



# Preliminary Geo-Environmental Risk Assessment

**Westgate, Dartford**

Presented to **Muse Development Ltd**

Issued: March 2020

Delta-Simons Project No. 18-0704.01



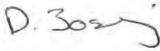
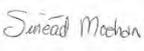
**Delta-Simons Environmental Consultants Limited**  
Head Office: 3 Henley Office Park, Doddington Road, Lincoln, LN6 3QR  
Tel: 01522 882555 | [www.deltasimons.com](http://www.deltasimons.com)



## Report Details

|                             |  |
|-----------------------------|--|
| <b>Client</b>               | Muse Developments Ltd  |
| <b>Report Title</b>         | Preliminary Geo-Environmental Risk Assessment  |
| <b>Site Address</b>         | Westgate, Dartford, DA1 2DF  |
| <b>Project No.</b>          | 18-0704.01   |
| <b>Delta-Simons Contact</b> | Simon Brown ( <a href="mailto:simon.brown@deltasimons.com">simon.brown@deltasimons.com</a> ) |

## Quality Assurance

| Issue No. | Status | Issue Date                  | Comments | Author   | Technical Review   | Authorised   |
|-----------|--------|-----------------------------|----------|--|--|--|
| 3         | Final  | 26 <sup>th</sup> March 2020 |          |  |  |  |
|           |        |                             |          | David Josling<br>Principal   | Sinéad Meehan<br>Principal   | Simon Brown<br>Executive Director  |

## About us

Delta-Simons is a trusted, multidisciplinary environmental consultancy, focused on delivering the best possible project outcomes for customers.

Specialising in Environment, Health & Safety and Sustainability, Delta-Simons provide support and advice within the property development, asset management, corporate and industrial markets. Operating from ten locations - Lincoln, Birmingham, Bristol, Dublin, Leeds, London, Manchester, Newcastle, Norwich and Nottingham - we employ over 100 environmental professionals, bringing experience from across the private consultancy and public sector markets.

Delta-Simons is proud to be a founder member of the Inogen® Environmental Alliance, a global corporation providing multinational organisations with consistent, high quality and cost effective environmental, health, safety, energy and sustainability solutions. Inogen assists multinational clients by resolving liabilities from the past, addressing today's requirements and delivering solutions for the future. With more than 200 offices located on every continent, more than 6,430 staff worldwide, and projects completed in more than 120 countries, Inogen provides a single point of contact for diverse markets as Automotive, Chemical, Consumer Products & Retail, Financial, Food & Beverage, Healthcare, Insurance, Manufacturing, Non-Profit Organisations, Oil & Gas, Real Estate, Services Firms, Technology and Transportation, among others.

## Executive Summary

|   |  |
|---|--|
| <b>Brief</b>  | Delta-Simons Environmental Consultants Limited (“Delta-Simons”) was instructed by TPS on behalf of Muse Developments Ltd (the “Client”) to prepare a Preliminary Geo-Environmental Risk Assessment for land known as Westgate, Dartford, DA1 2DF (the “Site”).   |
| <b>Site Use &amp; Surrounding Area</b>  | The Site currently comprises an irregularly shaped plot of land comprising a carpark, Orchard Street and a presently undeveloped area of crushed fill/Made Ground. The Site is located within Dartford’s central business district.  |
| <b>Environmental Setting</b>  | <p>A limited thickness of Made Ground across the Site is anticipated to be underlain by a sequence of Alluvium and Thames River Terrace Gravel superficial deposits overlying bedrock classified as the Lewes Nodular Chalk Formation.</p> <p>The superficial deposits are classified as Secondary Aquifers (A/Undifferentiated), and the bedrock as a Principal Aquifer. The Site is located within a designated groundwater Source Protection Zone (SPZ) Inner Zone (Zone 1).</p> <p>The nearest major surface water feature is the River Darent approximately 265 m to the east.</p>  |
| <b>Contamination Potential Sources</b>  | Limited potential sources of contamination have been identified associated with historical industrial activity (including a brewery), electrical substations on-Site and Made Ground deposits related to historical demolition works. Off-Site industrial activity has also been identified as a potential source of contamination.  |
| <b>Development Considerations</b>   | <p>Widespread contamination is considered unlikely and the preliminary risk assessment has identified a <b>Low to Moderate</b> risk of soil/groundwater contamination and hazardous ground gas at the Site. Asbestos may be present within the Made Ground.</p> <p>Potentially significant geohazards at the Site relate to ground instability due to dissolution features in the underlying chalk and potential for weak compressible deposits (Made Ground and Alluvium).</p>  |
| <b>Recommendations</b>  | <p>It is recommended that an intrusive ground investigation is undertaken to assess the potential for contamination and ground gases to impact on the proposed development, and to determine the geotechnical conditions across the Site, allowing the Site-specific ground and groundwater model to be refined and enable an assessment of foundation and engineering solutions to be made. Further desk-based assessment of the potential for ground instability associated with dissolution features in the chalk bedrock should be undertaken.</p> <p>Furthermore, it is recommended that a Remediation and Verification Plan is produced in advance of the building phase of works to set out procedures to be followed during the development works in the context of contaminated land; and</p> <p>A Site Verification Report should be produced on completion of the redevelopment works for full compliance with published planning conditions.</p> |
| <p>This is intended as a summary only. Further detail and the limitations of the assessment is provided within the main body of the Report.</p> |  |

## Table of Contents

|   |    |
|---|----|
| 1.0 INTRODUCTION.....                                   | 1  |
| 1.1 Appointment.....                                    | 1  |
| 1.2 Context & Purpose .....                             | 1  |
| 1.3 Scope of Works .....                                | 1  |
| 1.4 Limitations.....                                    | 2  |
| 2.0 SITE CONTEXT & DATA REVIEW.....                     | 3  |
| 2.1 Site Information.....                               | 3  |
| 2.2 Environmental Setting .....                         | 4  |
| 2.3 Historical Use of the Site & Surrounding Area ..... | 5  |
| 2.4 Environmental Database Review .....                 | 6  |
| 2.5 Planning Review/Regulatory Enquiries .....          | 7  |
| 3.0 CONCEPTUAL SITE MODEL .....                         | 8  |
| 3.1 Introduction .....                                  | 8  |
| 3.2 Potential Contamination Sources .....               | 8  |
| 3.3 Potential Pathways .....                            | 8  |
| 3.4 Potential Receptors .....                           | 9  |
| 4.0 PRELIMINARY GROUND ENGINEERING APPRAISAL.....       | 11 |
| 4.1 Preliminary Ground Model.....                       | 11 |
| 4.2 Plausible Geohazards .....                          | 11 |
| 5.0 DEVELOPMENT CONSIDERATIONS.....                     | 12 |
| 5.1 Potential Remediation Requirements & Solutions..... | 12 |
| 5.2 Geotechnical Considerations.....                    | 12 |
| 6.0 CONCLUSIONS & RECOMMENDATIONS.....                  | 14 |
| 6.1 Land Contamination .....                            | 14 |

### Figures

Figure 1      Site Location Map

### Appendices

Appendix A      Limitations  
Appendix B      Risk Definitions  
Appendix C      Site Photographs  
Appendix D      Historical Maps  
Appendix E      Landmark Envirocheck® Report  
Appendix F      Explosive Ordnance Desktop Threat Assessment

# 1.0 Introduction

## 1.1 Appointment

Delta-Simons Environmental Consultants Limited (“Delta-Simons”) was instructed by TPS on behalf of Muse Developments Ltd (the “Client”) to prepare a Preliminary Geo-Environmental Risk Assessment for land known as Westgate, Dartford, DA1 2DF (the “Site”).

A Site location is presented in Figure 1.

## 1.2 Context & Purpose

The aim of this report is to identify likely environmental and geotechnical issues associated with soil and groundwater conditions that may affect the proposed development of the site.

This report is designed in general accordance with guidance on Land Contamination: Risk Management pages of the [GOV.UK](https://www.gov.uk) web pages, the relevant requirements of the National Planning Policy Framework 2019 (NPPF) (paragraphs 170 & 178-180)<sup>1</sup> and the Planning Practice Guidance (Land Affected by Contamination)<sup>2</sup>.

This Preliminary Geo-Environmental Risk Assessment is to support a planning submission for the redevelopment of the Site. It is understood that the development will comprise the demolition of existing structures to make way for the construction of a mixed use commercial (A1, A2, A3, A4, D1, D2 and B1), cinema (D2), hotel (C1), residential (C3) and health/wellbeing (D1) with associated parking, infrastructure, public realm and landscaping. It is understood that a sublevel will be constructed below the car park to house a sprinkler tank.

## 1.3 Scope of Works

To complete this preliminary risk assessment, the following works were undertaken:

- ▲ Review of the environmental setting of the Site, including the current use/status of the Site and surrounding area, and review of the geology, hydrogeology and hydrology;
- ▲ Review of the historical activities of the Site and surrounding area;
- ▲ Review of regulatory information relating to the Site;
- ▲ Review of the online planning records for the Site;
- ▲ Consultation and review of information from the Local Authority in relation to Part 2A of the 1990 Environmental Protection Act;
- ▲ Completion of a Site reconnaissance by undertaking a visual inspection of readily accessible areas of the Site;
- ▲ Development of an outline Conceptual Site Model and undertake a Preliminary Risk Assessment with respect to potential contamination focussed on the proposed land use;
- ▲ Identification of potential contamination risks and/or liabilities associated with the proposed acquisition of the Site;
- ▲ Provision of commentary on potential land contamination and geotechnical constraints in the context of the proposed development; and
- ▲ Summary of readily available data on the flood risk associated with the Site.

In completing this Assessment, Delta-Simons has utilised the following data sources and third party information:

- ▲ Current (OS) maps and online mapping including aerial photos;
- ▲ British Geological Survey (BGS) data;

<sup>1</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/779764/NPPF\\_Feb\\_2019\\_web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_Feb_2019_web.pdf)

<sup>2</sup> <https://www.gov.uk/guidance/land-affected-by-contamination>

- ▲ Local Authority Contaminated Land Officer information;
- ▲ A Landmark Envirocheck Report for the Site (Ref. 168151210\_1\_1), dated May 2018; and
- ▲ Historical Maps included as part of the Envirocheck® Report.

## 1.4 Limitations

The standard limitations associated with this assessment are presented in Appendix A. In addition, there are the following specific limitations that apply to this assessment:

- ▲ The Consultant undertaking the Site inspection completed a visual check for invasive species, particularly Japanese Knotweed. It should be noted however that the Consultant is not a trained ecologist and a separate survey undertaken by an experienced Ecologist should be completed to provide a robust assessment; and
- ▲ The report includes a preliminary assessment for the potential for radon gas hazards. A detailed radon assessment falls outside of the scope of this report, and the requirement for radon mitigation measures in the proposed development should be identified separately to the satisfaction of Dartford Borough Council Building Control.

## 2.0 Site Context & Data Review

### 2.1 Site Information

|   |   |                  |            |
|---|---|------------------|------------|
| <b>Co-ordinates</b>                     | Centred approximately at National Grid Reference 54070, 174170.   | <b>Elevation</b> | c. 5 m AOD |
|   |   | <b>Area</b>      | 1.22 Ha    |
| <b>Site Location</b>                    | The Site occupies an irregularly shaped plot located near the centre of Dartford. The Site is loosely defined within Westgate Road to the north, Spital Street to the south, Kent Road to the west and Hythe Street to the east.  |                  |            |
| <b>Current Site Use</b>                 | The Site can be considered as occupying three parts: the western area currently comprises a car park and the eastern area comprises crushed concrete/demolition rubble (surrounded by security fencing); the two areas are separated by Orchard Street (and pavements). Electricity substations are located towards the northern end of Orchard Street and in the south-west corner of the carpark.   |                  |            |
| <b>Proposed Development Description</b> | It is understood that the development will comprise the demolition of existing structures to make way for the construction of a mixed use commercial (A1, A2, A3, A4, D1, D2 and B1), cinema (D2), hotel (C1), residential (C3) and life hub (D1) with associated parking, infrastructure, public realm and landscaping. It is understood that a sublevel will be constructed below the car park to house a sprinkler tank.   |                  |            |
| <b>Site Reconnaissance</b>              | <p>Delta-Simons conducted a Site visit on 8<sup>th</sup> June 2018. A series of Site photographs are presented as Appendix C, and pertinent information that was observed or reported on-Site is summarised as follows:</p> <ul style="list-style-type: none"> <li>▲ The Site area to the east of Orchard Street is largely defined by steel fencing surrounding an area of generally level, crushed stone fill at surface with occasional vegetation. Adjacent to the boundaries, the vegetation is locally thicker. No Japanese Knotweed was identified visually however the Site visit was not a detailed ecological survey;</li> <li>▲ An electricity substation is located off Orchard Street within the eastern Site area;</li> <li>▲ To the south, the Site area was bounded by the fascia of the former Spital Street development, the rear of the public house and the rear of the Copperfields development. In the northeast, Kent Curry house forms part of the Site boundary;</li> <li>▲ The Site area to the west of Orchard Street is currently a car park. The area generally slopes gently downwards to the east and west from a line running north to south through the centre;</li> <li>▲ An electricity substation is located in the southwest of the car park;</li> <li>▲ At the time of the survey the southern boundary of the car park was defined by on-going residential development and the northern boundary by steel fencing. Access onto Orchard Street and Kent Road to the west is open to pedestrians;</li> <li>▲ The car park contained three electric car charging points and associated infrastructure; and</li> <li>▲ The surrounding area is largely commercial with some residential property. No obvious sources of contamination were identified.</li> </ul> <p>It has been assumed that no further significant changes have occurred at the site since the date of the site walkover.</p> <p><i>The electricity substations represent a potential source of contamination. No other sources were identified during the Site visit.</i></p> |                  |            |

|                                 |  |  |
|---------------------------------|--|--|
| <b>Current Surrounding Area</b> | <b>North</b>   | Commercial and residential property on Orchard Street, Kent Road and Hythe Street.                               |
|                                 | <b>East</b>  | Commercial and residential property on Hythe Street.   |
|                                 | <b>South</b>   | Commercial and residential property on Spital Street, Orchard Street and Kent Road.                              |
|                                 | <b>West</b>  | Commercial property on Kent Road. A Kwik-Fit garage is located approximately 20 m to the north-west of the Site. |
|                                 | <i>The Kwik-Fit garage represents a potential source of significant contamination identified in the area surrounding the Site.</i> |  |

## 2.2 Environmental Setting

|                                   |   |
|-----------------------------------|---|
| <b>Published Geology</b>          | From published British Geological Survey (BGS) mapping (1:50,000 Sheet Number 271, Dartford), the Site is indicated as being underlain by superficial deposits of Alluvium (mainly silt and clay, locally peaty) overlying Thames River Terrace Gravel deposits (gravel, sandy and clayey in part). The underlying bedrock is classified as the Lewes Nodular Chalk Formation. Given the current Site status, Made Ground is likely to be present overlying the Alluvium at the Site.   |
| <b>Specific Ground Conditions</b> | Historical BGS borehole coverage in the vicinity of the Site is limited.<br>TQ57SW175, located approximately 50 m east of Site recorded 0.5 m of Made Ground overlying brown gravel and sand (river terrace deposits) to 5.0 m bgl.<br>TQ57SW13/B, located approximately 50 m south-west of the Site recorded approximately 17 m of gravel overlying chalk to 75 m bgl. Groundwater level was recorded at c.2.9 m bgl.<br>No other BGS borehole scans are available within 100 m of the Site.   |
| <b>Hydrogeology</b>               | According to the Envirocheck® Report, the superficial deposits are classified as a Secondary A Aquifer in the south and Secondary Undifferentiated in the north. The bedrock (Lewes Chalk) is classified as a Principal Aquifer.<br>The Envirocheck® Report also indicates that the Site is located within a designated groundwater Source Protection Zone (SPZ) Inner Zone (Zone 1), and that there are three licensed abstraction records from groundwater located within 500 m of the Site, the nearest located approximately 300 m to the east and relating to a potable public water supply. |
| <b>Hydrology</b>                  | The nearest surface water feature is the River Darent, located approximately 266 m to the north-east of the Site.<br>According to the Envirocheck Report, one record of licensed abstraction from surface water is located within 500 m of the Site, relating to non-evaporative cooling approximately 310 m to the north-east.   |
| <b>Flooding</b>                   | A detailed Flood Risk Assessment has been completed by a third party and further information relating to the status of the site is covered within this report.<br>According to the Envirocheck® Report identified the potential for Groundwater Flooding of Property situated below ground level.   |
| <b>Coal Mining</b>                | According to the Envirocheck® Report, the Site does not lie within an area affected by coal mining activity.  |

|                                  |   |
|----------------------------------|---|
| <b>Quarrying</b>                 | “Old Chalk Pits” are recorded within 500 m of the Site on historical plans. Unmarked pits predating the mapping may exist closer to or within the Site boundary.  |
| <b>Radon Gas</b>                 | The Site lies within an area where less than 1% of homes are above the National Radiological Protection Board (NRPB) recommended “action level” for radon. BRE211 (2007) indicates that no radon protective measures are necessary in the construction of new buildings at the Site.  |
| <b>Ecological Receptors</b>      | It is understood from information provided within the Envirocheck® Report, there are no statutory ecological receptors located within 1 km of the Site.   |
| <b>Heritage Interest</b>         | According to Historic England, a Grade II public house (listed as The Coach and Horses but apparently now called Industry) is located adjacent to the south-east of the Site, and a Grade II listed chapel is recorded approximately 40 m south-west of the Site. Other listed sites are recorded in the vicinity along Spital Street and Kent Road.  |
| <b>Unexploded Ordnance (UXO)</b> | The project management team has obtained an Explosive Ordnance Desktop Threat Assessment (presented in Appendix F). The report identified a Medium Risk of German High Explosive Bombs being present.   |
| <b>Environmental Sensitivity</b> | <p>The following receptors are considered to have a moderate to high environmental sensitivity, however when they are considered in the context of the surrounding developed/commercial area and absence ecological receptors, the overall sensitivity of the Site is considered to be reduced:</p> <ul style="list-style-type: none"> <li>▲ Principal Aquifer underlying the superficial strata (themselves Secondary Aquifers); and</li> <li>▲ the Site’s location within a SPZ Zone 1 and the public potable water supply borehole located approximately 300 m from the Site.</li> </ul> |

### 2.3 Historical Use of the Site & Surrounding Area

|                                    |   |
|------------------------------------|---|
| <b>Approach</b>                    | The historical development of the Site and surrounding area has been assessed through a review of available historical OS maps dating to 1860 and Google Earth historical satellite imagery. A summary of the key historical Site uses and developments in the surrounding area is presented below. Copies of pertinent historical maps are included as Appendix D.   |
| <b>Historical Features On-Site</b> | <p>The earliest historical map recorded the Site as being predominantly occupied by a brewery, with an orchard garden occupying the northern and western areas, and terraced residential property on Hythe Street and Spital Street occupying parts of the eastern and southern boundary respectively.</p> <p>Development of the Site took place between 1883 and 1897. The brewery was extended across the centre and south-east of the Site, and terraced housing associated with Orchard Street was constructed in the centre and west of the Site.</p> <p>By 1909 the western reaches of the Site were also occupied by terraced housing associated with Kent Road.</p> <p>Before 1938, the houses on Spital Road forming part of the Site’s southern boundary had been demolished.</p> <p>An aerial photo dated 1947 appears to show the demolition of the brewery and some of the houses abutting Kent Road; these are interpreted as bomb strikes in WWII.</p> <p>By 1961, the majority of the former Brewery site, occupying the eastern Site area, had been redeveloped into an un-named building. The building was extended to occupy the entire eastern Site area before 1975. During that time, the houses to the west of</p> |

|  |  |
|--|--|
|  | <p>Orchard Street were demolished. An unlabelled structure, located where the present electricity substation is found, was recorded from c.1961 until mapping dated 2006.</p> <p>A multi-storey carpark had been constructed on the Site area to the west of Orchard Street before 1982. An electricity substation was recorded to the southwest of the carpark on mapping dated 1993.</p> <p>No significant changes were recorded on any plans until mapping dated 2018, which detailed the demolition of the multi-storey carpark to the west and the development to the east of Orchard Street, leaving the Site in its present condition.</p> <p><i>Given the former industrial uses and the dual phases of demolition (possibly including bomb damage), buried structures, locally deep Made Ground and potentially contaminated ground are anticipated.</i></p>  |
| <p><b>Potentially Contaminative Historical Features Off-Site</b></p> | <p>Potential sources of contamination within 250 m of the Site include:</p> <ul style="list-style-type: none"> <li>▲ Dartford Print Works, 250 m east, c.1860-c.1961, and c.1961-c.1982 as a Works;</li> <li>▲ Goods Depot and railway sidings, c.110 m north-east, c.1860-c.1975; From c.1897, the sidings were listed as a coal depot;</li> <li>▲ Cattle market, 100 m south, c.1860-c.1982;</li> <li>▲ Iron Foundry, 100 m north, c.1860-c.1909; between c.1909 and c.1931, the foundry was repurposed as an Engineering Works and later (until c.1982) simply a Works. Tanks associated with the Works were recorded c.90 m north (1982 mapping);</li> <li>▲ Baltic Saw Mills (later, simply, Mill), c.125 m east, c.1897-c.1967;</li> <li>▲ Coach and Motor Works (later, simply, Garage), 100 m south, c.1909-c.2000;</li> <li>▲ Works, c.20 m northwest, c.1961-c.2006;</li> <li>▲ Works, c.200 m south, c.1966-c.2000;</li> <li>▲ Works, c.120 m east, c.1961-c.1982; and</li> <li>▲ Works, c.10 m west, c.1970-c.1983.</li> </ul> |

## 2.4 Environmental Database Review

|   |  |
|---|--|
| <p><b>Approach</b></p>                                    | <p>The Landmark Envirocheck® Report provides a database of environmental information held by various statutory bodies including the EA, Local Authority (LA), Health &amp; Safety Executive (HSE) and HPA amongst others. A full copy of the Envirocheck® Report is provided in Appendix E and the most relevant information is summarised below.</p>  |
| <p><b>Features On-Site</b></p>                            | <p>The Landmark Envirocheck® Report does not list any pertinent entries within the boundaries of the Site.</p>   |
| <p><b>Potentially Contaminative Features Off-Site</b></p> | <p>Pertinent entries included within the Landmark Envirocheck® Report located within 250 m from the Site include the following:</p> <ul style="list-style-type: none"> <li>▲ One Discharge Consent (effective from April 1991 until it was revoked February 2003) operated by A.P.V. Baker Ltd for Trade Effluent Into Land was located c.160 m to the north. (Another discharge consent, effective between 1967 and 1991, was operated by Wellcome Chemical Works for Trade Discharges – Cooling Water to Freshwater Stream/River c. 250 m to the northeast);</li> <li>▲ Three Local Authority Pollution Prevention and Controls, all currently permitted, relating to respraying of road vehicles (c.40 m south-west since 1994), and dry cleaning (c.40 m north-east since 2007 and c. 20 m north-east since 2010); and</li> <li>▲ Two Pollution incidents to Controlled Waters: a Category 3 – Minor Incident relating to a white substance (chemicals – paints/dyes) in watercourse dated May 1998 (c.</li> </ul> |

|   |  |
|---|--|
|   | <p>200 m north-east) and a Category 3 – Minor Incident relating to sewage in the River Darent dated July 1994 (c.225 m south-east).</p> <p>There are no BGS, LA and EA registered landfill sites on or within 250 m of the Site. No landfill data was available from relevant Local Authorities.</p> <p>Seven active Contemporary Trade Directory Entries are located within 100 m of the Site associated with dry cleaning, tyre dealing, domestic cleaning services, freight forwarding, car dealing and electric goods.</p> <p>A Fuel Station Entry, Westgate House Service Station, was recorded approximately 125 m to the west. It's status is recorded as Obsolete.</p> |
| <b>Implications for Land Contamination Risk</b> | <p><i>No potential sources of contamination have been identified at the Site from the regulatory information. Potential off-Site sources of contamination have been identified that will be considered in the preliminary risk assessment.</i></p>   |

## 2.5 Planning Review/Regulatory Enquiries

|   |  |                      |            |
|---|--|----------------------|------------|
| <b>On-line Planning Portal</b>                                | Dartford Borough Council   | <b>Date Accessed</b> | 05/06/2018 |
| <b>Findings</b>   | <p>The Site and surrounding in area have been subject to hundreds of planning applications dating back to 1888. The most relevant applications to the present development project are recorded below:</p> <p><u>12/01094/CON – September 2012</u></p> <p>Demolition of part of 19-33 Spital Street within Dartford Conservation Area with retention of Spital Street and Orchard Street façade (former Co-op 20 - 54 Hythe Street and 19-33 Spital Street). Relates to the most southerly extent of the eastern half of the current Site.</p> <p>Decision: Conservation Area Consent</p> <p><u>07/00687/FUL – September 2008</u></p> <p>Demolition of existing building, with the retention of Spital Street facade and redevelopment of site to provide 2 detached buildings. Building 1: (fronting Hythe Street) erection of building up to 6 storeys in height comprising 61 x 1 bedroom flats and 65 x 2 bedroom flats (126 units) with 6 retail units at ground floor level and communal garden at first floor level (Orchard Street elevation). Building 2: (fronting Spital Street) Erection of part 3/part 5 storey building comprising 12 x 1 bedroom flats, 32 x 2 bedroom flats and 6 x 3 bedroom flats (50 units) with retail unit and communal garden at ground floor level together with 88 car parking spaces at basement and ground floor level and a pedestrian link walkway from Hythe Street to Orchard Street.</p> <p>Decision: Application Permitted</p> <p>No additional potentially contaminative activities or other information pertinent to this assessment was identified from the historical planning records.</p> |                      |            |
| <b>Part 2A of the Environmental Protection Act (EPA) 1990</b> | <p>The Contaminated Land Officer (CLO) was contacted on 5<sup>th</sup> June 2018. The CLO confirmed that “The site is not listed on the Part 2a Public Register for Dartford Borough Council and has therefore not been prioritised in that context”.</p>  |                      |            |

## 3.0 Conceptual Site Model

### 3.1 Introduction

A Conceptual Site Model (CSM) represents the relationships between contaminant sources, pathways and receptors, to support the identification and assessment of Possible Pollutant Linkages (PPL).

Where PPL are identified, a preliminary risk assessment is undertaken to assess the likelihood that each possible linkage exists and to determine whether these pose potentially unacceptable risks to identified receptors and require further assessment. Where this linkage is of a form that subsequently leads to the potential for land being identified as 'contaminated land' under the terms of Part 2A of the Environmental Protection Act 1990, the linkage is termed a significant pollutant linkage.

At the preliminary risk assessment stage, which is typically based upon desk study information, the decision on whether a PPL poses a potentially unacceptable risk is based upon professional judgement. The significance of the PPL will also be determined dependant on the context of the land use and the purpose of the assessment.

Assessing risks from land contamination underpins the "suitable for use" approach adopted for Part 2A of the EPA 1990 regulatory regime and the National Planning Policy Framework (NPPF), March 2012.

### 3.2 Potential Contamination Sources

Potential contamination sources identified in Section 2.2 as relevant to the Site are presented in the following table:

| Source  | Location              | Dates Present              | Potential Associated Contaminants of Concern                              |
|---|-----------------------|----------------------------|---|
| Brewery   | Eastern Site area     | c.1883 to c. 1945          | Heavy metals, asbestos, TPH, PAH, VOC, hazardous ground gases.            |
| Made Ground - Potential demolition and historic sources | Site-wide             | c.1938 to present          | Asbestos, heavy metals, PAH, TPH, hazardous ground gases.                 |
| Electricity substations                                 | Southwest and central | c.1961 and 1993 to present | PAH, PCB.   |
| Surrounding industrial uses including railway lines     | Off-Site              | c.1860 to present          | Heavy metals, asbestos, TPH, PAH, VOC, SVOC, PCB, hazardous ground gases. |

### 3.3 Potential Pathways

The potential pathways are considered to be as follows:

- ▲ P1 - Direct contact, ingestion or inhalation of soil bound contaminants/dust during or following redevelopment.
- ▲ P2 - Inhalation of organic vapours associated with contamination.
- ▲ P3 - Migration of ground gas/vapours into on-site buildings causing asphyxiation or risk of explosion.
- ▲ P4 - Leaching of contamination into groundwater followed by migration of groundwater to the wider groundwater environment or discharge to surface waters.
- ▲ P5 - Direct contact between aggressive ground conditions and new infrastructure.

### 3.4 Potential Receptors

Relevant potential receptors are considered to include:

- ▲ R1 - Construction workers.
- ▲ R2 - Third parties during construction (adjacent Site users and adjacent residents).
- ▲ R3 - Future Site users and maintenance workers.
- ▲ R4 - The underlying aquifer(s).
- ▲ R5 - The Built Environment (new buildings and infrastructure/utilities).

| Pollutant Linkage Assessment              |                    |                    |                             |   |                        |
|---|--------------------|--------------------|-----------------------------|---|------------------------|
| Source(s)                                 | Pathway(s)         | Receptor(s)        | Risk Rating                 | Justification & Mitigation (if required)  | Requires Investigation |
| Brewery, potential Demolition Made Ground | P1, P2, P3, P4, P5 | R1, R2, R3, R4, R5 | <b>Moderate Risk</b>        | <p>Given the industrial Site history and the demolition of on-Site buildings, it is considered likely that there are Made Ground Deposits on-site which could be potentially contaminated. There is considered to be a possible pollutant linkage between the deposits anticipated on Site and identified receptors, including the underlying aquifers.</p> <p>The presence and matrix of the Made Ground can be confirmed and the potential risk to receptors assessed through a ground investigation and subsequent Geo-Environmental Assessment at the Site.</p> | Y                      |
| Electricity Substations                   | P1, P2, P3, P4     | R1, R2, R3, R4     | <b>Low to Moderate Risk</b> | <p>Substations represent a potential source of hydrocarbon contamination, particularly PAH and PCB. However, given the two substations identified on-Site are currently operational, maintenance is anticipated to be good and therefore the risk reduced.</p> <p>The presence of historical or ongoing contamination can be confirmed through a ground investigation at the Site.</p>  | Y                      |
| Surrounding Historical Land Uses          | P2, P3             | R1, R3             | <b>Low to Moderate Risk</b> | <p>It is considered that the adjacent historical land uses may represent sources of contamination. There is the potential for vapours and hazardous ground gases to migrate on to Site from the surrounding ground through the superficial and Made Ground strata. Furthermore, vapour generating contamination has the potential to migrate on to Site mobilised by groundwater.</p> <p>The presence of contamination migrating on to Site can be confirmed through a ground investigation.</p>  | Y                      |

## 4.0 Preliminary Ground Engineering Appraisal

### 4.1 Preliminary Ground Model

Based on the available information, it is anticipated that the Site is likely underlain by a sequence of Made Ground underlain by Alluvium and River Terrace Gravels, with Chalk bedrock beneath. Groundwater is anticipated to be present beneath the Site in the chalk, with perched groundwater possible in the overlying gravels.

### 4.2 Plausible Geohazards

The geohazards listed below have been identified by following guidance presented in the HA document HD22/08 'Managing Geotechnical Risk' (2008) which aims to identify and manage the geotechnical risks associated with a scheme throughout its lifespan, from planning to construction to maintenance.

The following geohazards are considered to be substantial ground related risks associated with the proposed development. A substantial risk is defined by Delta-Simons in Appendix B.

- ▲ The Envirocheck® Report identifies a Moderate Potential for Compressible Ground Stability Hazards on Site. Other Ground Stability Hazards are recorded as No Hazard to Low Risk;
- ▲ Given the presence of the underlying Chalk bedrock and the vicinity of the River Darent, chalk dissolution features are considered to be a potential hazard across the Site;
- ▲ Given the anticipated presence of Alluvium, soft and/or compressible ground is likely with potentially low bearing capacity and unacceptable levels of total/differential settlement may occur;
- ▲ The history of demolition at the Site indicates that Made Ground will be present at the Site. Made Ground is typically variable in nature and strength with a potentially low bearing capacity and unacceptable levels of total/differential settlement may occur; and
- ▲ As a result of previous demolition, relict structures may be present that could act as obstructions.

Potential solutions and further steps to address the aforementioned issues are discussed in Section 5.

## 5.0 Development Considerations

### 5.1 Potential Remediation Requirements & Solutions

|                                       |  |
|---------------------------------------|--|
| <b>Soils</b>                          | <p>The risk of the Site requiring widespread remediation to protect end users is considered to be low to moderate, although localised remedial measures, for example removal of contamination hotspots and provision of a clean soil cover for proposed soft landscaping, may be required in areas of Made Ground.</p> <p>If contamination and/or Asbestos Containing Materials (ACMs) are identified, then this may have an impact on waste disposal costs.</p> |
| <b>Groundwater</b>                    | <p>Significant widespread groundwater contamination resulting from on-Site activity is not anticipated.</p>  |
| <b>Ground Gas</b>                     | <p>The risk of significant ground gas being present is considered to be moderate, and it would be prudent to allow for basic ground gas protection measures until monitoring data is available for interpretation.</p>   |
| <b>Building Fabric &amp; Services</b> | <p>Widespread contamination at the Site is considered unlikely. However, services are recommended to be placed in clean corridors. A drinking water pipeline assessment may be required following soils chemical results. Aggressive ground chemistry may attack buried concrete and therefore there may be a requirement for protection measures to be put in place at the Site.</p>  |

### 5.2 Geotechnical Considerations

|                                      |  |
|--------------------------------------|--|
| <b>Foundations &amp; Floor Slabs</b> | <p>The shallow ground conditions are anticipated to comprise Made Ground (associated with current uses and demolition of former structures) underlain by a sequence of Alluvium and Thames River Terrace Gravels over bedrock of the Lewes Nodular Chalk Formation.</p> <p>The underlying Alluvium deposits at the Site may pose a risk for shallow foundations due to compressibility and unacceptable levels of total/differential settlement and the underlying granular deposits at the Site may be a more suitable founding medium however this depends on final design parameters. If required, a piled foundation solution transferring loads to the chalk may be suitable for the proposed development.</p> <p>However, the potential for dissolution features associated with underlying chalk needs to be investigated and may require upgraded foundation and floor slab solutions (e.g. reinforced rafts, pre-pile probing, grouting).</p> |
| <b>Groundworks</b>                   | <p>A hydraulic breaker or floor-saw will be required to break up the widespread hardstanding across the western section of Site.</p> <p>Relict structures from housing, former multi-storey carpark, the brewery and the subsequent development on the eastern Site area may be present.</p> <p>The potential for shallow groundwater may also present problems for excavations.</p>   |
| <b>External Works</b>                | <p>California Bearing Ratio testing will be required to determine road construction thickness. Consideration will need to be given for the potential for differential settlement to affect road surfaces and services and appropriately mitigated within the design.</p>   |
| <b>Ground Instability</b>            | <p>The potential of chalk dissolution features beneath the Site and surrounding area increases the risk of ground instability.</p>   |

---

|  |  |
|--|--|
|  | Should this not be investigated and assessed properly to determine whether remedial stabilisation measures are required, it will have significant cost implications with regards to the construction of any development. |
|--|--|

## 6.0 Conclusions & Recommendations

### 6.1 Land Contamination

|                                     |  |
|-------------------------------------|--|
| <p><b>Conceptual Site Model</b></p> | <p>The outline Conceptual Site Model has identified several potential sources of contamination associated with the Site's former user as a brewery, Made Ground and electricity substations. Contaminants of concern are likely to comprise heavy metals, hydrocarbon fractions, PAHs, PCBs, SVOCs, VOCs, asbestos and ground gas. When these are considered in the context of existing/future receptors (future residential occupants, Principal Aquifer, SPZ3) several potential pollutant linkages have been identified and the development is considered to pose a <b>Low to Moderate</b> risk to human health and controlled waters.</p>  |
| <p><b>Recommendations</b></p>       | <p>It is recommended an intrusive ground investigation to be undertaken to investigate:</p> <ul style="list-style-type: none"> <li>▲ The presence, thickness and nature of any Made Ground and superficial deposits;</li> <li>▲ The potential for chalk dissolution features;</li> <li>▲ The presence, concentrations and leachability of substances of concern in shallow soils (including Made Ground) on-Site;</li> <li>▲ The presence of substances of concern in any perched water/soil pore water or deep groundwater beneath Site; and</li> <li>▲ Likelihood of significant ground gas and/or soil vapour intrusion into future on-Site and off-Site buildings.</li> </ul> <p>Furthermore, it is recommended that a Remediation and Verification Plan is produced in advance of the building phase of works to set out procedures to be followed during the development works in the context of contaminated land; and</p> <p>A Site Verification Report should be produced on completion of the redevelopment works for full compliance with published planning conditions.</p> <p>The following costs are anticipated to be incurred during any future development:</p> <ul style="list-style-type: none"> <li>▲ Undertaking a Natural &amp; Mining Cavities Database Searches and Cavities Occurrence Assessment;</li> <li>▲ All shallow intrusive works on Site must be undertaken with the support of an Explosive Ordnance Disposal (EOD) Engineer, including intrusive magnetometer surveys to the maximum bomb penetration depth (10m);</li> <li>▲ Completing a ground investigation with and subsequent Geo-Environmental Assessment;</li> <li>▲ Undertaking further assessments, for example a Detailed Quantitative Risk Assessment (DQRA), liaison with relevant Regulatory Authorities, and, if required, subsequent soil and groundwater remediation;</li> <li>▲ Completing a waste classification exercise and the disposal of soils for engineering purposes (e.g. foundation and service trench arisings, engineering cut, excavations etc) or remediation;</li> <li>▲ Use of clean inert material in service runs across the Site; and</li> <li>▲ Use of upgraded water supply pipes, even where low concentrations of hydrocarbons are present.</li> </ul> |

## Figure 1 – Site Location Map



## Appendix A – Limitations

## Limitations

The recommendations contained in this Report represent Delta-Simons professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Delta-Simons obtained, reviewed and evaluated information in preparing this Report from the Client and others. Delta-Simons conclusions, opinions and recommendations has been determined using this information. Delta-Simons does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Delta-Simons has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

This Report was prepared by Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

## Appendix B – Risk Definitions

## Contaminated Land Risk Definitions

The following methodology is based on the methodology presented in CIRIA C552 Contaminated Land Risk Assessment: A Guide to Good Practice 2001. It requires the classification of the:

- ▲ Magnitude of the potential consequence (severity) of the Risk occurring: and
- ▲ Magnitude of the Probability (likelihood) of the Risk occurring.

The classifications are then compared to indicate the risk presented by each pollutant linkage.

### Consequence to Receptor Definition Matrix

|                    | Human Health   | Controlled Waters   | Buildings/Services   |
|--------------------|--|---|--|
| Severe Consequence | Acute or chronic permanent impact on human health.   | Sensitive controlled water pollution ongoing, or just about to occur. | Catastrophic collapse  |
| Medium Consequence | Chronic permanent impact on human health   | Gradual pollution of sensitive controlled water                       | Degradation of materials   |
| Mild Consequence   | Chronic temporary impact on human health   | Gradual pollution of non-sensitive controlled water                   | Damage to building rendering it unsafe to occupy (eg foundation damage resulting in instability).        |
| Minor Consequence  | Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). | Slight discoloration of water   | Easily repairable effects of damage to buildings, structures and services, i.e discoloration of concrete |

### Probability Definitions

| Probability    | Definition in Context  |
|----------------|--|
| Higher         | There is a pollution linkage and an event that either 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.<br>Positive evidence of source, pathway and receptor.   |
| Likely         | There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.<br>Suspect source, pathway, and receptor |
| Low Likelihood | There is a pollution linkage and circumstances are possible under which an event could occur.<br>However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.  |
| Unlikely       | There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term<br>No evidence of hazard, pathway, and receptor   |

**Standard Risk Matrix**

|             |                | Consequence/Magnitude of impact |              |              |              |
|-------------|----------------|---------------------------------|--------------|--------------|--------------|
|             |                | Severe                          | Medium       | Mild         | Minor        |
| Probability | High           | 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     |

**Classified risks and likely action**

| Significance Level    | Definition/Comments  |
|-----------------------|--|
| <b>Very High Risk</b> | <p>There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening.</p> <p>This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.</p> <p>Demonstrable contaminated land situation, highest threat &amp; liability level, urgent action recommended.</p>   |
| <b>High Risk</b>      | <p>Harm is likely to arise to a designated receptor from an identified hazard.</p> <p>Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.</p> <p>Likely contaminated land situation, risk assessment and action recommended.</p>   |
| <b>Moderate</b>       | <p>It is possible that harm could arise to a designated receptor from an identified hazard. However, if is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild</p> <p>Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.</p> <p>Plausible contaminated land situation, risk assessment and possible action recommended.</p> |
| <b>Low Risk</b>       | <p>It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.</p> <p>Unlikely contaminated land situation, possible risk assessment and possible action.</p>  |
| <b>Very Low Risk</b>  | <p>There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.</p> <p>Negligible risk, no action recommended except vigilance for changes in conditions.</p>   |

## Geotechnical Risk Classification

The geohazards listed in the report within Section 4 follow guidance presented in Clayton, C.R.I. (2001) *Managing Geotechnical Risk*, Thomas Telford and the Highways Agency document HD22/08 '*Managing Geotechnical Risk*' (2008) which aims to identify and manage the geotechnical risks associated with a scheme throughout its lifespan, from planning to construction to maintenance.

For each geohazard the probability of the hazard occurring (P) has been considered together with the impact it would have (I) if it were to happen to calculate the risk rating between 1 and 25.

Risks that fall within Moderate, Significant and Severe categories below are considered to be **substantial** and are therefore listed within the report.

| Probability        | (P) | X | Impact         | (I) | = | (R)     | Risk        |
|--------------------|-----|---|----------------|-----|---|---------|-------------|
| Very Likely (VLk)  | 5   |   | Very High (VH) | 5   |   | 20 – 25 | Severe      |
| Likely (Lk)        | 4   |   | High (H)       | 4   |   | 15 – 19 | Substantial |
| Plausible (P)      | 3   |   | Medium (M)     | 3   |   | 10 – 14 | Moderate    |
| Unlikely (U)       | 2   |   | Low (L)        | 2   |   | 5 – 9   | Minor       |
| Very Unlikely (VU) | 1   |   | Very Low (VL)  | 1   |   | 1 – 4   | Negligible  |

## Appendix C – Site Photographs

## Site Photographs



**Photograph 1: Northern extent of eastern Site area**



**Photograph 2: Southern extent of eastern Site area**



**Photograph 3: Protection of retained facia on Spital Street**



**Photograph 4: The carpark occupying the western Site area**



**Photograph 5: The electricity substation located in the southwest corner of the carpark**



**Photograph 6: The western Site boundary with Kent Road**



**Photograph 7: Electric-car charging infrastructure**



**Photograph 8: Orchard Street from the north**

## Appendix D – Historical Maps

# Historical Mapping Legends

## Ordnance Survey County Series 1:10,560

|  |   |  |                             |  |               |
|--|---|--|-----------------------------|--|---------------|
|  | Gravel Pit                                    |  | Sand Pit                    |  | Other Pits    |
|  | Quarry  |  | Shingle                     |  | Orchard       |
|  | Osiers  |  | Reeds                       |  | Marsh         |
|  | Mixed Wood                                    |  | Deciduous                   |  | Brushwood     |
|  | Fir   |  | Furze                       |  | Rough Pasture |
|  | Arrow denotes flow of water                   |  | Trigonometrical Station     |  |               |
|  | Site of Antiquities                           |  | Bench Mark                  |  |               |
|  | Pump, Guide Post, Signal Post                 |  | Well, Spring, Boundary Post |  |               |
|  | <b>-285</b> Surface Level                     |  |                             |  |               |
|  | Sketched Contour                              |  | Instrumental Contour        |  |               |
|  | Main Roads                                    |  | Minor Roads                 |  |               |
|  | Sunken Road                                   |  | Raised Road                 |  |               |
|  | Road over Railway                             |  | Railway over River          |  |               |
|  | Railway over Road                             |  | Level Crossing              |  |               |
|  | Road over River or Canal                      |  | Road over Stream            |  |               |
|  | Road over Stream                              |  |                             |  |               |
|  | County Boundary (Geographical)                |  |                             |  |               |
|  | County & Civil Parish Boundary                |  |                             |  |               |
|  | Administrative County & Civil Parish Boundary |  |                             |  |               |
|  | County Borough Boundary (England)             |  |                             |  |               |
|  | County Burgh Boundary (Scotland)              |  |                             |  |               |
|  | Rural District Boundary                       |  |                             |  |               |
|  | Civil Parish Boundary                         |  |                             |  |               |

## Ordnance Survey Plan 1:10,000

|  |   |  |                         |
|--|---|--|-------------------------|
|  | Chalk Pit, Clay Pit or Quarry   |  | Gravel Pit              |
|  | Sand Pit  |  | Disused Pit or Quarry   |
|  | Refuse or Slag Heap   |  | Lake, Loch or Pond      |
|  | Dunes   |  | Boulders                |
|  | Coniferous Trees  |  | Non-Coniferous Trees    |
|  | Orchard   |  | Scrub                   |
|  | Coppice   |  |                         |
|  | Bracken   |  | Heath                   |
|  | Rough Grassland   |  |                         |
|  | Marsh   |  | Reeds                   |
|  | Saltings  |  |                         |
|  | Building  |  | Glasshouse              |
|  | Sloping Masonry   |  | Pylon                   |
|  | Electricity Transmission Line   |  | Pole                    |
|  | Cutting   |  | Embankment              |
|  | Standard Gauge Multiple Track   |  |                         |
|  | Standard Gauge Single Track   |  |                         |
|  | Siding, Tramway or Mineral Line   |  |                         |
|  | Narrow Gauge  |  |                         |
|  | Geographical County   |  |                         |
|  | Administrative County, County Borough or County of City                                       |  |                         |
|  | Municipal Borough, Urban or Rural District, Burgh or District Council                         |  |                         |
|  | Borough, Burgh or County Constituency<br>Shown only when not coincident with other boundaries |  |                         |
|  | Civil Parish<br>Shown alternately when coincidence of boundaries occurs                       |  |                         |
|  | BP, BS Boundary Post or Stone   |  | Pol Sta Police Station  |
|  | Ch Church   |  | PO Post Office          |
|  | CH Club House   |  | PC Public Convenience   |
|  | F E Sta Fire Engine Station   |  | PH Public House         |
|  | FB Foot Bridge  |  | SB Signal Box           |
|  | Fn Fountain   |  | Spr Spring              |
|  | GP Guide Post   |  | TCB Telephone Call Box  |
|  | MP Mile Post  |  | TCP Telephone Call Post |
|  | MS Mile Stone   |  | W Well                  |

## 1:10,000 Raster Mapping

|  |  |  |  |
|--|--|--|--|
|  | Gravel Pit   |  | Refuse tip or slag heap                    |
|  | Rock   |  | Rock (scattered)                           |
|  | Boulders   |  | Boulders (scattered)                       |
|  | Shingle  |  | Mud  |
|  | Sand   |  | Sand Pit                                   |
|  | Slopes   |  | Top of cliff                               |
|  | General detail   |  | Underground detail                         |
|  | Overhead detail  |  | Narrow gauge railway                       |
|  | Multi-track railway                                      |  | Single track railway                       |
|  | County boundary (England only)                           |  | Civil, parish or community boundary        |
|  | District, Unitary, Metropolitan, London Borough boundary |  | Constituency boundary                      |
|  | Area of wooded vegetation                                |  | Non-coniferous trees                       |
|  | Non-coniferous trees (scattered)                         |  | Coniferous trees                           |
|  | Coniferous trees (scattered)                             |  | Positioned tree                            |
|  | Orchard  |  | Coppice or Osiers                          |
|  | Rough Grassland  |  | Heath                                      |
|  | Scrub  |  | Marsh, Salt Marsh or Reeds                 |
|  | Water feature  |  | Flow arrows                                |
|  | MHW(S) Mean high water (springs)                         |  | MLW(S) Mean low water (springs)            |
|  | Telephone line (where shown)                             |  | Electricity transmission line (with poles) |
|  | Bench mark (where shown)                                 |  | Triangulation station                      |
|  | Point feature (e.g. Guide Post or Mile Stone)            |  | Pylon, flare stack or lighting tower       |
|  | Site of (antiquity)                                      |  | Glasshouse                                 |
|  | General Building   |  | Important Building                         |

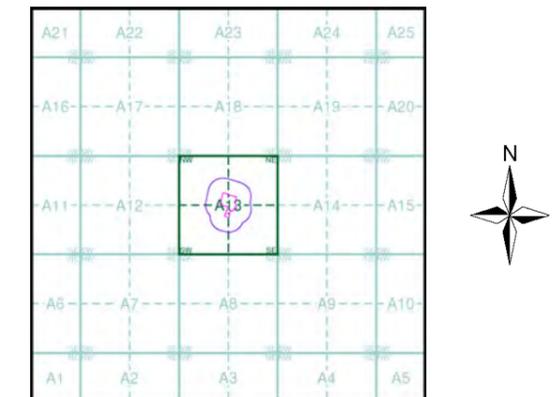
# Envirocheck®

LANDMARK INFORMATION GROUP®

## Historical Mapping & Photography included:

| Mapping Type                  | Scale    | Date        | Pg |
|-------------------------------|----------|-------------|----|
| Kent                          | 1:10,560 | 1869        | 3  |
| Essex                         | 1:10,560 | 1872        | 4  |
| Kent                          | 1:10,560 | 1898        | 5  |
| Kent                          | 1:10,560 | 1910        | 6  |
| London                        | 1:10,560 | 1920        | 7  |
| Essex                         | 1:10,560 | 1921        | 8  |
| Kent                          | 1:10,560 | 1931        | 9  |
| Kent                          | 1:10,560 | 1938        | 10 |
| London                        | 1:10,560 | 1938        | 11 |
| Essex                         | 1:10,560 | 1938        | 12 |
| Kent                          | 1:10,560 | 1939 - 1950 | 13 |
| Historical Aerial Photography | 1:10,560 | 1947 - 1948 | 14 |
| Historical Aerial Photography | 1:10,560 | 1947        | 15 |
| Ordnance Survey Plan          | 1:10,000 | 1961        | 16 |
| Ordnance Survey Plan          | 1:10,000 | 1966 - 1967 | 17 |
| Ordnance Survey Plan          | 1:10,000 | 1974 - 1977 | 18 |
| Gravesend                     | 1:10,000 | 1977        | 19 |
| Ordnance Survey Plan          | 1:10,000 | 1983 - 1987 | 20 |
| London                        | 1:25,000 | 1985        | 21 |
| Ordnance Survey Plan          | 1:10,000 | 1988        | 22 |
| Ordnance Survey Plan          | 1:10,000 | 1992 - 1996 | 23 |
| Ordnance Survey Plan          | 1:10,000 | 1996        | 24 |
| 10K Raster Mapping            | 1:10,000 | 1999        | 25 |
| 10K Raster Mapping            | 1:10,000 | 2006        | 26 |
| VectorMap Local               | 1:10,000 | 2018        | 27 |

## Historical Map - Slice A



## Order Details

Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

## Site Details

Westgate, DARTFORD, DA1 2DF

**Landmark**  
 INFORMATION GROUP

Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk

# Russian Military Mapping Legends

## 1:5,000 and 1:10,000 mapping

a. Not drawn to scale    b. Drawn to scale

|  |  |  |   |
|--|--|--|---|
|  | Government and Administrative Buildings      |  | Military and Industrial Buildings               |
|  | Military and Communication Areas             |  | Subway Entrance                                 |
|  | Fireproof Building                           |  | Prominent Fireproof Building                    |
|  | Non-fireproof Building                       |  | Non-fireproof Building (non-dwelling)           |
|  | Factory, mill, and flour mill, with chimneys |  | Factory, mill, and flour mill, without chimneys |
|  | Power Station, drawn to scale                |  | Hydroelectric Power Station                     |
|  | Radio Station, drawn to scale                |  | Telephone Station, drawn to scale               |
|  | Abandoned Open-pit Mine or Quarry            |  | Open-pit Salt Mine                              |
|  | Pit  |  | Oil Deposit or Well                             |
|  | Oil Seepage                                  |  | Natural Gas Tank                                |
|  | Tailings Pile                                |  | Fuel Storage Tanks                              |
|  | Bench Mark                                   |  | Drill Hole                                      |
|  | Burial Mound                                 |  | Triangulation Point on Burial Mound             |
|  | Single-track Railroad                        |  | Double-track Railroad                           |
|  | Small Bridge                                 |  | Tunnel  |
|  | Pipe (Culvert)                               |  | Railroad and Station Building                   |
|  | Coniferous Forest                            |  | Deciduous Forest                                |
|  | Mixed Forest                                 |  | Lawns   |
|  | Citrus Orchard                               |  | Wet Ground                                      |
|  | Scattered Vegetation                         |  |   |

**243,8** Values for prominent elevations  
**186.0** Numbers for spot elevations, depth soundings, contour lines, etc.  
**0,2** Velocity of the current, width of river bed, depth of river  
**180/12** Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

### Russian Alphabet (For reference and phonetic interpretation of map text)

|                 |                |                 |                       |
|-----------------|----------------|-----------------|-----------------------|
| <b>А а (A)</b>  | <b>З з (Z)</b> | <b>П п (P)</b>  | <b>Ч ч (CH)</b>       |
| <b>Б б (B)</b>  | <b>И и (I)</b> | <b>Р р (R)</b>  | <b>Ш ш (SH)</b>       |
| <b>В в (V)</b>  | <b>Й й (Y)</b> | <b>С с (S)</b>  | <b>Щ щ (SHCH)</b>     |
| <b>Г г (G)</b>  | <b>К к (K)</b> | <b>Т т (T)</b>  | <b>Ъ (-)</b>          |
| <b>Д д (D)</b>  | <b>Л л (L)</b> | <b>У у (U)</b>  | <b>Ы (Y)</b>          |
| <b>Е е (E)</b>  | <b>М м (M)</b> | <b>Ф ф (F)</b>  | <b>Ь (')</b>          |
| <b>Ё ё (YO)</b> | <b>Н н (N)</b> | <b>Х х (KH)</b> | <b>Э э (E)</b>        |
| <b>Ж ж (ZH)</b> | <b>О о (O)</b> | <b>Ц ц (TS)</b> | <b>Ю ю (YU or IU)</b> |
|                 |                |                 | <b>Я я (YA or IA)</b> |

## 1:25,000 mapping

a. Not drawn to scale    b. Drawn to scale

|  |  |  |  |
|--|--|--|--|
|  | Government and Administrative Buildings            |  | Military and Industrial Buildings                      |
|  | Military and Communication Areas                   |  | Subway Entrance  |
|  | Partly Demolished Buildings                        |  | Demolished Buildings                                   |
|  | Built-Up Area with Fireproof Buildings Predominant |  | Built-Up Area with Non-Fireproof Buildings Predominant |
|  | Individual Fireproof Building                      |  | Prominent Industrial Building                          |
|  | Individual Dwelling, Fireproof                     |  | Ruins of an Individual Dwelling                        |
|  | Factory or Mill Chimney                            |  | Factory or Mill with Chimney                           |
|  | Factory or Mill without Chimney                    |  | Mine or Open Pit Mine                                  |
|  | Operating Shaft or Mine                            |  | Non-Operating Shaft or Mine                            |
|  | Salt Mine  |  | Tailings Pile  |
|  | Pit  |  | Stone Quarry   |
|  | Gas Pump or Service Station                        |  | Fuel Storage or Natural Gas Tank                       |
|  | Oil or Natural Gas Derrick                         |  | Small Hydroelectric Power Station                      |
|  | Power Station                                      |  | Transformer Station                                    |
|  | Cemetery   |  | Burial Mound (height in metres)                        |
|  | Triangulation Point on Burial Mound                |  | Triangulation Point                                    |
|  | Bench Mark   |  | Telegraph Office                                       |
|  | Telephone Station                                  |  | Radio Station  |
|  | Radio Tower  |  | Airfield or Seaplane Base                              |
|  | Landing Strip                                      |  | Cut  |
|  | Fill   |  | Km Post  |
|  | Plantings  |  | Width of Road  |
|  | Steep Grade  |  | Highway under Construction                             |
|  | Improved Dirt Road (former truck road)             |  | Small Bridge   |
|  | Pipe (Culvert)                                     |  | Tunnel   |
|  | Dismantled Railroad                                |  | Double-track Railroad with First Class Station         |
|  | Railroad Under Construction                        |  | Shore Embankment                                       |
|  | River or Ditch with Embankment                     |  | Water Gauge  |
|  | Direction and velocity of current                  |  | Water Level Mark                                       |
|  | Well   |  | Water Reservoir or Rain Water Pit                      |
|  | Spring   |  | Isobath with value                                     |
|  | Heavy (Index) Contour Line                         |  | Contour Line and Value                                 |
|  | Half Contour Line                                  |  | Spot Elevation Value                                   |
|  | Coniferous   |  | Deciduous  |
|  | Mixed  |  | Scrub  |

## Key to Numbers on Mapping

### TQ57\_London

| No. | Description                         |
|-----|-------------------------------------|
| 114 | Factories (Chemicals And Machinery) |

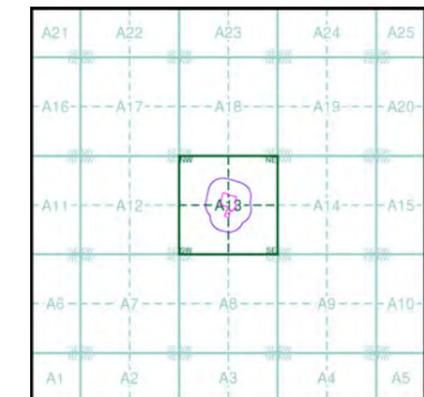
# Envirocheck®

LANDMARK INFORMATION GROUP®

## Historical Mapping & Photography included:

| Mapping Type                  | Scale    | Date        | Pg |
|-------------------------------|----------|-------------|----|
| Kent                          | 1:10,560 | 1869        | 3  |
| Essex                         | 1:10,560 | 1872        | 4  |
| Kent                          | 1:10,560 | 1898        | 5  |
| Kent                          | 1:10,560 | 1910        | 6  |
| London                        | 1:10,560 | 1920        | 7  |
| Essex                         | 1:10,560 | 1921        | 8  |
| Kent                          | 1:10,560 | 1931        | 9  |
| Kent                          | 1:10,560 | 1938        | 10 |
| London                        | 1:10,560 | 1938        | 11 |
| Essex                         | 1:10,560 | 1938        | 12 |
| Kent                          | 1:10,560 | 1939 - 1950 | 13 |
| Historical Aerial Photography | 1:10,560 | 1947 - 1948 | 14 |
| Historical Aerial Photography | 1:10,560 | 1947        | 15 |
| Ordnance Survey Plan          | 1:10,000 | 1961        | 16 |
| Ordnance Survey Plan          | 1:10,000 | 1966 - 1967 | 17 |
| Ordnance Survey Plan          | 1:10,000 | 1974 - 1977 | 18 |
| Gravesend                     | 1:10,000 | 1977        | 19 |
| Ordnance Survey Plan          | 1:10,000 | 1983 - 1987 | 20 |
| London                        | 1:25,000 | 1985        | 21 |
| Ordnance Survey Plan          | 1:10,000 | 1988        | 22 |
| Ordnance Survey Plan          | 1:10,000 | 1992 - 1996 | 23 |
| Ordnance Survey Plan          | 1:10,000 | 1996        | 24 |
| 10K Raster Mapping            | 1:10,000 | 1999        | 25 |
| 10K Raster Mapping            | 1:10,000 | 2006        | 26 |
| VectorMap Local               | 1:10,000 | 2018        | 27 |

## Russian Map - Slice A



## Order Details

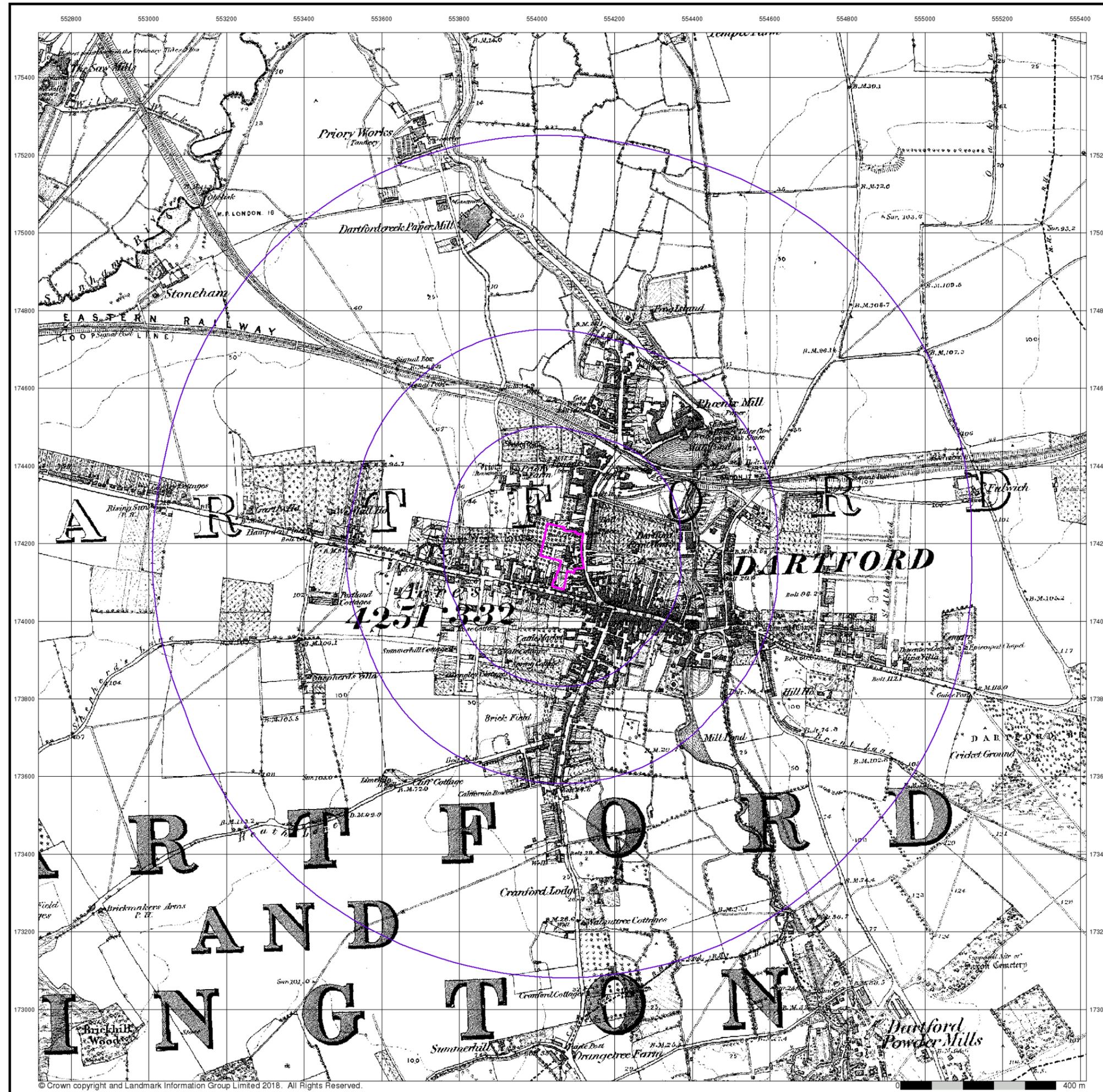
Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

## Site Details

Westgate, DARTFORD, DA1 2DF

**Landmark**  
 INFORMATION GROUP

Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk



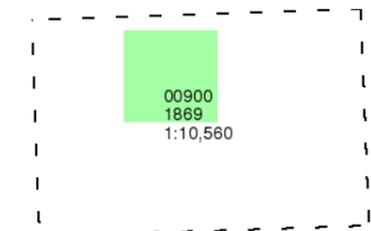
**Kent**

**Published 1869**

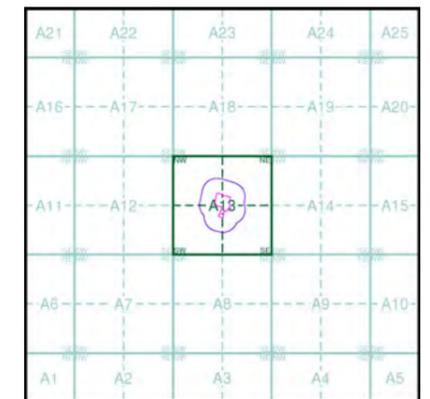
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A



### Order Details

Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

### Site Details

Westgate, DARTFORD, DA1 2DF

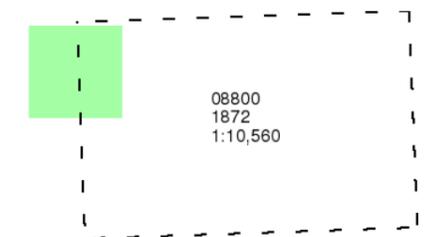
## Essex

Published 1872

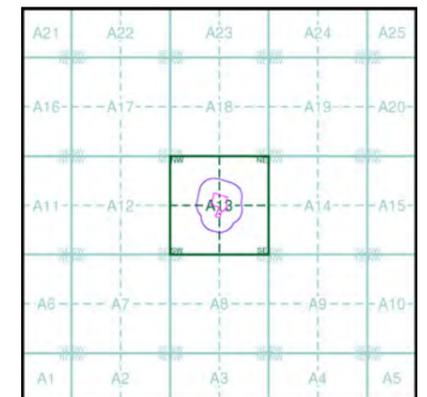
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A

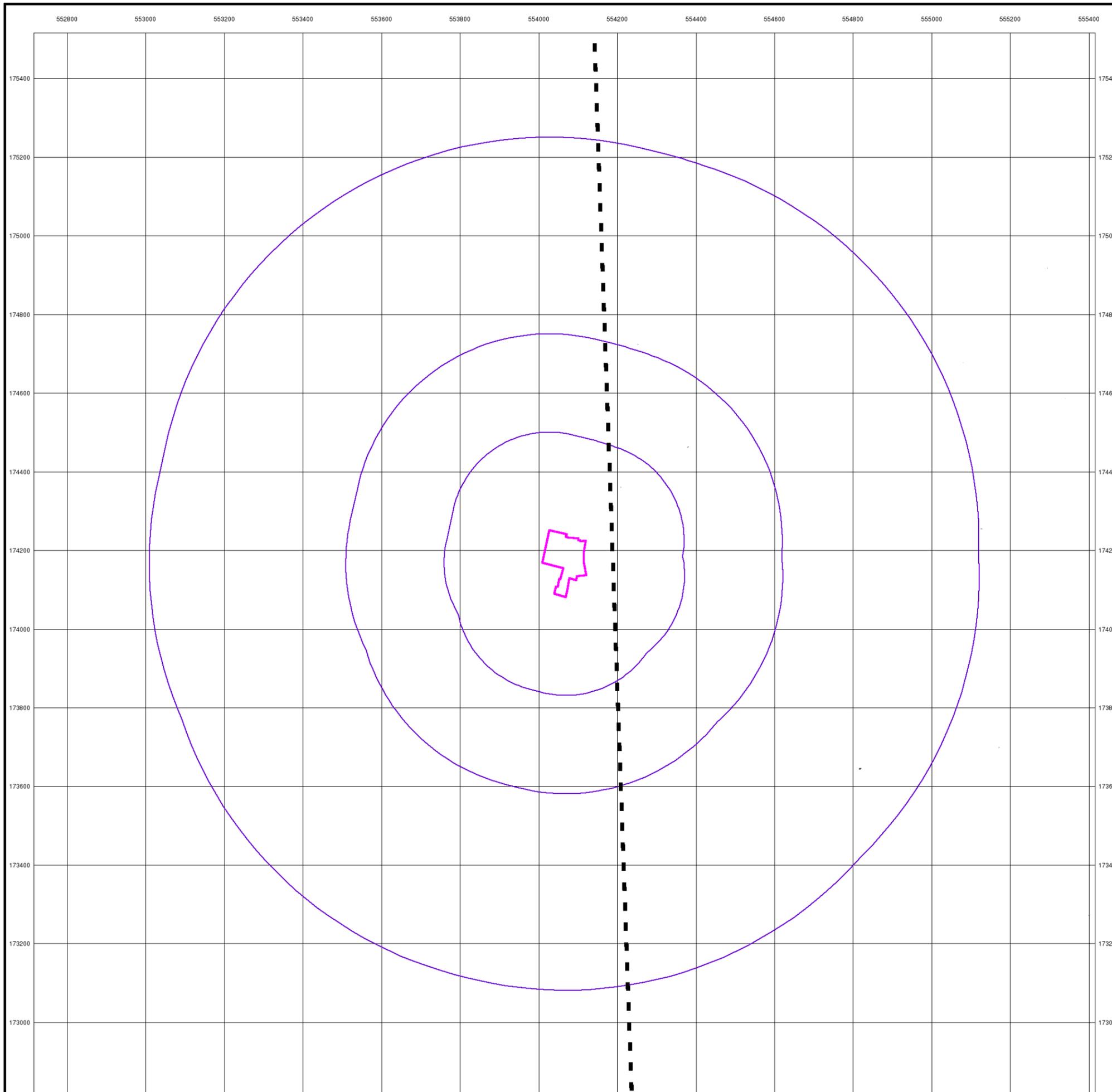


### Order Details

Order Number: 168151210\_1\_1  
Customer Ref: 18-0704.01  
National Grid Reference: 554070, 174170  
Slice: A  
Site Area (Ha): 1.07  
Search Buffer (m): 1000

### Site Details

Westgate, DARTFORD, DA1 2DF

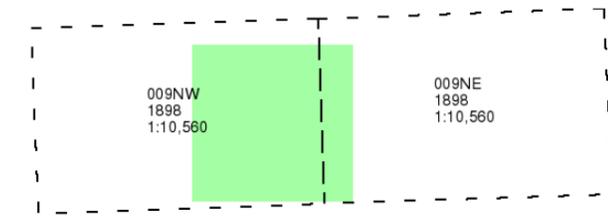




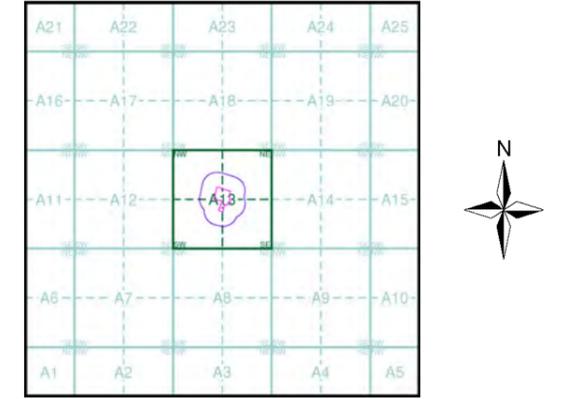
**Kent**  
**Published 1898**  
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)

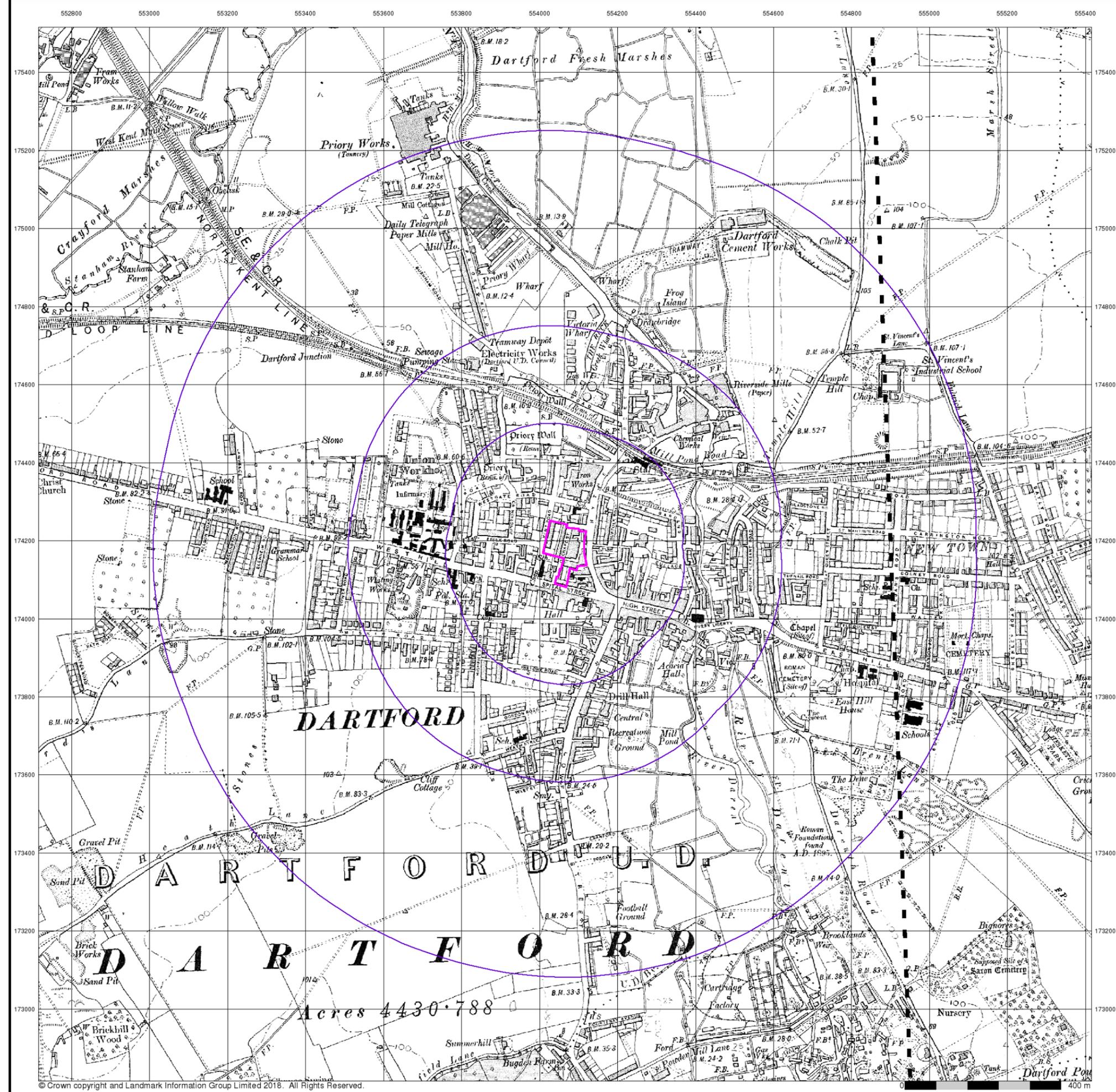


### Historical Map - Slice A



**Order Details**  
 Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

**Site Details**  
 Westgate, DARTFORD, DA1 2DF



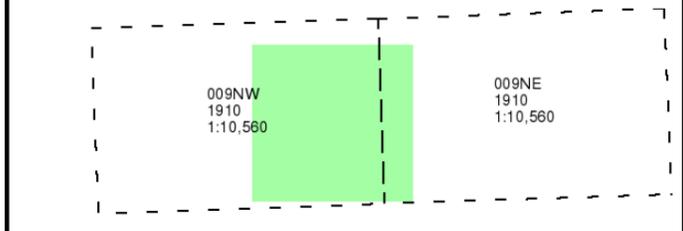
# Envirocheck®

LANDMARK INFORMATION GROUP®

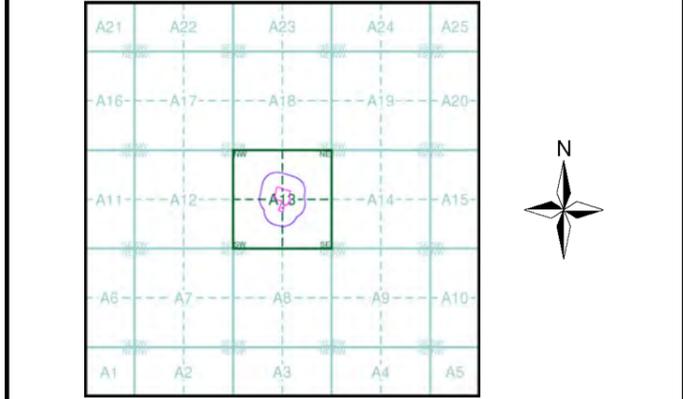
**Kent**  
**Published 1910**  
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)



## Historical Map - Slice A



**Order Details**  
 Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

**Site Details**  
 Westgate, DARTFORD, DA1 2DF

**Landmark**  
 INFORMATION GROUP  
 Tel: 0844 844 9952  
 Fax: 0844 844 9951  
 Web: www.envirocheck.co.uk

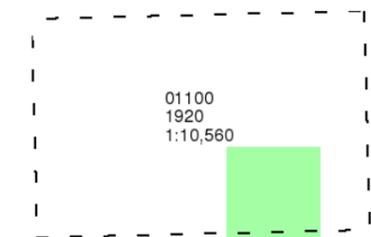
## London

Published 1920

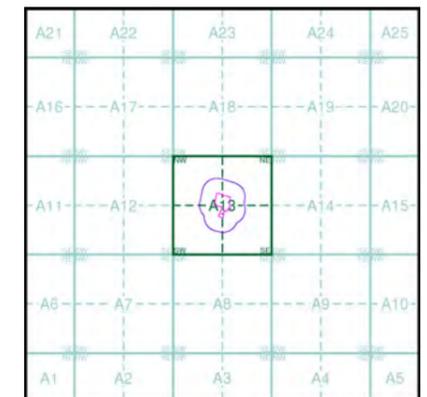
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A

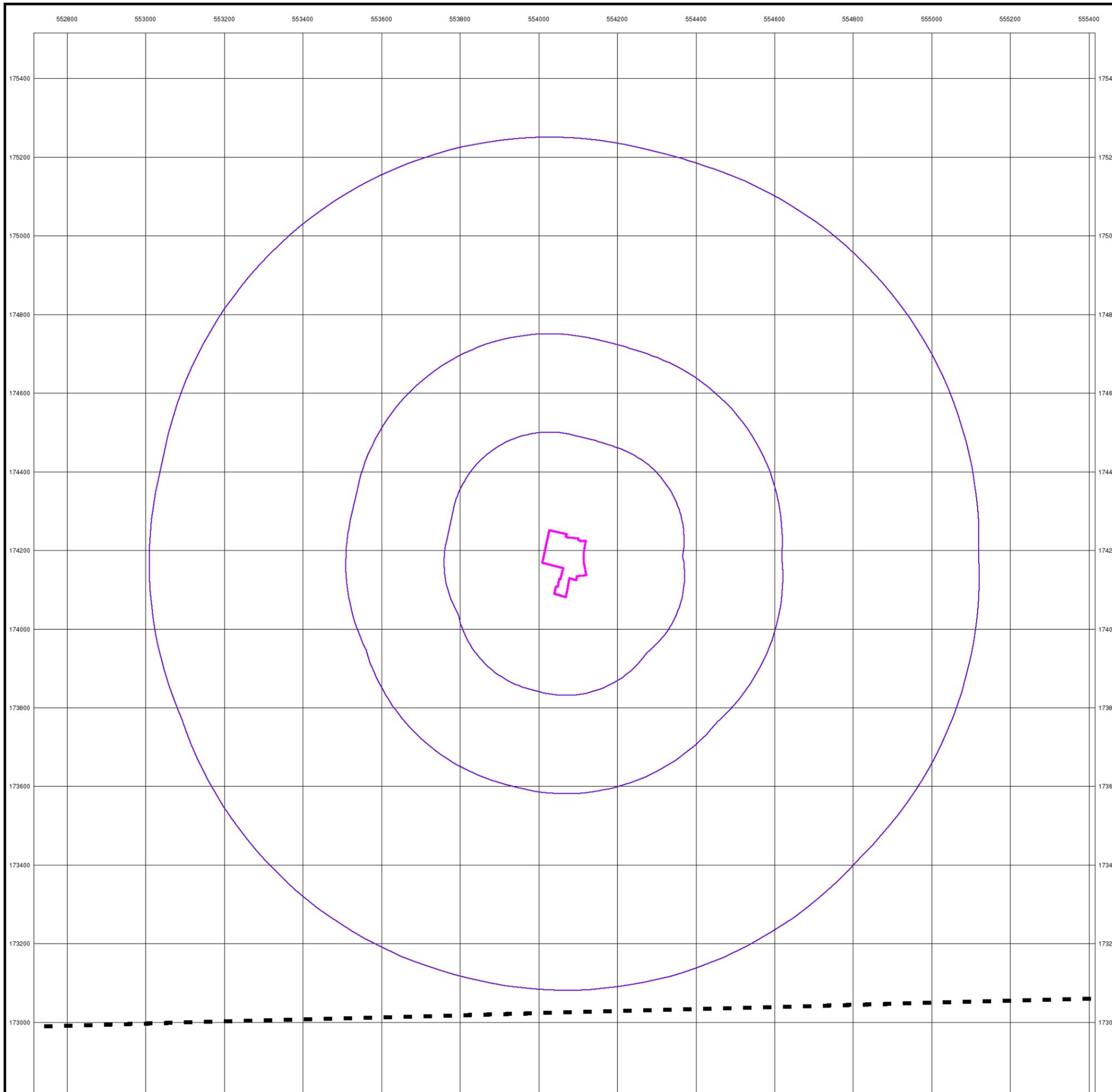


### Order Details

Order Number: 168151210\_1\_1  
Customer Ref: 18-0704.01  
National Grid Reference: 554070, 174170  
Slice: A  
Site Area (Ha): 1.07  
Search Buffer (m): 1000

### Site Details

Westgate, DARTFORD, DA1 2DF

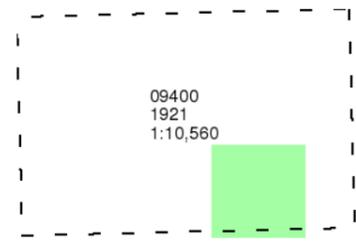




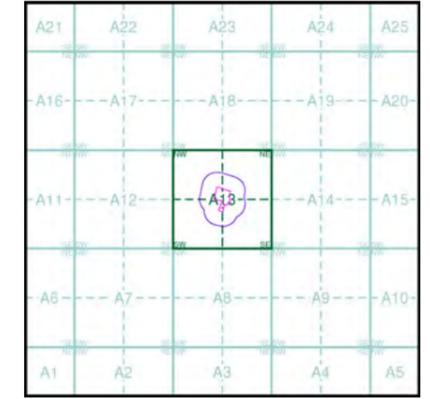
**Essex**  
**Published 1921**  
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

**Map Name(s) and Date(s)**

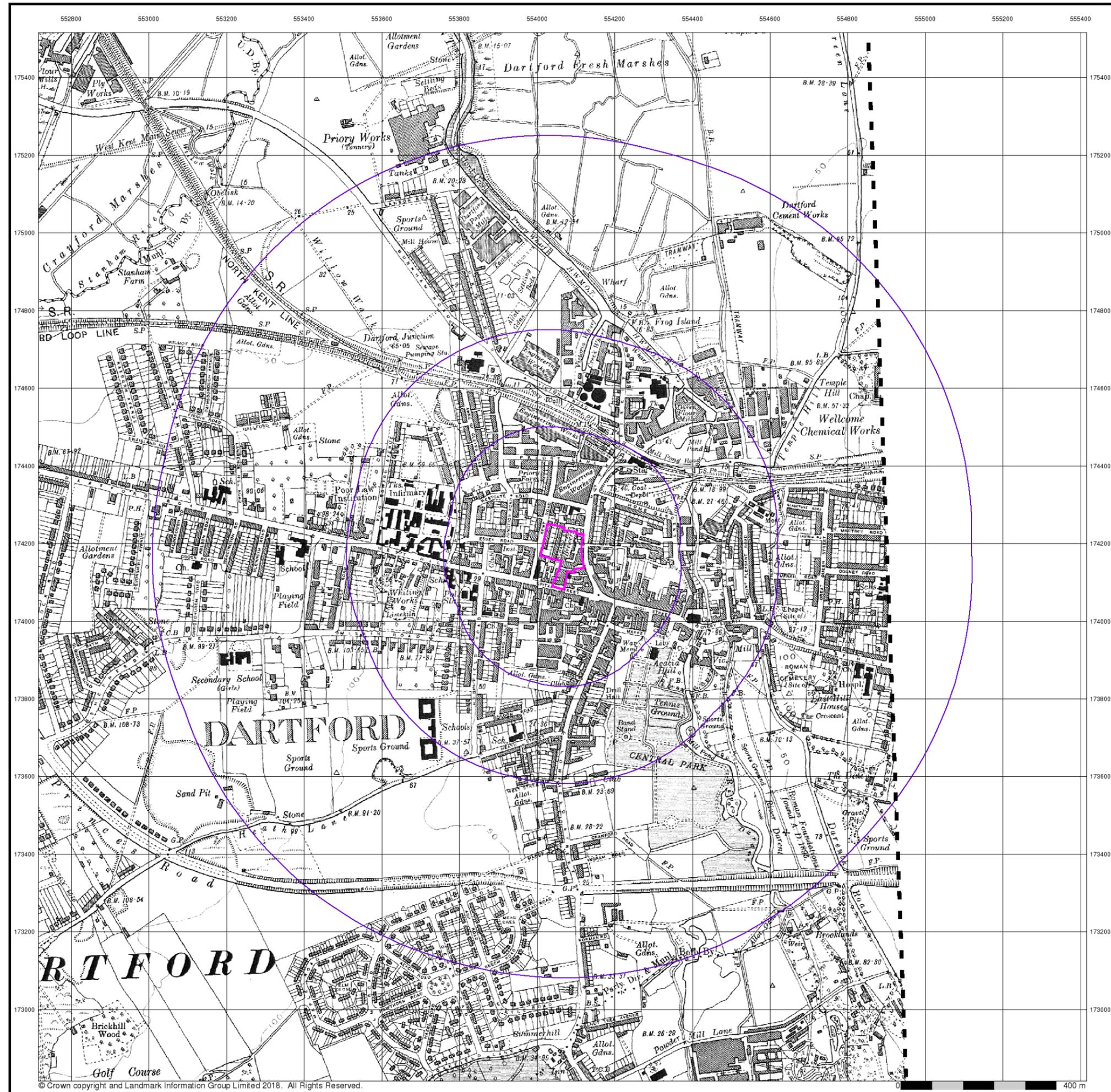


**Historical Map - Slice A**



**Order Details**  
 Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

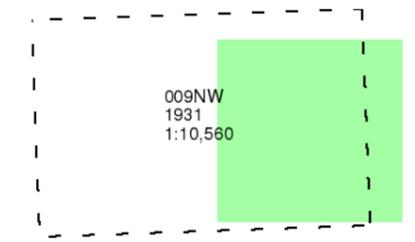
**Site Details**  
 Westgate, DARTFORD, DA1 2DF



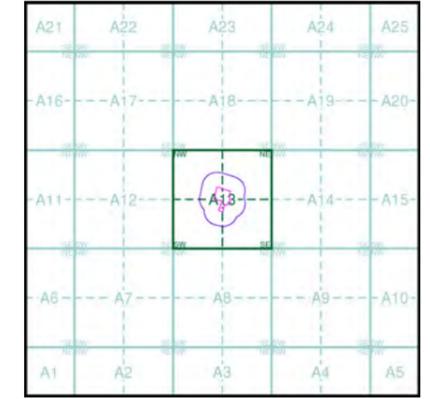
**Kent**  
**Published 1931**  
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)

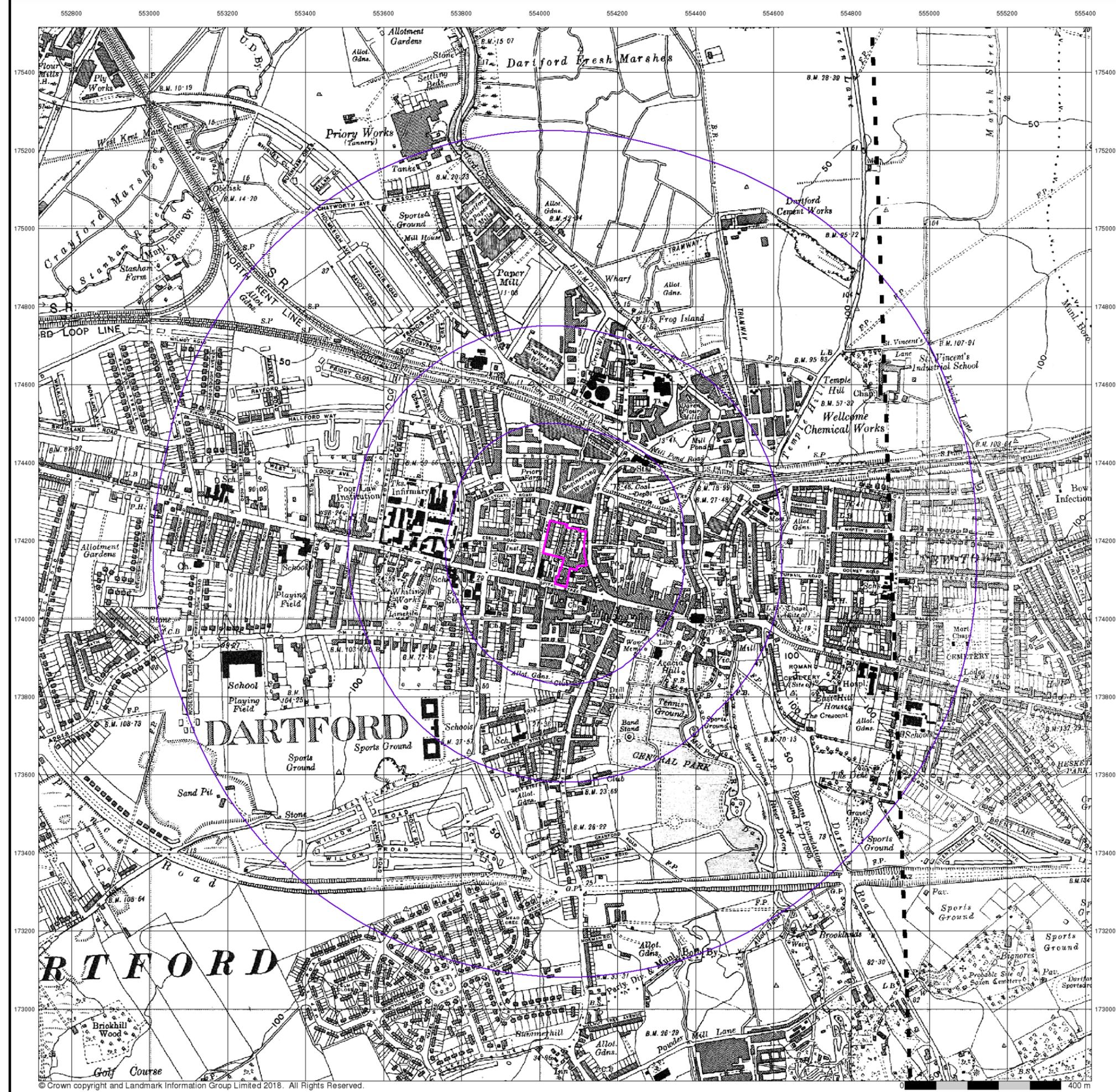


### Historical Map - Slice A



**Order Details**  
 Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

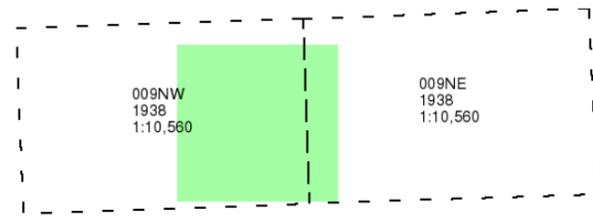
**Site Details**  
 Westgate, DARTFORD, DA1 2DF



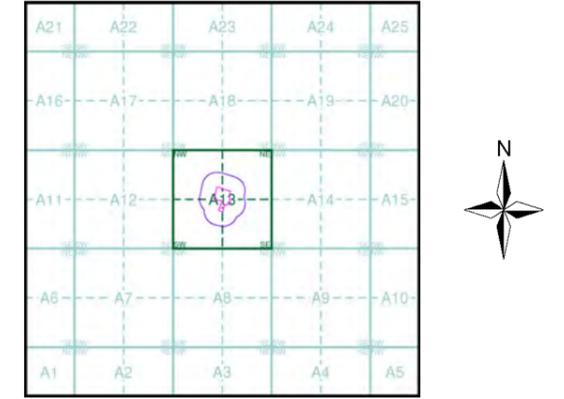
**Kent**  
**Published 1938**  
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A



**Order Details**  
 Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

**Site Details**  
 Westgate, DARTFORD, DA1 2DF

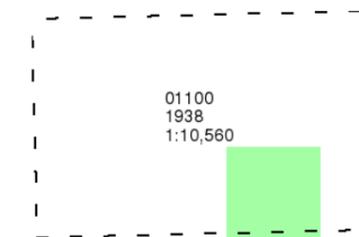
## London

Published 1938

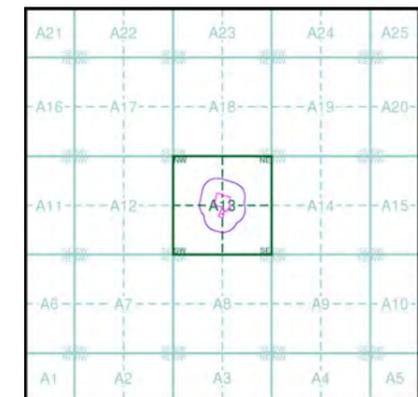
Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A

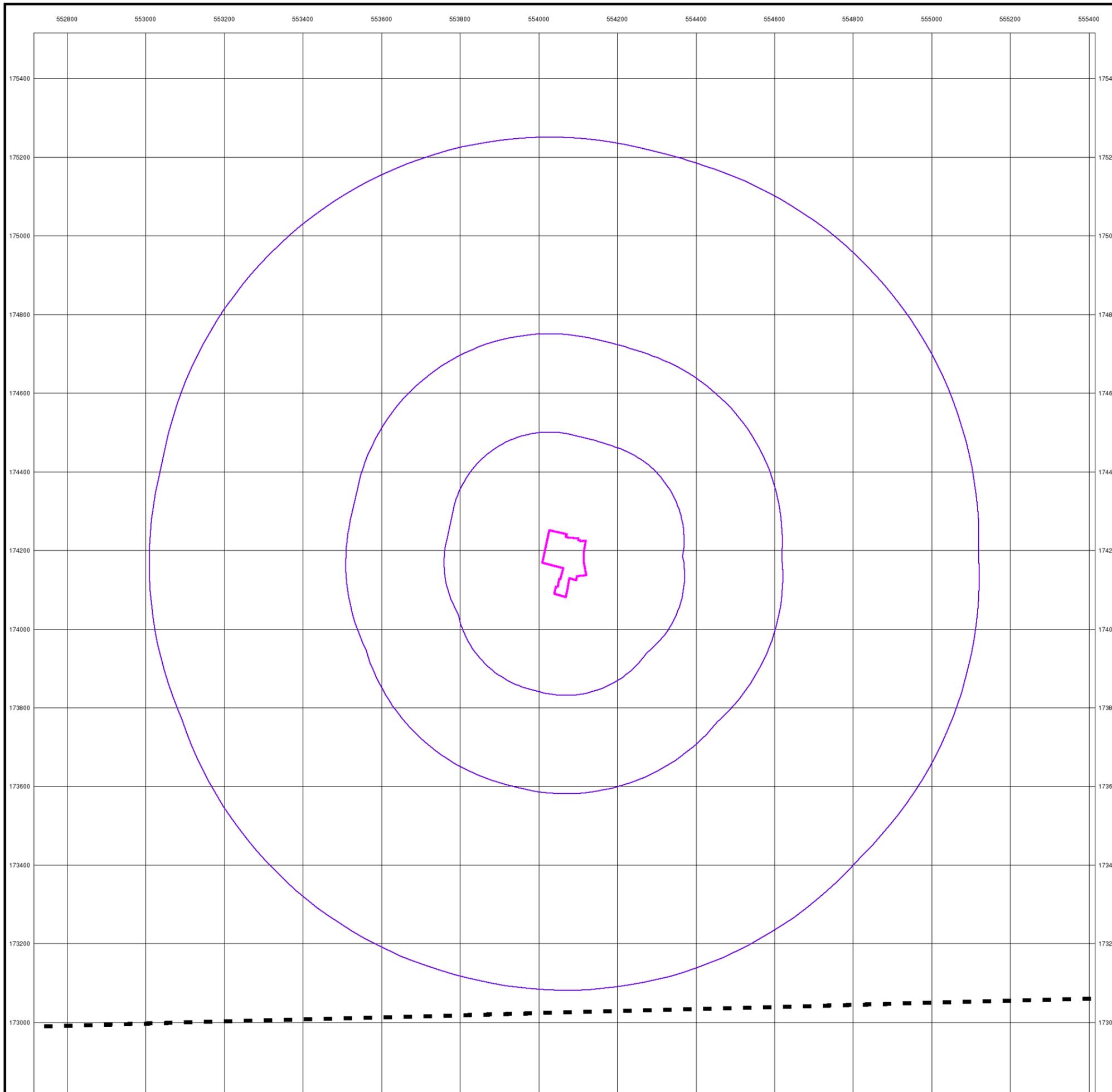


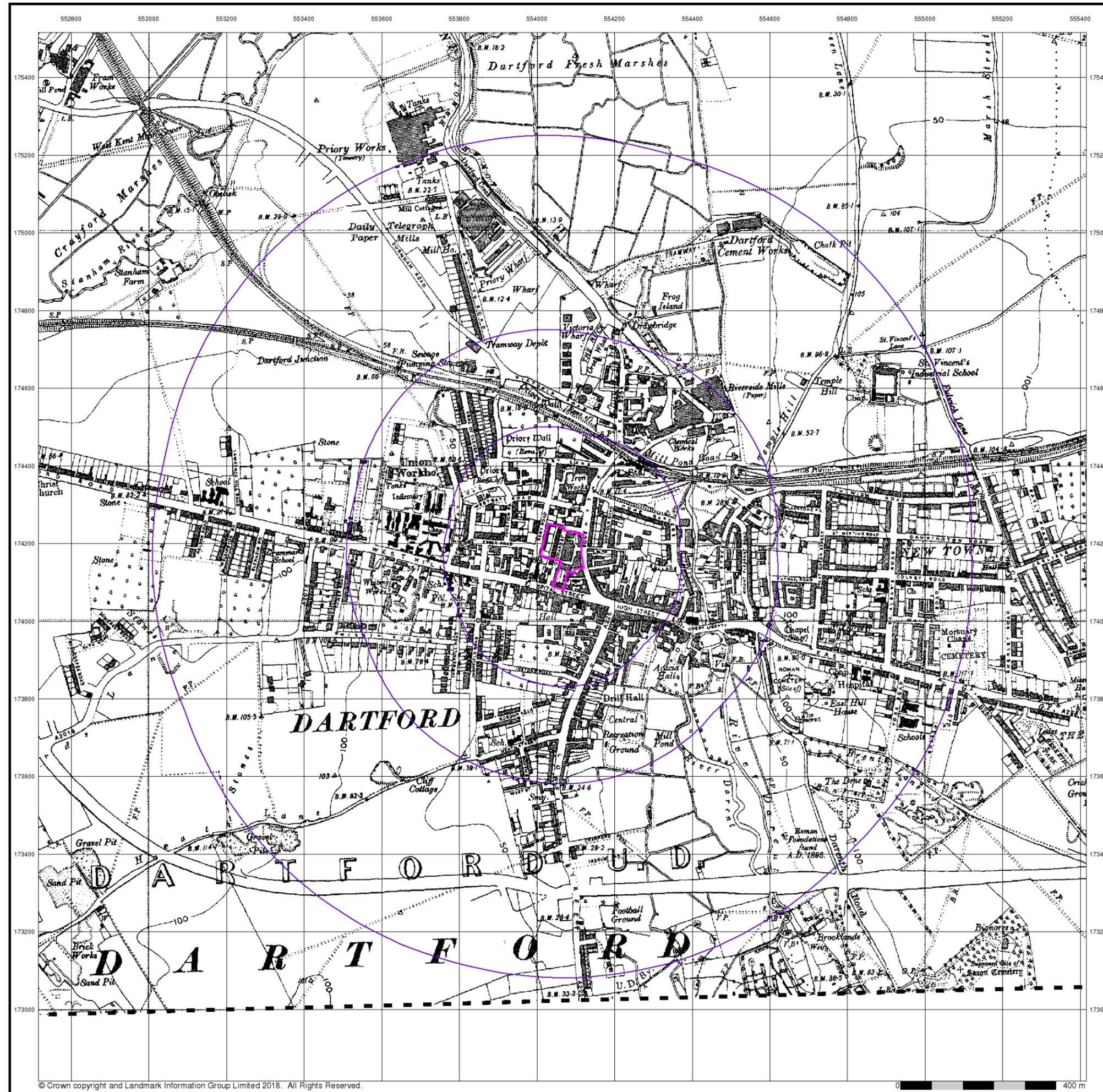
### Order Details

Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

### Site Details

Westgate, DARTFORD, DA1 2DF

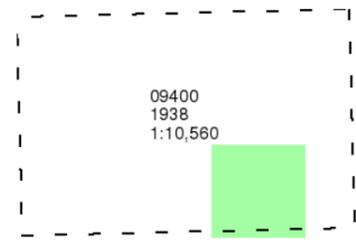




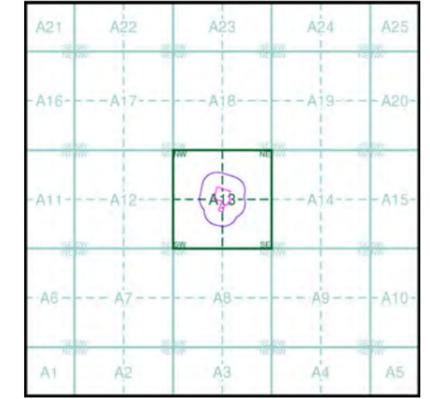
**Essex**  
**Published 1938**  
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)

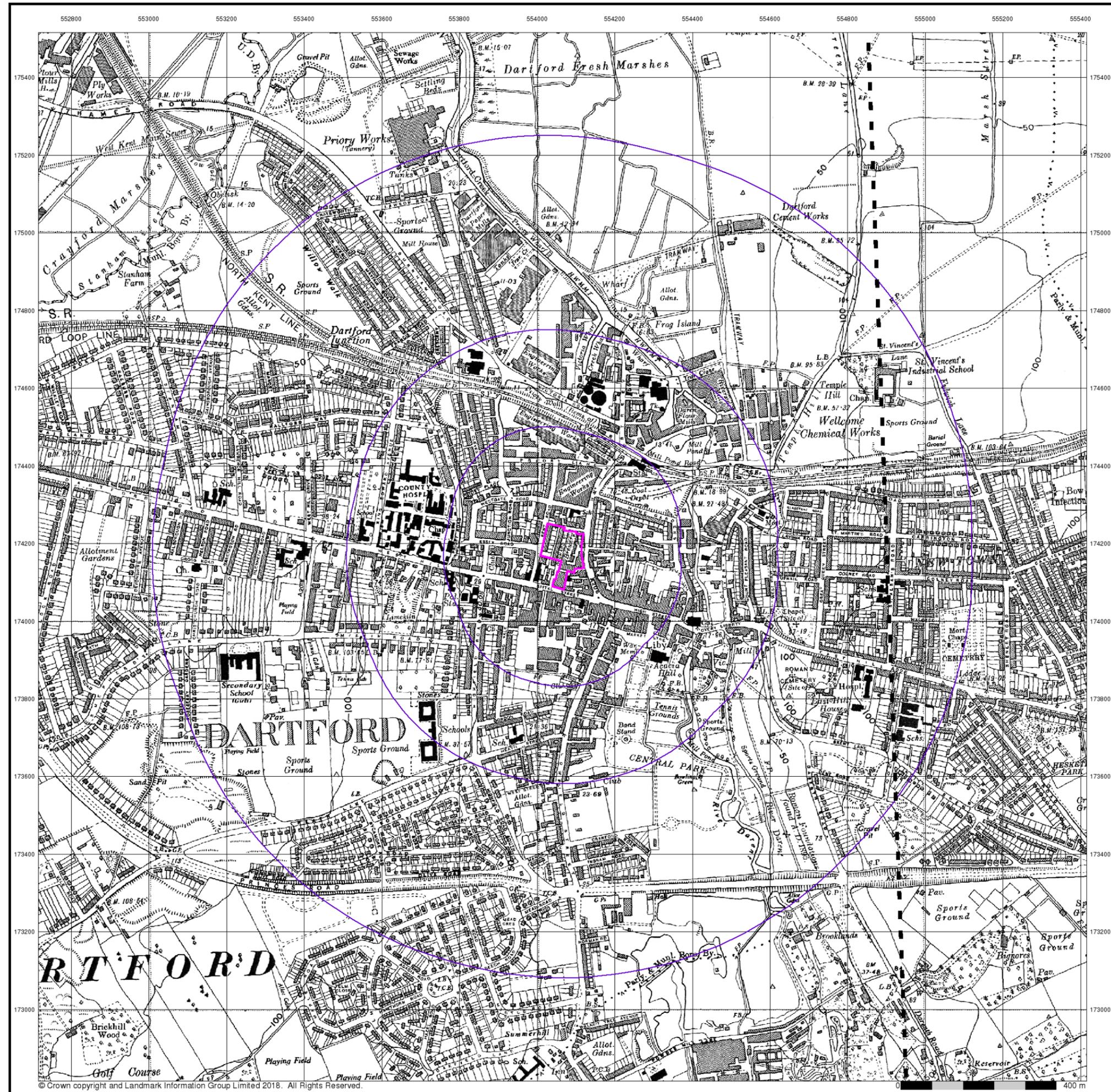


### Historical Map - Slice A



**Order Details**  
 Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

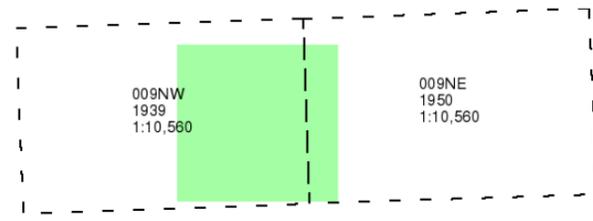
**Site Details**  
 Westgate, DARTFORD, DA1 2DF



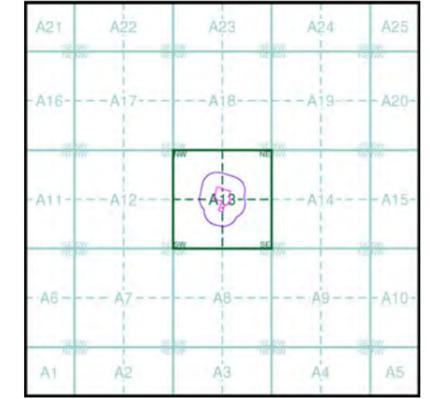
**Kent**  
**Published 1939 - 1950**  
**Source map scale - 1:10,560**

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

### Map Name(s) and Date(s)



### Historical Map - Slice A



**Order Details**  
 Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

**Site Details**  
 Westgate, DARTFORD, DA1 2DF

## Historical Aerial Photography

Published 1947 - 1948

Source map scale - 1:10,560

The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

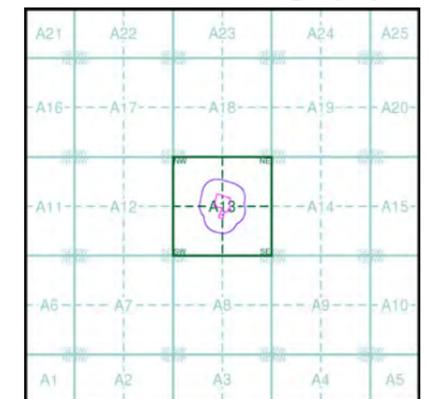
© Landmark Information Group and/or Data Suppliers 2010.

### Map Name(s) and Date(s)

|                            |                            |
|----------------------------|----------------------------|
| TQ57NW<br>1948<br>1:10,560 | TQ57NE<br>1947<br>1:10,560 |
|----------------------------|----------------------------|

|                            |                            |
|----------------------------|----------------------------|
| TQ57SW<br>1947<br>1:10,560 | TQ57SE<br>1947<br>1:10,560 |
|----------------------------|----------------------------|

### Historical Aerial Photography - Slice A



### Order Details

Order Number: 168151210\_1\_1  
Customer Ref: 18-0704.01  
National Grid Reference: 554070, 174170  
Slice: A  
Site Area (Ha): 1.07  
Search Buffer (m): 1000

### Site Details

Westgate, DARTFORD, DA1 2DF



## Historical Aerial Photography

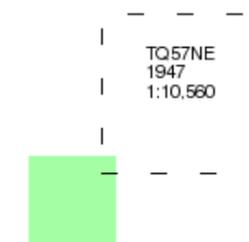
Published 1947

Source map scale - 1:10,560

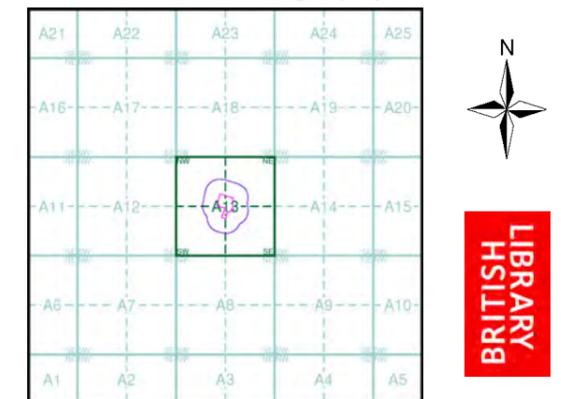
The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

© Landmark Information Group and/or Data Suppliers 2010.

### Map Name(s) and Date(s)



### Historical Aerial Photography - Slice A



### Order Details

Order Number: 168151210\_1\_1  
 Customer Ref: 18-0704.01  
 National Grid Reference: 554070, 174170  
 Slice: A  
 Site Area (Ha): 1.07  
 Search Buffer (m): 1000

### Site Details

Westgate, DARTFORD, DA1 2DF

