LABORATORY TEST REPORT

#### TEST REQUIREMENTS:

To determine the Laboratory California Bearing Ratio of sample in accordance with BS 1377: Part 4: Clause 7: 1990

#### SAMPLE DETAILS:

Certificate of sampling received:	Yes
Laboratory Ref. No:	S75491 / 278003
Client Ref. No:	TP5 @ 0.45m
Date and Time of Sampling:	17/09/2018
Date of Receipt at Lab:	18/09/2018
Date of Start of Test:	10/10/2018
Sampling Location:	TP5 @ 0.45m
Name of Source:	Site Won
Method of Sampling:	Disturbed Bulk Sample
Sampled By:	Egniol CQA Engineer
Material Description:	Brown sandy silty soil
Target Specification:	N/A


#### RESULTS:

See attached

#### Comments:

Corrections are carried out in accordance with BS 1377 : Part 4: Clause 7: 1990 if applicable

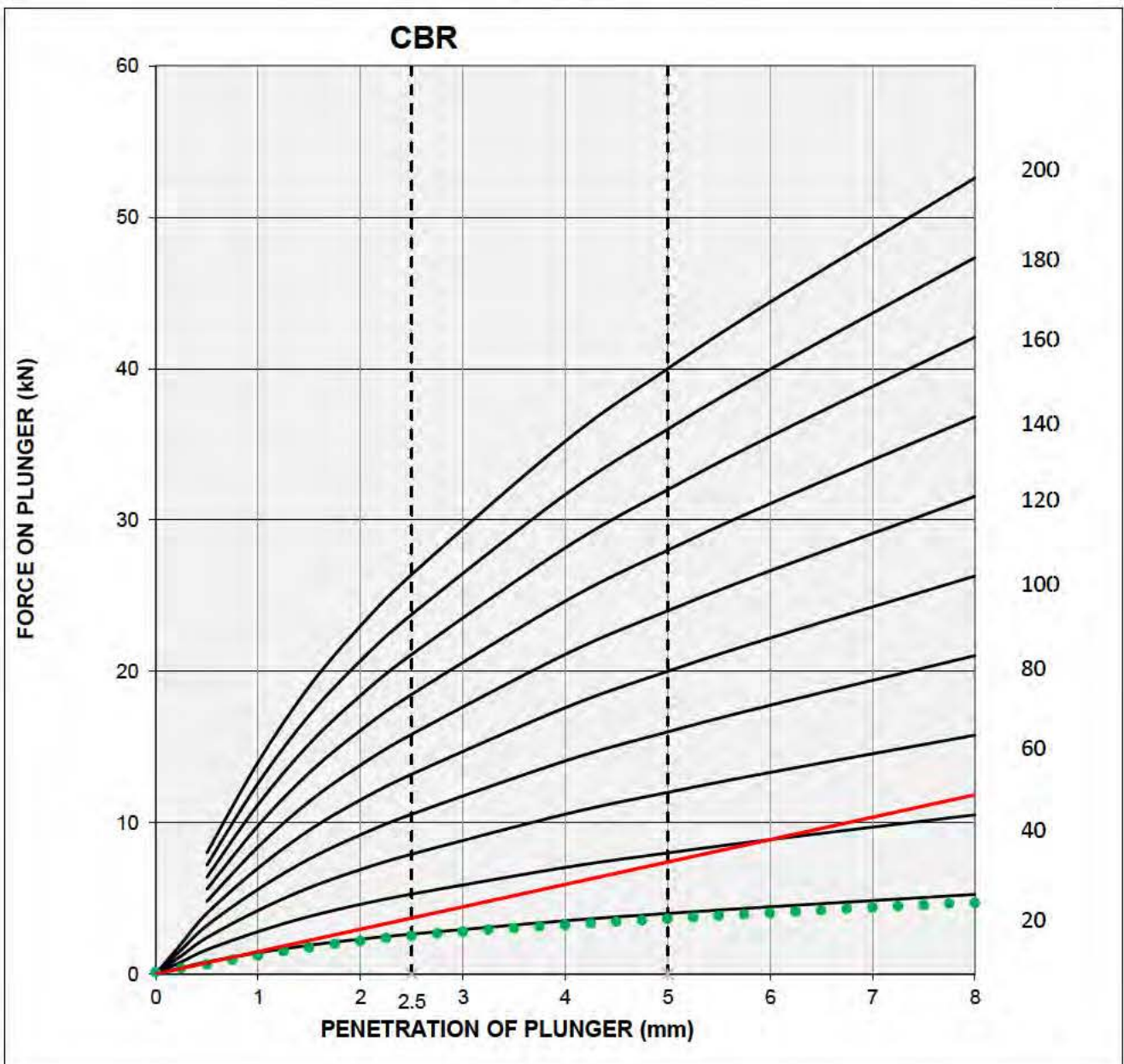
and approved by:

  
Meical Owen  
Soils Team Manager





Reference: TP5 @ 0.45m			
Unsoaked	Period of Soaking: N/A	Date of CBR Test: 10/10/2018	
Material: Brown sandy silty soil			
Compaction Method: 2.5 kg Rammer			
Presence of Particles 20mm+ beneath plunger: NONE		% Greater than 20mm: 0.6	
Moisture Content(%):	7.5	Dry Density (Mg/m3):	1.649
CBR Value / Top (%):	19 (2 Sig Figures)		
Swell: N/A			



Our Ref: EFS/190278 (Ver. 2)

Your Ref:

October 4, 2018



Environmental Chemistry

SOCOTEC UK Limited

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Owen Stevens  
Egniol Environmental Limited  
Llys Onnen  
Ffordd y Llyn  
Parc Menai  
Bangor  
Gwynedd  
GWYNEDD  
LL57 4DF

For the attention of Owen Stevens

Dear Owen Stevens

**Sample Analysis - Gullivers World**

Samples from the above site have been analysed in accordance with the schedule supplied.  
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 03/11/18 when they will be discarded. Please call 01283 554400 for an extension of this date.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with SOCOTEC UK Limited (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for SOCOTEC UK Limited

G Boparai  
Project Co-ordinator  
01283 554400

# TEST REPORT



1252

Report No. EFS/190278 (Ver. 2)

Egniol Environmental Limited  
Egniol Environmental Limited  
Llys Onnen  
Ffordd y Llyn  
Parc Menai  
Bangor  
Gwynedd  
GWYNEDD  
LL57 4DF

**Site: Gullivers World**

The 7 samples described in this report were registered for analysis by SOCOTEC UK Limited on 22-Sep-2018. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 04-Oct-2018

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 5)  
Subcontracted Analysis Reports (Pages 6 to 7)  
*The accreditation status of subcontracted analysis is displayed on the appended subcontracted analysis reports.*  
Analytical and Deviating Sample Overview (Pages 8 to 9)  
Table of Additional Report Notes (Page 10)  
Table of Method Descriptions (Page 11)  
Table of Report Notes (Page 12)  
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of  
SOCOTEC UK Li  
Becky Batham




Operations Manager  
Energy & Waste Services

Date of Issue: 04-Oct-2018

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

			Units :	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
			Method Codes :	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	GROHSA	GROHSA	GROHSA	GROHSA	GROHSA	GROHSA	GROHSA	GROHSA	GROHSA
			Method Reporting Limits :	10	10	20	20	10	10	30	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LAB ID Number	Client Sample Description	Sample Date	Benzene	Ethyl Benzene	m/p Xylenes	MTBE	o Xylene	Toluene	Xylenes	GRO	GRO (>C5 - C6)	GRO (>C7 - C8)	GRO (>C8 - C10)	GRO (C5-C6 Aliphatic)	GRO (C6-C7 Aliphatic)	GRO (C6-C7)	GRO (C7-C8 Aliphatic)	GRO (C8-C10 Aliphatic)		
1923284	TP01 0.30		< 10.0	< 10.0	< 20.0	< 20.0*	< 10.0	< 10.0	< 30.0	< 0.200	< 0.200	< 0.200*	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200*	< 0.200	
1923285	TP03 0.45		< 10.0	< 10.0	< 20.0	< 20.0	< 10.0	< 10.0	< 30.0	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	
1923286	TP01 0.90		< 10.0	< 10.0	< 20.0		< 10.0	< 10.0	<30											
1923287	TP02 0.25		< 10.0	< 10.0	< 20.0	< 20.0	< 10.0	< 10.0	< 30.0	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	
1923288	TP05 0.30																			
1923871	TP02 0.80																			
1923884	TP03 0.70																			
 <p>Bretby Business Park, Ashby Road Burton-on-Trent, Staffordshire, DE15 0YZ Tel +44 (0) 1283 554400 Fax +44 (0) 1283 554422</p>			Client Name	Egniol Environmental Limited								Sample Analysis								
			Contact	Owen Stevens																
			Gullivers World								Date Printed	04-Oct-2018								
											Report Number	EFS/190278								
Gullivers World								Table Number	1											







## **CERTIFICATE OF ANALYSIS**

**ANALYSIS REQUESTED BY:** SOCOTEC UK Ltd  
Environmental Chemistry  
PO Box 100  
Burton upon Trent  
Staffordshire  
DE15 0XD

**CONTRACT NO:** S01263-3

**DATE OF ISSUE:** 03.10.18

**DATE SAMPLES RECEIVED:** 29.09.18

**DATE SAMPLES ANALYSED:** 01.10.18

**SAMPLE DESCRIPTION:** Two soil/loose aggregate samples

**ANALYSIS REQUESTED:** Qualitative analysis of samples for determination of presence/type of asbestos

### **METHODS:**

Our method involves initial examination of the samples followed by detailed analysis of representative sub-samples. The sub-samples are analysed qualitatively for asbestos by polarised light and dispersion staining as described by the Health and Safety Executive in HSG 248.

### **RESULTS:**

#### **Initial Screening**

No asbestos was detected in either of the soil samples by stereo-binocular and polarised light microscopy

A summary of the results is given in Table 1.





**CONTRACT NO:** S01263-3

**DATE OF ISSUE:** 03.10.18

**RESULTS: (cont.)**

**Table 1: Qualitative Results**

**SOCOTEC Job I.D:** S190278

IOM sample number	Client sample number	ACM type detected	PLM result
S60723	S1923284 TP01 0.30	-	No Asbestos Detected
S60724	S1923285 TP03 0.45	-	No Asbestos Detected

Our detection limit for this method is 0.001%.

**COMMENTS:**

IOM Consulting cannot accept responsibility for samples that have been incorrectly collected or despatched by external clients.

Any opinions and interpretations expressed herein are outwith the scope of our UKAS accreditation.

AUTHORISED BY



**D Third**  
*Scientific Technician*

Customer Egniol Environmental Limited  
Site Gullivers World  
Report No S190278

Consignment No S78416  
Date Logged 22-Sep-2018  
In-House Report Due 28-Sep-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	BTEXHSA MTBE (µg/kg)	CustServ REPORT A	GROHSA GRO (AA) by HSA GC-FID	ICPBOR Boron (H2O Soluble)	ICPMSS Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	KONECR Chromium vi:	NRA Leachate	PAHMSUS PAH (16) by GCMS	SFAP1 Phenol Index.(AR)	Sub020 Asbestos ID (Stage 1)	TPHUSI TPH All Band >C10-C12	TPH All Band >C12-C16	TPH All Band >C16-C21	TPH All Band >C21-C35	TPH All Band >C8-C10	TPH All Band >C8-C40	TPH Aro Band >C10-C12		
																												Sampled	✓
CL/1923284	TP01 0.30	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
CL/1923285	TP03 0.45	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
CL/1923286	TP01 0.90	D		D		D	D	D	D	D	D	D	D	D	D	D		D											
CL/1923287	TP02 0.25	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D		D		D	D	D	D	D	D	D	D	D	D
CL/1923288	TP05 0.30	D		D															D										
CL/1923871	TP02 0.80	D		D																D									
CL/1923884	TP03 0.70	D		D																D									

**Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.**

**If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.**

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - Note: due date may be affected if triggered
□	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

Where individual results are flagged see report notes for status.

Customer Egniol Environmental Limited  
Site Gullivers World  
Report No S190278

Consignment No S78416  
Date Logged 22-Sep-2018  
In-House Report Due 28-Sep-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	TPHUSI					WISUM59	
			TPH Aro Band >C12-C16	TPH Aro Band >C16-C21	TPH Aro Band >C21-C35	TPH Aro Band >C8-C10	TPH Aro Band >C8-C40		TPH by GC/FID (AR/SI)
			✓	✓	✓	✓	✓	✓	✓
CL/1923284	TP01 0.30	D	D	D	D	D	D	D	D
CL/1923285	TP03 0.45	D	D	D	D	D	D	D	D
CL/1923286	TP01 0.90	D							D
CL/1923287	TP02 0.25	D	D	D	D	D	D	D	D
CL/1923288	TP05 0.30	D							
CL/1923871	TP02 0.80	D							
CL/1923884	TP03 0.70	D							

**Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.**

**If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.**

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
■	Analysis Required
■	Analysis dependant upon trigger result - Note: due date may be affected if triggered
□	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

Where individual results are flagged see report notes for status.

# Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
TPHUSSI	CL1923284 CL1923285 CL1923287	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (C12-C16) on the aromatic fraction. These circumstances should be taken into consideration when utilising the data.
GROHSA	CL1923284	The Secondary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily (including the Primary Process Control) and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation , where applicable, from the affected analytes (C7-C8) . These circumstances should be taken into consideration when utilising the data.
BTEXHSA	CL1923284	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (MTBE) . These circumstances should be taken into consideration when utilising the data.

# Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPBOR	Oven Dried @ < 35°C	Determination of Boron in soil samples by hot water extraction followed by ICPOES detection
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TPHUSSI	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection including quantitation of Aromatic and Aliphatic fractions.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Where individual results are flagged see report notes for status.

# Report Notes

## Generic Notes

### Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.  
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

### Waters Analysis

Unless stated otherwise results are expressed as mg/l

**Nil:** Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

### Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm<sup>3</sup>@ 15°C

### Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

### Asbestos Analysis

**CH** Denotes Chrysotile                      **TR** Denotes Tremolite  
**CR** Denotes Crocidolite                  **AC** Denotes Actinolite  
**AM** Denotes Amosite                      **AN** Denotes Anthophyllite  
**NAIIS** No Asbestos Identified in Sample  
**NADIS** No Asbestos Detected In Sample

## Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

**N.D** Not determined                      **N.Det** Not detected

**N.F** No Flow

**NS** Information Not Supplied

**Req** Analysis requested, see attached sheets for results

Ⓟ Raised detection limit due to nature of the sample

\* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

**Note:** The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.



#### APPENDIX IV -EXPRESS UXO





# **Express Preliminary UXO Risk Assessment**

<b>Client</b>	Egniol
<b>Project</b>	Gulliver's World
<b>Site Address</b>	Shackleton Close, Warrington, WA5 9YZ
<b>Report Reference</b>	EP7128-00
<b>Date</b>	22/08/18
<b>Originator</b>	CB

## **Assessment Objective**

This preliminary risk assessment is a qualitative screening exercise to assess the likely potential of encountering unexploded ordnance (UXO) at the Gulliver's World site. The assessment involves the consideration of the basic factors that affect the potential for UXO to be present at a site as outlined in Stage One of the UXO risk management process.

## **Background**

This assessment uses the sources of information available in-house to 1<sup>st</sup> Line Defence Ltd to enable the placement of a development site in context with events that may have led to the presence of German air-delivered or Allied military UXO. The report will identify any immediate necessity for risk mitigation or additional research in the form of a Detailed UXO Risk Assessment. It makes use of 1<sup>st</sup> Line Defence's extensive historical archives, library and unique geo-databases, as well as internet resources, and is researched and compiled by UXO specialists and graduate researchers.


The assessment directly follows CIRIA C681 guidelines "Unexploded Ordnance, a Guide for the Construction Industry". The document will therefore assess the following factors:

- Basic Site Data
- Previous Military Use
- Indicators of potential aerial delivered UXO threat
- Consideration of any Mitigating Factors
- Extent of Proposed Intrusive Works
- Any requirement for Further Work

It should be noted that the vast majority of construction sites in the UK will have a low or negligible risk of encountering UXO and should be able to be screened out at this preliminary stage. The report is meant as a common sense 'first step' in the UXO risk management process. The content of the report and conclusions drawn are based on basic, preliminary research using the information available to 1<sup>st</sup> Line Defence at the time this report was produced. It should be noted that the only way to entirely negate risk from UXO to a project would be to support the works proposed with appropriate UXO risk mitigation measures. It is rarely possible to state that there is absolutely 'no' risk from UXO to a project.





Risk Assessment Considerations	
<p>Site location and description/current use</p>	<p>The site is located in Warrington, Cheshire. An irregular parcel of land currently occupied by open ground of predominantly a grassland nature with a small area of hard surfaced ground in the east, the site is bound to the north by grassland utilised as an overspill car park, to the east by a structure of unknown purposes, to the south and west by woodland. The site is part of the premises of Gulliver’s World theme park.</p> <p>The site is approximately centred on the OS grid reference: <b>SJ 5888089890</b>.</p> 
<p>Are there any indicators of current/historical military activity on/close to the site?</p>	<p>Evidence at this stage suggests that the site was located immediately east of one of many auxiliary camps associated with RAF Burtonwood situated in the surrounding area.</p> <p>RAF Burtonwood was constructed in 1940 and became part of the Civil Repair Organisation. Its initial purpose was to carry out modifications to make aircraft ready for issue to units, including engine modification. In July 1942, Burtonwood was passed over to the United States Army Air Force (USAAF) and its facilities adapted to provide thousands of aircraft, engines and equipment for daylight bomber offensives across the continent. This expansion of facilities included the construction of a large depot to the south of the site, within Great Sankey and later, in the immediate post-war period, the extension of all three runways.</p> <p>At this preliminary stage, it is not clear to what extent the presence of this auxiliary camp would have increased the risk from Allied Military Ordnance.</p>
<p>What was the pre- and post-WWII history of the site?</p>	<p>Pre-WWI historical OS mapping from 1907 indicates the site to have occupied entirely by open ground of a presumed grassland nature. The site may have comprised part of the grounds of <i>Bewsey New Hall</i> which is situated immediately west of the site boundary. Pre-WWII historical OS mapping from 1928 and 1937 indicate no significant changes within the site boundary or its immediate surrounding area.</p> <p>Post-WWII historical OS mapping from 1960-1991 indicates no significant changes within the site boundary. Change is noted to the east and south of the boundary in the form of residential properties. Further post-WWII historical OS mapping from 1963 indicates the development of structures to the east, which look to be in the layout of a former military camp.</p>
<p>Was the area subject to bombing during WWII?</p>	<p>During WWII, the site was situated within the Rural District of Warrington. Warrington, a district of 22,457 acres, was subject to an overall low density bombing campaign according to Home Office statistics; this consisted of 100 high explosive (HE) bombs, four parachute mines and two oil bombs. This totalled 106 incidents, and an average of 4.7 items of ordnance recorded per 1,000 acres.</p> <p>At this preliminary stage, it has not been possible to determine whether the proposed site was subject to bombing incidents due to the lack of a comprehensive record set.</p>





Is there any evidence of bomb damage on/close to the site?	According to historic OS mapping, no structures were present within the site boundary during WWII for which damage could be attributed. The acquisition of WWII-era aerial photography may help to determine if any ground disturbance occurred within the proposed site boundary.
To what degree would the site have been subject to access?	The proposed site boundary was occupied entirely by undeveloped fields during WWII. It is anticipated that the site was not subject to a regular level of access as a result. However, the presence of Bewsey Manor Hall to the west of the boundary is likely to have increased access levels in the site's immediate surrounding area. Further research on the condition and wartime usage of the site will however be required to confirm this.
To what degree has the site been developed post-WWII?	No evidence of significant redevelopment occurring on site is noted in recent aerial photography. The entire footprint is still occupied by open ground of a grassland nature.
What is the nature and extent of the intrusive works proposed?	The nature and extent of works proposed was not available at the time of writing.

**Summary and Conclusions**

During WWII, the proposed site area was situated within the Rural District of Warrington. A district of 22,457 acres, Warrington was subject to a very low density bombing campaign, with 4.7 items of ordnance recorded per 1,000 acres according to Home Office statistics. At this preliminary stage, it has not been possible to determine whether the proposed site was subject to bombing incidents due to the lack of a comprehensive record set.

Evidence at this stage suggests that the site was located immediately east of one of many auxiliary camps associated with RAF Burtonwood situated in the surrounding area.

It is thought at this stage that the risk from Allied Military Ordnance due to the presence of this camp is of more concern than the risk of German Aerial-Delivered Ordnance, given the relative lack of recorded bombing in the area.

**Recommendations**

Given the findings of this preliminary report, further research is recommended in the form of a **Detailed UXO Risk Assessment**.

Further research would include visits to local and national archives, and the acquisition of any available local bombing records, aerial photography and other archival material. Following this, a more precise assessment on the risk presented from items of UXO can be made.

Prior to or in lieu of a Detailed Assessment, it is recommended that appropriate UXO Risk Mitigation Measures are provided for intrusive works proposed.

If the client has any anecdotal or empirical evidence of UXO risk on site, please contact 1<sup>st</sup> Line Defence.



## APPENDIX V – UTILITIES SEARCH

# Essentials Utility Search Report

**For the following location:**

GULLIVERS HOTEL, GULLIVERS WORLD  
THEME PARK, SHACKLETON CLOSE, N/A, N/A,

**Client:**

Anna Cole

**Co-ordinates:**

358866.700,389863.800

**Reference:**

GRS05183/estl\_GS-5334251

**Search Date:**

17/08/2018

**emapsite™**



**Technics**  
Geospatial Consultant Surveyors

**LOCATION INTELLIGENCE**

To access Groundsure's market leading environmental solutions, please call **08444 159 000**,  
email [info@groundsure.com](mailto:info@groundsure.com) or contact your authorised reseller.

**WWW.GROUNDSURE.COM**

Thank you for your Utility Search Report order. You have selected one of several report options developed to suit the specific needs of our different customers. The range comprises:

### Utility Essentials

The Utility Essentials report gives visibility of the 5 key services – Gas, Electric, Water, Sewage and British Telecom, supplied for areas of up to 25 hectares. The Essentials report is ideal for remote sites where only the main utilities providers are likely to be present or projects where the aim is merely to check the availability of the main utilities e.g. in the planning stages of a new development. All available information is collated and delivered as a single report in 5 working days with any outstanding information being delivered as soon as it is available.

### Utility Premium

The Utility Premium report provides comprehensive information about all services affecting your site, including: Gas and Oil Pipelines; mains Water and Sewerage; Telecoms and fibre-optic cables; and transportation networks. This report is ideal when comprehensive information is required for your site, ensuring you are managing your risk and avoiding expensive delays. Supplied for areas of up to 25 hectares, all available information is gathered, collated and supplied as a single report within 10 working days, with any outstanding information being delivered as soon as it is available. Please note, a search of Vtesse Networks Ltd is not included in this report. If you require a Vtesse Networks Ltd search this is available through our Utility Singles Telecoms report.

### Utility Fast-track

The Utility Fast-track report delivers all the information of a Premium report (Gas and Oil Pipelines; mains Water and Sewerage; Telecoms and fibre-optic cables; and transportation networks) but with all available supplier responses being collated in a report and delivered to you within 5 working days, with any outstanding information being delivered as soon as it is available. Please note, a search of Vtesse Networks Ltd is not included in this report. If you require a Vtesse Networks Ltd search this is available through our Utility Singles Telecoms report.

### Utility Singles

Our Utility Singles reports enable you to request data for a single utility type. You can order Gas, Water & Sewerage, Electricity or Telecoms as an individual search. This is a cost-effective way to obtain relevant information if you only need to check the availability/position of a particular utility in order to plan a new development or make changes to an existing development. Supplied for areas of up to 25 hectares\*, all available information is gathered, collated and supplied as a single report within 10 working days, with any outstanding information being delivered as soon as it is available.

\*Telecom report with Vtesse is limited to a maximum radius of 250m.

## UTILITY REPORT CONTENT & INFORMATION

### 1 Purpose of Utilities Report

The Utilities Report is intended to be for project planning and feasibility only. It is not suitable to be used for construction or excavation purposes. The existence of utilities on the plans does not imply that they are suitable in size, capacity, type or location for the project purpose. The Utility Companies should be contacted directly for clarification in this regard.

### 2 Compilation of the Utilities Report

The Utilities Report is a compilation of Utility Company record plans. These are obtained via application to the Utility Companies following a geographic search to determine which Companies are in a given area. The data is provided by the Utility Companies in a variety of formats including faxed plans, pdf files, digital drawing files and paper drawings. They are all converted to pdf files for inclusion in the report. The quality of the plans therefore varies. A quality assured process is followed for each report. This requires that it is checked at different stages during the process before being subjected to a final assessment prior to issue.

### 3 Limitations and Accuracy of the data

Each Utility Company has its own disclaimer statement in respect of the information they provide. They do not guarantee or provide a warranty for the data. The Utility Company disclaimers should be referred to when considering the accuracy and completeness of the data. Generally the plans provided are for guidance only and are not guaranteed to be up to date or to be a complete record of the Utility Company plant in a given area.

Some Utility Companies only show main utilities. Therefore service pipes or cables may not be shown on the plans but they may be present on the site.

Some Utility Companies state that the utilities may deviate from the route and position shown on the plans.

Due to the time delay between installation of, or repair or upgrading of utilities and the subsequent updating of the Utility Companies plans, it should be noted that there could be utilities present that are not shown on the plans.

The user shall make further enquires and investigations to satisfy himself as to the adequacy of the plans and position of the utilities. The exact position of the utilities should be verified by the use of suitable detecting devices and safe digging practices in accordance with HS(G)47. Further advice on the location of the utilities should be requested from the owner.

### 4 Completeness

Whilst every effort is made to locate all Utility Companies in a given area, due to the sensitive or restrictive nature of certain sites, the existence of redundant utilities, the emergence of new companies and the combining of, takeover or sale of existing Companies, we cannot guarantee to provide details on all utilities in a given area.

### 5 Date

Due to the Utility Companies plans being regularly changed and updated, the Utility Report is only valid at the time of production.

### 6 Liability

For the reasons given in 1 – 5 above neither emapsite Ltd nor Technics Group Limited (trading name of Subtechnics Limited) can accept any liability for or offer any guarantees for the report or the content. No representation is made by either emapsite Ltd and/or Technics Group Limited as to the accuracy, completeness, sufficiency or otherwise of this report.

### 7 Copyright

The copyright of the Utilities Report remains with Technics Group Limited and may not be copied nor communicated using any method either in whole or in part without the prior written consent of Technics Group Limited.

### 8 Assignment

The Utility Report cannot be assigned to any other party without the prior written consent of Technics Group Limited.

## Terms and Conditions

The Terms and Conditions should be read in conjunction with the 'Report Content & Information' sheet. The content of the 'Report Content & Information' sheet forms part of the Terms and Conditions.

### 1. Disbursements

- 1.1. Several Utility Companies charge for either searching to determine if they have any plant or for providing plans. These charges are included in the cost of Utility Essentials, Utility Premium and Utility Fast-track Reports, and are not charged as extra. Utility Singles Reports do not include disbursement charges and these will be charged as extra to the client at cost. The client will be made aware of any applicable charges prior to finalisation of purchase.
- 1.2. The Utility Companies that make a charge or the charges themselves may be changed or updated without notification to the client.

### 2. Turnaround times

- 2.1. Whilst every effort is made to produce the reports as quickly as possible we are reliant on the Utility Companies to provide us with the plans and/or data. Depending on the product purchased, generally reports are completed within approximately 5 to 15 working days.
- 2.2. No guarantees can be made regarding the time taken to complete the report.

### 3. Limitation of Liability

- 3.1 Technics Group Ltd (trading name of Subtechnics Limited) and/or emapsite Ltd will make all reasonable endeavors to provide the Utility Report within the stated time period and shall not be liable for any delay arising because of any act, omission or delay of any Utility Company.
- 3.2 The Utility Companies have no liability to Technics Group Ltd and/or emapsite Ltd in relation to the provision of information, plans and/or data or the omission of or to provide such information, plans or data. Therefore Technics Group Ltd and/or emapsite Ltd shall have no liability to a Client for the information, plans and data contained in a Utilities Report.
- 3.3 Technics Group Ltd and/or emapsite Ltd shall have no liability in relation to any Utilities Report for loss or damage arising in relation to loss of profits, loss of business, loss of use, costs, damages, charges or expenses.

### 4. Cancellation Policy

- 4.1. We are unable to cancel the order once finalised.

### 5. Force Majeure

Technics Group Ltd and/or emapsite Ltd will have no liability to the Client if it is prevented from or delayed in performing its obligations in connection with producing the Utilities Report by any act, event, omission, accident or incident beyond its reasonable control. These include but are not limited to:- any form of industrial dispute, strike or lock-out, breakdown or failure of a utility service or transport network, act of God, war, riot, civil commotion, malicious damage, accident, incident, breakdown of plant, machinery or electronic system, fire or flood.

### 6. Governing Law

The Governing Law and Jurisdiction of these Terms and Conditions, any Contract or Agreement are governed by and construed in accordance with the laws of England and Wales. The courts of England and Wales shall have non-exclusive jurisdiction to settle any dispute or claim that arises out of or in connection with these Terms and Conditions, any Contract or Agreement.



# Site Location Plan

Our Ref                    GRS05183/estl\_GS-5334251

Grid Reference        OSGB: 358866.700,389863.800



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Produced by the Ordnance Survey National Geographic Database and incorporating surveyed revision available at the date of production.

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The representation of a road, track or path is no evidence of a right of way.

The representation of features as lines is no evidence of a property boundary.

## Utility Company Underground Services Results Schedule

Your Ref: estl\_GS-5334251

Our Ref: GRS05183

Address: GULLIVERS HOTEL, GULLIVERS WORLD THEME PARK, SHACKLETON

Grid Reference: 358866.700,389863.800

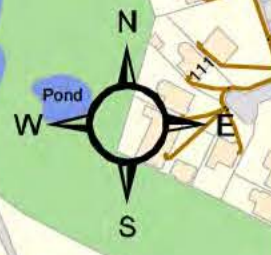
Postcode: WA5 9YZ

Author: Matthew Clarke

Search Date: 17/08/2018

Utility Company	Responses	Outcome
<b>Electricity</b>		
Scottish Power	1	Affected
<b>Gas</b>		
National Grid UK	7	Affected
<b>Telecoms/Cable</b>		
BT Openreach	4	Affected
<b>Water and Sewers</b>		
United Utilities (Water)	1	Affected
United Utilities (Sewer)	0	Cancelled

# Electricity



This map image may not be used for planning application use

The position and depths of underground and overhead apparatus as indicated on this plan are approximate and are intended for guidance only. The depths may have changed if the land surface levels have altered. You are also informed that the plan may not show, or may inaccurately show, individual property services and services to street lighting installations. The onus of locating the apparatus precisely before commencing any excavations or other works in the immediate vicinity therefore rests entirely upon the person undertaking or responsible for those works. Before any such works are undertaken the precise location of the apparatus and cables should therefore be ascertained by suitable means. In the event of an emergency or for further assistance please contact 0800 092 9290 (Scottish Power area) or 0800 00 15400 (SP Manweb area).

**SP ENERGY NETWORKS**  
an arm of SP Manweb plc

SP Manweb plc  
 Registered Office: c/o PowerSystems  
 3 Prenton Way, Prenton, CH43 3ET  
 Registered in England and Wales No 2386937

**OVERHEAD LINE** ————

**UNDERGROUND CABLES**

In Use ————  
 Out of Use - - - - -  
 Assumed route <----->

**VOLTAGE COLOUR KEY**

EHV	132kV	BLUE
HV	33kV	GREEN
LV		RED
		BROWN

Where cables have been laid SINCE 1 OCTOBER 1988, the following depths in mm apply (to the tops of cables or ducts) UNLESS OTHERWISE SHOWN, but see comments. (TO TOP OF CABLE, ADD 75mm FOR BOTTOM OF TRENCH)

	EHV	HV	LV
IN FOOTPATHS	775	600	450
ACROSS ROADS	775	700	600
ALONG ROADS	775	700	600
AGRICULTURAL	910	910	910

Your attention is drawn to the Health and Safety Executive Booklet HSG47, available from HSE.

DATE: 20/08/2018

SCALE: 1 : 2,500

MAP REFERENCE: 358,866 389,863

0 5 10 20 30 40 Metres

# Gas



Stephen Sawyer  
Technics Group  
Technics House  
Guildford  
Guildford  
Surrey  
GU4 7WA

Plant Protection  
Cadent  
Block 1; Floor 1  
Brick Kiln Street  
Hinckley  
LE10 0NA  
E-mail: [plantprotection@cadentgas.com](mailto:plantprotection@cadentgas.com)  
Telephone: +44 (0)800 688588

**National Gas Emergency Number:**  
**0800 111 999\***

**National Grid Electricity Emergency Number:**  
**0800 40 40 90\***

\* Available 24 hours, 7 days/week.  
Calls may be recorded and monitored.

[www.cadentgas.com](http://www.cadentgas.com)

**Date:** 21/08/2018

**Our Ref:** NW\_TW\_Z1\_3SWX\_460187

**Your Ref:** GRS05183

**RE: Proposed Works, Gullivers Hotel, Gullivers World Theme Park, Shackleton Close, Warrington, Cheshire**

Thank you for your enquiry which was received on 20/08/2018.  
Please note this response and any attached map(s) are valid for 28 days.

An assessment has been carried out with respect to Cadent Gas Ltd, National Grid Electricity Transmission plc's and National Grid Gas plc's apparatus. Please note it does not cover the items listed in the section "Your Responsibilities and Obligations", including gas service pipes and related apparatus.

For details of Network areas please see the Cadent website (<http://cadentgas.com/Digging-safely/Dial-before-you-dig>) or the enclosed documentation.

**As your works are at a "proposed" stage, any maps and guidance provided are for information purposes only. This is not approval to commence work. You must submit a "Scheduled Works" enquiry at the earliest opportunity and failure to do this may lead to disruption to your plans and works. Plant Protection will endeavour to provide an initial assessment within 14 days of receipt of a Scheduled Works enquiry and dependent on the outcome of this, further consultation may be required.**

**In any event, for safety and legal reasons, works must not be carried out until a Scheduled Works enquiry has been completed and final response received.**

## Your Responsibilities and Obligations

The "Assessment" Section below outlines the detailed requirements that must be followed when planning or undertaking your scheduled activities at this location.

It is your responsibility to ensure that the information you have submitted is accurate and that all relevant documents including links are provided to all persons (either direct labour or contractors) working for you near Cadent and/or National Grid's apparatus, e.g. as contained within the Construction (Design and Management) Regulations.

This assessment solely relates to Cadent Gas Ltd, National Grid Electricity Transmission plc (NGET) and National Grid Gas plc (NGG) and apparatus. This assessment does **NOT** include:

- Cadent and/or National Grid's legal interest (easements or wayleaves) in the land which restricts activity in proximity to Cadent and/or National Grid's assets in private land. You must obtain details of any such restrictions from the landowner in the first instance and if in doubt contact Plant Protection.
- Gas service pipes and related apparatus
- Recently installed apparatus
- Apparatus owned by other organisations, e.g. other gas distribution operators, local electricity companies, other utilities, etc.

It is **YOUR** responsibility to take into account whether the items listed above may be present and if they could be affected by your proposed activities. Further "Essential Guidance" in respect of these items can be found on the National Grid Website (<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589934982>).

This communication does not constitute any formal agreement or consent for any proposed development work; either generally or with regard to Cadent and/or National Grid's easements or wayleaves nor any planning or building regulations applications.

Cadent Gas Ltd, NGG and NGET or their agents, servants or contractors do not accept any liability for any losses arising under or in connection with this information. This limit on liability applies to all and any claims in contract, tort (including negligence), misrepresentation (excluding fraudulent misrepresentation), breach of statutory duty or otherwise. This limit on liability does not exclude or restrict liability where prohibited by the law nor does it supersede the express terms of any related agreements.

If you require further assistance please contact the Plant Protection team via e-mail ([click here](#)) or via the contact details at the top of this response.

Yours faithfully

Plant Protection Team



# ASSESSMENT

## Affected Apparatus

The apparatus that has been identified as being in the vicinity of your proposed works is:

High or Intermediate pressure (above 2 bar) Gas Pipelines and associated equipment  
Low or Medium pressure (below 2 bar) gas pipes and associated equipment. (As a result it is highly likely that there are gas services and associated apparatus in the vicinity)

## Requirements

### BEFORE carrying out any work you must:

Carefully read these requirements including the attached guidance documents and maps showing the location of apparatus.

Contact the landowner and ensure any proposed works in private land do not infringe Cadent and/or National Grid's legal rights (i.e. easements or wayleaves). If the works are in the road or footpath the relevant local authority should be contacted.

Ensure that all persons, including direct labour and contractors, working for you on or near Cadent and/or National Grid's apparatus follow the requirements of the HSE Guidance Notes HSG47 - 'Avoiding Danger from Underground Services' and GS6 – 'Avoidance of danger from overhead electric power lines'. This guidance can be downloaded free of charge at <http://www.hse.gov.uk>

In line with the above guidance, verify and establish the actual position of mains, pipes, cables, services and other apparatus on site before any activities are undertaken.

# GUIDANCE

## **High Pressure Gas Pipelines Guidance:**

If working in the vicinity of a high pressure gas pipeline the following document must be followed: 'Specification for Safe Working in the Vicinity of Cadent and/or National Grid High Pressure Gas Pipelines and Associated Installations - Requirements for Third Parties' (SSW22). This can be obtained from: <http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=33968>

## **Dial Before You Dig Pipelines Guidance:**

<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=33969>

## **Excavating Safely - Avoiding injury when working near gas pipes:**

[http://www.nationalgrid.com/NR/rdonlyres/2D2EEA97-B213-459C-9A26-18361C6E0B0D/25249/Digsafe\\_leaflet3e2finalamends061207.pdf](http://www.nationalgrid.com/NR/rdonlyres/2D2EEA97-B213-459C-9A26-18361C6E0B0D/25249/Digsafe_leaflet3e2finalamends061207.pdf)

## **Standard Guidance**

### **Essential Guidance document:**

<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589934982>

### **General Guidance document:**

<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=35103>

### **Excavating Safely in the vicinity of gas pipes guidance (Credit card):**

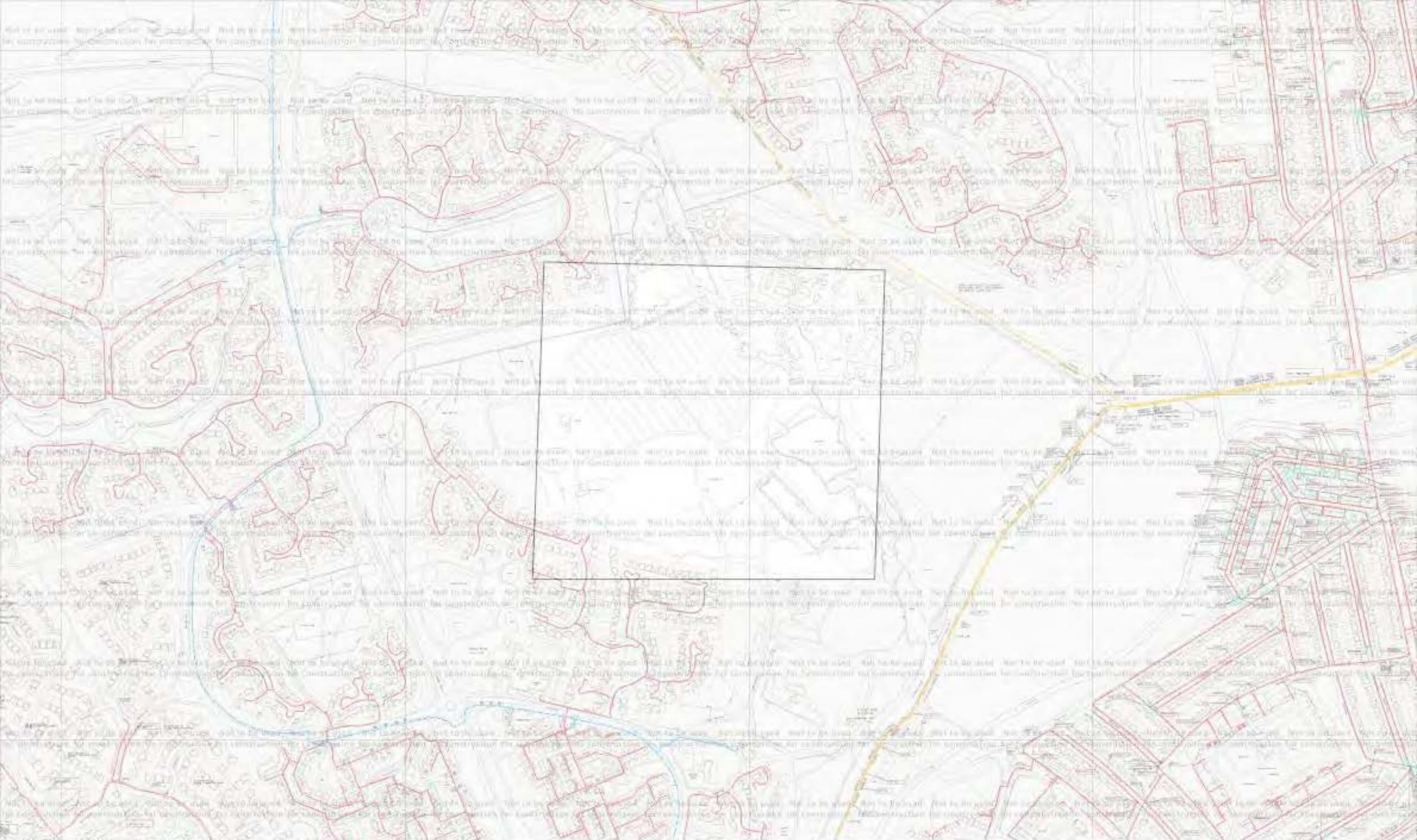
<http://www.nationalgrid.com/NR/rdonlyres/A3D37677-6641-476C-9DDA-E89949052829/44257/ExcavatingSafelyCreditCard.pdf>

### **Excavating Safely in the vicinity of electricity cables guidance (Credit card):**

<http://www.nationalgrid.com/NR/rdonlyres/35DDEC6D-D754-4BA5-AF3C-D607D05A25C2/44858/ExcavatingSafelyCreditCardelectricitycables.pdf>

Copies of all the Guidance Documents can also be downloaded from the National Grid Website:

<http://www.nationalgrid.com/uk/Gas/Safety/work/downloads/>



ID: NW_TW_Z1_38WX_450167	View extent: 2050m, 1220m	<b>Map not to be used for construction</b>	Map 1 of 1 (GAS)
USER: utilityreports	LP MAINS MF MAINS IP MAINS LHP MAINS NHP MAINS	<p>This plan shows those pipes owned by National Grid Gas plc in its role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Grid Gas plc or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with H5/GJ47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.</p>	MAPS Plot Server Version 1.9.0
DATE: 21/08/2018	0m 100m Approximate scale 1:5000 on A3 Colour Landscape		<p><b>Cadent</b> Your Gas Network</p>
DATA DATE: 17/08/2018	Valve Depth of Cover Syphon Diameter Change Material Change Out of Standard Service		
REF: GRS05183	MAP REF: SJ5889		<p>This plan is reproduced from or based on the OS map by National Grid Gas plc, with the sanction of the controller of HM Stationery Office. Crown Copyright Reserved. Ordnance Survey Licence number 100024886.</p>
CENTRE: 358942, 389963			

# ENQUIRY SUMMARY

## Received Date

20/08/2018

## Your Reference

GRS05183

## Location

Centre Point: 358942, 389963

X Extent: 514

Y Extent: 462

Postcode: WA5 9YZ

Location Description: Gullivers Hotel, Gullivers World Theme Park, Shackleton Close, Warrington, Cheshire

## Map Options

Paper Size: A3

Orientation: LANDSCAPE

Requested Scale: 2500

Actual Scale: 1:5000 (GAS)

Real World Extents: 2060m x 1220m (GAS)

## Recipients

utility.reports@technicsgroup.com

## Enquirer Details

Organisation Name: Technics Group

Contact Name: Stephen Sawyer

Email Address: utility.reports@technicsgroup.com

Telephone: 01483 230080

Address: Technics House, Guildford, Guildford, Surrey, GU4 7WA

## Description of Works

Gullivers Hotel, Gullivers World Theme Park, Shackleton Close, Warrington, Cheshire, WA5 9YZ

## Enquiry Type

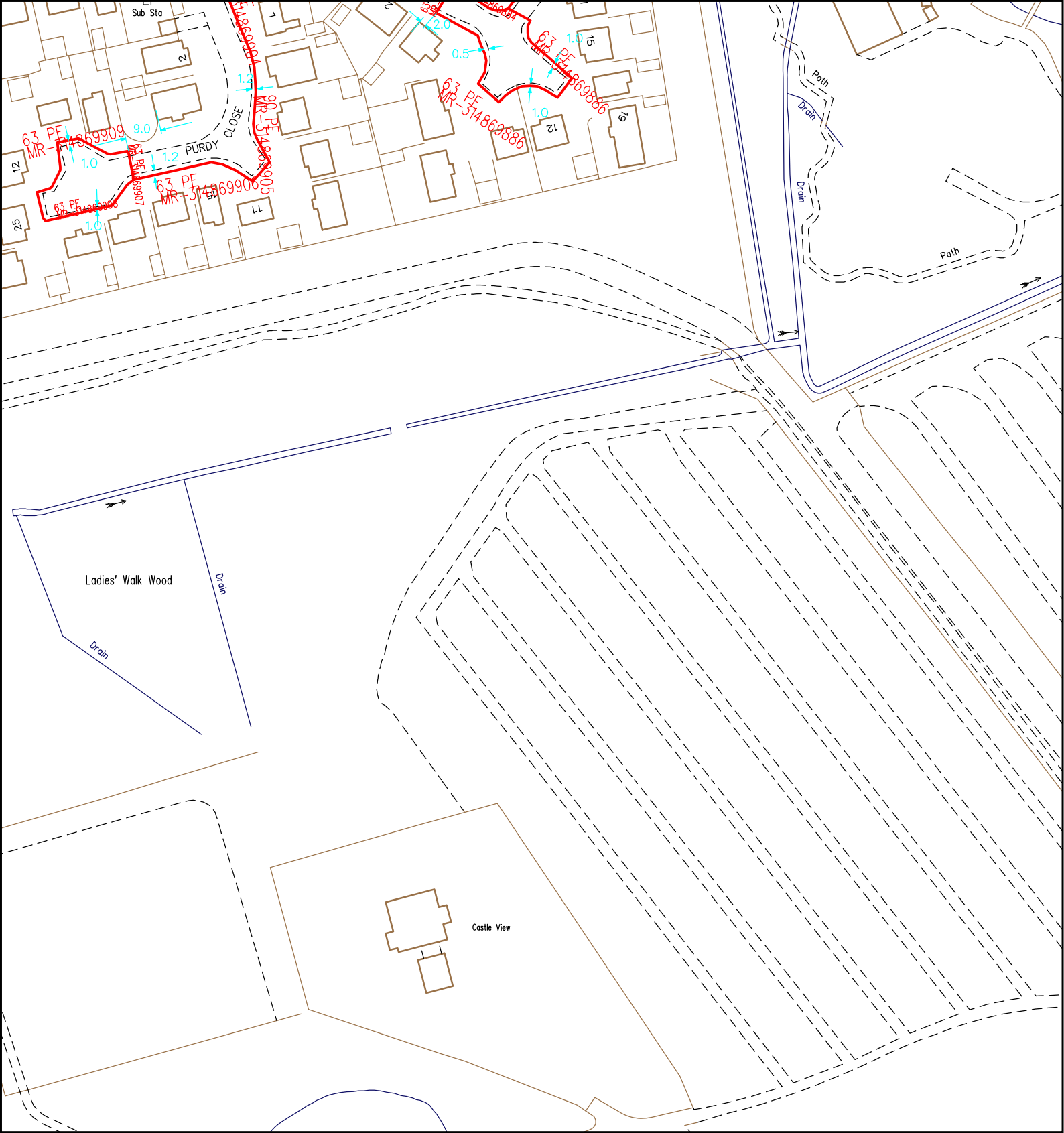
Proposed Works





## Activity Type

Utility Works

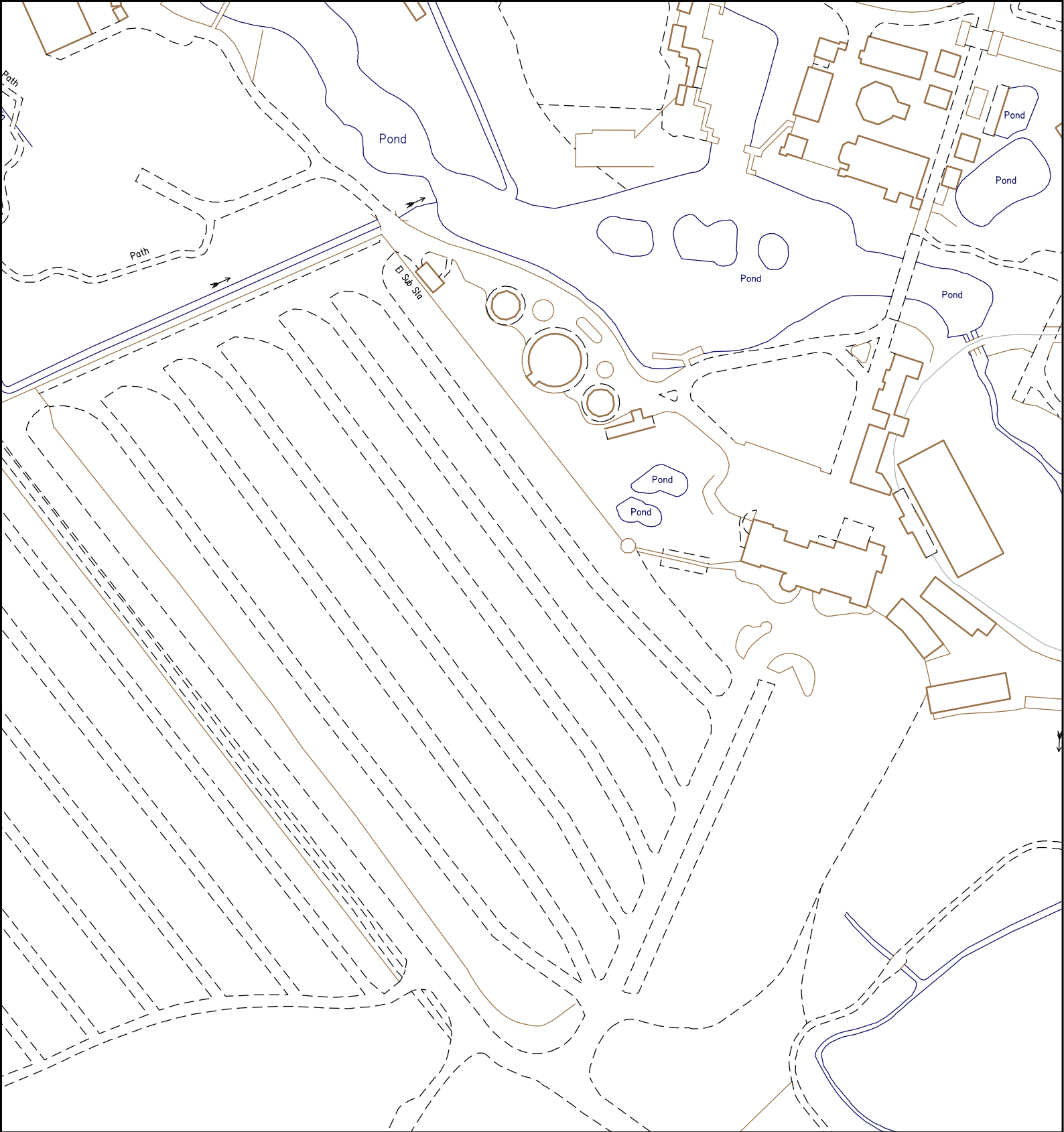
## Work Types

Work Type: Plans Only



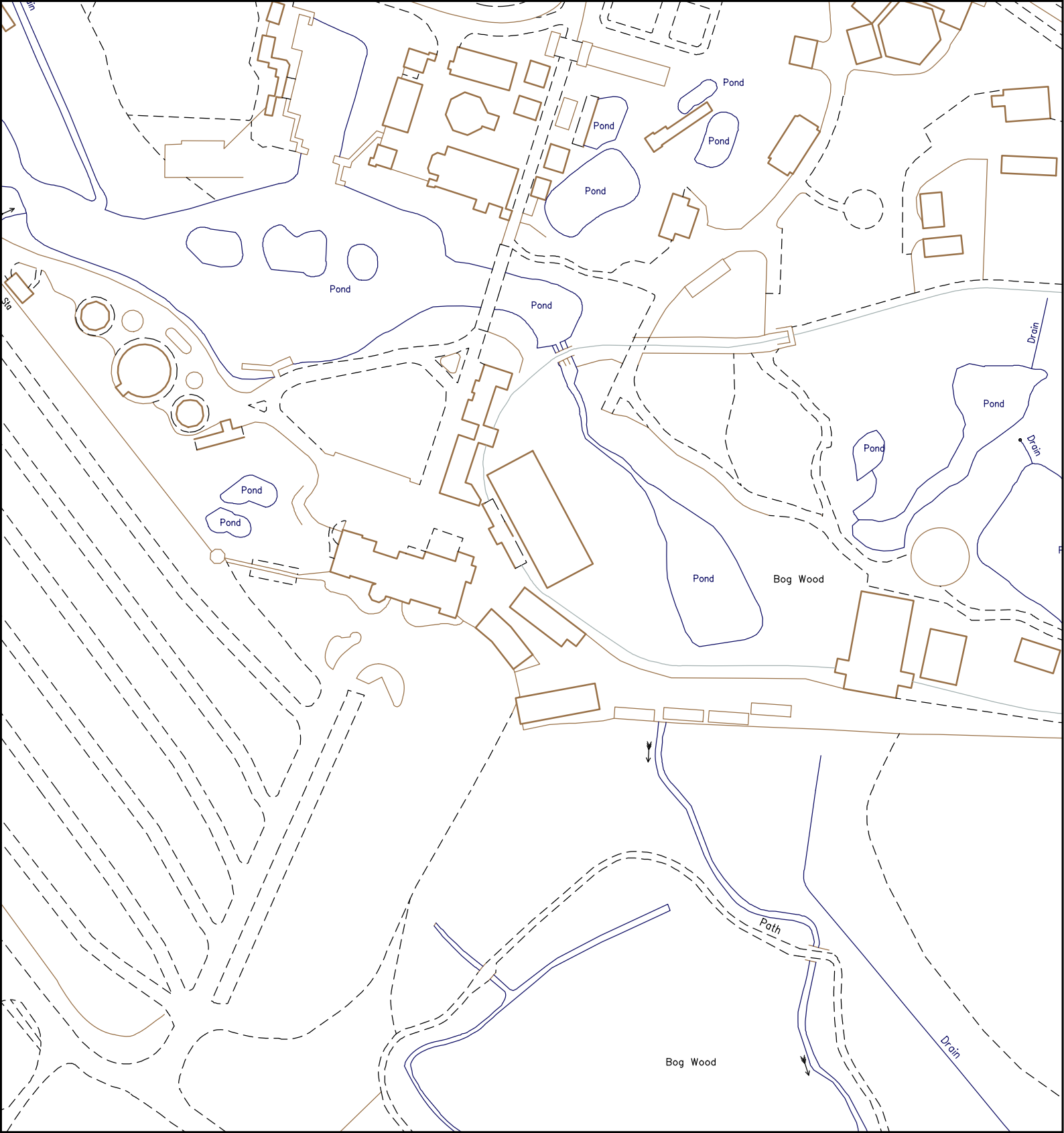
SCALE: 1 : 1250	LP MAINS 	MAPS Viewer Version 5.8.0.1  Local Machine  This plan is reproduced from or based on the OS map by Cadent Gas Ltd, with the sanction of the controller of HM Stationery Office. Crown Copyright Reserved.
USER ID: madeleine.stevens	MP MAINS 	
DATE: 21/08/2018	IP MAINS 	
EXTRACT DATE: 13/06/2018	LHP MAINS 	
MAP REF: SJ5890		
CENTRE: 358761, 390053		





This plan shows those pipes owned by Cadent Gas Ltd in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy hereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Cadent Gas Ltd or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm)  
A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.



SCALE: 1 : 1250	LP MAINS		MAPS Viewer Version 5.8.0.1  Local Machine  This plan is reproduced from or based on the OS map by Cadent Gas Ltd, with the sanction of the controller of HM Stationery Office. Crown Copyright Reserved.
USER ID: madeleine.stevens	MP MAINS		
DATE: 21/08/2018	IP MAINS		
EXTRACT DATE: 13/06/2018	LHP MAINS		
MAP REF: SJ5890			
CENTRE: 358961, 390053			

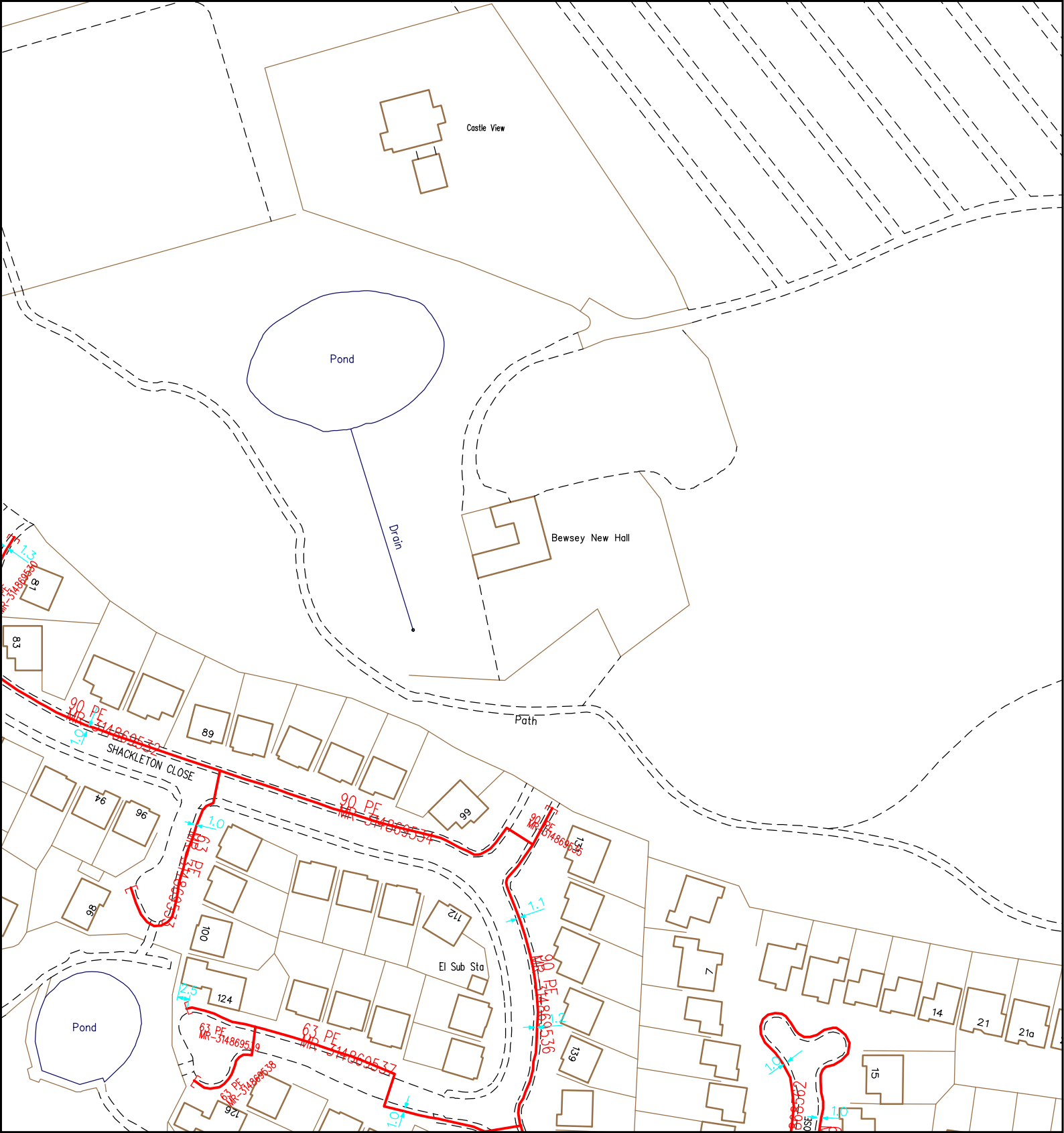
This plan shows those pipes owned by Cadent Gas Ltd in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy hereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Cadent Gas Ltd or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm)  
 A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.



SCALE: 1 : 1250	LP MAINS MP MAINS IP MAINS LHP MAINS	 LP MAINS  MP MAINS  IP MAINS  LHP MAINS	MAPS Viewer Version 5.8.0.1
USER ID: madeleine.stevens			
DATE: 21/08/2018			
EXTRACT DATE: 13/06/2018			
MAP REF: SJ5990			Local Machine
CENTRE: 359062, 390055			This plan is reproduced from or based on the OS map by Cadent Gas Ltd, with the sanction of the controller of HM Stationery Office. Crown Copyright Reserved.

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A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.

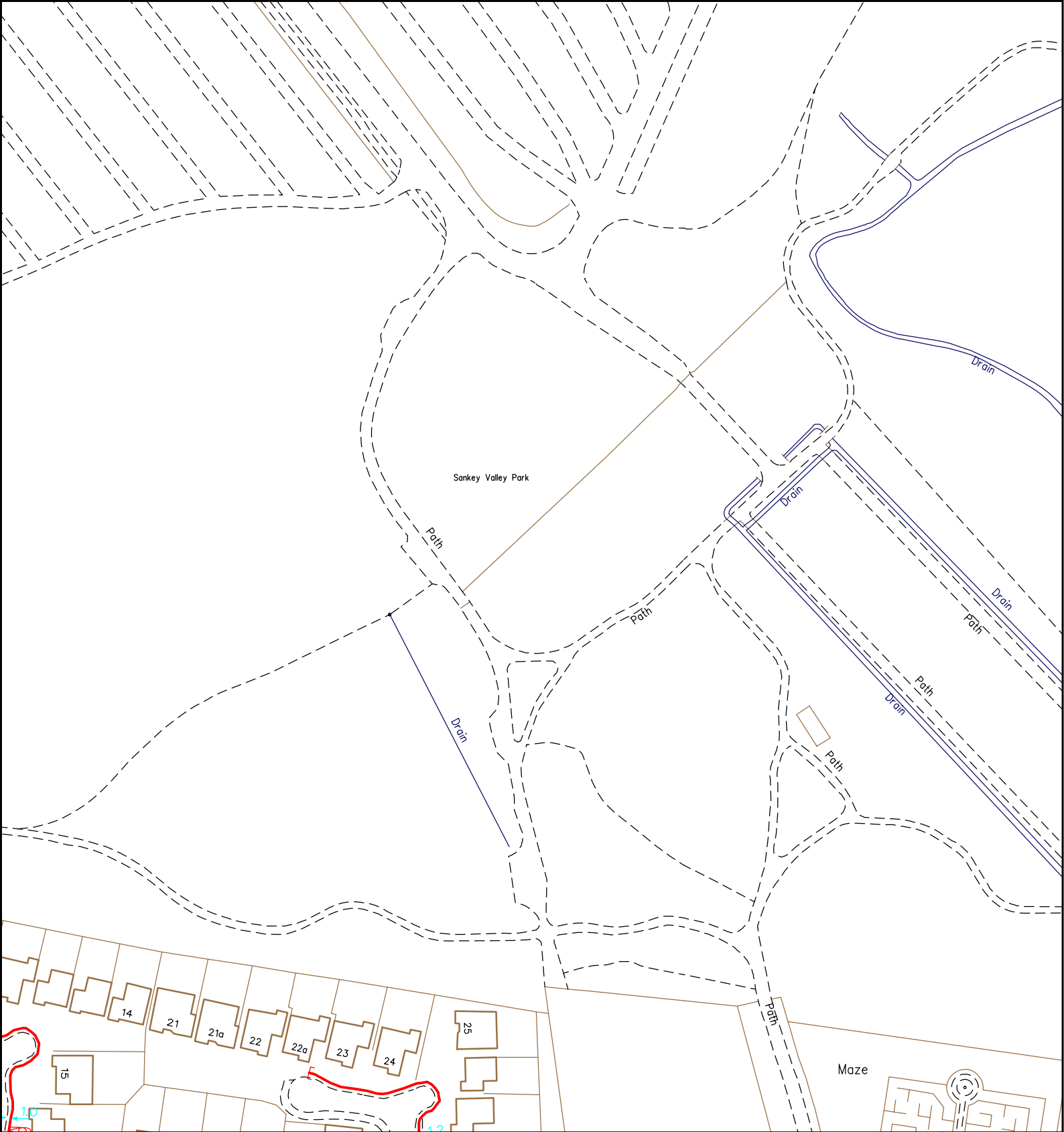






SCALE: 1 : 1250	LP MAINS	MAPS Viewer Version 5.8.0.1  Local Machine  This plan is reproduced from or based on the OS map by Cadent Gas Ltd, with the sanction of the controller of HM Stationery Office. Crown Copyright Reserved.
USER ID: madeleine.stevens	MP MAINS	
DATE: 21/08/2018	IP MAINS	
EXTRACT DATE: 13/06/2018	LHP MAINS	
MAP REF: SJ5889		
CENTRE: 358762, 389855		

This plan shows those pipes owned by Cadent Gas Ltd in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy hereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Cadent Gas Ltd or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm)

A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.



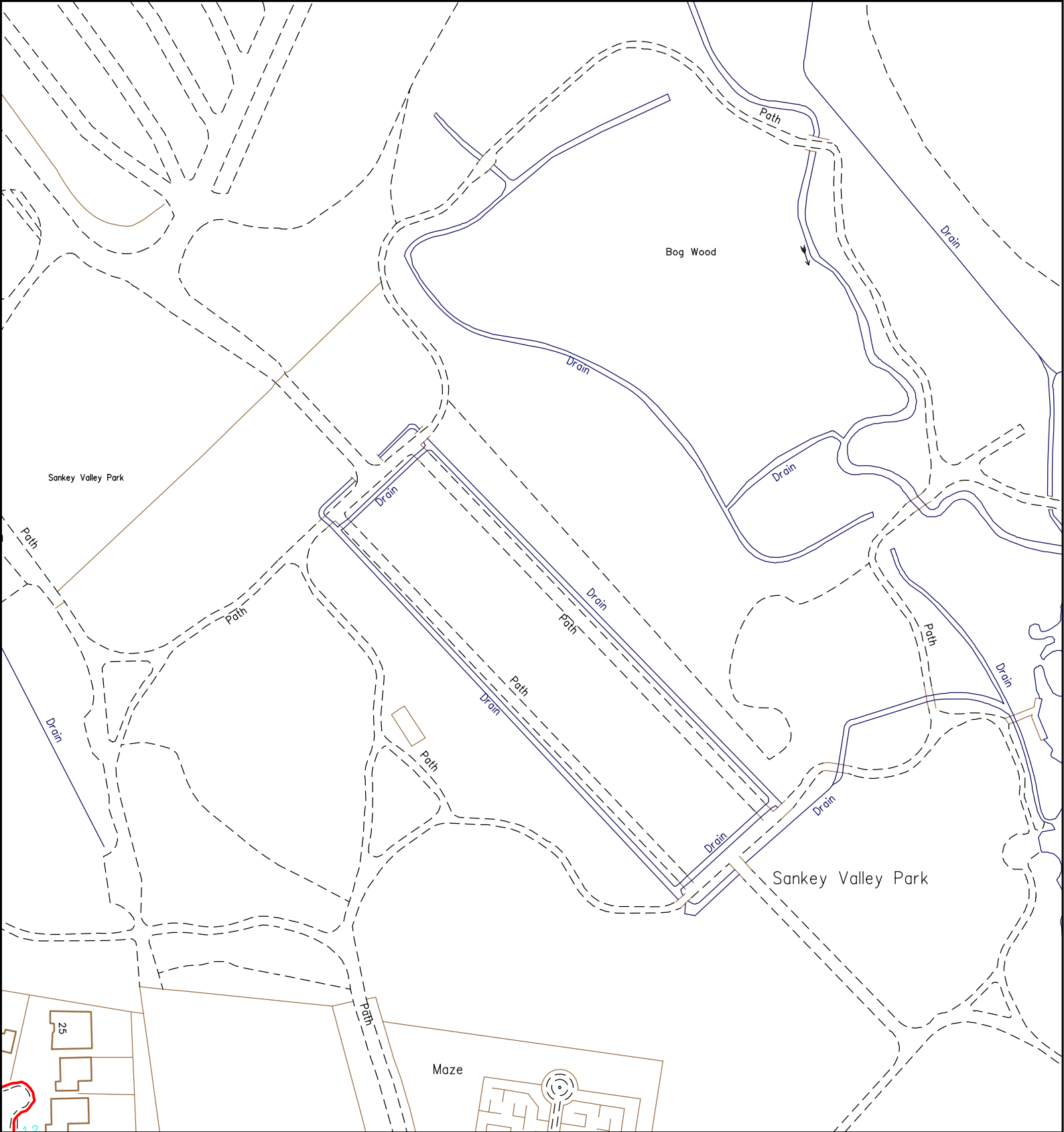






SCALE: 1 : 1250	LP MAINS MP MAINS IP MAINS LHP MAINS	   	MAPS Viewer Version 5.8.0.1
USER ID: madeleine.stevens			Local Machine
DATE: 21/08/2018			
EXTRACT DATE: 13/06/2018			
MAP REF: SJ5889			
CENTRE: 358962, 389855			This plan is reproduced from or based on the OS map by Cadent Gas Ltd, with the sanction of the controller of HM Stationery Office. Crown Copyright Reserved.

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**Page 21 of 38**

A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.



SCALE: 1 : 1250	LP MAINS 	MAPS Viewer Version 5.8.0.1
USER ID: madeleine.stevens	MP MAINS 	
DATE: 21/08/2018	IP MAINS 	
EXTRACT DATE: 13/06/2018	LHP MAINS 	
MAP REF: SJ5989		
CENTRE: 359062, 389855		Local Machine
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This plan shows those pipes owned by Cadent Gas Ltd in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy hereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Cadent Gas Ltd or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm)

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# Telecoms/Cable

# Maps by email Plant Information Reply



## IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy.

It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.



**openreach**

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FOR PROFESSIONAL FREE ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING LOCATE AND MARKING SERVICE

email [cbyd@openreach.co.uk](mailto:cbyd@openreach.co.uk)

ADVANCE NOTICE REQUIRED  
(Office hours: Monday - Friday 08.00 to 17.00)  
[www.openreach.co.uk/cbyd](http://www.openreach.co.uk/cbyd)

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## KEY TO BT SYMBOLS

DP		Pole	
Planned DP		Planned Pole	
PCP		Joint Box	
Planned PCP		Change Of State	
Built Duct		Split Coupling	
Planned Duct		Duct Tee	
Inferred Duct		Planned Box	
Building		Manhole	
Kiosk		Planned Manhole	
Hatchings		Cabinet	
		Planned Cabinet	

Other proposed plant is shown using dashed lines.  
BT Symbols not listed above maybe disregarded.  
Existing BT Plant may not be recorded.  
Information valid at time of preparation

BT Ref : DSQ04534V  
Map Reference : (centre) SJ5886689963  
Easting/Northing : (centre) 358866,389963  
Issued : 21/08/2018 16:53:25

**WARNING: IF PLANNED WORKS FALL INSIDE HATCHED AREA IT IS ESSENTIAL BEFORE PROCEEDING THAT YOU CONTACT THE NATIONAL NOTICE HANDLING CENTRE. PLEASE SEND E-MAIL TO: [nnhc@openreach.co.uk](mailto:nnhc@openreach.co.uk)**

# Maps by email Plant Information Reply



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## KEY TO BT SYMBOLS

		Pole	○
DP	●	Planned Pole	○ (dashed)
Planned DP	● (dashed)	Joint Box	■
PCP	⊠	Change Of State	+
Planned PCP	⊠ (dashed)	Split Coupling	⊗
Built	— (solid)	Duct Tee	▲
Planned	- - - (dashed)	Planned Box	■ (dashed)
Inferred	— (dotted)	Manhole	■ (solid)
Duct	— (solid)	Planned Manhole	■ (dashed)
Building	■ (solid)	Cabinet	⊠ (solid)
Kiosk	Ⓚ	Planned Cabinet	⊠ (dashed)
Hatchings	⊠ (hatched)		

Other proposed plant is shown using dashed lines.  
BT Symbols not listed above maybe disregarded.  
Existing BT Plant may not be recorded.  
Information valid at time of preparation

BT Ref : WJR04532H  
Map Reference : (centre) SJ5896689963  
Easting/Northing : (centre) 358966,389963  
Issued : 21/08/2018 16:54:09

**WARNING: IF PLANNED WORKS FALL INSIDE HATCHED AREA IT IS ESSENTIAL BEFORE PROCEEDING THAT YOU CONTACT THE NATIONAL NOTICE HANDLING CENTRE. PLEASE SEND E-MAIL TO: [nnhc@openreach.co.uk](mailto:nnhc@openreach.co.uk)**

# Maps by email Plant Information Reply



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## KEY TO BT SYMBOLS

DP		Pole	
Planned DP		Planned Pole	
PCP		Joint Box	
Planned PCP		Change Of State	
Built		Split Coupling	
Planned		Duct Tee	
Inferred		Planned Box	
Duct		Manhole	
Building		Planned Manhole	
Kiosk		Cabinet	
Hatchings		Planned Cabinet	

Other proposed plant is shown using dashed lines.  
BT Symbols not listed above maybe disregarded.  
Existing BT Plant may not be recorded.  
Information valid at time of preparation

BT Ref : IID045571  
Map Reference : (centre) SJ5886689763  
Easting/Northing : (centre) 358866,389763  
Issued : 21/08/2018 16:55:17

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# Maps by email Plant Information Reply



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## KEY TO BT SYMBOLS

DP		Pole	
Planned DP		Planned Pole	
PCP		Joint Box	
Planned PCP		Change Of State	
Built		Split Coupling	
Planned		Duct Tee	
Inferred		Planned Box	
Duct		Manhole	
Building		Planned Manhole	
Kiosk		Cabinet	
Hatchings		Planned Cabinet	

Other proposed plant is shown using dashed lines.  
BT Symbols not listed above maybe disregarded.  
Existing BT Plant may not be recorded.  
Information valid at time of preparation

BT Ref : LES04555K

Map Reference : (centre) SJ5896689763

Easting/Northing : (centre) 358966,389763

Issued : 21/08/2018 16:56:11

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# Water and Sewers





**Technics Group**

**1M  
Merrow Business Park,  
Guildford, Surrey  
GU4 7WA**

**FAO:**

**How to contact us:**

**United Utilities Water Limited  
Property Searches  
Haweswater House  
Lingley Mere Business Park  
Great Sankey  
Warrington  
WA5 3LP**

**Telephone: 0370 7510101**

**E-mail: [propertysearches@uuplc.co.uk](mailto:propertysearches@uuplc.co.uk)**

**Your Ref: GRS05183  
Our Ref: UUPS-ORD-51368  
Date: 22/08/2018**

**Dear Sirs**

**Location: Gullivers Hotel Gullivers World Theme Park Shackleton Close Warrington Cheshire, WA5 9YZ**

I acknowledge with thanks your request dated 20/08/2018 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

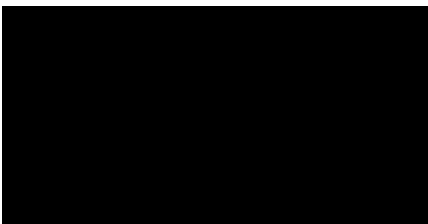
The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,





## TERMS AND CONDITIONS - WASTERWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

### TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



## Extract from Map of Public Sewers

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available.

The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded.

United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown. Crown copyright and database rights [2016] Ordnance Survey 100022432.

United Utilities Water Limited 2014  
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**Gullivers Hotel  
Gullivers World Theme Park  
Shackleton Close  
Warrington  
Cheshire  
WA5 9YZ**

Printed By: Property Searches Date: 22/08/2018

**DO NOT SCALE**  
Approximate Scale: 1:5000

 **United  
Utilities**  
helping life flow smoothly

## Wastewater Symbology

Abandoned	Fault	Surface Water	Combined	
				Public Sewer
				Private Sewer
				Section End
				Rising Main
				Sludge Main
				Overflow
				Water Course
				Highway Drain

All joint marks follow the standard colour convention: red - combined, brown - SW, blue - surface water, purple - overflow

- |                  |                          |
|------------------|--------------------------|
| Manhole          | Side Entry Manhole       |
| Head of System   | Outfall                  |
| Extent of Survey | Sonden Chamber           |
| Reading Eye      | Inspection Chamber       |
| inlet            | Bifurcation Chamber      |
| Discharge Point  | Lamp hole                |
| Valve            | T-Junction / Saddle      |
| Penstock         | Gullypit                 |
| Washout Chamber  | Valve Chamber            |
| Valve            | Vent Column              |
| Air Valve        | Vortex Chamber           |
| Non Return Valve | Penstock Chamber         |
| Sockway          | Network Storage Tank     |
| Gully            | Sewer Overflow           |
| Cascade          | Ww Treatment Works       |
| Flow Meter       | Ww Pumping Station       |
| Hatch Box        | Septic Tank              |
| Oil Interceptor  | Control Kiosk            |
| Summit           |                          |
| Drop Shaft       | Change of Characteristic |
| Drives Hole      |                          |



# Extract from Map of Water Mains

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available

The actual positions may be different from those shown on the plan, private service pipes may be shown where a known record is available.

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United Utilities Water Limited 2014  
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**Gullivers Hotel  
Gullivers World Theme Park  
Shackleton Close  
Warrington  
Cheshire  
WA5 9YZ**

Printed By: Property Searches Date: 22/08/2018

**DO NOT SCALE**  
Approximate Scale: 1:5000





## END USER LICENCE AGREEMENT

### 1 Introduction

By accessing this DATA the End User agrees to abide by the Terms and Conditions of Licence contained herein.

### 2 Definitions

- **LICENSOR** – emapsite.com Limited (Registered Number 3931726: MASDAR House, 1 Reading Road, Eversley, Hants RG27 0RP) who have been licensed to market the Intellectual Property Rights of others under these terms.
- **RESELLER** – Groundsure Limited and/or their own channel partners
- **END USER** – the person, organisation or company who is accessing the DATA, on the basis of these Licence terms, having been accepted as a Licensee by Licensor and paid the Price due to the Reseller in consideration for such Licence, and is identified as the person, organisation or company given on the corresponding invoice for this product from the Reseller.
- **DATA** - means the Products licensed and made available to the End User by the Licensor as a series of data sets which together provide indicative maps showing the underground assets of Utility Providers for England, Wales and Scotland and compiled by Subtechnics Limited.

### 3 Grant of licence

The licence granted to the End User is personal, revocable, non-exclusive and non-transferable, limited to Internal Use (as defined in clause 5 below) as the only Permitted Use by the End User and is for a period as specified in the corresponding order invoice from the Reseller. Save as expressly authorised to vary in accordance with clause 5 below, the End User shall be prohibited from:

- modifying, translating, format-changing, enhancing, reproducing, copying (except where strictly necessary for system back up), redistributing, disseminating, selling, dealing with, licensing, encumbering, reverse engineering, disassembling or decompiling the DATA, or any part of thereof, except to the extent permitted by law;
- using the DATA in any manner for the creation of products or services for Distribution;
- using DATA otherwise than for Internal Use;
- assigning or dealing with in any way its rights under the End User Contract;
- putting, or allowing the DATA (or any Derived Data) to be put on any free, open or public access website; and
- distributing or granting licences of the DATA (in whatever form) or material derived from DATA (including interrogating DATA), save as expressly varied by relevant part of clause 5 below.

### 4 Intellectual Property and Copyright

4.1 The End User must acknowledge and agree that all Intellectual Property Rights in the DATA are the absolute property of the Utility Providers (or where relevant

Subtechnics Limited or the licensor). Material which is derived, developed or copied from DATA shall be deemed assigned to the relevant Utility Provider as legal and beneficial owner at creation, except as provided in this paragraph. However, where that material is created by End User under relevant Permitted Use by End User authorised by Licensor in accordance with the Agreement, the Intellectual Property in that material shall belong to the End User.

4.2 Copyright statements must be used with DATA as follows:

© Utility Provider (named as applicable) and Subtechnics Limited

### 5 Permitted use

5.1 PERMITTED USE BY END USER SHALL BE LIMITED TO INTERNAL USE. COMMERCIAL USE SHALL BE PROHIBITED. The meanings of such phrases are set out below.

5.2 Internal Use means the following internal uses by the End User: Without compromising the prohibitions contained in clause 3 above, analysing the DATA against a location or a series of locations to obtain information derived from the DATA such as proximity to underground assets and use of and sharing such information/results of such analysis internally within the End User's legal entity only.

5.3 Commercial Use means use that does not fall under Internal Uses (as above) and involves the provision or any form of Distribution to any third party of the DATA or any material derived from DATA (including Derived Data or Static Data) in connection with, expectation of or anticipation of any direct or indirect commercial benefit or commercial relationship (including a service, broker or agency agreement) and whether or not in return for any consideration (including direct or indirect fee, payment or other benefit), free of charge or for no consideration.

5.4 Derived Data means any material derived from or created using DATA, including where DATA is manipulated, aggregated, integrated, combined, merged, modelled, transformed or processed in or with other data or facilities;

5.5 Static Data means DATA and any data (including Derived Data resulting from Internal Uses presented or included in static format in presentations or reports in hard copy, .pdf or similar format. Static Data does not allow for alteration of the data presented, nor enable any further analysis to be carried out against the data (including against the DATA).

### 6 Confidentiality

6.1 In this clause 6, 'Confidential Information' means all confidential information disclosed (whether in writing, orally or by another means and whether directly or indirectly) by a Party to the other Party whether before or after the date of this Agreement which might reasonably be considered confidential, including the DATA, information relating to the DATA, and information relating to any of the operations, plans or intentions, clients, contacts, product information, software, data, processes, methods, know-how, trade

secrets, market opportunities and business affairs of a Party.

6.2 Each Party shall treat the other Party's Confidential Information as confidential and shall protect it as such. It shall manage it with not less than the same degree of care as it does its own Confidential Information. In any event where Confidential Information is disclosed in any way by one Party ('Disclosing Party') to the other Party ('Receiving Party'), either before or during the Term of this Agreement or after its expiry or termination for any reason, the Receiving Party shall:

not use Confidential Information for a purpose other than the performance of its obligations under this Agreement;  
not disclose Confidential Information to any person except with the prior written consent of the Disclosing Party; and  
make every effort to prevent the use or disclosure of Confidential Information.

6.3 During the term of this Agreement the Receiving Party may disclose Confidential Information solely to the extent that such disclosure is necessary for the purposes of this Agreement, to any of its directors, other officers, employees, End Users, Affiliates, contractors or sub-contractors. Receiving Party shall ensure that persons to whom Confidential Information is disclosed are made aware of and comply with the Receiving Party's obligations of confidentiality as if they were the Receiving Party.

## 7 Information Access

7.1 In so far as the End User is, or is deemed to be, or acts for and on behalf of or on the authority of a Public Authority for the purposes of the Information Access Regimes:

End User acknowledges that the Utility Providers, Subtechnics Limited, Reseller and Licensor consider that DATA is exempted from disclosure because DATA is:

proprietary to the Utility Provider and disclosure would harm the interests of the Utility Provider (including its commercial interests);

protected by database rights and other Intellectual Property;

confidential and the disclosure of it by the End User would constitute a breach of confidence actionable by the Utility Provider, Subtechnics Limited and/or the Licensor; and  
confidential commercial or industrial information protected by laws to protect a legitimate economic interest.

7.2 End User shall, in the event it receives a request for information ('Access Request') under the Information Access Regimes pursuant to which the DATA might be disclosed:

immediately notify the Reseller of the Access Request and provide the Reseller with full and complete details of the Access Request and the DATA that may be disclosed, together with any other information the Reseller may request;

consult, as soon as possible within receipt of Access Request, with the Reseller as to whether the DATA constitutes information which is exempt from disclosure or publication pursuant to the Information Access Regimes and/or pursuant to the matters set out above;

notify the Reseller immediately of any final decision as to disclosure of the DATA and no less than 72 hours before

any proposed disclosure, as to what if any of the DATA (or any Derived Data) is proposed to be disclosed and co-operate fully and at End User's sole cost with the requirements set out in this paragraph.

7.3 End User shall not disclose the DATA in any publication scheme maintained pursuant to any Information Access Regime without first notifying the Reseller in advance of disclosure in accordance with this paragraph.

7.4 Where the End User is, or is deemed to be, or acts for and on behalf of or on the authority of a Public Authority under the Information Access Regimes and the End User seeks to make disclosure or discloses DATA under the Information Access Regimes without the consent of the Reseller, such disclosure shall entitle the Reseller and/or the Licensor and/or Subtechnics Limited to terminate the End User Contract with immediate effect and without liability on their part.

7.5 The Contracts (Rights of Third Parties) Act 1999 shall apply for the benefit of Subtechnics Limited and the Licensor and the Reseller that Subtechnics Limited and/or the Licensor and/or the Reseller may (but shall have no obligation to) enforce any of the terms in the End User Contract which relate to disclosure under the Information Access Regimes, limitation on liability, use of DATA or infringement of Intellectual Property Rights in the DATA.

## 8 Termination

8.1 The licence must terminate automatically in the event that the End User materially breaches any of the requirement / obligations set out in this End User Licence Agreement. All use of DATA and material derived from DATA shall cease promptly in such event, except as follows:

- Following expiry of the End User Contract, the End User may continue to use limited material created using DATA during the term of its End User Contract. Such material is limited to that which is both properly authorised as relevant Permitted Use by the End User and is in static form, i.e. such that after termination it is not changed, added to, updated, modified in any other way or used in or to create any new, updated, supplemented or modified product, tool, analysis or material.

- Material which is not in static form (including probabilistic modelling and models and output therefrom, which is automatically deemed to be not static) shall not be used after termination of the End User Contract.

- the End User must be prohibited from using DATA (including in Reseller's Product/Service), and from deriving any new, updated, supplemented or modified product, tool or material from DATA, after the date of termination of its End User Contract.

8.2 The invalidity or unenforceability of any part of this Agreement shall not prejudice or affect the validity or enforceability of the remainder of the Agreement, which shall remain in full force and effect. If any provision of this Agreement is found to be invalid, illegal or unenforceable but would cease to be so if some part of the provision were deleted or modified, the provision in question shall apply with such minimum modification as may be necessary to make it



valid, legal and enforceable and still give effect to the commercial intention of the Parties in this Agreement.

## 9 Fees

9.1 The End User must acknowledge its obligation to pay licence fees to the Reseller. The total price of the Products shall be the Reseller's written quoted price as varied from time to time. The price is exclusive of any applicable Value Added Tax, which the End User shall be additionally liable to pay to Licensors.

9.2 End User shall pay in full on order or shall pay within 30 days of the date of invoice, if accepted for an account with the Reseller. The time of payment shall be of the essence of the Contract. All payments shall be made in full without deduction in respect of any set-off or counterclaim. If the End User fails to make any payment on the due date then without prejudice to any other right or remedy available to Licensors, Licensors shall be entitled to:

cancel the Contract or suspend any deliveries to the End User;

appropriate any payment made by the End User to the DATA; and

charge the End User interest (both before and after any judgment) on the amount unpaid, at the rate of 4 per cent per annum over the base rate for the time being of Barclays Bank PLC.

Licence to DATA is not deemed to commence until payment has been made of the Price in full to Licensors.

## 10 Liability

10.1 Licensors warrant that the DATA will correspond with its specification at the time of delivery. The above warranty does not extend to any defect resulting from use of the DATA with materials or equipment not supplied by Licensor. The above warranty is given by Licensors subject to the following conditions:

Neither Licensor nor Reseller shall be under any liability in respect of any defect in the DATA arising from any drawing, design or specification supplied by the End User or in respect of any defect arising from failure to follow Licensors' guidance, misuse or alteration of the DATA without Licensors' approval;

Neither Licensor nor Reseller shall be under any liability under the above warranty (or any other warranty, condition or guarantee) if the total price for the DATA has not been paid by the due date for payment; and Except in respect of death or personal injury caused by Licensor or Reseller's negligence, neither Licensor nor Reseller shall be liable to the End User for any consequential loss or damage (whether for loss of profit or otherwise), costs, expenses, or other claim for consequential compensation whatsoever which arises out of or in connection with the supply of the DATA, except as expressly provided in these Conditions.

Except in respect of injury to or death of any person Licensor's and Reseller's aggregate liability for breach of contract, negligence or other default shall not exceed the value of the Contract.

Except as expressed here all warranties, conditions or other terms implied by statute or common law are excluded to the fullest extent permitted by law.

## 11 Governing Law and Jurisdiction

The End User Contract and any matter, dispute or claim arising from or in connection with the End User Contract in so far as it applies to DATA and its use (including non-contractual disputes or claims) shall be governed by and construed in accordance with English law. The End User must submit to the mediation process prescribed in the Agreement and, subject to that, to the exclusive jurisdiction of the English court.

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