



**PHASE I AND II  
ENVIRONMENTAL  
ASSESSMENT**

**Lake Garage,  
Smithybridge Road,  
Littleborough,  
ROCHDALE,  
OL15 0BQ**

**For**

**James Hall & Co (Properties) Ltd**

**November 2020**

**20/1080.1.1**

**Geo² Remediation Limited**

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**James Hall & Co (Properties) Ltd.**

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**Report ref no. 20/1080.1.1**

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### **Revision Log**

| <b>Issue No.</b> | <b>Date</b> | <b>Description</b>    |
|------------------|-------------|-----------------------|
| 1                | 24/11/20    | 1 <sup>st</sup> issue |

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**1.0 Introduction**

Geo<sup>2</sup> Remediation Limited (Geo<sup>2</sup>) were commissioned by James Hall & Co (Properties) Ltd to conduct an Environmental Site Assessment of the Lake Garage site, Smithy Bridge Road, Littleborough, Rochdale, OL15 0BQ. The site is located at grid reference 393028, 415011. The study was undertaken prior redevelopment of the property for continuing use as a commercial premises.

The assessment, consisting of a desk-study and review of environmental data followed by an intrusive sub-surface ground investigation, was conducted in order to update the findings of a Phase I and II site investigation at this site undertaken in July 2016.

- *Geo<sup>2</sup> Phase I and II Environmental Assessment, 0566, Lake Garage, July 2016*

The site investigation was conducted on the 3<sup>rd</sup> November 2020. The investigation was undertaken in accordance with Geo<sup>2</sup> Remediation Ltd Method Statement SMS SI 1080. The findings of the investigation are presented in this report.

## 2.0 Site Reconnaissance

### 2.1 Site's Use and Location

Figure 1 and Figure 2 show the site location in a regional setting. The area shown within the bold site boundary on Figure 3, in Appendix A, will be referred to throughout this document as 'the site'.

At the time of investigation, the site was a derelict maintenance garage and car showroom extending over a 0.19 hectare area. A large building currently occupies the south west portion of the site. It is understood that petrol filling station (PFS) facilities were formerly present at the site, although all above ground infrastructure has been decommissioned. It is understood that the site has not been in operation as a garage circa 2018 according to internet mapping.

Photographs of the site, obtained during the investigation, are presented in Appendix B.

### 2.2 Site Location and Topography

The site is situated in a medium-density residential area of Smithy Bridge, approximately 1.1km south west of Littleborough town centre.

The site is currently not in use and has one access and one egress point along the north eastern boundary onto Smithy Bridge road.

Figures 1 and 2 in Appendix A show the location of the site.

The surrounding land uses are summarised in Table 1.

| Direction | Land use                                            |
|-----------|-----------------------------------------------------|
| North     | Smithy Bridge Road with residential housing beyond. |
| East      | Residential Housing.                                |
| West      | Residential Housing.                                |
| South     | Residential Housing.                                |

**Table 1.** Land uses in the Surrounding Area.

The front of the site has a pronounced slope to the north and west, towards Smithy Bridge Road. The rear section of the site appears to have had the levels altered, and currently slopes steeply to the north west.

## 2.3 Fuel Storage Infrastructure

Two historical underground fuel storage tanks located in one tank farm to the north of the main building were identified during the previous Geo<sup>2</sup> investigation. Details of the underground storage tanks (USTs) are shown below in Table 2.

| Tank No. | Size (l)<br>approx | Time since<br>decommissioning |
|----------|--------------------|-------------------------------|
| 1        | 2,500              | 1975                          |
| 2        | 2,500              | 1975                          |

**Table 2.** Details of Underground Storage Tanks

According to earlier site investigation these tanks were associated with former PFS activities at the site, but were decommissioned with a concrete fill in the 1970's. It is not known if additional tanks may be present beneath the building, or in other areas of the site.

Formerly noted above storage tanks (ASTs), drums, car engines and vehicles were no longer present on the site. The potential area of previously unidentified AST was noted to be located under small shed to the west of the building rear. Black staining was noted along the south-western wall.

## 2.4 Surfacing and Drainage

No surface water drainage or interceptor was identified during the site investigation.

Combined surface water and foul drainage from the site leaves from a point on the northern boundary.

The site is largely surfaced in tarmac, with some trench scarring and identified as having significant mounding and undulations in areas, and as such, is considered to be in fair condition. The access ramp to the rear maintenance garage is currently concrete in a good condition.

There is no significant landscaping at the site.

A service plan showing the location of services is provided as Figure 3 in Appendix A.

## 2.5 Previous Reports

A Phase I and II desk-based study and site investigation was undertaken by Geo<sup>2</sup> Remediation Ltd in June 2016.

The investigation was undertaken in order to establish the presence and extent of sub-surface contaminants, if any, resulting from the past and current landuse such as the use of the site as a maintenance garage, car showroom and a historical PFS.

Ground conditions encountered across the site comprised tarmac or concrete hardstanding over made ground, comprising slightly sandy clays and gravels with occasional brick, ash and concrete fragments to a depth of up to 1.5m bgl. The made ground was found to be underlain by firm boulder clay, proven to depths of at least 3m bgl. All the soil bores terminated due to refusal on

stiff boulder clays. No bedrock was encountered. Locations of the soil bores indicated on Figure 3 presented in Appendix A.

Visual and olfactory indications of contamination were encountered in shallow soils in SB3, adjacent to waste oil tank in south west corner. No other evidence was noted in any location.

No TPH fractions were recorded to exceed generic assessment criteria within the soil samples, as derived by the Environment Agency (SGV), LQM/ CIEH (S4ULs), CL:AIRE C4SL's and EIC..

No groundwater was identified in any of the soil bores.

No significant risk associated with the historical and current land uses was identified at the time of investigation.

### **3.0 Desk Study**

Information regarding the environmental setting of the site was obtained from the Envirocheck report, which collated information from a variety of sources. A copy of the Envirocheck report is presented in Appendix C. This has been updated from that produced in 2016 Geo<sup>2</sup> report.

Where indicated in the following sections, the data from the Envirocheck report has been supplemented with additional information obtained from freely available on-line data.

#### **3.1 Site Geology**

The site geology is likely to comprise superficial deposits of Devensian Till (Diamicton) underlain by the Pennine Lower Coal Measures Formation. However, the BGS indicates that the site may be located on Sandstone of the Milnrow Sandstone Formation.

There is very low to no hazard of ground stability issues for the site.

The site does not lie within a radon affected area, as less than 1% of properties are above the Action Level. As such no basic radon protection measures are necessary in the construction of new homes or extensions.

#### **3.2 Coal Mining**

The site is in an area which may be affected by coal mining activity. As such a coal mining report has been purchased from the Coal Authority, this report is summarised below:

- The site is in a surface area which could have been affected by mining of one seam of coal at 180m to 190m depth last worked in 1886.
- Any movement in the ground associated with this mining should have stopped by now.
- The site is in an area with reserves of coal which could be worked at some time in the future, however no license has been granted and the Coal Authority has not received an application for a license to mine coal in the area, overall the area is not likely to be affected from any planned future underground coal mining.

#### **3.3 Site Hydrogeology**

The bedrock and superficial deposits beneath the site as a Secondary Aquifer - A, which is described by the Environment Agency as permeable layers of rock which are capable of

supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers.

The groundwater within the bedrock is classified as having medium vulnerability with low pollutant speed due to well connected fractures.

The groundwater in the superficial deposits is classified as having low vulnerability with low pollutant speed.

There are two surface water abstractions recorded within 1,000m of the site. The nearest abstraction is located 923m to the north-east which is used as a boiler feed at Akzo Nobel Chemicals Ltd.

### 3.4 Site Hydrology

The Hollingworth Lake located 276m to the east of the site is the nearest surface water feature, however as this is a man-made reservoir it is unlikely to be in connectivity with groundwater. As a result, it is likely that the River Roch, 620m to the north west, is the nearest water course in connectivity with the underlying groundwater beneath the site.

The site is not indicated to be at risk of flooding.

There are twenty discharge consents located within 1,000m of the site. The closest current consent relates to an emergency overflow operated by R Hill, which discharges into Hollingworth Lake at a point 356m to the south east of the site.

There have been 17 Pollution Incidents to Controlled Waters within 1000m of site. The closest was at 410m to the north west and was described as a Minor Incident of leakage of an unknown pollutant from Boats/Ships into Rochdale Canal.

### 3.5 Waste

There are five Historical Landfill sites within 1,000m of the site. The nearest facility was located 410m to the north, this operated until circa 1984 and accepted inert and industrial waste.

There are three BGS Recorded Landfills within 1,000m of the site. The nearest facility is located 440m to the north.

There are eleven records of Potentially Infilled Land (Non-Water) within 1,000m of the site. The records all relate to Unknown Filled Ground (e.g. pit, quarry, pond). The nearest is located 154m to the south east and is indicated on historical maps from 1956 until 1965, when it is likely to have been infilled. This area is now residential housing.

### 3.6 Other Potentially Contaminative Land Uses

Akzo Nobel Chemicals, 617m to the north east is described as a Control of Major Accident Hazards Site (COMAH) and Notification of Installations Handling Hazardous Substances (NIHHS) site. The Akzo Chemicals site is also listed as a Planning Hazardous Substance Consents site, with flammable gasses and liquids noted on site.

### 3.7 Other Receptors

There is an area of adopted green belt 275m to the east of the site.

Rochdale Canal, 374m to the north west is a Site of Special Scientific Interest and a Special Area of Conservation.

## 4.0 Site History

Details regarding the development of the site, its immediate surroundings and potentially contaminative land uses were obtained from a review of historical maps.

Copies of the maps are provided as Appendix C and a summary is provided in Table 3. All distances are approximate and are relative to the site, unless otherwise stated.

| Date       | Onsite                                                                                                                                                                                                                                                                                                    | Offsite                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1851-1893  | The site is an undeveloped land.                                                                                                                                                                                                                                                                          | The Hollingworth Reservoir is located 276m to the east of the site and extends to 1,200m. There are a <b>railway tracks</b> 400m to the north west. A number of ground workings, such as sandstone quarries and coal pits are shown, with the nearest being 400m to the north east. A <b>sanitary works</b> is shown 300m to the west. There is a works 900m to the north east and further <b>mills</b> , 350m and 600m west, 750m to the south west and 750m and 950m to the north west. There is a sewage works 600m to the north west. |
| 1910-1911  | No change.                                                                                                                                                                                                                                                                                                | The formerly noted sanitary works is no longer shown. An oil distillery is now present 750m north east and tanks are shown, 1,000m north east.                                                                                                                                                                                                                                                                                                                                                                                            |
| 1930-1938  | No change.                                                                                                                                                                                                                                                                                                | The <b>Broadfield Picker Works</b> has been developed, 200m to the west. Two tanks are now shown, 700m east and 750m to the south east.                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1955-1968  | Large building labelled as a garage with associated forecourt has been developed on the site. Additional three buildings have been constructed in the south-eastern portion of the site.                                                                                                                  | Two further <b>works</b> are now shown, 100m and 200m to the north west. The tanks are no longer present. The oil distillery and mill to the north east are now shown as a works. The works and mill to the west are no longer shown. An unidentified pit is also shown, 150m to the east.                                                                                                                                                                                                                                                |
| 1974-1988  | On the 1970's mapping three buildings in the south-eastern part of the site have been demolished and the large building now extends to former building boundaries. Later in 1980's forecourt no longer appears on the mapping and garage building further redeveloped into its current day configuration. | Two electric substations are now present, 200m to the south and 250m to the north east. The pit now appears to have been infilled. The works and tanks to the north west are no longer present. Three of the works, 200m west, 200m north west and 100m north are no longer shown.                                                                                                                                                                                                                                                        |
| 1990-1999  | No change.                                                                                                                                                                                                                                                                                                | The sewage works and works to the north west are and mill to the west are no longer present.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 20016-2020 | No change.                                                                                                                                                                                                                                                                                                | No significant change.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Table 3.** Review of the Historical Maps

The site's historical use as a garage and a PFS since circa 1950's and as a garage since circa 1970's are the most likely sources of contamination at the site.

Historical and current off-site land use as works and railway could be potential sources of contamination.

## 5.0 Hazard Identification

UK legislation and guidance on assessing potentially contaminated land recommends the use of a risk assessment process based on a review of source/pathway/receptor relationships for various environmental media. The first stage of any risk assessment is to identify, using the desk study data and site information, the presence and extent of any hazard at the site, theoretical or demonstrable.

A key component of the overall risk assessment process is identification of “relevant contaminant linkages” between contaminants and receptors. This can be accomplished through development of a site-specific conceptual model in which the potential contaminants, pathways and receptors identified on-site are described.

Each element can be defined as follows:

- **Contaminant source:** A substance either on or under the land and which has the potential to cause harm or pollution to human or environmental receptors.
- **Pathway:** A route or means by which a receptor can be exposed to or affected by a source.
- **Receptor:** A living organism or an ecological system or, controlled water, or property including buildings, crops and livestock.

The presence of all three of the above elements identifies a contamination linkage and a potentially unacceptable risk. To ensure that any risk present to, or, from the site can be appropriately managed each of these contamination linkages will be targeted by the investigation.

### 5.1 Contaminant Source

The former use of the site as a maintenance garage and car showroom, along with a historical use as a PFS with associated storage of fuel and oils presents potential contaminant sources at the site. Contamination may have occurred through leaks and spills from the fuel storage and distribution infrastructure and site drainage during the historical and current operational life of the site. No potential sources of contamination are currently associated with the car showroom although the storage of chemicals and oils in the past cannot be ruled out. Even though no contamination sources were detected in 2016 investigation further impact may have occurred till closure in 2018.

There is no indication of any significant volume of infilled land onsite, or other potentially significant historical or current landuses in the surrounding area which are considered to be in close enough proximity to affect the site. A number of ground workings, such as quarries and pit were present on the historical maps. It is not clear if these have been infilled, but due to their distance from the site, it is considered unlikely that there will be a risk of off gassing to site users.

### 5.2 Receptors or Points of Exposure

Potential receptors both on and offsite that could be affected by contamination hazards at the site are listed below:

- **Surface water**

The nearest surface water body is the Hollingworth Lake, 276m to the east, however as this is a man made feature, it is unlikely to be in conductivity with groundwater, and as such, the

River Roch, 620m to the north is assumed to be the nearest surface water receptor. This may act as receiving water should any contamination from the site migrate through site drainage or through the deeper aquifer. Potentially any impact could affect water quality or aquatic life.

- **Groundwater as a resource**

The superficial deposits and bedrock below site are listed as Secondary Aquifer – A.

The site is not located within a Source Protection Zone.

Any impact to groundwater may affect the quality of the resource and therefore impact future users.

Encountered natural clays to 3m bgl during 2016 site investigation will act as a barrier for potential contamination migrating vertically and reaching groundwater.

- **Current and future residential site users**

This will include exposure to users on the site, including within buildings. The proposed continued hardcover use of the site will effectively sever many pathways. Accumulation of possible hazardous ground gasses or vapour in buildings is considered to present a risk to future site users.

No significant thickness of made ground was encountered during the former investigative works, therefore the risk of ground gas generation is considered to be low.

- **Neighbouring residential and public properties**

The nearest residential neighbours are located immediately to the south, east and west of the site. The nearest residential property will represent the most sensitive human health receptors for any migrating contamination impact.

- **Site workers during any redevelopment**

Any construction workers involved in works in impacted areas may become directly exposed to contaminants. Any potential harm should be taken into consideration by contractors in an appropriate Health and Safety assessment and appropriate risk mitigation measures enacted. This represents an easy and low-cost solution to any such hazard and as such it is not considered necessary to consider construction workers any further in this assessment.

### 5.3 Contamination Pathways

Potential pathways by which any identified contamination may manifest itself in the environment are as follows:

- **Groundwater migration**

Based on 2016 site investigation findings, underlying geology is comprised of firm boulder clays which will act as a barrier for any vertical migration and therefore a potential threat to the water body within bedrock is considered to be low. Records indicate that superficial deposits are an aquifer, which may increase the potential of contaminant transmission.

- **Accumulation of volatile vapours and tainting of potable water**

Volatile compounds may generate potentially harmful vapours which may accumulate within buildings onsite or offsite. Shallow contamination or ground gases may migrate along, or within, water pipes or ducting, potentially providing a preferential pathway and permitting tainting of buried water pipes. Exposure to contaminated material may lead to tainting of water supplies.

- **Direct contact, inhalation and ingestion**

This may occur during redevelopment works at the site. At present, this pathway is not active as the majority of the site is covered in hardstanding.

#### 5.4 Initial Contaminant Linkages

All contaminant linkages arising as a result of the interconnection of the contaminant source, contamination pathways and potential receptors detailed above are summarised in Table 4, below. These contaminant linkages are used to design the site investigation, guiding the type of investigation, location of soil bores and the required sample analysis.

| Linkage No. | Source                                                                                                                                                            | Pathway                                                                                   | Receptor                                                                      |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 1           | Potential releases and historical identified impact, leaks and spills associated with historical use of the site as a PFS, maintenance garage and car dealership. | Leaching to groundwater or migration within the aquifer.                                  | Surface waters such the River Roch 620m away.                                 |
| 2           |                                                                                                                                                                   |                                                                                           | The Secondary Aquifer A in bedrock and superficial deposits.                  |
| 3           |                                                                                                                                                                   | Vapour accumulation (including exposure to harmful vapours and tainting of water supply). | Current and future commercial site users principally within buildings onsite. |
| 4           |                                                                                                                                                                   |                                                                                           | Neighbouring site users, principally within enclosed spaces.                  |
| 5           |                                                                                                                                                                   | Direct contact, inhalation and ingestion.                                                 | Current and future commercial site users.                                     |

**Table 4.** Identified Initial Contaminant Linkages

## 6.0 Site Investigation

In order to provide an assessment of each of the identified contamination linkages an intrusive investigation was specified to obtain further information regarding the geology of the site and the quality of the soils and groundwaters below site.

### 6.1 Soils Investigation

A percussive window sampling drilling rig was used to construct seven soil bores (WS1-7) to depths of up to 3.5m below ground level (m bgl), the locations of boreholes are indicated on Figure 3, present in Appendix A, and were targeted to allow comparison with ground conditions encountered in the 2016 investigation. As a result of the drilling techniques, relatively undisturbed soils were obtained for field and laboratory analysis and for logging of ground conditions. Field analysis comprised the examination of each of the samples for visual and olfactory indications of contamination. Headspace analysis of samples was also conducted for volatile hydrocarbons using a photo-ionisation detector (PID).

The investigation was restricted in some areas due to buildings, buried services and the location of the former tank farm. A service tracer was used to ensure that all drilling locations were safely away from buried services and structures. The investigation carried out covered the wider area of the site and targeted potentially contaminative features.

Ground conditions on-site comprised tarmac hardcover over made ground. The made ground comprised sandy clayey gravel fill, underlain by soft to firm gravelly clay. Gravels of red brick and sandstone to a depth of 0.85 m bgl. The made ground was underlain by soft to firm grey/brown slightly gravelly clay with occasional coal fragments. Below this in the boreholes drilled in the eastern portion of the site (WS02-04) a layer of slightly silty clayey very sandy gravel of siltstone and a layer of slightly clayey silt or sand was encountered proven to a maximum depth of 3.3m bgl. Layer of gravel or sand in these locations was followed by soft to firm sandy clay.

No visual or olfactory evidence of hydrocarbon contamination was encountered during the site investigation.

Soil samples were taken from soil bores at 0.5m intervals, and samples were monitored for visual and olfactory evidence of contamination, alongside the use of a Photo-ionisation detector (PID). Selected samples were sent for laboratory analysis.

The logs of the soil bores, which are presented in Appendix D, detail the ground conditions and the sampling depths together with the visual and olfactory characteristics of the soils. Table 5 below shows the locations of soil bores along with justifications for their investigation.

| Target/Rationale for Investigative Locations  | Location |     |     |     |     |     |     |
|-----------------------------------------------|----------|-----|-----|-----|-----|-----|-----|
|                                               | WS1      | WS2 | WS3 | WS4 | WS5 | WS6 | WS7 |
| Underground storage tanks                     |          |     |     |     |     | ✓   | ✓   |
| Former above ground storage tank or drum area | ✓        | ✓   | ✓   |     |     |     |     |
| Former forecourt area                         |          |     |     |     | ✓   | ✓   | ✓   |
| Former garage                                 | ✓        | ✓   | ✓   |     | ✓   |     |     |
| General Coverage                              | ✓        |     |     | ✓   | ✓   |     |     |
| Neighbouring properties                       | ✓        | ✓   |     |     |     |     |     |
| Comparison with historical results            | ✓        |     |     | ✓   | ✓   |     | ✓   |

**Table 5. Soil Bore Location Rationale**

## 6.2 Groundwater Investigation

Groundwater was noted at the base of WS03 and WS05 boreholes.

However, sufficient quantities of groundwater have not accumulated to obtain a groundwater sample in WS03 borehole and only a grab sample of groundwater was taken from WS05 borehole during the site investigation. The results of the lab analysis are detailed in section 7.3.

## 7.0 Laboratory Analysis

### 7.1 Analysis Rationale

Five soil samples were selected for laboratory analysis following field screening, via visual and olfactory methods and using a Photo-Ionisation Detector (PID). The soil samples were collected from depths of 0.3 mbgl to 2.9 mbgl.

Samples were analysed for contaminants associated with use of the site as a former petrol filling station and a garage as specified in *Guidance for the Safe Development of Housing on Land Affected by Contamination* (EA / NHBC, 2008). Sample selection is shown below in Tables 6 and 7.

| Sample No. | Depth (m) | Suite of Analysis                                                  |
|------------|-----------|--------------------------------------------------------------------|
| WS1        | 0.8       | Hydrocarbons (TPH-CWG), BTEX, MTBE, SVOC and VOC.                  |
| WS3        | 2.8       | Hydrocarbons (TPH-CWG), BTEX, MTBE, TOC.                           |
| WS4        | 0.3       | CLEA Metals, Asbestos ID, Hydrocarbons (TPH-CWG), BTEX, MTBE.      |
| WS5        | 1.8       | TOC, Hydrocarbons (TPH-CWG), BTEX, MTBE.                           |
| WS6        | 0.8       | CLEA Metals, Asbestos ID, TOC, Hydrocarbons (TPH-CWG), BTEX, MTBE. |
| WS7        | 2.9       | Hydrocarbons (TPH-CWG), BTEX, MTBE, SVOC and VOC.                  |

**Table 6.** Soil Sample Selection Strategy.

| Sample No. | Suite of Analysis                   |
|------------|-------------------------------------|
| WS5        | Hydrocarbons (TPH-CWG), BTEX, MTBE. |

**Table 7.** Groundwater Sample Selection Strategy

## 7.2 Results of the Soils Analysis

The analysis, conducted by a Gas Chromatography / Flame Ionisation Detector (GC/FID) and Gas Chromatography / Mass Spectrometry (GC / MS) comprised fractionation and speciation of hydrocarbons including analysis for benzene, toluene, ethylbenzene and xylenes (BTEX) and MTBE compounds. Selected samples were analysed for:

- Heavy metals by ICP-MS;
- Volatile and semi volatile components (including PAHs), by GC/MS.
- Polychlorinated Biphenyls (PCBs) by Acetone/Hexane extraction / GC-MS;
- Asbestos Containing Materials (ACMs) by Polarised light microscopy / Gravimetry.

The soil samples were analysed for contaminants associated with historical use of the site as a garage. The results of soil analysis were compared using the following UK guidance:

- LQM/CIEH's Suitable for Use Levels (S4ULs),
- DEFRA Category 4 Screening Levels (C4SLs);
- EIC Soil Generic Assessment Criteria for Human Health (2010).

The results of laboratory analysis on the soil samples are presented overleaf in Tables 8 to 12 and documented in Appendix E.

| Determinands                                                                                                                                                                                                 | 03/11/2020    |               |               |               |               |               | GAC*    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------|
|                                                                                                                                                                                                              | WS1<br>(0.8m) | WS4<br>(0.3m) | WS5<br>(1.8m) | WS6<br>(0.8m) | WS7<br>(2.9m) | WS3<br>(2.8m) | SOM 1%  |
| <b>BTEX (mg/kg)</b>                                                                                                                                                                                          |               |               |               |               |               |               |         |
| Benzene                                                                                                                                                                                                      | 3.4           | < 1.0         | < 1.0         | <b>3.5</b>    | < 1.0         | < 1.0         | 28000   |
| Toluene                                                                                                                                                                                                      | <b>1.3</b>    | < 1.0         | < 1.0         | 1.2           | < 1.0         | < 1.0         | 520000  |
| Ethylbenzene                                                                                                                                                                                                 | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 870000  |
| m- & p- Xylenes                                                                                                                                                                                              | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 505000  |
| o-Xylenes                                                                                                                                                                                                    | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 480000  |
| MTBE                                                                                                                                                                                                         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 13000   |
| <b>Aliphatic (mg/kg)</b>                                                                                                                                                                                     |               |               |               |               |               |               |         |
| Aliphatic C5-C6                                                                                                                                                                                              | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 3400    |
| Aliphatic >C6-C8                                                                                                                                                                                             | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 8300    |
| Aliphatic >C8-C10                                                                                                                                                                                            | < 1.0         | <b>53</b>     | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 2100    |
| Aliphatic >C10-C12                                                                                                                                                                                           | < 1.0         | <b>9.6</b>    | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 10000   |
| Aliphatic >C12-C16                                                                                                                                                                                           | < 1.0         | <b>11</b>     | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 61000   |
| Aliphatic >C16-C21                                                                                                                                                                                           | < 1.0         | <b>29</b>     | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 1600000 |
| Aliphatic >C21-C35                                                                                                                                                                                           | < 1.0         | <b>400</b>    | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 1600000 |
| <b>Aromatics (mg/kg)</b>                                                                                                                                                                                     |               |               |               |               |               |               |         |
| Aromatic C6-C7                                                                                                                                                                                               | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 28000   |
| Aromatic >C7-C8                                                                                                                                                                                              | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 59000   |
| Aromatic >C8-C10                                                                                                                                                                                             | < 1.0         | <b>16</b>     | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 3700    |
| Aromatic >C10-C12                                                                                                                                                                                            | < 1.0         | <b>13</b>     | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 17000   |
| Aromatic >C12-C16                                                                                                                                                                                            | < 1.0         | <b>28</b>     | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 36000   |
| Aromatic >C16-C21                                                                                                                                                                                            | < 1.0         | <b>150</b>    | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 28000   |
| Aromatic >C21-C35                                                                                                                                                                                            | < 1.0         | <b>3000</b>   | < 1.0         | < 1.0         | < 1.0         | < 1.0         | 28000   |
| <b>TPH (mg/kg)</b>                                                                                                                                                                                           | < 10          | <b>4300</b>   | < 10          | < 10          | < 10          | < 10          |         |
| Notes:<br><b>Bold</b> indicates highest fraction concentration. Highlighted <b>grey</b> cells indicates exceedance of guidance.<br>* LQM/CIEH 'Suitable 4 Use Levels' and C4SL 'Category 4 Screening Levels' |               |               |               |               |               |               |         |

**Table 8.** Results of laboratory analysis for hydrocarbons in soils, November 2020

Only WS04 sample sent to the laboratory for TPH-CWG, BTEX and MTBE analysis indicated the presence of TPH compounds at concentrations slightly above method detection limits. The highest concentration of 3000 mg/kg in the aromatic >C21-C35 band was identified in WS04 (0.3m).

None of the recorded TPH fractions (or any of the other compounds listed in Table 8) are considered to present a potential risk to human health in a commercial setting, as the analysed concentrations all fall below generic screening criteria, as derived by DEFRA's (C4SLs), LQM/CIEH (S4ULs) and EIC.

Additionally, sample collected from SB4, in close proximity to WS04 location, during May 2016 works recorded no hydrocarbon concentrations above the laboratory detection limits. However, high TPH concentrations recorded in WS04 sample could be associated with a fragment of tarmac within the sample that might resulted in elevated hydrocarbon concentrations.

Sample collected from shallow soil near former ASTs, suggestive of surface spills from SB3 noted in May 2016 report, recorded elevated TPH concentrations. During the most recent site investigation sample taken from WS01 located in close proximity to SB3, recorded no TPH fractions above the laboratory limits of detection and no visual or olfactory evidence of hydrocarbon contamination was noted.

No evidence of new or ongoing release were encountered during 2020 investigative works.

The results of the heavy metal and asbestos analysis of soil samples are shown below, in Table 9.

| 03/11/2020                                                                                                                                                                      |                             |                    |                           |        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------|---------------------------|--------|
| Determinands                                                                                                                                                                    | Sample Location (depth (m)) |                    | Background concentrations | GAC*   |
|                                                                                                                                                                                 | WS04 (0.3)                  | WS06 (0.8)         |                           |        |
| <b>Metals (mg/kg)</b>                                                                                                                                                           |                             |                    |                           |        |
| Arsenic                                                                                                                                                                         | <b>17</b>                   | 12                 | 15-25                     | 640    |
| Cadmium                                                                                                                                                                         | <b>0.53</b>                 | 0.13               | <1.8                      | 190    |
| Chromium                                                                                                                                                                        | <b>25</b>                   | 15                 | 60-90                     | 8600   |
| Copper                                                                                                                                                                          | <b>34</b>                   | 24                 |                           | 68000  |
| Mercury                                                                                                                                                                         | < 0.10                      | <b>0.12</b>        |                           | 25.8   |
| Nickel                                                                                                                                                                          | 23                          | <b>24</b>          | 30-45                     | 980    |
| Lead                                                                                                                                                                            | <b>91</b>                   | 46                 | 100-200                   | 2300   |
| Selenium                                                                                                                                                                        | < 0.20                      | <b>0.48</b>        |                           | 12000  |
| Zinc                                                                                                                                                                            | <b>63</b>                   | 51                 |                           | 730000 |
| Asbestos ID                                                                                                                                                                     | NAD                         | NAD                |                           |        |
| <b>TOC (%)</b>                                                                                                                                                                  | <b>WS05 (1.8m)</b>          | <b>WS06 (0.8m)</b> | <b>WS03 (2.8)</b>         |        |
|                                                                                                                                                                                 | 0.76                        | 5.7                | 0.24                      |        |
| <p>Notes: <b>Bold</b> indicates highest fraction concentration. Highlighted grey cells indicates exceedance of guidance.</p> <p>* LQM/CIEH 'Suitable 4 Use Levels' (SOM 1%)</p> |                             |                    |                           |        |

**Table 9.** Results of Heavy Metal and other Inorganic Concentrations in Soils (in mg/kg, unless stated otherwise), November 2020.

None of the samples from both investigations contained heavy metals at concentrations which exceeded estimated background levels and the LQM/CIEH Suitable 4 Use Levels for a commercial/industrial setting.

An asbestos screen did not encounter asbestos fibres in any of the tested samples.

Table 10 overleaf, summarises the results of semi volatile organic compounds (SVOC) analyses of soil samples collected from WS1 (0.8m) and WS07 (2.9m).

| 03/11/2020                                                                                          |                |                |                            |                |                |
|-----------------------------------------------------------------------------------------------------|----------------|----------------|----------------------------|----------------|----------------|
| Contaminant<br>(mg/kg)                                                                              | WS01<br>(0.8m) | WS07<br>(2.9m) | Contaminant<br>(mg/kg)     | WS01<br>(0.8m) | WS07<br>(2.9m) |
| N-Nitrosodimethylamine                                                                              | < 0.50         | < 0.50         | Dimethylphthalate          | < 0.50         | < 0.50         |
| Phenol                                                                                              | < 0.50         | < 0.50         | 2,6-Dinitrotoluene         | < 0.50         | < 0.50         |
| 2-Chlorophenol                                                                                      | < 0.50         | < 0.50         | Acenaphthene               | < 0.50         | < 0.50         |
| Bis-(2-Chloroethyl)Ether                                                                            | < 0.50         | < 0.50         | 3-Nitroaniline             | < 0.50         | < 0.50         |
| 1,3-Dichlorobenzene                                                                                 | < 0.50         | < 0.50         | Dibenzofuran               | < 0.50         | < 0.50         |
| 1,4-Dichlorobenzene                                                                                 | < 0.50         | < 0.50         | 4-Chlorophenylphenylether  | < 0.50         | < 0.50         |
| 1,2-Dichlorobenzene                                                                                 | < 0.50         | < 0.50         | 2,4-Dinitrotoluene         | < 0.50         | < 0.50         |
| 2-Methylphenol                                                                                      | < 0.50         | < 0.50         | Fluorene                   | < 0.50         | < 0.50         |
| Bis(2-Chloroisopropyl)Ether                                                                         | < 0.50         | < 0.50         | Diethyl Phthalate          | < 0.50         | < 0.50         |
| Hexachloroethane                                                                                    | < 0.50         | < 0.50         | 4-Nitroaniline             | < 0.50         | < 0.50         |
| N-Nitrosodi-n-propylamine                                                                           | < 0.50         | < 0.50         | 2-Methyl-4,6-Dinitrophenol | < 0.50         | < 0.50         |
| 4-Methylphenol                                                                                      | < 0.50         | < 0.50         | Azobenzene                 | < 0.50         | < 0.50         |
| Nitrobenzene                                                                                        | < 0.50         | < 0.50         | 4-Bromophenylphenyl Ether  | < 0.50         | < 0.50         |
| Isophorone                                                                                          | < 0.50         | < 0.50         | Hexachlorobenzene          | < 0.50         | < 0.50         |
| 2-Nitrophenol                                                                                       | < 0.50         | < 0.50         | Pentachlorophenol          | < 0.50         | < 0.50         |
| 2,4-Dimethylphenol                                                                                  | < 0.50         | < 0.50         | Phenanthrene               | < 0.50         | < 0.50         |
| Bis(2-Chloroethoxy)Methane                                                                          | < 0.50         | < 0.50         | Anthracene                 | < 0.50         | < 0.50         |
| 2,4-Dichlorophenol                                                                                  | < 0.50         | < 0.50         | Carbazole                  | < 0.50         | < 0.50         |
| 1,2,4-Trichlorobenzene                                                                              | < 0.50         | < 0.50         | Di-N-Butyl Phthalate       | < 0.50         | < 0.50         |
| Naphthalene                                                                                         | < 0.50         | < 0.50         | Fluoranthene               | < 0.50         | < 0.50         |
| 4-Chloroaniline                                                                                     | < 0.50         | < 0.50         | Pyrene                     | < 0.50         | < 0.50         |
| Hexachlorobutadiene                                                                                 | < 0.50         | < 0.50         | Butylbenzyl Phthalate      | < 0.50         | < 0.50         |
| 4-Chloro-3-Methylphenol                                                                             | < 0.50         | < 0.50         | Benzo[a]anthracene         | < 0.50         | < 0.50         |
| 2-Methylnaphthalene                                                                                 | < 0.50         | < 0.50         | Chrysene                   | < 0.50         | < 0.50         |
| 4-Nitrophenol                                                                                       | < 0.50         | < 0.50         | Bis(2-Ethylhexyl)Phthalate | < 0.50         | < 0.50         |
| Hexachlorocyclopentadiene                                                                           | < 0.50         | < 0.50         | Di-N-Octyl Phthalate       | < 0.50         | < 0.50         |
| 2,4,6-Trichlorophenol                                                                               | < 0.50         | < 0.50         | Benzo[b]fluoranthene       | < 0.50         | < 0.50         |
| 2,4,5-Trichlorophenol                                                                               | < 0.50         | < 0.50         | Benzo[k]fluoranthene       | < 0.50         | < 0.50         |
| 2-Chloronaphthalene                                                                                 | < 0.50         | < 0.50         | Benzo[a]pyrene             | < 0.50         | < 0.50         |
| 2-Nitroaniline                                                                                      | < 0.50         | < 0.50         | Indeno(1,2,3-c,d)Pyrene    | < 0.50         | < 0.50         |
| Acenaphthylene                                                                                      | < 0.50         | < 0.50         | Dibenz(a,h)Anthracene      | < 0.50         | < 0.50         |
|                                                                                                     |                |                | Benzo[g,h,i]perylene       | < 0.50         | < 0.50         |
| <b>Notes</b><br>Shaded grey indicates where concentrations are above available assessment criteria. |                |                |                            |                |                |

**Table 10.** Summary of SVOC Concentrations in Soils (µg/kg), November 2020

All samples sent to the laboratory for SVOC analysis did not indicate the presence of SVOC compounds at concentrations above method detection limits. Therefore, not considered a significant concern for human health in a commercial industrial setting.

Samples collected during May 2016 investigative works from close proximity locations, did not indicate the presence of SVOC compounds at concentrations above method detection limits.

| 03/11/2020                                                                                                              |             |             |                                   |             |             |
|-------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-----------------------------------|-------------|-------------|
| Contaminant (µg/kg)                                                                                                     | WS01 (0.8m) | WS07 (2.9m) | Contaminant (µg/kg)               | WS01 (0.8m) | WS07 (2.9m) |
| <b>Volatile Organic Compounds</b>                                                                                       |             |             | <b>Volatile Organic Compounds</b> |             |             |
| Dichlorodifluoromethane                                                                                                 | < 1.0       | < 1.0       | 1,2-Dibromoethane                 | < 5.0       | < 5.0       |
| Chloromethane                                                                                                           | < 1.0       | < 1.0       | Chlorobenzene                     | < 1.0       | < 1.0       |
| Vinyl Chloride                                                                                                          | < 1.0       | < 1.0       | 1,1,1,2-Tetrachloroethane         | < 2.0       | < 2.0       |
| Bromomethane                                                                                                            | < 20        | < 20        | Ethylbenzene                      | < 1.0       | < 1.0       |
| Chloroethane                                                                                                            | < 2.0       | < 2.0       | m & p-Xylene                      | < 1.0       | < 1.0       |
| Trichlorofluoromethane                                                                                                  | < 1.0       | < 1.0       | o-Xylene                          | < 1.0       | < 1.0       |
| 1,1-Dichloroethene                                                                                                      | < 1.0       | < 1.0       | Styrene                           | < 1.0       | < 1.0       |
| Trans 1,2-Dichloroethene                                                                                                | < 1.0       | < 1.0       | Tribromomethane                   | < 1.0       | < 1.0       |
| 1,1-Dichloroethane                                                                                                      | < 1.0       | < 1.0       | Isopropylbenzene                  | < 1.0       | < 1.0       |
| cis 1,2-Dichloroethene                                                                                                  | < 1.0       | < 1.0       | Bromobenzene                      | < 1.0       | < 1.0       |
| Bromochloromethane                                                                                                      | < 5.0       | < 5.0       | 1,2,3-Trichloropropane            | < 50        | < 50        |
| Trichloromethane                                                                                                        | < 1.0       | < 1.0       | N-Propylbenzene                   | < 1.0       | < 1.0       |
| 1,1,1-Trichloroethane                                                                                                   | < 1.0       | < 1.0       | 2-Chlorotoluene                   | < 1.0       | < 1.0       |
| Tetrachloromethane                                                                                                      | < 1.0       | < 1.0       | 1,3,5-Trimethylbenzene            | < 1.0       | < 1.0       |
| 1,1-Dichloropropene                                                                                                     | < 1.0       | < 1.0       | 4-Chlorotoluene                   | < 1.0       | < 1.0       |
| Benzene                                                                                                                 | <b>3.4</b>  | < 1.0       | Tert-Butylbenzene                 | < 1.0       | < 1.0       |
| 1,2-Dichloroethane                                                                                                      | < 2.0       | < 2.0       | 1,2,4-Trimethylbenzene            | < 1.0       | < 1.0       |
| Trichloroethene                                                                                                         | < 1.0       | < 1.0       | Sec-Butylbenzene                  | < 1.0       | < 1.0       |
| 1,2-Dichloropropane                                                                                                     | < 1.0       | < 1.0       | 1,3-Dichlorobenzene               | < 1.0       | < 1.0       |
| Dibromomethane                                                                                                          | < 1.0       | < 1.0       | 4-Isopropyltoluene                | < 1.0       | < 1.0       |
| Bromodichloromethane                                                                                                    | < 5.0       | < 5.0       | 1,4-Dichlorobenzene               | < 1.0       | < 1.0       |
| cis-1,3-Dichloropropene                                                                                                 | < 10        | < 10        | N-Butylbenzene                    | < 1.0       | < 1.0       |
| Toluene                                                                                                                 | <b>1.3</b>  | < 1.0       | 1,2-Dichlorobenzene               | < 1.0       | < 1.0       |
| Trans-1,3-Dichloropropene                                                                                               | < 10        | < 10        | 1,2-Dibromo-3-Chloropropane       | < 50        | < 50        |
| 1,1,2-Trichloroethane                                                                                                   | < 10        | < 10        | 1,2,4-Trichlorobenzene            | < 1.0       | < 1.0       |
| Tetrachloroethene                                                                                                       | < 1.0       | < 1.0       | Hexachlorobutadiene               | < 1.0       | < 1.0       |
| 1,3-Dichloropropane                                                                                                     | < 2.0       | < 2.0       | 1,2,3-Trichlorobenzene            | < 2.0       | < 2.0       |
| Dibromochloromethane                                                                                                    | < 10        | < 10        | Methyl Tert-Butyl Ether           | < 1.0       | < 1.0       |
| Notes:<br><b>Bold</b> indicates highest fraction concentration. Highlighted grey cells indicates exceedance of guidance |             |             |                                   |             |             |

**Table 12.** Summary of VOC Concentrations in Soils (µg/kg), November 2020

WS01 soil sample collected from close proximity and sent to the laboratory for VOC analysis did indicate the presence of two determinands at concentrations slightly above method detection limits. However, concentrations were not recorded above the GAC for human health in a commercial industrial setting.

SB3 soil sample from May 2016 site investigation in a close proximity to the WS01 did record the presence of same two determinands at concentrations slightly above method detection limits. No significant increase of VOC concentrations within the soil samples were noted when compared with 2020 investigative works.

### 7.3 Results of the Water Analysis

The analysis conducted by a Gas Chromatography / Flame Ionisation Detector (GC/FID) and Gas Chromatography / Mass Spectrometry (GC / MS) comprised fractionation and speciation of hydrocarbons including analysis for BTEX and MTBE compounds.

The samples were analysed for contaminants associated with use of the site as a former garage. The results of groundwater analysis were compared to Tier 1 screening criteria sourced from the following legislation:

- Water Supply (Water Quality) Regulations 2000.
- Standards for Hazardous Substances (from the WFD, 2006/60/EC), 2013.
- Drinking Water Quality Standards England and Wales, 2000 (Amended 2004, DWS).
- Environmental Quality Standards (EQS) as presented in the River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Directions 2010.
- SOBRA Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater.

A summary of the analytical results is presented in Table 13. The laboratory certificates are presented in Appendix E.

| Determinand                                                                                                           | Sample Identity | UK drinking water standard                | EQS | SOBRA GAC <sub>gwap</sub> (µg/l) |
|-----------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------|-----|----------------------------------|
|                                                                                                                       | WS05            |                                           |     | Commercial                       |
| Benzene                                                                                                               | < 1.0           | 1                                         | 10  | 20,000                           |
| Toluene                                                                                                               | < 1.0           | 700                                       | 74  | 21,000,000                       |
| Ethylbenzene                                                                                                          | < 1.0           | 300                                       | -   | 960,000                          |
| m & p-Xylene                                                                                                          | < 1.0           | 500                                       | -   | 940,000                          |
| o-Xylene                                                                                                              | < 1.0           | 500                                       | -   | 1,100,000                        |
| MTBE                                                                                                                  | < 1.0           | 15                                        | -   | 7,800,000                        |
|                                                                                                                       |                 | <b>WHO guide values for TPH fractions</b> |     |                                  |
| Aliphatic >C5-C6                                                                                                      | < 0.10          | 15000                                     |     | 190,000                          |
| Aliphatic >C6-C8                                                                                                      | < 0.10          | 15000                                     |     | 150,000                          |
| Aliphatic >C8-C10                                                                                                     | < 0.10          | 300                                       |     | 5,700                            |
| Aliphatic >C10-C12                                                                                                    | < 0.10          | 300                                       |     | 3,600                            |
| Aliphatic >C12-C16                                                                                                    | < 0.10          | 300                                       |     | -                                |
| Aliphatic >C16-C21                                                                                                    | < 0.10          | -                                         |     | -                                |
| Aliphatic >C21-C35                                                                                                    | < 0.10          | -                                         |     | -                                |
|                                                                                                                       |                 |                                           |     |                                  |
| Aromatic >C5-C7                                                                                                       | < 0.10          | 1                                         |     | 20,000,000                       |
| Aromatic >C7-C8                                                                                                       | < 0.10          | 700                                       |     | 21,000,000                       |
| Aromatic >C8-C10                                                                                                      | < 0.10          | 300-500                                   |     | 190,000                          |
| Aromatic >C10-C12                                                                                                     | < 0.10          | 90                                        |     | 660,000                          |
| Aromatic >C12-C16                                                                                                     | < 0.10          | 90                                        |     | 3,700,000                        |
| Aromatic >C16-C21                                                                                                     | < 0.10          | 90                                        |     | -                                |
| Aromatic >C21-C35                                                                                                     | < 0.10          | 90                                        |     | -                                |
|                                                                                                                       |                 |                                           |     |                                  |
| <b>TPH</b>                                                                                                            | < 10            |                                           |     |                                  |
| Notes: <b>Bold</b> indicates highest fraction concentration. Highlighted grey cells indicates exceedance of guidance. |                 |                                           |     |                                  |

**Table 13.** Summary of the Results of the TPH, BTEX and MTBE Analysis of groundwater (µg/l).

The WS05 sample did not indicate the presence of TPH compounds at concentrations above method detection limits. Therefore, not considered a significant risk to controlled waters in a commercial industrial setting.

## 8.0 Risk Estimation

### 8.1 Discussion of Investigation Findings

This investigation targeted potential land contamination associated with use of the site as a historical PFS and former garage. This included drilling in close proximity locations from site investigation undertaken in May 2016 and new locations which were not accessible during initial works due to parked vehicles, waste and general storage.

Ground conditions on-site comprised a limited cover of made ground, which demonstrated no evidence of contaminated materials within its composition. Natural strata was variable across the site, generally comprised soft to firm grey/brown slightly gravelly clay with occasional coal fragments. In the eastern portion of the site this layer of clay was underlain by gravels, silts and/or sands followed with a layer of soft to firm sandy clay.

Groundwater was noted at the base of WS03 and WS05 boreholes, however grab sample was obtained only from WS05 borehole as sufficient amounts did not accumulate in WS03 borehole.

All TPH concentrations in the groundwater are below the relevant Generic Assessment Criteria for controlled waters and are considered unlikely to pose a risk to future site users.

The soil sampling results compared to soil sample results collected during an earlier investigation during May 2016. No hydrocarbon concentrations exceeded relevant generic assessment criteria for human health within the November 2020 soil samples and showed no significant change from the results recorded in May 2016, suggesting no significant new impact has occurred.

No evidence of significant land contamination source onsite or offsite which may have impacted the site.

### 8.2 Qualitative Risk Assessment

Each of the identified plausible contamination linkages in the preliminary conceptual site model is reviewed based upon the findings of the site investigation which allows a greater understanding of the ground conditions at the site, site observations, soil and groundwater quality and chemical analysis. This review, discussed for each contamination linkage in Tables 14 a-f, allows a qualitative risk assessment to be undertaken.

A qualitative risk assessment is undertaken in line with guidance provided in *Guidance for the Safe Development of Housing on Land Affected by Contamination* (EA / NHBC, 2008). The purpose of this assessment is to determine the relative significance of the identified contamination linkages by assessing the probability of an impact occurring and by assessing the perceived severity of an impact to a receptor. The classification of these two factors is detailed in Appendix F.

Those linkages considered of low risk or less on the basis of the additional site data will not be considered any further in this assessment. Linkages considered to be more significant are identified as presenting potentially unacceptable risk which may present a potentially unacceptable risk to the identified receptor. In these instances, further works may be considered necessary.

|           |                                                                                                                                                                                                                                                 |                                                                                                                                                                   |                  |                                               |                       |                 |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-----------------------------------------------|-----------------------|-----------------|
| Linkage 1 | <b>Source-</b>                                                                                                                                                                                                                                  | Potential releases and historical identified impact, leaks and spills associated with historical use of the site as a PFS, maintenance garage and car dealership. |                  |                                               | <b>Probability</b>    | <b>Severity</b> |
|           | <b>Pathway-</b>                                                                                                                                                                                                                                 | Leaching to groundwater followed by migration within the aquifer.                                                                                                 | <b>Receptor-</b> | Surface waters such the River Roch 620m away. |                       |                 |
|           | Potential releases of contaminants, such as hydrocarbons stored on site, may have occurred during the historical use of the site as a PFS and a former garage.                                                                                  |                                                                                                                                                                   |                  |                                               | Low Likelihood        | Mild            |
|           | The nearest surface water feature is the River Roch located 620m to the north west.                                                                                                                                                             |                                                                                                                                                                   |                  |                                               | <b>Classification</b> |                 |
|           | Laboratory results did not indicate significant contamination of soils and groundwater on site, so this pathway is considered unlikely to be active.<br><br>Additionally, given the distance to the receptor, the risk is considered to be low. |                                                                                                                                                                   |                  |                                               | Low Risk              |                 |

**Table 14a. Qualitative Risk Assessment**

|           |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                   |                  |                                                              |                       |                 |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------------------------------------------|-----------------------|-----------------|
| Linkage 2 | <b>Source-</b>                                                                                                                                                                                                                                                                                     | Potential releases and historical identified impact, leaks and spills associated with historical use of the site as a PFS, maintenance garage and car dealership. |                  |                                                              | <b>Probability</b>    | <b>Severity</b> |
|           | <b>Pathway-</b>                                                                                                                                                                                                                                                                                    | Leaching to groundwater followed by migration within the aquifer.                                                                                                 | <b>Receptor-</b> | The Secondary Aquifer A in bedrock and superficial deposits. |                       |                 |
|           | The site is underlain by a Secondary A Aquifer within the superficial deposits and within the bedrock.                                                                                                                                                                                             |                                                                                                                                                                   |                  |                                                              | Low likelihood        | Mild            |
|           | Given the use of the site as a historical PFS and former garage, there is a potential for leaks and spills of hydrocarbons which have the potential to impact the aquifer.                                                                                                                         |                                                                                                                                                                   |                  |                                                              | <b>Classification</b> |                 |
|           | Laboratory analysis of soils and groundwater did not indicate significant contamination of TPH, BTEX, MTBE or VOC/SVOC compounds. Additionally, underlying clays will reduce potential migration of contaminants to the groundwater. Therefore, the risk to underlying aquifers is considered low. |                                                                                                                                                                   |                  |                                                              | Low Risk              |                 |

**Table 14b. Qualitative Risk Assessment**

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                   |           |                                                         |                |          |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------|----------------|----------|
| Linkage 3 | Source-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Potential releases and historical identified impact, leaks and spills associated with historical use of the site as a PFS, maintenance garage and car dealership. |           |                                                         | Probability    | Severity |
|           | Pathway-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Vapour accumulation (including exposure to harmful vapours and tainting of water supply).                                                                         | Receptor- | Future site users, principally within buildings onsite. |                |          |
|           | <p>The most vulnerable on-site receptors are the future commercial site users. Use of the onsite buildings as commercial units will reduce exposure duration and increase dilution.</p> <p>With respect to indoor air, it is theoretically possible that contaminant and their vapours may gain entrance through cracks or service ducts and potentially may lead to exposure via inhalation or the tainting of water supply pipes. Any such impact may be capable of causing harm to human health.</p> <p>None of the soil or groundwater samples exceed the GAC or SOBRA Vapour GAC for commercial industrial site use, therefore; do not pose a significant risk of vapour generation.</p> |                                                                                                                                                                   |           |                                                         | Unlikely       | Mild     |
|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                   |           |                                                         | Classification |          |
|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                   |           |                                                         | Low Risk       |          |

**Table 14c. Qualitative Risk Assessment**

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |           |                                      |                |          |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------|----------------|----------|
| Linkage 4 | Source-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Potential releases and historical identified impact, leaks and spills associated with historical use of the site as a PFS, maintenance garage and car dealership. |           |                                      | Probability    | Severity |
|           | Pathway-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Vapour accumulation (including exposure to harmful vapours and tainting of water supply).                                                                         | Receptor- | Neighbouring site users & residents. |                |          |
|           | <p>With respect to indoor air, it is theoretically possible that contaminants and their vapours may gain entrance through cracks or service ducts and potentially may lead to exposure via inhalation or the tainting of water supply pipes. Any such impact may be capable of causing harm to human health.</p> <p>Laboratory results did not report concentrations that are considered in excess of the SOBRA Vapour GAC for commercial industrial site use. Also, the lack of extensive made ground will reduce ground gas generation potential.</p> |                                                                                                                                                                   |           |                                      | Unlikely       | Medium   |
|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |           |                                      | Classification |          |

**Table 14d. Qualitative Risk Assessment**

|           |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |           |                                                         |                |          |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------|----------------|----------|
| Linkage 5 | Source-                                                                                                                                                                                                                                                                                                                 | Potential releases and historical identified impact, leaks and spills associated with historical use of the site as a PFS, maintenance garage and car dealership. |           |                                                         | Probability    | Severity |
|           | Pathway-                                                                                                                                                                                                                                                                                                                | Direct contact, inhalation and ingestion.                                                                                                                         | Receptor- | Future site users, principally within landscaped areas. |                |          |
|           | Laboratory analytical results for the shallow soil samples did not indicate the presence of any contamination above Tier 1 GAC assessment criteria.<br><br>Based on the results, the identified concentrations in the soils together with absence of landscaped areas on the site are considered to present a low risk. |                                                                                                                                                                   |           |                                                         | Low Likelihood | Mild     |
|           |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |           |                                                         | Classification |          |
|           |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                   |           |                                                         | Low Risk       |          |

**Table 14e.** Qualitative Risk Assessment

Table 15 summarises the relative significance of each contaminant linkage and which are deemed to present a possibility of a potentially unacceptable risk. These linkages should be considered for further assessment or remedial works in order to mitigate these identified risks. Those without the potential to cause significant harm will not be considered any further.

| Linkage No. | Source                                                                                                                                                            | Pathway                                                                                   | Receptor                                                          | Potentially unacceptable risk |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------|
| 1           | Potential releases and historical identified impact, leaks and spills associated with historical use of the site as a PFS, maintenance garage and car dealership. | Leaching to groundwater or migration within the aquifer.                                  | Surface waters such the River Roch 620m away.                     | x                             |
| 2           |                                                                                                                                                                   |                                                                                           | The Secondary Aquifer A in bedrock and superficial deposits.      | x                             |
| 3           |                                                                                                                                                                   | Vapour accumulation (including exposure to harmful vapours and tainting of water supply). | Future commercial site users principally within buildings onsite. | x                             |
| 4           |                                                                                                                                                                   |                                                                                           | Neighbouring site users, principally within enclosed spaces.      | x                             |
| 5           |                                                                                                                                                                   | Direct contact, inhalation and ingestion.                                                 | Current and future site users within landscaped areas.            | x                             |

**Table 15.** Summary of Qualitative Risk Assessment.

## 9.0 Conclusions and Recommendations

### 9.1 Conclusions

A desk study and an intrusive investigation was conducted of the Lake Garage site, Smithy Bridge Road, Littleborough, Rochdale, OL15 0BQ.

The purpose of the assessment was to assess the potential for a risk to be posed to the users of the site and sensitive environmental receptors from historical land uses of the site such as historical PFS and former garage.

No visual or olfactory evidence was identified during the site investigation.

It is considered that the risk to future site users is low as all recorded contaminant concentrations in soils are below the Generic Assessment Criteria for human health for commercial end use.

It is considered that the risk to controlled waters is low as no active source was identified during the site investigation and as continuous groundwater was not encountered and due to presence of impermeable clays the risk of an impact migrating is reduced.

It should also be noted that localised contamination may remain in areas that could not be investigated, such as beneath buildings or around historical PFS infrastructure.

Asbestos fibres were not identified in any of the soil samples sent off for analysis, however there is a potential for asbestos to have been used in the fabric of the buildings on site. As no asbestos assessment has been made on the building, its presence cannot be ruled out.

Overall, Geo<sup>2</sup> considers that the site represents a **Low** risk to human health and environmental receptors.

### 9.2 Recommendations

On the basis of the Phase I and II Environmental Assessment Geo<sup>2</sup> recommend the following:

- Based on the information available, should any development works take place on site, a watching brief should be imposed to ensure that any impacts unidentified in the site investigation can be characterised and treated appropriately. Any unidentified contaminated material should be considered in the event of a redevelopment as costs for offsite disposal of these materials may be significant.
- Prior to any redevelopment works at the site, a demolition asbestos survey should be undertaken (if it has not been undertaken already) to ensure that subcontractors are aware of the risk and to avoid the deposition of asbestos fibres across the site. Whilst undertaking the redevelopment work, it is recommended that the relevant personal protective equipment (PPE) is deployed to ensure that any risks to site workers are removed. During development sampling of any materials to be reused or disposed of offsite should be undertaken.

## 10.0 Limitations

Geo<sup>2</sup>'s conclusions, recommendations and opinions are based on information gathered at the time of the investigation from a variety of third party sources and from observations made during site reconnaissance and ground conditions encountered during the field work and on the results of laboratory and field tests performed during the investigation. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata and water conditions between or below intrusive locations. It should also be noted that groundwater levels may vary due to seasonal or other effects and may at times differ to those measured during the investigation.

A portion of this report is based solely upon information provided by third parties. The information has not been independently verified by Geo<sup>2</sup>. Whilst this report and the opinions given in it are accurate to the best knowledge of Geo<sup>2</sup>, Geo<sup>2</sup> cannot guarantee the completeness or accuracy of any descriptions, opinions or conclusions based solely upon information that has not been independently verified.

The recommendations contained within this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted industry practices and hydrological and engineering practices at this time. As such they are not a guarantee that the site is free of hazardous materials or conditions.

Geo<sup>2</sup> prepared this report for our Client; any third parties using this report do so entirely at their risk. Geo<sup>2</sup> makes no warranty or representation whatsoever, express or implied, with respect to the use by a third party of any information contained in this report or its suitability for any purpose. Geo<sup>2</sup> assumes no responsibility for any costs, claims, damages or expenses (including any consequential damages) resulting from the use of this report or any information contained in this report by a third party.

This report was prepared by:



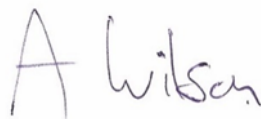
---

Ugne Ankenaitė

24<sup>th</sup> November 2020

Date

This report was reviewed by:



---

Adam Wilson

24<sup>th</sup> November 2020

Date

## **11.0 References**

### **British Standards Institute**

BS10175:2011 "Investigation of potentially contaminated land sites – code of practice".

### **Environment Agency**

Land Contamination Risk Management (LCRM) Guidance, 2020.

Science Report Final SC050021/SR2. Human Health Toxicological Assessment of Contaminants in Soil. Environment Agency. January 2009.

Science Report SC050021/SR3. Updated Technical Background to the CLEA Model. Environment Agency. January 2009.

Science Report SC050021/SR7. Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values. Environment Agency, November 2008.

SC050021/Final Technical review 1. A Review of Body Weight and Height Data used within the Contaminated Land Exposure Assessment Model (CLEA). Environment Agency. January 2009.

Science report: SC050021. Using Soil Guideline Values. / SGV Introduction. Environment Agency, March 2009.

Chemical Standards Database (accessed online) - Workplace exposure limits (WELs) are set under the Control of Substances Hazardous to Health (Amendment) Regulations 2004 (SI 2004/3386).

### **BGS**

BGS Geology of Britain Viewer

### **Department of the Environment**

Industry Profile- Road vehicle fuelling, service and repair- Garages and Filling Station.1996

DEFRA SP1010 Category 4 Screening Levels (C4SL) for assessment of land affected by contamination 2014

### **Ciria**

C552 Contaminated Land Risk Assessment: A guide to good practice.

### **NHBC**

Guidance for Safe Development of Housing on Land Affected by Contamination.  
R+D Publication 66:2008

### **CL:AIRE**

CL:AIRE in association with AGS and EIC. The Soil Generic Assessment Criteria for Human Health Risk Assessment. January 2010.

## **LQM/ CIEH**

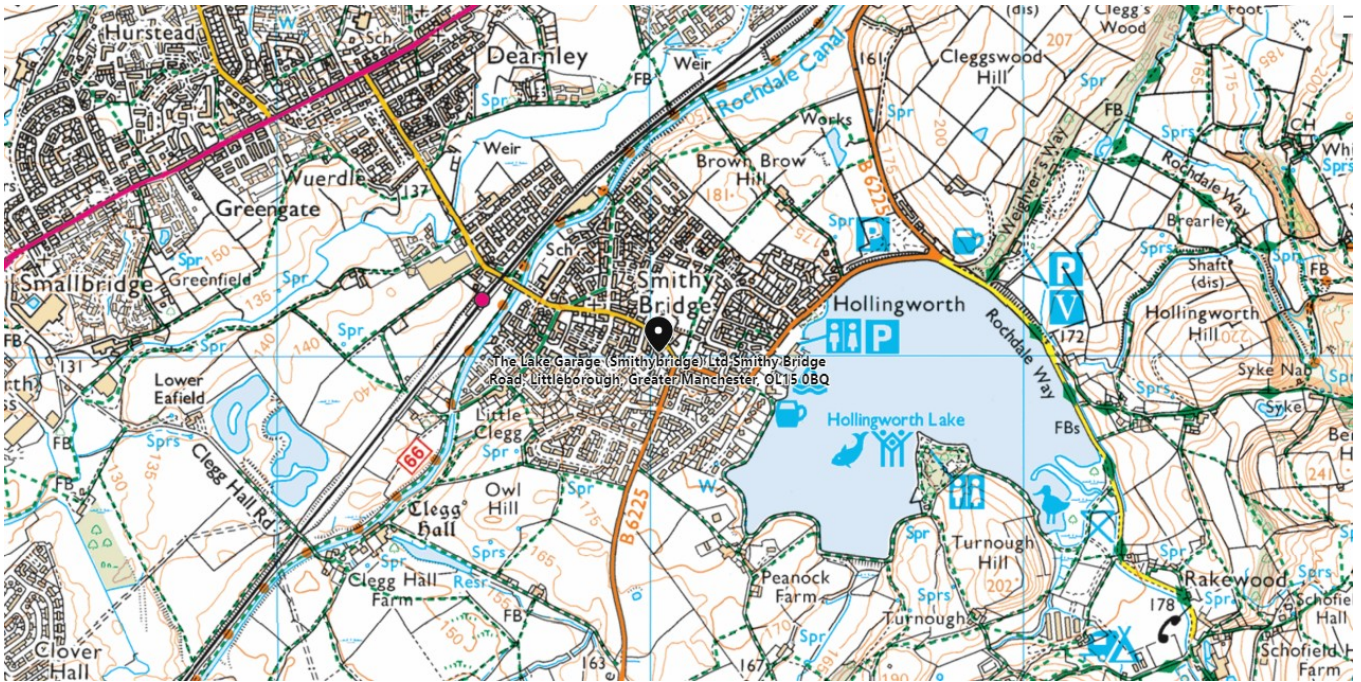
LQM/CIEH Suitable 4 Use Levels Nathaniel, C.P; McCaffrey, C.; Gillett, A.G.; Ogden, R.C. & Nathaniel, J.F. Land Quality Press, Nottingham 2015

## **Geo<sup>2</sup> Remediation Ltd**

Phase I/II Environmental Assessment June 2016 16/0566

## Appendix A

### Figures



Ref: [bing.com/maps](http://bing.com/maps)

Figure 1 - Site Location



Ref: [google.co.uk/maps](http://google.co.uk/maps)

Figure 2 - Site Location

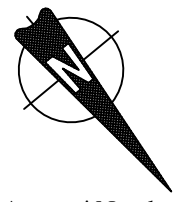


Figures 1 & 2 Site Location -  
Lake Garage, Smithybridge Road, Littleborough, Rochdale, OL15 0BQ.

Geo<sup>2</sup> Remediation Limited, The Coniston, Louisa Street, Idle, West Yorkshire, BD10 8NE

Tel: (0113) 2575397

[www.geo2.co.uk](http://www.geo2.co.uk)



| LEGEND |                                     |
|--------|-------------------------------------|
|        | Foul Drainage                       |
|        | Surface Drainage                    |
|        | Combined Drainage                   |
|        | Electricity                         |
|        | Electricity High Voltage            |
|        | Electricity Low Voltage             |
|        | Gas                                 |
|        | Ground Probing Radar                |
|        | Water                               |
|        | Cable Television                    |
|        | Close Circuit Television            |
|        | Communication                       |
|        | British Telecom                     |
|        | Compressed Air                      |
|        | Offset Fill-Line                    |
|        | Oil Pipe                            |
|        | Pipe                                |
|        | Ventilation                         |
|        | Fuel Line                           |
|        | Vapour Recovery                     |
|        | Gauge Line                          |
|        | Telemetry                           |
|        | Fibre Optics                        |
|        | Unknown                             |
|        | Fence                               |
|        | Edge of Canopy                      |
|        | Gully Run                           |
|        | End Of Trace                        |
|        | Do Not Drill / No Drill Zone        |
|        | T TANK* - W=Water F=Foam U=Unknown  |
|        | Window Sample from November 2020 SI |
|        | Window Sample from May 2016 SI      |

| ABBREVIATIONS |                            |
|---------------|----------------------------|
| AR            | Assumed Route              |
| BO            | Bollard                    |
| BOILL         | Illuminated Bollard        |
| BH            | Borehole                   |
| BTB           | British Telecom Box        |
| BTIC          | British Telecom Cover      |
| CBOX          | Control Box                |
| C/B FENCE     | Closeboard Fence           |
| CR            | Cable Riser                |
| CATV          | Cable TV                   |
| CP            | Catch Pit                  |
| Co            | Concrete                   |
| CON           | Conifer                    |
| CL            | Cover Level                |
| d             | Depth (in metres)          |
| D/CHAN        | Drainage Channel           |
| DP            | Down Pipe                  |
| ER            | Earth Rod                  |
| EIC           | Electricity IC             |
| EP            | Electricity Pole           |
| EOC           | Edge of Canopy             |
| EOT           | End of Trace               |
| F/BED         | Flower Bed                 |
| FH            | Fire Hydrant               |
| FS            | Fire Switch                |
| GV            | Gas Valve                  |
| G             | Gully                      |
| GPR           | Ground Probing Radar       |
| G/RUN         | Gully Run                  |
| HT            | Height                     |
| H/CHESTNUT    | Horse Chestnut             |
| H/HORN        | Hawthorn                   |
| IC            | Inspection Cover           |
| IL            | Invert Level               |
| INT           | Interceptor                |
| KO            | Kerb Outlet                |
| LP            | Lamp Post                  |
| LC            | Lighting Column            |
| LH            | Lamp Hole                  |
| MH            | Manhole Cover              |
| MW            | Monitoring Well            |
| NPV           | No Pipes Visible           |
| OH            | Overhead Service           |
| OSA           | Off Survey Area            |
| OSBM          | Ordnance Survey Bench Mark |
| PR            | Pipe Riser                 |
| P             | Post                       |
| P&R FENCE     | Post & Rail Fence          |
| RET WALL      | Retaining Wall             |
| RWP           | Rain Water Pipe            |
| RS            | Road Sign                  |
| RE            | Roadside Eye               |
| S/A           | Soakaway                   |
| S/BIRCH       | Silver Birch               |
| SAP           | Sapling                    |
| SEC FENCE     | Security Fence             |
| SL            | Spot Light                 |
| SP            | Soil Pipe                  |
| ST            | Stop Tap                   |
| SV            | Sluice Valve               |
| SVP           | Soil Vent Pipe             |
| SVS           | Soil Vapour Sample         |
| TSM           | Temporary Bench Mark       |
| TFR           | Taken From Records         |
| TL            | Traffic Light              |
| TP            | Telegraph Pole             |
| TS            | Traffic Sensor             |
| UTL           | Unable to Locate           |
| UTR           | Unable to Raise            |
| UTS           | Unable to Survey           |
| UTT           | Unable to Trace            |
| VR            | Vapour Recovery            |
| VP            | Vent Pipe                  |
| WL            | Water Level                |
| WM            | Water Meter                |
| WFC           | Water Filled Chamber       |
| WP            | Waste Pipe                 |
| WR            | Water Riser                |
| WS            | Window Sample              |
| Ø             | Pipe Diameter              |

General Notes: This drawing replaces drawing number 0516-GEO2-4376.

BT Overhead feeds now cut.

Electric Mains electric unable to detect.

Possibility that all services are demolished/disconnected.



32 Doncaster Road, Barnsley, South Yorkshire, S70 1TL.  
Tel: 01226 292 377 Mobile: 07969 360287  
E-Mail: scott@avoinmaasurveys.com & info@avoinmaasurveys.com  
Website: www.avoinmaasurveys.com

Client  
Geo2  
Geo2 Remediation Limited  
11 The Mending Rooms, Sunny Bank Mills, Town St.  
Farsley, Leeds, LS28 3UJ.

Site Location  
Lake Garage  
Smithybridge Road  
Rochdale, OL15 0BQ

|             |                |          |            |             |        |
|-------------|----------------|----------|------------|-------------|--------|
| Surveyed by | J.T.           | Drawn by | A.B.       | Approved by | .      |
| Drawing No. | 1020-GEO2-8231 | Revision | -          |             |        |
| Scale       | 1:100@ A1      | Date     | 03-11-2020 | Sheet No.   | 1 of 1 |

DISCLAIMER: The location of under ground services shown on this drawing has been determined using electro-magnetic (and/or ground probing radar, where requested) techniques and visual observations. the limitations of this drawing should be realised and no guarantee can be given that all services have been identified. This drawing may not include the location of all public services that may cross the site and therefore the relevant service drawings should be obtained from the appropriate utility company and used in conjunction with this drawing. Additional services, structures or other below ground obstructions not indicated on this drawing may be present on site. reference should be made to historical plans and as built drawings. Excavations in the vicinity of services should be carried out with due diligence ref: HSG47 document "avoiding dangers from underground services". Location accuracy is determined by referring to manufacturers guidelines for the systems deployed. Reference should be made to the latest version of AMS Ltd site procedures document for utility location surveys.

## **Appendix B**

### **Photographs**

# 1080 – Lake Garage, Littleborough – Photographic Survey 1

|                                                                                    |                                                                                     |                                                                                                                                                          |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Image 1: Northern boundary viewed from the north-west.</p>                      | <p>Image 2: Northern wall of former showroom building.</p>                          | <p>Image 3: Western boundary of the site..</p>                                                                                                           |
|   |   | A narrow alleyway between a red brick wall on the left and a chain-link fence on the right. There is some overgrown vegetation and debris on the ground. |
| <p>Image 4: North-eastern corner of the site.</p>                                  | <p>Image 5: Northern entry of former MOT garage.</p>                                | <p>Image 6: South-eastern boundary viewed from the north.</p>                                                                                            |
|  |  |                                                                      |

# 1080 – Lake Garage, Littleborough– Photographic Survey 2

**Image 7:** Potential former AST area, to the rear of MOT garage building.



**Image 8:** Southern corner of the site.



**Image 9:** Concrete ramp to the rear of the garage.



**Image 10:** Black staining along the western wall of the rear building.



**Image 11:** View of the southern, south-western boundary.

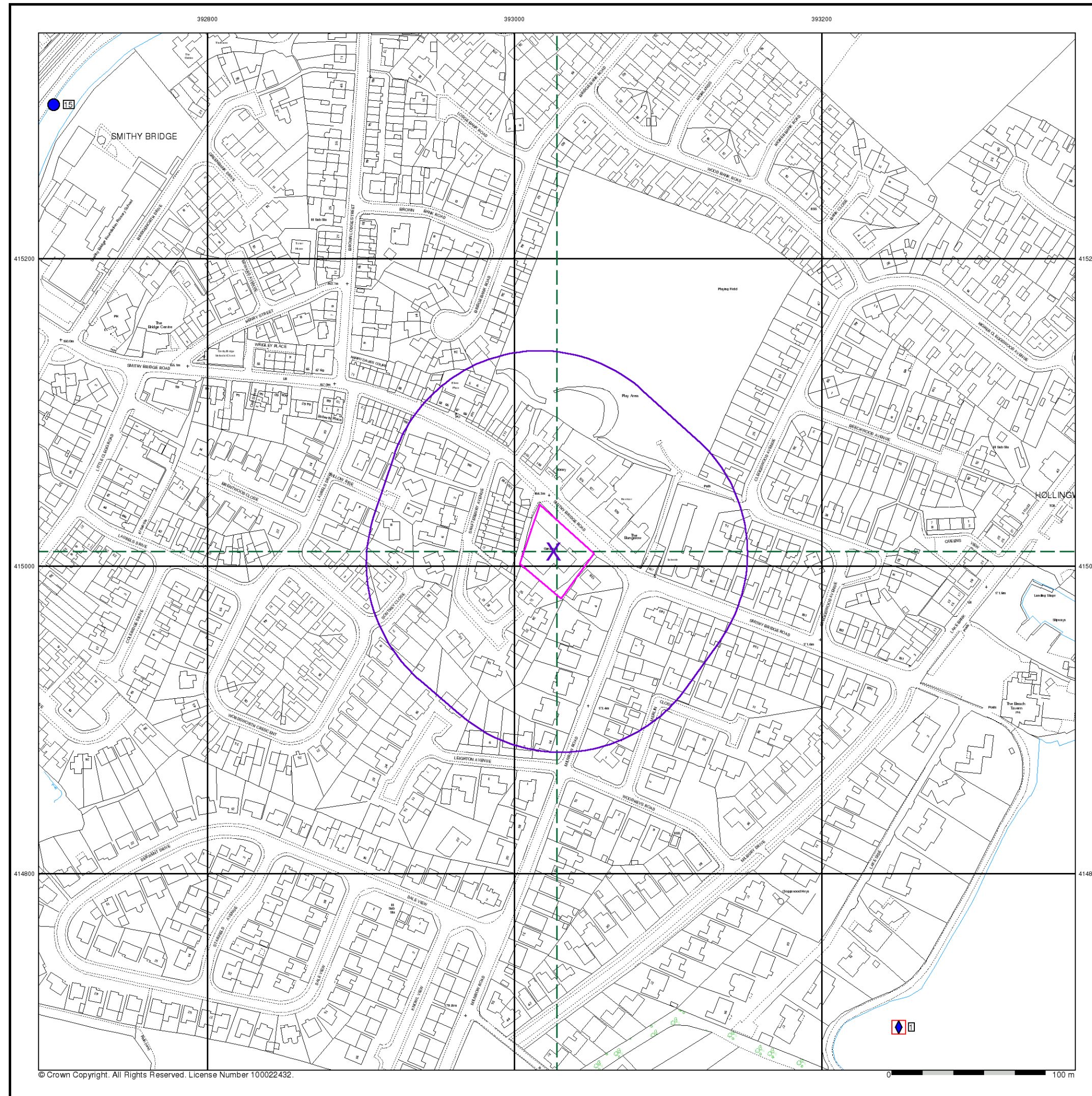


**Image 12:** Black staining on the wall of the south-western corner.



## **Appendix C**

### **Desk Study Data**



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# Envirocheck®

LANDMARK INFORMATION GROUP®

## General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location
- Pylon
- Overhead Transmission Line

## Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

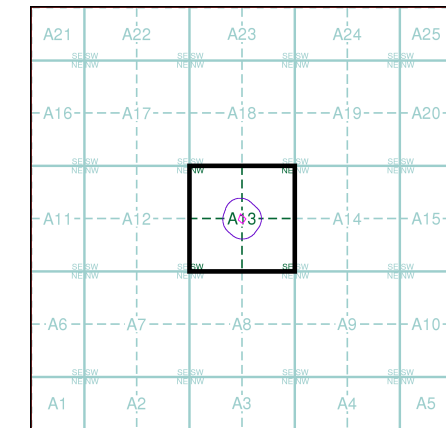
## Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement
- BGS Recorded Mineral Site

## Geological

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Non-water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Potentially Infilled Land (Water)
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

## Site Sensitivity Map - Segment A13



## Order Details

Order Number: 263973599\_1\_1  
Customer Ref: 0556 V2  
National Grid Reference: 393030, 415010  
Slice: A  
Site Area (Ha): 0.16  
Plot Buffer (m): 100

## Site Details

Lake Garage, Smithy Bridge Road, Littleborough, Lancashire, OL15 0BQ

Landmark®  
INFORMATION GROUP

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

# 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 |  |               |
|  | •285 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                                                   |
|  | Bracken                                                               |  | Heath                                                   |
|  | Marsh                                                                 |  | Reeds                                                   |
|  | Building                                                              |  | Glasshouse                                              |
|  | Sloping Masonry                                                       |  | Pylon                                                   |
|  | Cutting                                                               |  | Embankment                                              |
|  | Road Under                                                            |  | Road Over                                               |
|  | Level Crossing                                                        |  | Foot Bridge                                             |
|  | 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                   |
|  | Civil Parish                                                          |  |                                                         |
|  | BP, BS Boundary Post or Stone                                         |  | Police Station                                          |
|  | Church                                                                |  | Post Office                                             |
|  | Club House                                                            |  | Public Convenience                                      |
|  | Fire Engine Station                                                   |  | Public House                                            |
|  | Foot Bridge                                                           |  | Signal Box                                              |
|  | Fountain                                                              |  | Spring                                                  |
|  | Guide Post                                                            |  | Telephone Call Box                                      |
|  | Mile Post                                                             |  | Telephone Call Post                                     |
|  | Mile Stone                                                            |  | 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                                |
|  | Mean high water (springs)                                |  | 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                         |

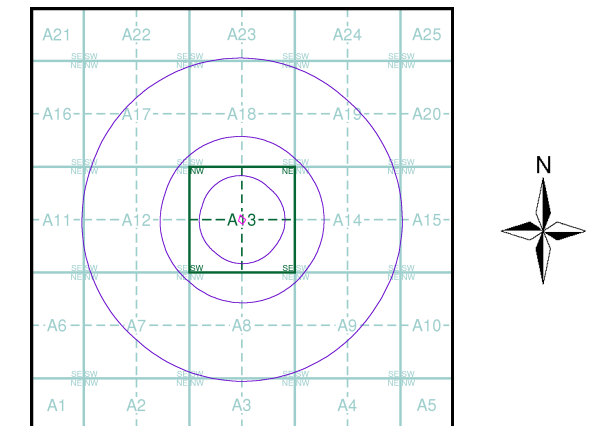
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## Historical Mapping & Photography included:

| Mapping Type           | Scale    | Date        | Pg |
|------------------------|----------|-------------|----|
| Lancashire And Furness | 1:10,560 | 1851        | 3  |
| Yorkshire              | 1:10,560 | 1854        | 4  |
| Lancashire And Furness | 1:10,560 | 1894 - 1895 | 5  |
| Yorkshire              | 1:10,560 | 1894 - 1895 | 6  |
| Lancashire And Furness | 1:10,560 | 1910 - 1911 | 7  |
| Yorkshire              | 1:10,560 | 1910 - 1911 | 8  |
| Yorkshire              | 1:10,560 | 1910 - 1911 | 9  |
| Lancashire And Furness | 1:10,560 | 1930 - 1932 | 10 |
| Lancashire And Furness | 1:10,560 | 1938        | 11 |
| Ordnance Survey Plan   | 1:10,000 | 1956        | 12 |
| Ordnance Survey Plan   | 1:10,000 | 1967 - 1968 | 13 |
| Manchester             | 1:25,000 | 1975        | 14 |
| Ordnance Survey Plan   | 1:10,000 | 1978 - 1979 | 15 |
| Ordnance Survey Plan   | 1:10,000 | 1990        | 16 |
| 10K Raster Mapping     | 1:10,000 | 1999        | 17 |
| 10K Raster Mapping     | 1:10,000 | 2006        | 18 |
| VectorMap Local        | 1:10,000 | 2020        | 19 |

## Historical Map - Slice A



## Order Details

Order Number: 263973599\_1\_1  
Customer Ref: 0556 V2  
National Grid Reference: 393030, 415010  
Slice: A  
Site Area (Ha): 0.16  
Search Buffer (m): 1000

## Site Details

Lake Garage, Smithy Bridge Road, Littleborough, Lancashire, OL15 0BQ

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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

Tailings Pile    Fuel Storage Tanks    Natural Gas Tank

Bench Mark    Drill Hole    Burial Mound    Triangulation Point on Burial Mound

Single-track Railroad    Double-track 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)

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

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    Bench Mark (monumented)    Telegraph Office    Telephone Station

Radio Station    Radio Tower    Airfield or Seaplane Base    Landing Strip

Telegraph/Telephone Lines    Main Highway    Highway under Construction    Improved Dirt Road (former truck road)

Double-track Railroad with First Class Station    Dismantled Railroad    Railroad Under Construction

Shore Embankment    River or Ditch with Embankment    Direction and velocity of current    Water Gauge    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

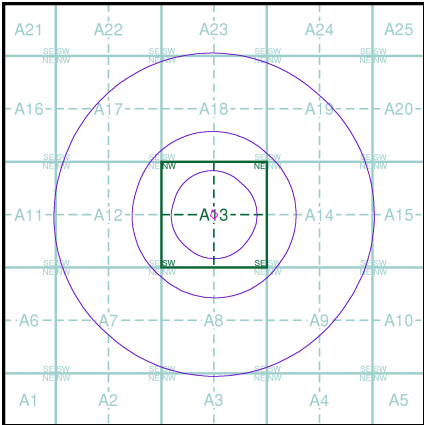
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Historical Mapping & Photography included:

| Mapping Type           | Scale    | Date        | Pg |
|------------------------|----------|-------------|----|
| Lancashire And Furness | 1:10,560 | 1851        | 3  |
| Yorkshire              | 1:10,560 | 1854        | 4  |
| Lancashire And Furness | 1:10,560 | 1894 - 1895 | 5  |
| Yorkshire              | 1:10,560 | 1894 - 1895 | 6  |
| Lancashire And Furness | 1:10,560 | 1910 - 1911 | 7  |
| Yorkshire              | 1:10,560 | 1910 - 1911 | 8  |
| Yorkshire              | 1:10,560 | 1910 - 1911 | 9  |
| Lancashire And Furness | 1:10,560 | 1930 - 1932 | 10 |
| Lancashire And Furness | 1:10,560 | 1938        | 11 |
| Ordnance Survey Plan   | 1:10,000 | 1956        | 12 |
| Ordnance Survey Plan   | 1:10,000 | 1967 - 1968 | 13 |
| Manchester             | 1:25,000 | 1975        | 14 |
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| Ordnance Survey Plan   | 1:10,000 | 1990        | 16 |
| 10K Raster Mapping     | 1:10,000 | 1999        | 17 |
| 10K Raster Mapping     | 1:10,000 | 2006        | 18 |
| VectorMap Local        | 1:10,000 | 2020        | 19 |

Russian Map - Slice A



Order Details

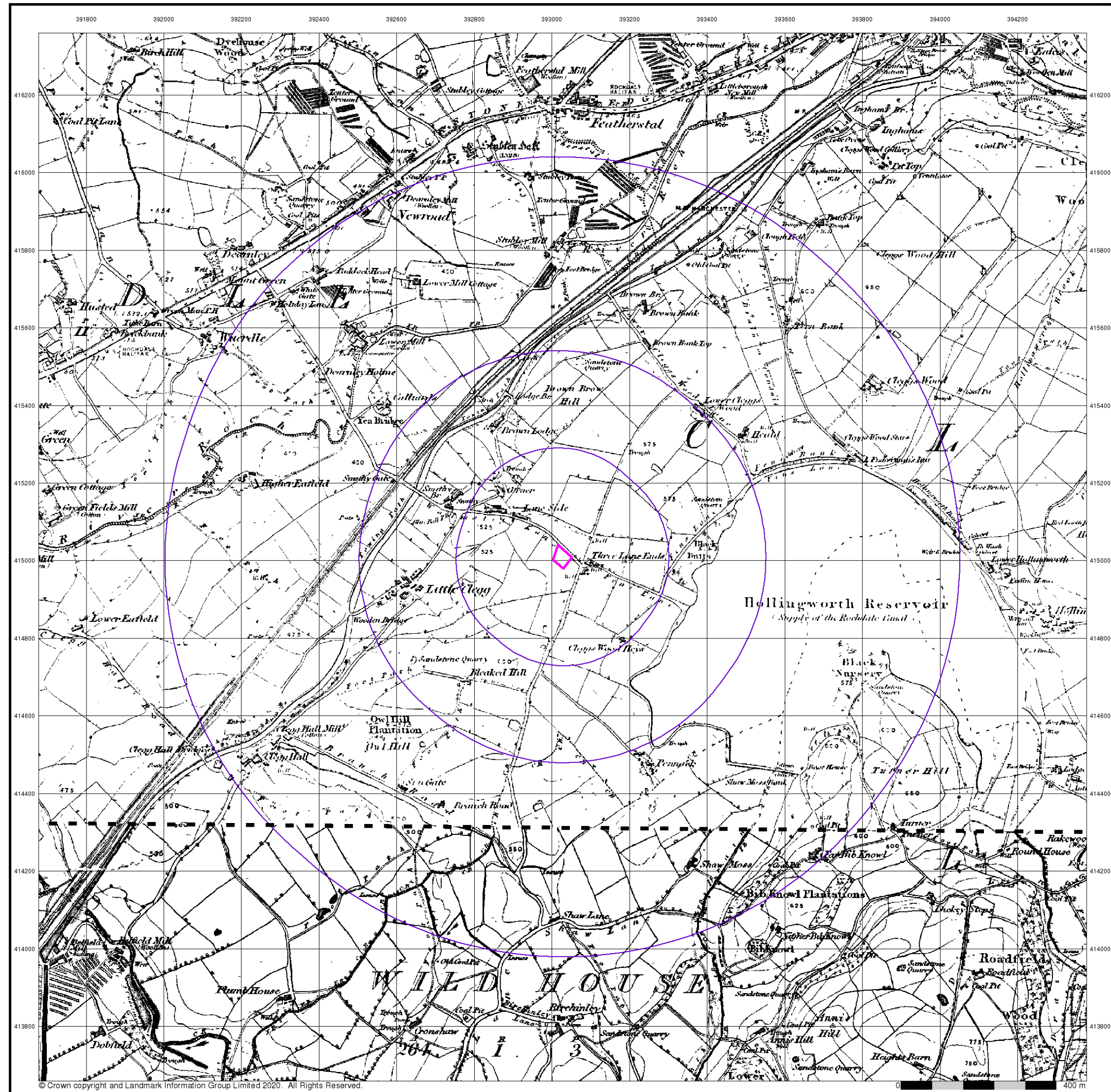
Order Number: 263973599\_1\_1  
Customer Ref: 0556 V2  
National Grid Reference: 393030, 415010  
Slice: A  
Site Area (Ha): 0.16  
Search Buffer (m): 1000

Site Details

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## Lancashire And Furness

### Published 1851

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

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

|          |
|----------|
| 08100    |
| 1851     |
| 1:10,560 |

|          |
|----------|
| 08900    |
| 1851     |
| 1:10,560 |

### Historical Map - Slice A

### Order Details

|                          |                |
|--------------------------|----------------|
| Order Number:            | 263973599_1_1  |
| Customer Ref:            | 0556 V2        |
| National Grid Reference: | 393030, 415010 |
| Slice:                   | A              |
| Site Area (Ha):          | 0.16           |
| Search Buffer (m):       | 1000           |

### Site Details

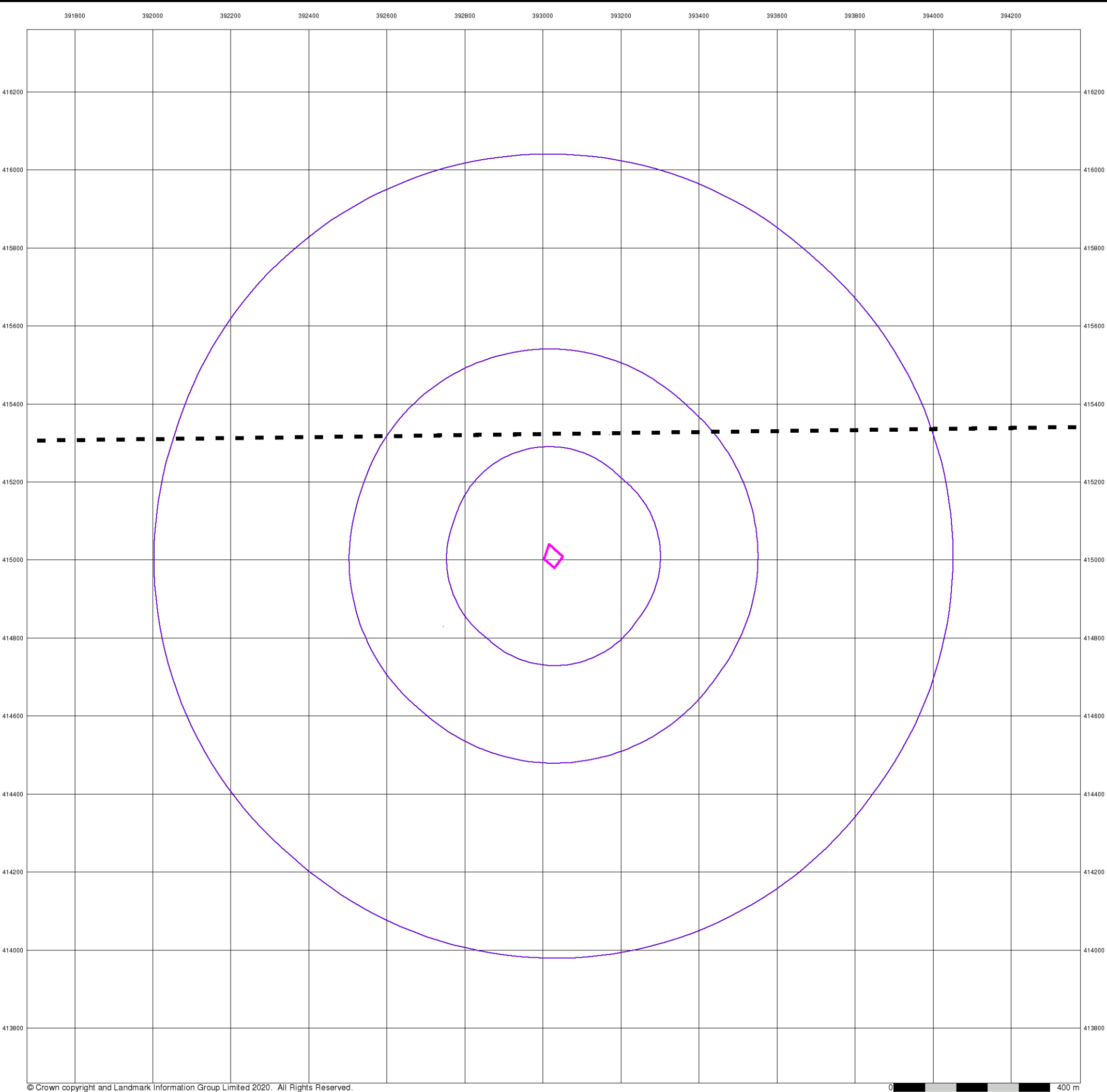
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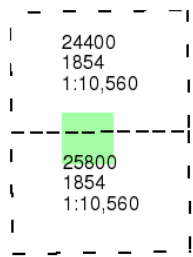
## Yorkshire

Published 1854

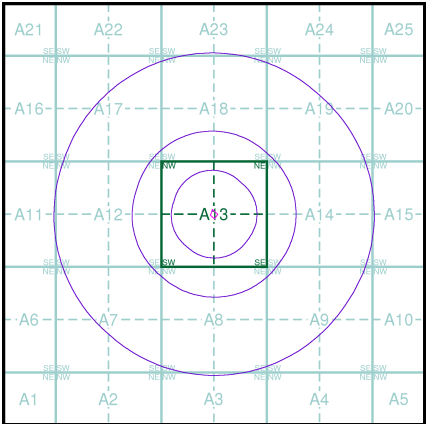
Source map scale - 1:10,560

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

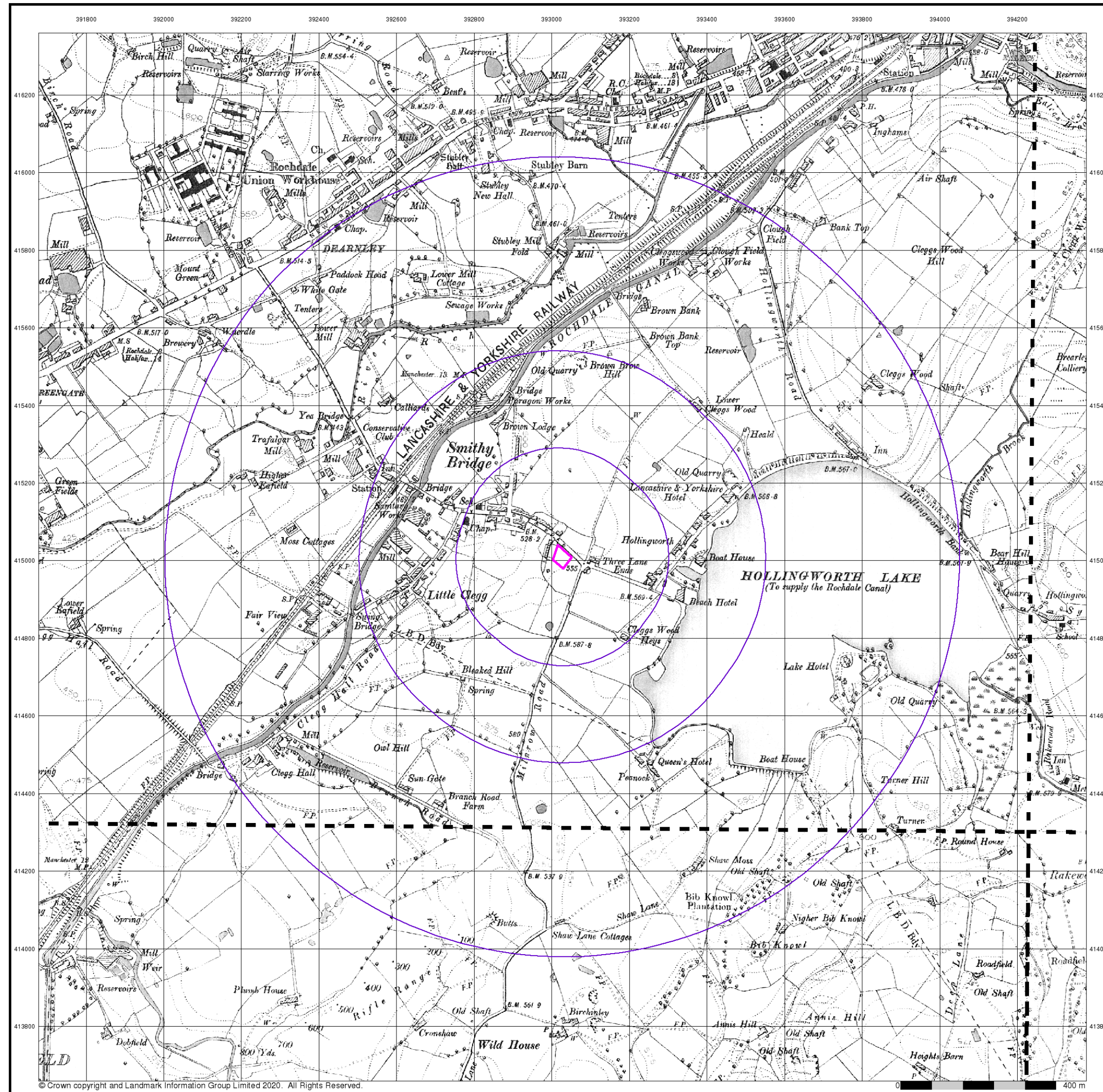


### Order Details

Order Number: 263973599\_1\_1  
Customer Ref: 0556 V2  
National Grid Reference: 393030, 415010  
Slice: A  
Site Area (Ha): 0.16  
Search Buffer (m): 1000

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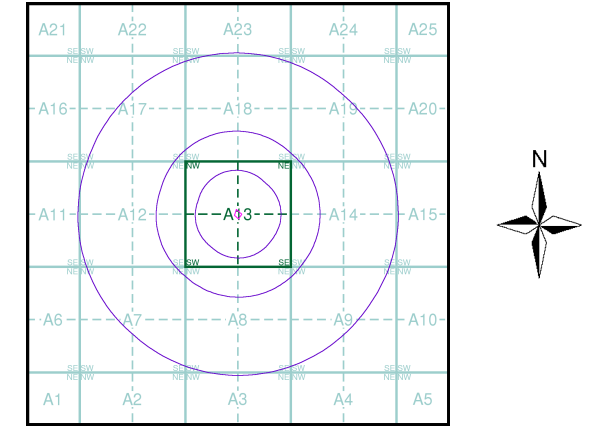
## Lancashire And Furness Published 1894 - 1895 Source map scale - 1:10,560

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)

|                           |                           |
|---------------------------|---------------------------|
| 081SW<br>1894<br>1:10,560 | 081SE<br>1895<br>1:10,560 |
| 089NW<br>1894<br>1:10,560 | 089NE<br>1895<br>1:10,560 |

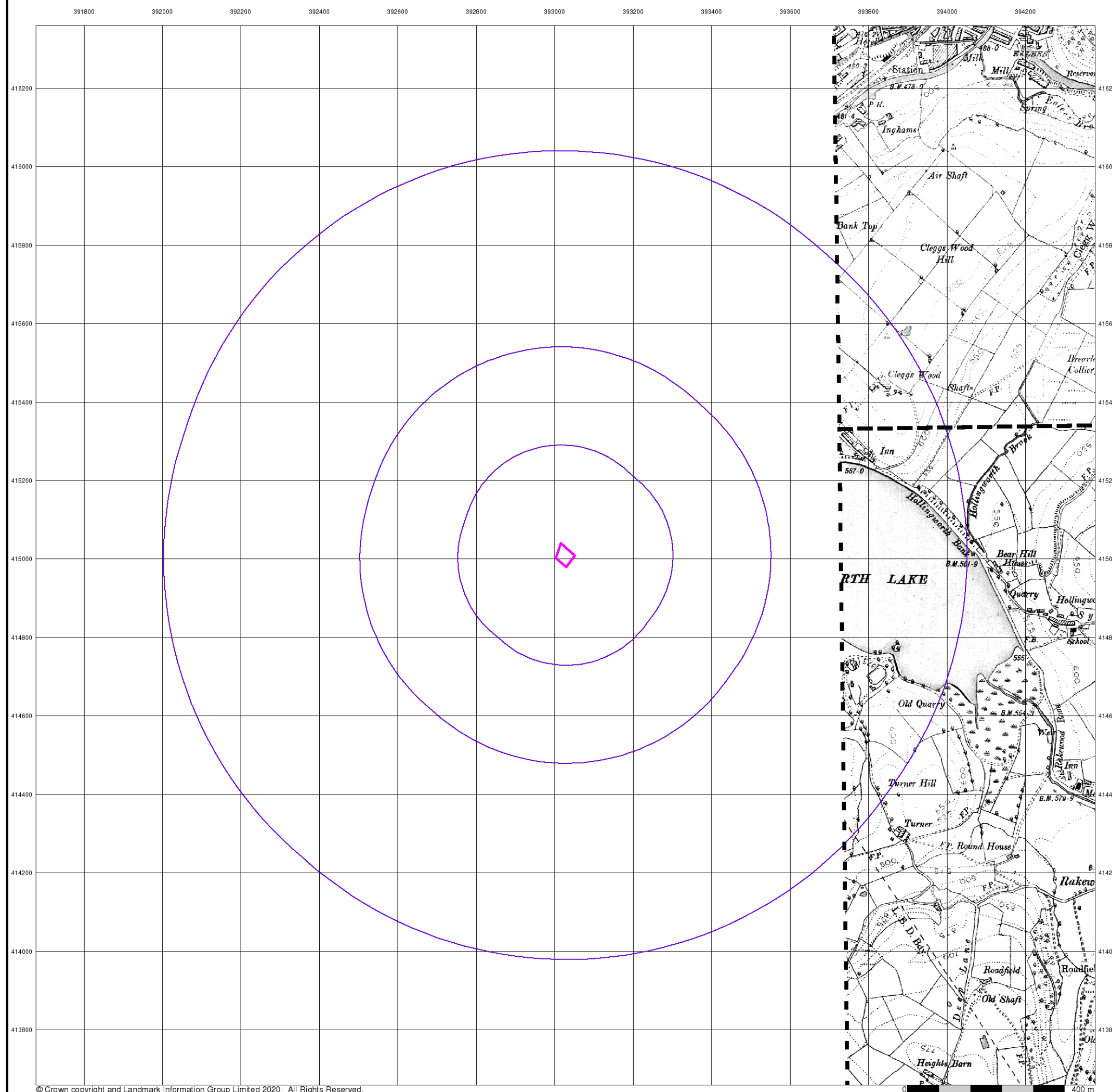
### Historical Map - Slice A



**Order Details**  
Order Number: 263973599\_1\_1  
Customer Ref: 0556 V2  
National Grid Reference: 393030, 415010  
Slice: A  
Site Area (Ha): 0.16  
Search Buffer (m): 1000

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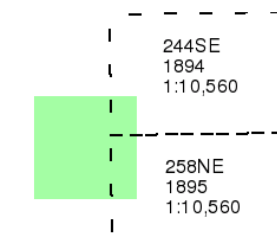
## Yorkshire

**Published 1894 - 1895**

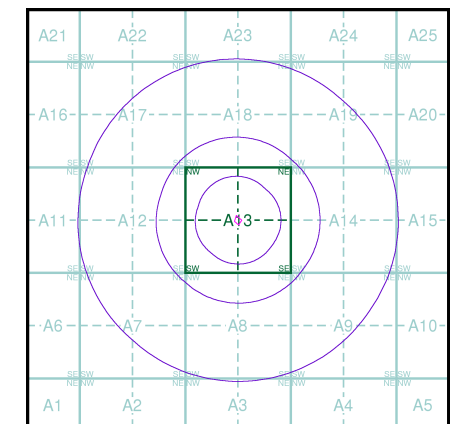
**Source map scale - 1:10,560**

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

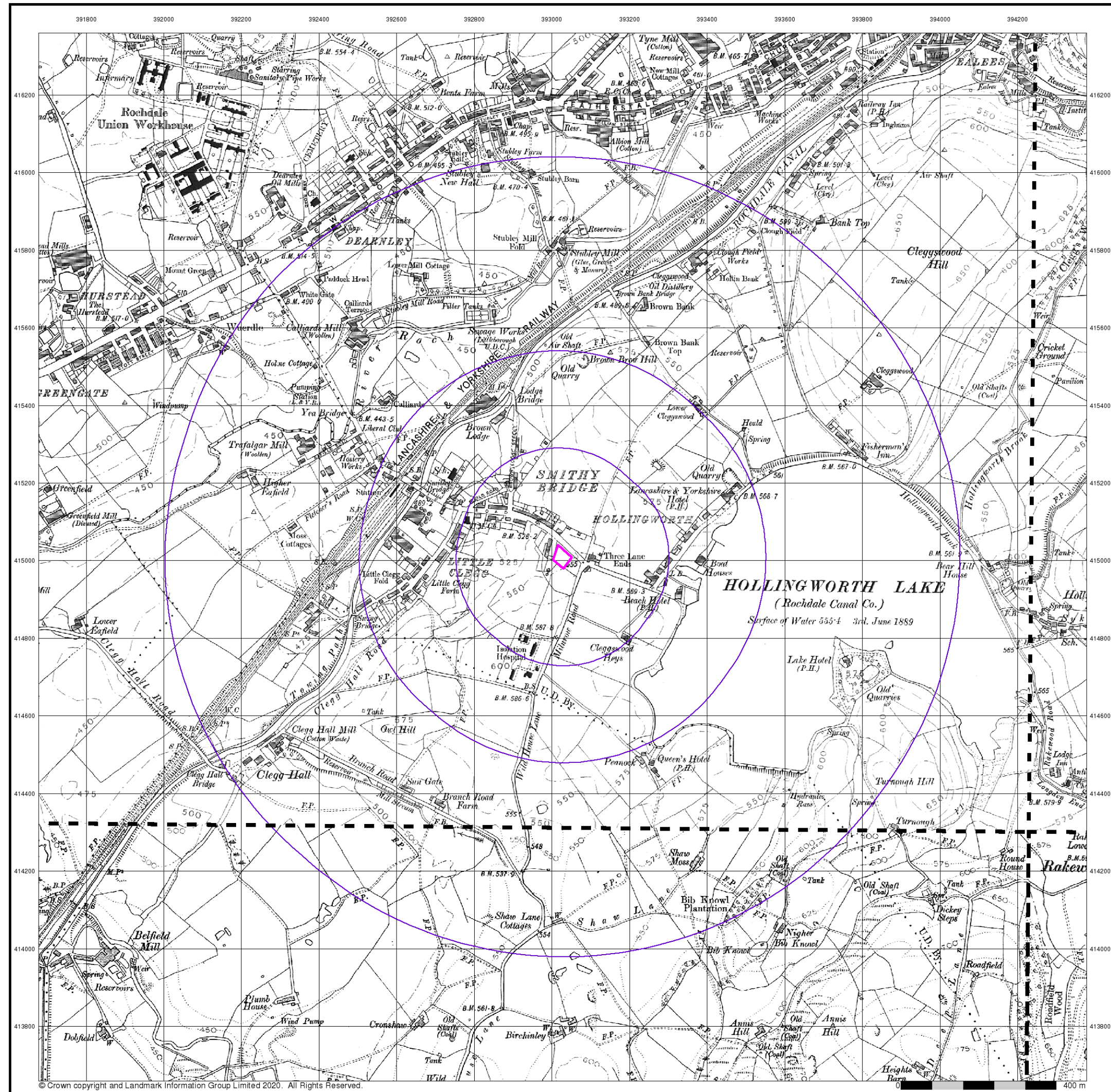
Order Number: 263973599\_1\_1  
Customer Ref: 0556 V2  
National Grid Reference: 393030, 415010  
Slice: A  
Site Area (Ha): 0.16  
Search Buffer (m): 1000

## Site Details

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## Lancashire And Furness

### Published 1910 - 1911

### 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)

|                           |                           |
|---------------------------|---------------------------|
| 081SW<br>1911<br>1:10,560 | 081SE<br>1910<br>1:10,560 |
| 089NW<br>1910<br>1:10,560 | 089NE<br>1910<br>1:10,560 |

### Historical Map - Slice A

### Order Details

|                          |                |
|--------------------------|----------------|
| Order Number:            | 263973599_1_1  |
| Customer Ref:            | 0556 V2        |
| National Grid Reference: | 393030, 415010 |
| Slice:                   | A              |
| Site Area (Ha):          | 0.16           |
| Search Buffer (m):       | 1000           |

### Site Details

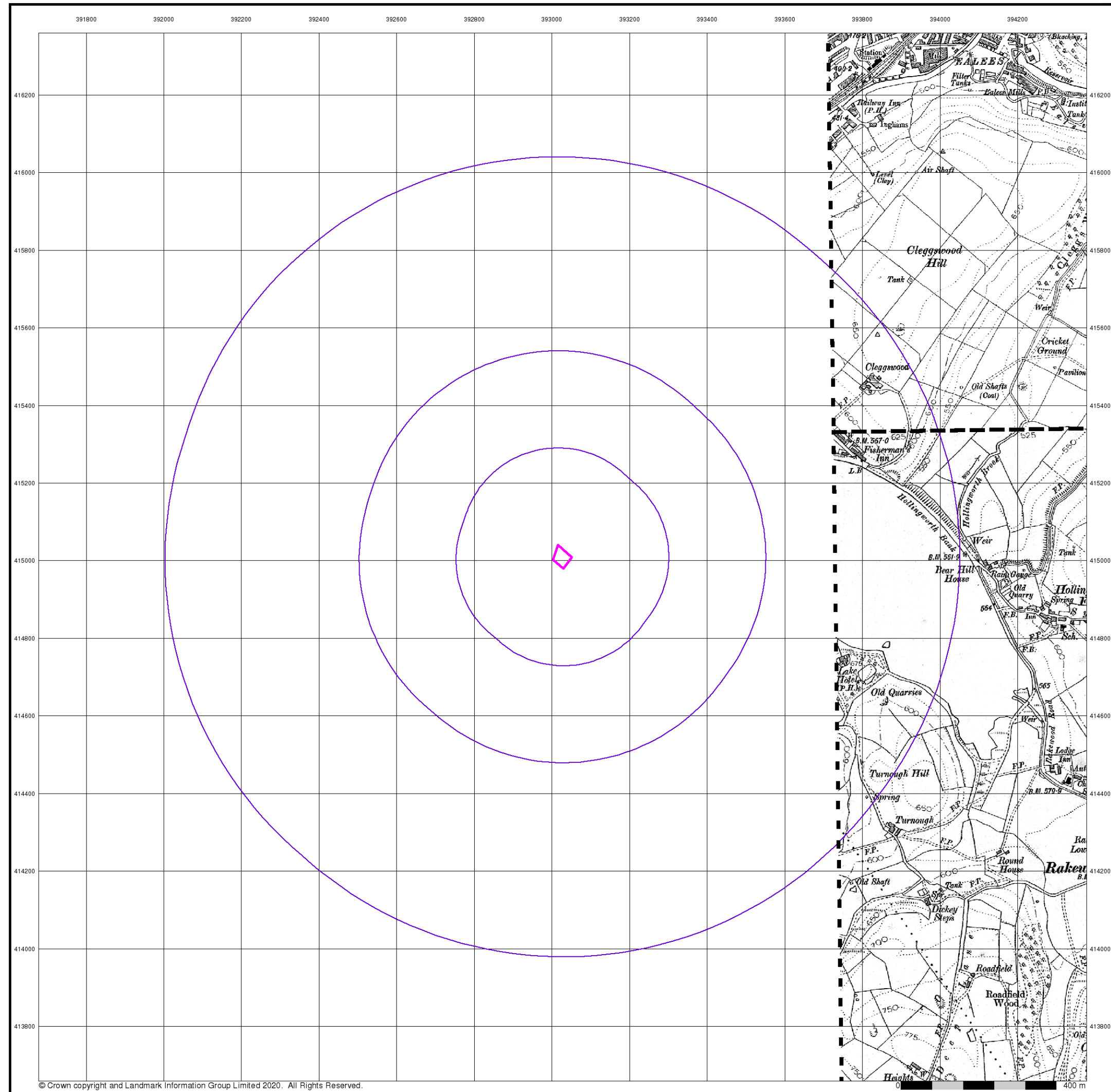
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## Yorkshire

### Published 1910 - 1911

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

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

|          |
|----------|
| 244SE    |
| 1911     |
| 1:10,560 |

|          |
|----------|
| 258NE    |
| 1910     |
| 1:10,560 |

### Historical Map - Slice A

### Order Details

|                          |                |
|--------------------------|----------------|
| Order Number:            | 263973599_1_1  |
| Customer Ref:            | 0556 V2        |
| National Grid Reference: | 393030, 415010 |
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| Site Area (Ha):          | 0.16           |
| Search Buffer (m):       | 1000           |

### Site Details

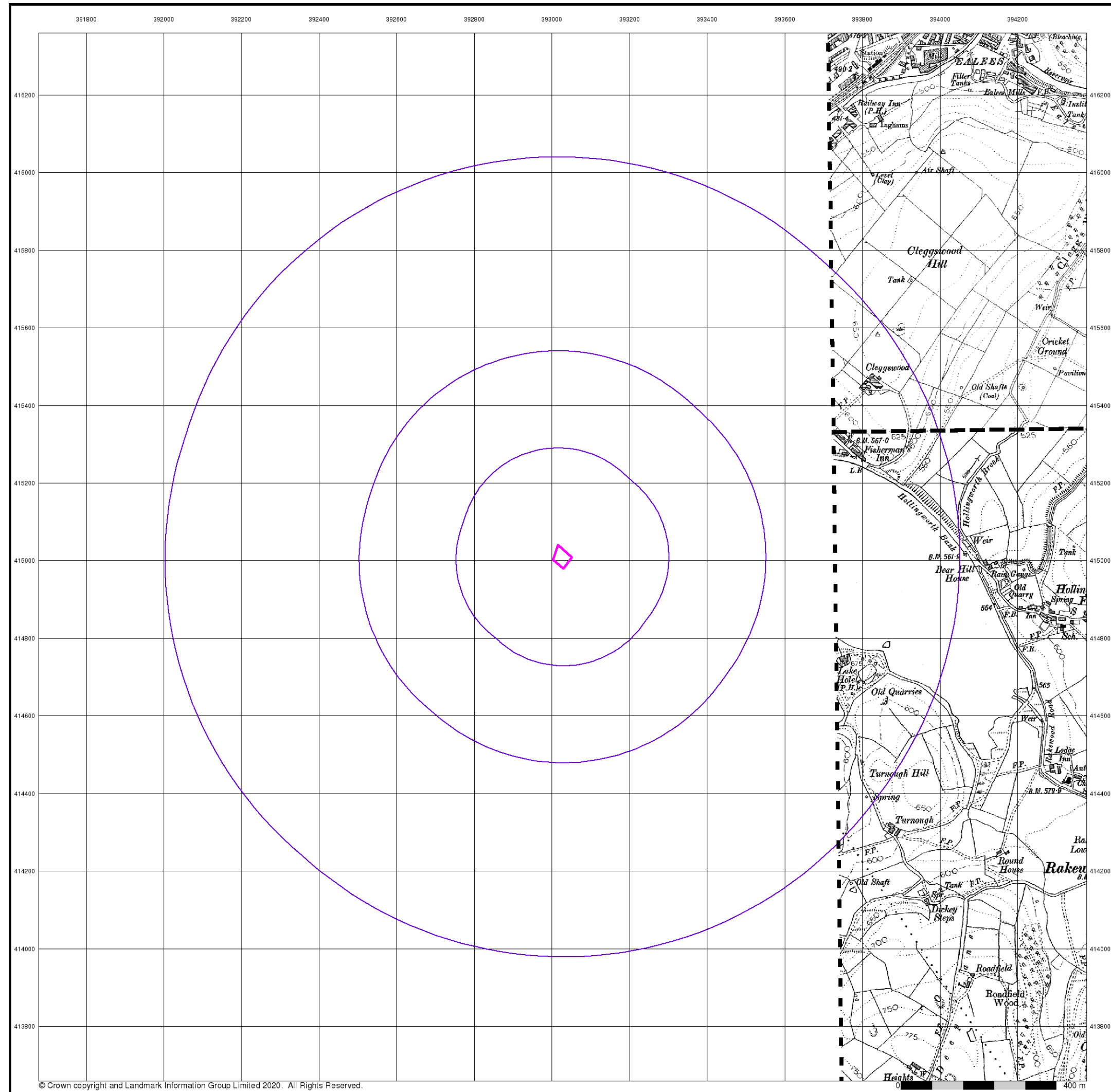
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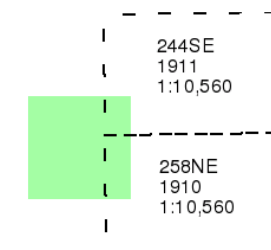
Yorkshire

Published 1910 - 1911

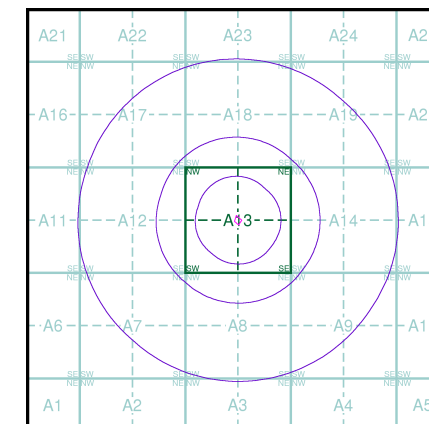
Source map scale - 1:10,560

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

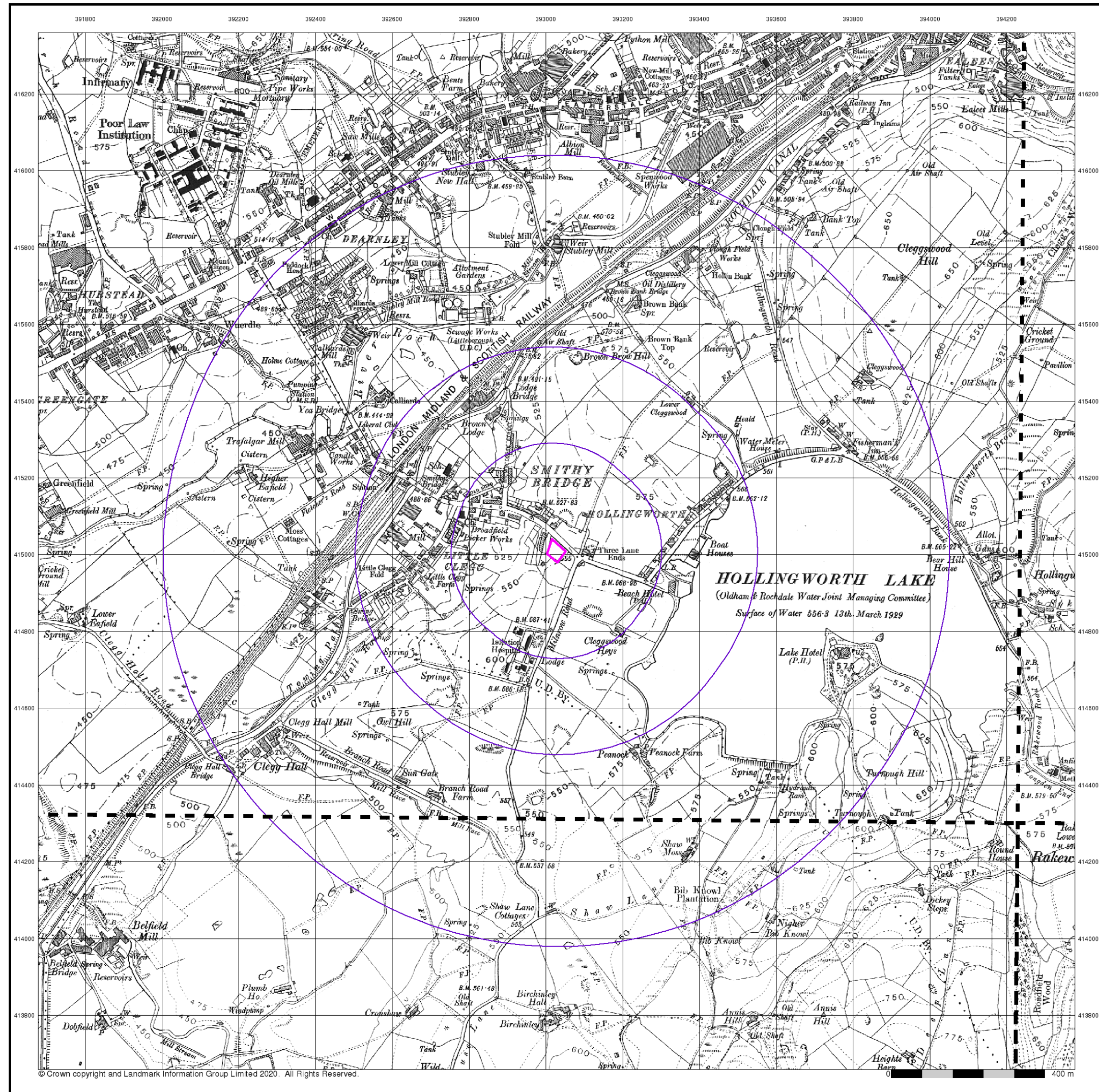
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Customer Ref: 0556 V2  
National Grid Reference: 393030, 415010  
Slice: A  
Site Area (Ha): 0.16  
Search Buffer (m): 1000

## Site Details

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## Lancashire And Furness

Published 1930 - 1932

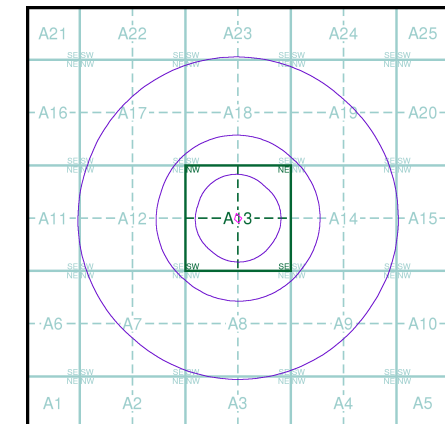
Source map scale - 1:10,560

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)

|                           |                           |
|---------------------------|---------------------------|
| 081SW<br>1932<br>1:10,560 | 081SE<br>1930<br>1:10,560 |
| 089NW<br>1931<br>1:10,560 | 089NE<br>1932<br>1:10,560 |

### Historical Map - Slice A



### Order Details

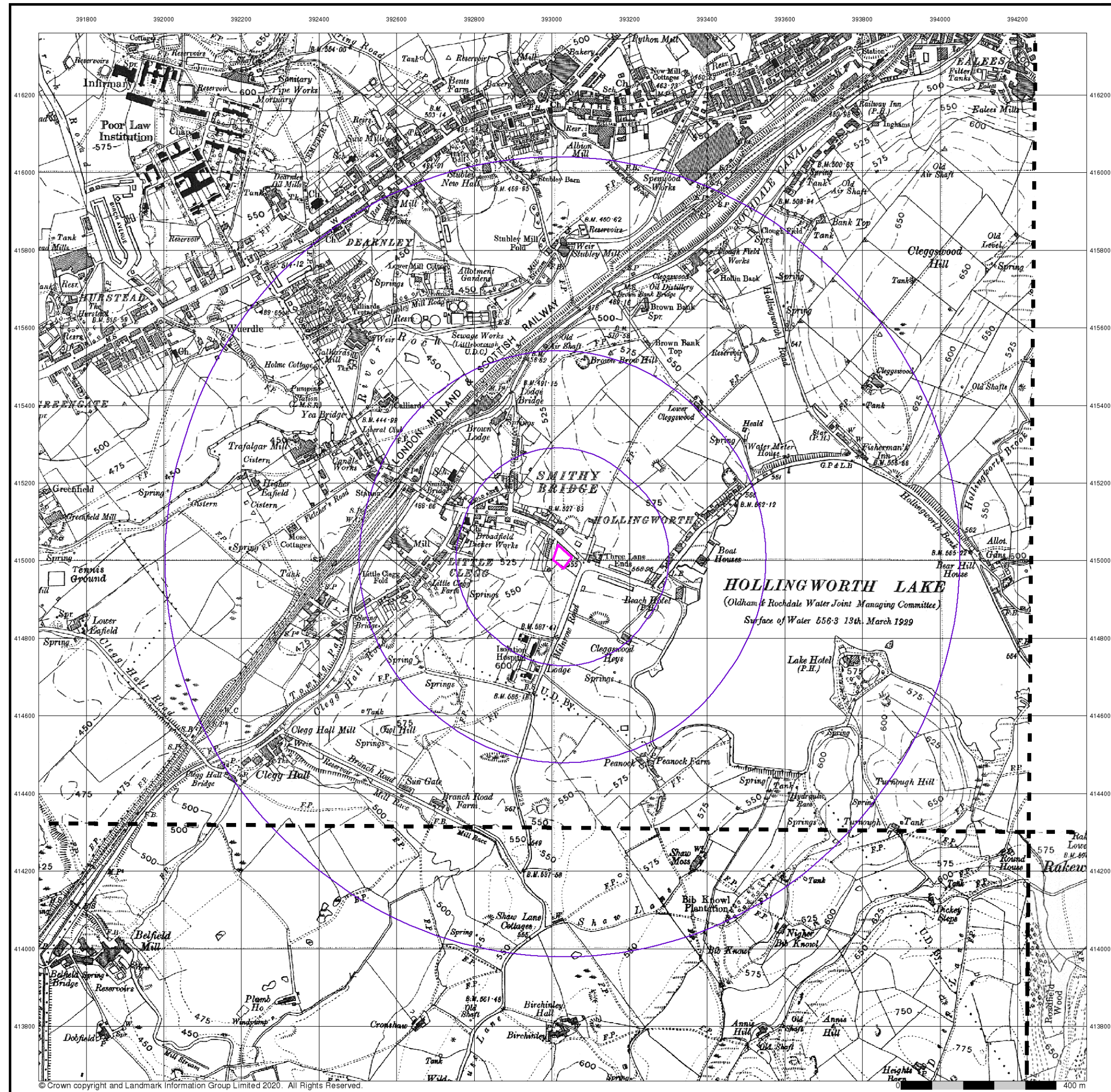
Order Number: 263973599\_1\_1  
Customer Ref: 0556 V2  
National Grid Reference: 393030, 415010  
Slice: A  
Site Area (Ha): 0.16  
Search Buffer (m): 1000

### Site Details

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## Lancashire And Furness

Published 1938

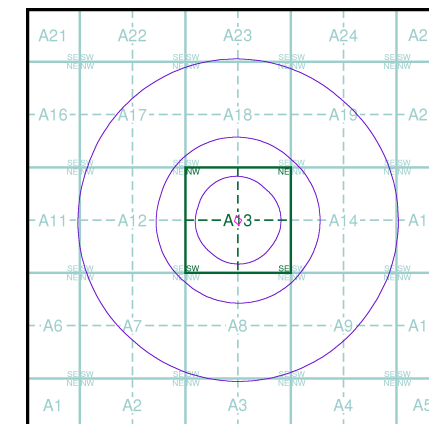
Source map scale - 1:10,560

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)

|                           |                           |
|---------------------------|---------------------------|
| 081SW<br>1938<br>1:10,560 |                           |
| 089NW<br>1938<br>1:10,560 | 089NE<br>1938<br>1:10,560 |

### Historical Map - Slice A



### Order Details

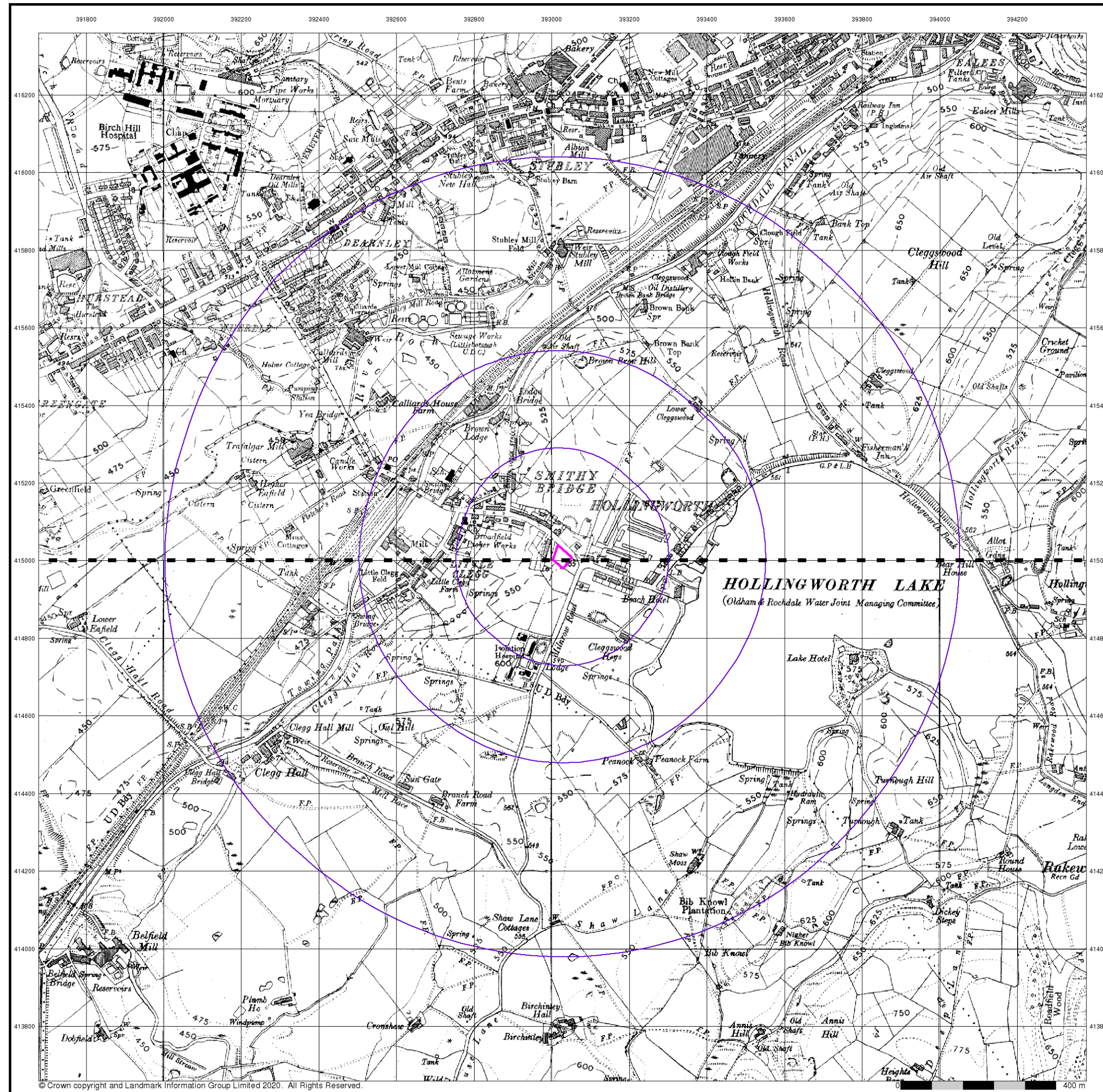
Order Number: 263973599\_1\_1  
Customer Ref: 0556 V2  
National Grid Reference: 393030, 415010  
Slice: A  
Site Area (Ha): 0.16  
Search Buffer (m): 1000

### Site Details

Lake Garage, Smithy Bridge Road, Littleborough, Lancashire, OL15 0BQ

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## Ordnance Survey Plan

Published 1956

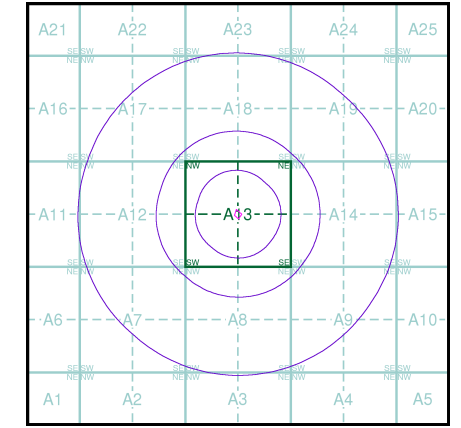
Source map scale - 1:10,000

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)

|          |      |
|----------|------|
| SD91NW   | 1956 |
| 1:10,560 |      |
| SD91SW   | 1956 |
| 1:10,560 |      |

## Historical Map - Slice A



## Order Details

|                          |                |
|--------------------------|----------------|
| Order Number:            | 263973599_1_1  |
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