ENVIRONMENTAL RISK ASSESSMENT

NB Clark Ltd

Butterwell DP Recycling Centre

Longhirst

Morpeth

Northumberland

NE61 3NF

EPR/LB3004MK/A001

Olive Compliance Ltd
Planet House, Northumbrian Way, Newcastle-upon-Tyne, NE12 6EH
Company No: 12861220

BASIS OF REPORT

This report has been prepared by Olive Compliance Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of NB Clark Ltd; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Olive Compliance Ltd.

Olive Compliance Ltd disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Information reported herein may be based on the interpretation of public domain data collected by Olive Compliance Ltd, and/or information supplied by the Client and/or its other advisors and associates. This data has been accepted in good faith as being accurate and valid.

The copyright and intellectual property in all drawings, reports, specifications, bills of quantities, calculations and other information set out in this report remain vested in Olive Compliance Ltd unless the terms of appointment state otherwise.

CONTENTS

1.0 INTRODUCTION 2

1.1 Methodology 2

2.0 SITE SETTING AND RECEPTORS 2

2.1 Site Setting 2

2.2 Risk Assessment of site activities 11

3.0 ENVIRONMENTAL RISK ASSESSMENT 13

3.1 Overview and Approach 13

4.0 CONCLUSION 15

REFERENCED DRAWINGS

SITE LAYOUT PLAN 003

SITE DRAINAGE PLAN 005

SITE RECEPTOR PLAN 004

APPENDICIES

Appendix A – Flood Risk and Drainage Assessment

Appendix B – Phase 1 Land Contamination Report with Supporting Documents

Appendix C – Ecology Report

1.0 Introduction

NB Clark Limited (NBC) has instructed Olive Compliance Limited (OCL) to prepare an application for a Bespoke Environmental Permit Variation Application for their site at Butterwell Disposal Point, Longhirst, Morpeth, Northumberland, NE61 3NF.

N. B. Clark Ltd. proposes to import inert wastes, to process through washing and mechanical screening and crushing to produce a secondary aggregate, soil and soil making material. Use will be made of the existing rail link and road network.

Supporting documentation is also included in the form of a Flood and Drainage Assessment, Ecology and Habitats Report and a Phase 1 Contaminated Land Report.

1.1 Methodology

This ERA has been undertaken in accordance with the Environment Agency (EA) *Risk assessments for your environmental permit*[1] (2016) and is a simple assessment of the risks to the environment and human health from accidents, noise and fugitive emissions that may be associated with the proposed operations at the site.

The aim of the assessment is to identify any significant risks and demonstrate that the risk of pollution or harm will be acceptable by taking the appropriate measures to manage these risks.

The above guidance requires all receptors that are near the site and could reasonably be affected by the proposed activities to be identified and considered as part of the ERA. Therefore:

- a 2km radius has been adopted in reviewing potentially sensitive receptors of ecological importance; and
- a radius of 1km from the proposed permit boundary has been adopted for all other potentially sensitive receptors (for example, residential, cultural heritage, commercial, industrial, agricultural and surface water receptors).

2.0 Site Setting and Receptors

2.1 Site Setting

The site (centred at NGR 424550 591100) is located at Butterwell Disposal Point, Longhirst, Morpeth, Northumberland, NE61 3NF. The site is principally bounded as detailed in Table 1 below.

Table 1 – Site Setting

Boundary	Description
North	**Rural/Agricultural**
East	**Rural/Agricultural**

[1] https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

South	**Rural/Agricultural**
West	**Rural/Agricultural**

The site location and environmental site setting is shown below.

Image 1 – Site Setting



2.1.1 Permitted Sites

Checks made on the EA public register[2] have identified that there are no other EA regulated permitted sites within 1k of the site.

2.1.2 Exemptions

Checks made on the EA public register have identified only 1 registration with registered waste exemptions within 1k of the site. These are registered for agricultural use. See information below.

- HIGH STEADS, LONGHIRST, MORPETH, NE61 6PS - D1, D7, S1, S2, T6, U1, U10, U12, U13, U8 WEX312553 – 0.8km

2.1.3 Waste Carriers

The company is a registered waste carrier. Registration number CBDU271868 refers and expires in January 2025.

[2] Public Registers Online (data.gov.uk) accessed August 2023

2.1.4 European/International Sites

Searches on the Multi Agency Geographical Information for the Countryside (MAGIC) website[3] confirm there are no Sites of Special Scientific Interest (SSSI), a special area of conservation (SAC), special protection areas (SPA) or RAMSAR sites within 2km of the site boundary (See Table 2).

Table 2 – Designated Sites within 2km

Designation	Site Name	Reason for Designation	Distance from Survey Area (Closest point)
Special Are of a Conservation	None within 2km		
Special Protection Area	None within 2km		
National Nature Reserve	None within 2km		
Site of Special Scientific Interest	None within 2km		
SSSI Impact Risk Zone (IRZ) The site lies within an identified SSSI Impact Risk Zone relating to designated sites in the wider area. The following impact risk triggers are identified: • Landfill, including inert landfill, non-hazardous landfill and hazardous landfill. • Any discharge of water or liquid waste of more than 20m^3/day to ground (ie to seep away) or to surface water, such as a beck or stream.			
Local Nature Reserve	Ulgham Meadow	-	1.9km west

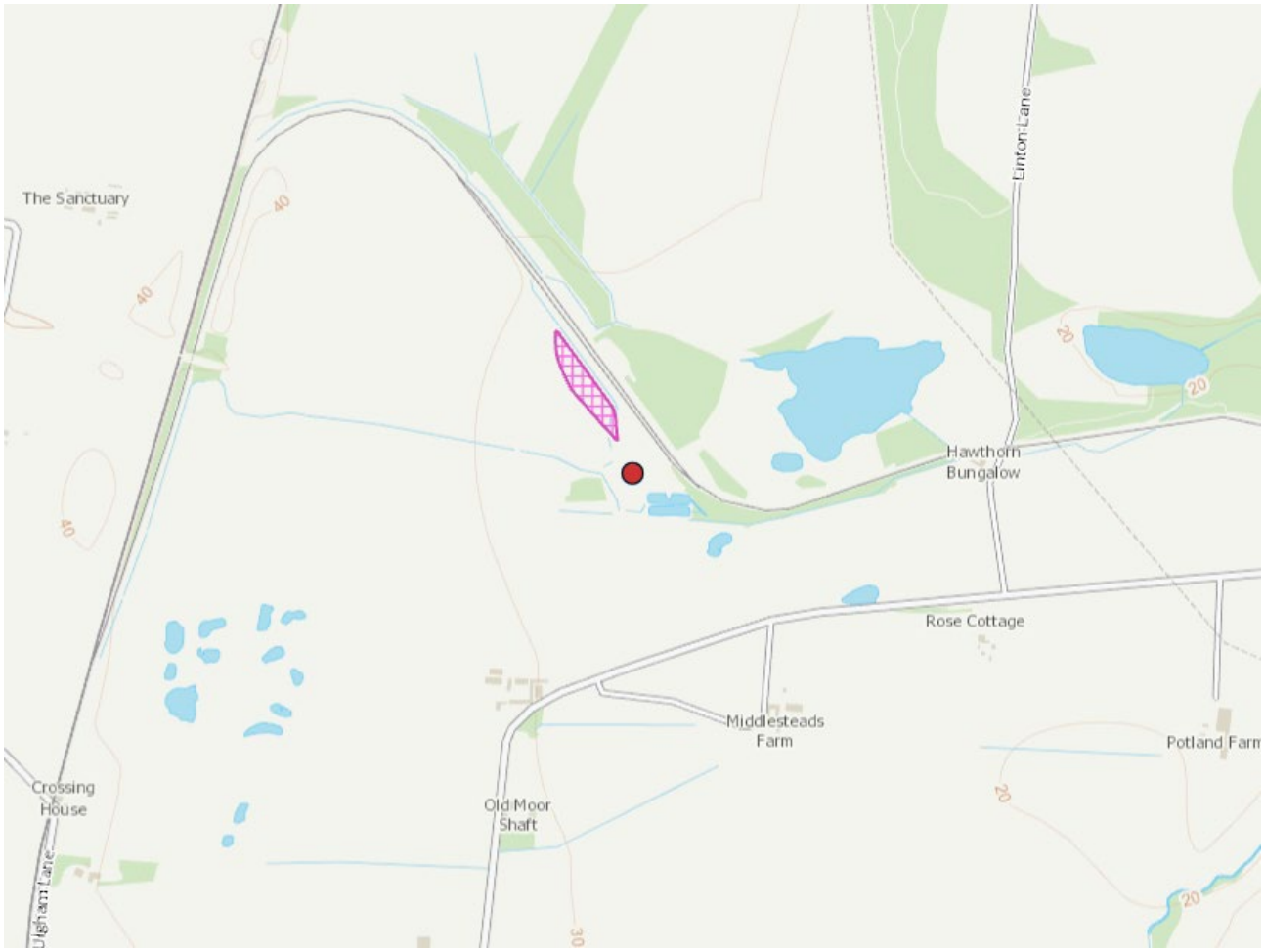
The ECIA report produced in March 2023 which identifies local habitats and potential impacts from the proposed site and activities including the Northumbria Coast SPA / RAMSAR site, the Northumberland Marine SPA and the Hawthorn Cottage Pasture SSSI. It was concluded that there would be a neutral effect and other receptors identified within the Application Site were not considered to be important ecological receptors.

2.1.5 Other receptors

Deciduous Woodland is recorded 50m to the East of the site as shown in Image 2 below, taken from the EA Screening pre the initial permit application.

[3] MAGIC (defra.gov.uk) accessed August 2023

Image 2 – Deciduous Woodland Location – EA Screening Map Extract



An area identified as deciduous woodland extends into the site boundary, however from a review of aerial imagery dating back to 2002, no woodland is or has been present on site.

None of the following receptors have been identified within 1km of the proposed permit boundary.

- National Nature Reserves;
- World Heritage Sites;
- Registered Parks and Gardens;
- Area of Outstanding Natural Beauty;
- Woodland Trust Sites; and
- National Forest.

The MAGIC website identified no areas of woodland listed within the Ancient Woodland Inventory within 2km of the site.

2.1.6 Major Roads and Transport Links

There are no motorways within 1km of the site boundary.

The site is within 800m (west of the site) of the Network Rail Eastern Railway Line.

2.1.7 Public/Tourist Areas

The site is surrounded by open countryside and dogwalkers or horse riders use the greenspace surrounding the site.

Non-Statutory Designated Sites - Linton Lane Northumberland Wildlife Trust Reserve

The Linton Lane Northumberland Wildlife Trust Reserve is located approximately 20m to the northeast from the Site boundary at its' closest point, separated by a strip of open mosaic habitat and a railway line.

The area comprises a former opencast coal mining site. The habitat in the Reserve includes two large ponds, a mixture of mature woodland and maturing alder/ willow carr, species rich grassland, marsh and aquatic habitats. The Site supports waterfowl assemblages as well as smaller passerine assemblages within the woodland areas.

The wetland areas within the Reserve are fed by the water flowing off the Site and surrounding fields.

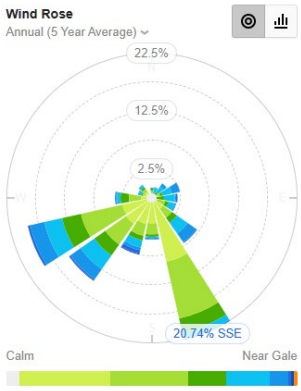
Due to the value of the habitat of the reserve both intrinsically and for the habitat which it provides to a range of species Linton Lane Northumberland Wildlife Trust Reserve is considered to be an IEF of Local level Importance.

2.1.8 Prevailing Wind Direction

The wind rose below shows the percentage of wind data recording over a 5-year average, reflecting the dominant wind direction from the site boundary (information sourced from the willyweather[4] application).

Image 3 – Wind Direction Average 5-year data – Boulmer

[4] Weather Forecast - United Kingdom - WillyWeather Accessed August 2023



The wind rose (above) shows that the predominant wind direction is from the south-south-west (20.74%).

It can be observed from Figure 2 (above) that the wind will be blowing principally towards receptors such as agricultural land and the East Coast Mainline.

2.1.9 Geology

According to the relevant British Geological Survey map, the underlying geology of the site is detailed below.

The 1/50,000 scale BGS geological map records that glacial till or 'boulder clay' extends across the entire Site, but in its northern and western parts there is a covering layer of made ground.

Areas of backfilled opencast workings are shown to lie to the north and north-east.

Since the compilation of this map, a large part of the Site was subject to opencast mining by UK Coal.

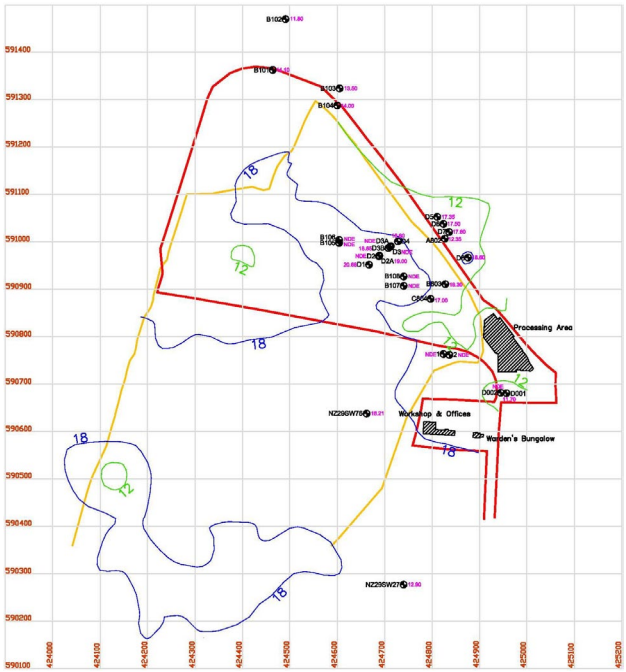
The 1/63,360 and 1/50,000 scale maps record that the Site is underlain by strata of the Upper Carboniferous, Pennine Middle Coal Measures Formation. These comprise an interbedded succession of mudstones, siltstones, sandstones, coal seams and seatearths.

The strata are shown to dip at between 3 and 5° (1v in 19h to 1v in 11h) towards the east and south-east.

The area is crossed by WNW-ESE and NE-SW normal faults of varying displacement.

There are details of only two boreholes held in the BGS's archive that provide information relevant to this study. Their locations are shown below.

Image 4 – BGS Borehole Locations



Borehole no. NZ29SW27 is located on the south side of the C125 public road at High Steads Farm and records 12.90m of glacial cover.

Borehole no. NZ29SW76 was removed during UK Coal's opencast mining operations, but the log shows a rockhead depth of 18.21m.

2.1.10 Hydrogeology

The superficial deposits at the Site are classified as a Secondary Aquifer by the Environment Agency, but given the predominance of glacial till, they are unlikely to represent an important source of water, even at a local level.

The bedrock strata are classified as a Secondary Aquifer – A and comprise, 'fractured or potentially fractured rocks, which do not have a high primary permeability, or other formations of variable permeability including unconsolidated deposits.' These do not produce large quantities of water for abstraction, but they are important for local supplies and in supplying base flows to rivers.

Groundwater levels at the Site were previously controlled by large scale pumping at Ellington Colliery. This was facilitated by the interconnection of old mine workings. Pumping ended when the colliery was closed in August 2005 and the water was then allowed to slowly recover and flood the workings. Nonetheless, it was still possible for UK Coal to carry out its opencast mining operations without the need for groundwater abstraction.

The Site lies about 5.3km to the west of the colliery and it is estimated that the underlying mine workings will now be flooded to a level of between -28.7m AOD and -23.4m AOD based on hydraulic gradients of 1v in 1000h and 1v in 500h respectively. This means that the groundwater lies at about 49 to 55m below ground surface where it is proposed to erect buildings and carry out mineral processing at the Site.

It follows therefore that there are no mine water discharges at or around the Site or are there likely to be within the lifetime of the proposed development.

The licensed groundwater abstractions held by M. Dungait & Sons of Manor Farm, Ulgham (licence nos. 1/22/04/025 and 1/22/04/025/R01) are located some distance to the north-west of the Site and will not be

impacted by the development. This is because there are no plans to abstract water or deposit contaminated materials and also applies to any unlicensed abstractions.

There are no source protection zones within 2km of the site.

There would appear to be only one former landfill site within the Envirocheck [5]search area. This was located at Rear Rose Cottage, Longhirst at Grid Ref. 425700 590500, about 800m south-east of the Site. The site received household waste but was closed some time ago. Again, there will be no adverse impact because there are no plans to abstract groundwater.

2.1.11 Surface Water Abstractions

The Landmark Envirocheck report records that water is abstracted from the River Lyne under the terms of a permit or licence held in the name of M. Dungait & Sons (licence number 1/22/04/022). This abstraction will not be impacted by the proposed development because it is located upstream of the Site.

There are no recorded unlicensed abstractions.

2.1.12 Air Quality

The site is not in an air quality management zone.

2.1.13 Flood Risk

The site is classed as having an extremely low risk of flooding from rivers, the sea or reservoirs.

The site is classed as having a high risk of flooding from surface water based on its location. `

2.1.14 Water Courses and Hydrology

The Site lies in the catchment of the River Lyne which is classified as a, *'Main River'*. A small tributary flows from west to east and passes beneath the main access road to the south of the proposed mineral processing area. There are existing drainage channels that will be adapted and used as part of the proposed development.

A Flood Risk and Drainage Assessment Report has been compiled for the Site (DAB Geotechnics Ltd., 2022b – See Appendix A).

Using the EA Flood Risk reference application[6], the below information in relation of flood risk is detailed below.

- Reservoirs

Flooding from reservoirs is unlikely in this area

[5] See Phase 1 Land Contamination Report

[6] Your long term flood risk assessment - Check your long term flood risk - GOV.UK (check-long-term-flood-risk.service.gov.uk)

- Rivers and the sea

Very low risk

- Surface water

Low risk

2.1.15 Coal Mining

The Coal Authority's CON29M Mining Report (Appendix C in the Coal Mining Risk Assessment Report – Phase 1 See Appendix B) raises a number of important points which are summarised below.

Further comments are based on the details shown on the Coal Authority's interactive map.

(i) Records show that seven coal seams have been extracted at depths of up to 160m beneath the Site. These were last worked in 1965 and comprise a mixture of total (longwall and shortwall) extraction and goafed pillared workings. Uncharted workings may be present, but none were encountered during UK Coal's opencast mining operations.

(ii) The Coal Authority's interactive map shows that the Site is underlain by past shallow workings, but it is unclear whether this takes into account UK Coal's opencast excavations.
(iii) There are no records of any mine gas emissions at the Site.

The risk of mine gas emission is discussed in the Coal Mining Risk Assessment Report (DAB Geotechnics Ltd., 2022a). The Envirocheck report refenced within the Phase 1 report records that the Site lies within a lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). No radon protective

2.2 Risk Assessment of site activities

The Site was previously used for the recovery of coal and other mineral reserves by surface mining and the storage, processing and loading of minerals into road and rail wagons operations.

The proposed site activities are to accept inert wastes such as soils, stones and demotion waste from the construction and demolition industry. Wastes are then washed, crushed and screened where applicable to produce secondary aggregates for resale, and the production of soil substitutes and recycled soils. The installation of a wash plant is aimed at reclaiming useable aggregate from waste materials delivered to the site, thereby providing a locally derived source of aggregates and reducing demand on raw material derived aggregates.

Wastes processed by wash plant are confirmed as non hazardous prior to acceptance on site and as such are of negligible leachability with regard potential contaminants.

Operational site surfaces are made up of concrete hardstanding with concrete storage bays for both wastes and non-waste storage.

Wash water is to be sourced from harvested water supplied through the drainage system from a fresh water settlement lagoon, using the existing system of surface drainage channels to create a freshwater lagoon. The intention is to collect as much water as possible on the Site for use in mineral and waste processing and minimize mains supply.

Surface runoff from the mineral and waste processing area will be directed through one of two existing treatment lagoons. The second lagoon will be adapted and, if required, enlarged to provide storm water storage. This will be allowed to partly fill during storm events and pumped out through the settlement lagoon when weather conditions permit. Discharge flows will be controlled at the prescribed rate using a proprietary flow control mechanism. The lagoons have been in place since 1979 and have continued to perform adequately throughout the operation of British Coal's storage, processing and rail loading facility and the development of UK Coal's surface mine when much greater demands were placed on their capacity.

Controls were previously set on the pH, suspended solids and iron content of the discharge water as part of the existing Environment Agency's consent. There will be no potential sources of acidity or iron oxides during the proposed development and the principal contaminant is expected to be in line suspended solids (i.e. silt, sand and clay sized particles derived from the processing of primary and secondary aggregates).

The flocculant (SPERFLOC A-130) is non-hazardous and is noted to have low mobility in soil. Waste, wash water, aggregate and filter cake will be subject to inspection and laboratory analysis on the following frequency to confirm adherence to permitting requirements.

Incoming Wastes are subject to pre-testing (WM3 waste classification), desk top reviews and assessment via site investigation reports for bulk loads with ad hoc loads tested or assessed through discussion with management prior to acceptance on site. This is to identify the risk of contaminated soil/stones entering the site and contamination of wastes and wash waters once within the process.

Wash water will be tested once per month for the first 6 months at which point a report would be produced presenting the data and providing a discussion on contaminant accumulation over time. Subject to data demonstrating a significant accumulation of contaminants was not occurring, monitoring will continue on a quarterly basis.

Lagoon water will be tested once per month for the first 6 months at which point a report would be produced presenting the data and providing a discussion on contaminant accumulation over time. Subject to data

demonstrating a significant accumulation of contaminants was not occurring, monitoring will continue on a quarterly basis.

Products produced such as Type 1 and 6F5 will be tested in accordance with the site WRAP Protocol.

Soils will be tested in accordance with BS3882.

The site has a Dust and Emissions plan to prevent and control any dust or emission from site.

The site is operated in accordance with the company environmental management system written to meet EA Guidance and Appropriate Measures.

Water discharge/trade effluent application will be submitted to authorise discharge and water quality standards.

3.0 Environmental Risk Assessment

3.1 Overview and Approach

This section outlines the procedure that has been followed in the undertaking of the ERA for the site. The results are presented, in accordance with the EA Guidance, in the tables presented in Section 3.2.

3.1.1 Identification of Hazards

The first step of an ERA is to consider and identify the risks posed to the environment by the activities proposed for a site.

The EA Guidance states that an operator must:

"*…identify whether any of the following risks could occur and what the environmental impact could be:*

- *any discharge, for example sewage or trade effluent to surface or groundwater*
- *accidents*
- *odour (not for standalone water discharge and groundwater activities)*
- *noise and vibration (not for standalone water discharge and groundwater activities)*
- *uncontrolled or unintended ('fugitive') emissions, for which risks include dust, litter, pests and pollutants that shouldn't be in the discharge*
- *visible emissions, eg smoke or visible plumes*."

3.1.2 Identification of Receptors

Section 2 of this document describes the site setting and the land uses in the vicinity of the proposed site. This information has been used in order to focus on the main receptors that could be potentially at risk from the activities of the site.

The site due the site setting and low risk activities it is not felt that the facility will impact sensitive receptors, habitats or local environment.

The site naturally lies in a depression with an established headline of the site, to screen offsite activities.

The processing area, and external concrete walls and bays are used as a further site control to reduce the risk of escape the of waste and any fugitive emissions such as noise and dust from site.

3.1.3 Identification of Potential Pathways

For each of the identified hazards for operation of the site, the ERA has considered that pathways through which each hazard may impact on a sensitive receptor. Where such pathways exist, the risks of potentially significant impacts have been assessed in accordance with Sections 3.1.4 and 3.1.5 (below) and the full details are included in the tables in Section 3.2.

Where no pathway exists between an identified hazard and an identified receptor, the associated risks are not considered further within the ERA and are, thus, not included in Section 3.2.

3.1.4 Assessment of Risks

The EA Guidance states that the nature of the ERA will be influenced by the type of activity (or activities) that are proposed for a site. For installations/waste operations, the ERA is required to consider, "*…one or more of the following, depending on the substances you discharge and where they're discharged to:*

- *assess the risks of your air emissions*
- *calculate the global warming impact of your air emissions*
- *assess risks to groundwater*
- *assess risk to groundwater from landfill leachate*
- *assess risks to surface water from hazardous pollutants*
- *assess risks to surface water from sanitary and other pollutants*"

For installations and waste operations, an operator is also required to decide how to treat, recycle or dispose of waste. The ERA has therefore included consideration of the environmental impact of the ultimate fate of the materials that will be processed by the proposed activities of the site.

3.1.5 Controlling Risks

The EA Guidance states:

"*You'll need to show how you're managing any risks appropriately by controlling and monitoring your emissions and through your management system.*"

Where an ERA identifies risks that are potentially significant, the ERA is required to demonstrate how the risk of pollution or harm can be mitigated by measures to manage these risks. The approach undertaken to the implementation of management/mitigation measures, for this ERA, is (in order of preference):

- Avoidance / prevention;
- Minimisation / management;
- Mitigation; and
- Offset / compensation.

The following tables present the assessment in terms of hazards posed, receptors and pathways, along with management and residual risks for the following hazards:

- Odour;
- Noise and Vibration;
- Fugitive Emissions (including dust, mud, litter and pests); and
- Accidents.

4.0 Conclusion

The overall conclusion from the Environmental Risk Assessment undertaken in support of the permit variation application is that there is unlikely to be a significant environmental impact upon potentially sensitive receptors as a result of the proposed Environmental Permit activities.

NB Clark Ltd are fully committed to ensuring the highest standards are met and will undertake its activities in a manner consistent with best industrial practices and with the implementation of the company's management system.

Table 3-1 Odour Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			**Managing the Risk**	**Assessing the Risk**		
Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	**What is the risk that still remains? The balance of probability and consequence**
Odours from the acceptance and storage of waste	*Site personnel and local human population*	Air	• No odorous wastes will be accepted at the site. • Permitted wastes are not known to give rise to odour. • Strict waste acceptance procedures will be adhered to, to ensure only permitted wastes are accepted on site. • In the event that odours are detected, investigations will be undertaken to determine the cause and appropriate remedial action taken. • The Operations Manager/Site Manager will be responsible for implementing risk management measures. • Daily odour assessment made as part of daily site inspections and detailed in the site EMS.	Negligible	Odour nuisance and loss of amenity.	Not significant

Table 3-2 Noise Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			**Managing the Risk**	**Assessing the Risk**		
Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	**What is the risk that still remains? The balance of probability and consequence**
Noise from vehicular movements (site access road and yard) Noise from operation of site plant.	*Site personnel and local human population*	Air.	• The site is located within a mainly commercial and rural area with limited human receptors within 500m. • Waste treatment operations will only be carried out during operational hours. All equipment will be maintained and operated in accordance with manufacturer's guidance and will be maintained in good working order. • The site will be operated so as to minimise noise emissions from the site. Measures that will be taken at the site include: • The imposition of a 15mph speed limit for vehicles delivering waste to the site. This will reduce noise associated with high engine speeds; training of all personnel in the need to minimise site noise. All personnel are responsible for monitoring and	Mobile. Intermittent throughout the day. Medium.	Noise nuisance and loss of amenity.	Not significant

			reporting excessive noise when carrying out their everyday roles; • Regular maintenance of site surfaces to prevent the development of potholes and damaged surfaces. This will significantly reduce noise generated by vehicles, particularly empty vehicles exiting the site; • Any noise complaint received will be logged in the site diary. The Operations Manager/Site Manager will investigate the complaint and will take action to identify the source of the noise and implement remedial measures where appropriate. • The measures employed at the site to minimise the emission of noise will be regularly reviewed by the Operations Manager/Site Manager and additional measures will be employed where required. • Noise management is detailed in the site EMS with staff fully trained in site operations and amenity awareness.			

Table 3-3 Fugitive Emissions Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			**Managing the Risk**	**Assessing the Risk**		
Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	**What is the risk that still remains? The balance of probability and consequence**
To Air:						
Dust from: Vehicle movements Waste storage and treatment Dusty wastes Waste deposition Waste surfaces	*Site personnel , local receptors and local human population*	Air	• Due to the nature of the waste accepted at site and activities, there is potential for dust particles to be released as dust to air. • The external waste storage and treatment area is located within a depression with a natural boundary of trees/bushes along the northern boundary to screen off activities and in manmade concrete bays. • The waste deposit and treatment of non-hazardous waste is carefully managed form pre and post acceptance, including water suppression and restriction of processing dependant on varying weather conditions. • Speed limits will be	Medium	Dust nuisance Harm to human health	Not significant

			implemented for vehicles using the site. The main access, exit and waste storage/processing areas of the site benefit from concrete surfacing. • Site access roads and operational areas will be maintained and repaired to minimise emissions of dust due to uneven and poor surfacing. • All roads and operational areas will be swept where necessary to reduce dust emissions. If required, the site will be washed down in particularly dry conditions. • Daily visual inspections of all areas of the site and the site boundary will be carried out by site personnel. In dry windy conditions the frequency of these inspections will be increased, if required. • In the event that significant visual dust is observed at the boundaries of the operational areas, activities will cease, and action will be taken to suppress the dust. • Dust suppression in the form of rain guns, hoses and bower will be implemented as part of the site dust and emissions			

			controls (See DEMP). • The site has a wheel wash for the cleaning of vehicle wheels upon entering and leaving site. • Dust management is detailed in the site EMS and DEMP with staff fully trained in site operations and amenity awareness.			
To Water						
Runoff from waste storage areas & site surfaces Percolation of contaminated water	Surface water: Groundwater within bedrock deposits.	Overland percolation through the ground	• Strict waste acceptance procedures will ensure that only permitted waste types are accepted on site reducing the risk of contaminated run off; • In the event that non-conforming waste is delivered to site, it will be isolated and removed from site at the earliest opportunity. • The main operational area benefits from impermeable surfacing and sealed drainage systems to prevent any release of contaminated water to land or local watercourses. • The Operations Manager/ Site Manager will be responsible for implementing risk management measures. • Testing of wash waters and inline wash plant water will be	Low	Contamination of surface water and groundwater.	Not significant

			implemented as part of the site water management plan.			
Pests						
Birds, vermin and insects.	*Site personnel and local human population*	Via air (flies and birds) or over ground (vermin and birds).	• Due to the nature of the wastes to be accepted at the site, it is not anticipated that pests will pose a risk at the facility. • The facility will be inspected by both site management and operatives for infestations of pests, vermin and insects on a routine basis. • A specialist pest control contractor will be deployed if required.	Negligible	Nuisance, loss of amenity and harm to human health.	Not significant
Mud/Litter						
Litter from acceptance and storage of waste	*Local human population and wildlife.*	Airborne litter	• Due to the nature of the waste to be accepted on site, it is not anticipated that litter will pose a serious risk. However, the boundary of the site and its environs will be regularly visually inspected and any litter cleaned up. The site will benefit from a perimeter fence which will limit the potential for litter to escape off-site. • It will be the responsibility of the site staff to monitor the	Low	Nuisance and loss of amenity	Not significant

			site for any signs of escaping materials either from within the site or from vehicles delivering or removing materials to and from the site. • Inspections will be carried out on a daily basis and a record maintained within the site diary. • Dust suppression in the form of rain guns, hoses and bower will be implemented as part of the site dust and emissions controls (See DEMP). • The site has a wheel wash for the cleaning of vehicle wheels upon entering and leaving site. • Dust management is detailed in the site EMS and DEMP with staff fully trained in site operations and amenity awareness.			
Mud on roads	*Local human population*	Transferral of mud on vehicle wheels	• The site entrance/exit roads are concrete or tarmac. It is therefore not expected that mud will feature as a problem on the site. • All operational areas on site are concrete hardstanding use for the treatment and storage of waste. • The following measures will be	Low	Mud on road, road traffic accidents.	Not significant

			taken to prevent the deposition or tracking of mud or debris from the site onto public areas or highways: • Site surfaces will be maintained free of significant quantities of mud and debris; • All operational areas will be subject to monitoring by staff throughout the working day; and • All vehicles leaving operational areas will, before leaving the site, be checked to ensure that they are clear of loose waste and that any products being exported from the site are secure. • In the event that mud, debris or waste arising from the site is deposited onto public areas outside the site, the following remedial measures will be implemented: • the affected public areas outside the site will be cleaned; and • traffic will be isolated from sources of mud and debris within the site to prevent further tracking of mud and debris, and measures will be taken to clear any such sources as soon as practicable. • The site has a wheel wash for			

			vehicles entering and exiting site to removed dried/wet mud prior to leaving the site and using local roads.			

Table 3-4 Accidents Risk Assessment and Management Plan

What do you do that can harm and what could be harmed			**Managing the Risk**	**Assessing the Risk**		
Hazard	Receptor	Pathway	Risk management	Probability of exposure	Consequence	**What is the overall risk**
What has the potential to cause harm?	What is at risk what do I wish to protect?	How can the hazard get to the receptor?	What measures will you take to reduce the risk? – Who is responsible for what?	How likely is this contact?	What is the harm that can be caused?	**What is the risk that still remains? The balance of probability and consequence**
Unauthorised waste	*Site personnel and local human population* *Local environment*	Via air (odours and dust) Overland (to sewer, surface water and groundwater)	• Upon delivery waste will be subject to strict pre and waste acceptance procedures to identify, reject and/or segregate potentially non-conforming waste. • Only waste authorised by the permit will be accepted at the site. • All wastes will be subject to inspection and checking against the declaration on the waste transfer documentation. • In the event that unauthorised waste is delivered to the site, the waste will be reloaded onto the delivery vehicle for removal from site, or will be segregated and	Low	Water contamination Odour and dust nuisance, loss of amenity	Not significant

			stored in a designated quarantine area prior to export from site. • The waste acceptance procedures are included in the EMS. • The Operations Manager/Site Manager will be responsible for implementing risk management measures.			

Fire	*Site personnel and local human population* *Local environment*	Air, water runoff	Due to the nature of the waste activity the risk of Fire could be low. A brief summary of the measures which will be employed is as follows: • incompatible materials will not be accepted at the site; • fire extinguishers will be provided at designated locations; • smoking will not be permitted in operational areas of the site; • working practices will ensure the assessment of fire hazards and training of employees in fire prevention, e.g. the use of fire extinguishers and emergency procedures; and • no wastes will be burned on the site and any fire at the site will be treated as an emergency. • In the event of a major fire, the following action will be taken: • the Operations Manager/Site Manager and Fire Brigade will be notified immediately and the Environment Agency as soon as practicable; • the burning area will be isolated and attempts will be made to extinguish the fire utilising the onsite fire extinguishers, if safe to do so; and • the site and buildings will be evacuated.	Low	Nuisance (smoke and fumes) and harm to human health. Water contamination (runoff)	Not significant

Spillage and Leakage	Local land quality, surface water and groundwater. *Site personnel, emergency services personnel and local human population*	Runoff and percolation through ground. Direct exposure and transport via air	To prevent loss of containment and minimise the risk and impact of releases the following measures will be implemented: • Containment system: any facilities for the storage of oils, fuels or chemicals will be sited above ground in bunded containment. • Storage vessels: storage tanks will be constructed to the appropriate British Standard; • Inspection: tanks will be inspected visually on a daily basis by site staff to ensure the continued integrity of the tanks, and identify the requirement for any remedial action; • Spill kits: materials suitable for absorbing and containing minor spillages will be maintained on site; and • Monitoring techniques: the site staff will undertake daily monitoring for evidence of spillage and leakage. • In the event of any potentially polluting leak or spillage occurring on site, the following action will be taken: • Minor spillages will be cleaned up immediately, using sand or proprietary absorbent. The resultant materials will be placed into containers and will then be	Low	Contamination of groundwater and surface water. Harm to human health.	Not significant

			removed from site and disposed of at a suitably permitted facility. The incident will be logged in the site diary. • Any dry wastes spilled on site will be quarantined immediately and controlled by the site manager. Wastes will be re bagged and stored within the container. • In the event of a major spillage, which is causing or is likely to cause polluting emissions to the environment, immediate action will be taken to contain the spillage and prevent liquid from entering surface water or drains. The spillage will be cleared immediately and placed in containers for offsite disposal, and the Environment Agency will be informed.			
Security and Vandalism	Personnel on site, emergency service workers.		The following security measures are in place: • Security gates: the site entrance will be locked at all times when the facility is unattended and when the site is not in use; • CCTV is installed around the site with external monitoring by the Operator and the external Security Company. • Authorised access system: all visitors to the site will be required to register in the visitor's book and sign out again	Low	Nuisance and harm to human health. Contamination of land and surface water.	Not significant

			on exit to minimise the risk of unauthorised visitors being present on site; and • Monitoring techniques: operational procedures, including regular inspections, will ensure continual monitoring of security provision at the site. • In the event of a breach of security at the site, the cause will be investigated, and appropriate mitigation measures implemented. Records to be maintained include inspections and maintenance of security fencing and gates, breaches of security, investigations and actions taken.			
Flooding	*Site personnel and local human population* *Local environment*	Overland	• According to the UK government Flood Map for Planning, has a low risk of flooding from Sea and Rivers. • According to the UK government Flood Map for Planning, has a high risk of flooding from surface water. The site has a comprehensive drainage system and storm water storage lagoon to manage flood water on site to reduce the risk to H&S or environmental risk. • Evacuation procedures will be implemented in the event of flooding. • The Operations Manager/Site	Med	Inundation of site with flood water	Not significant

			Manager will be responsible for implementing risk management measures.			

N B CLARK LTD.

FORMER BUTTERWELL SURFACE MINE AND COAL DISPOSAL POINT

FLOOD RISK AND DRAINAGE ASSESSMENT

FORMER BUTTERWELL SURFACE MINE AND COAL DISPOSAL POINT

FLOOD RISK AND DRAINAGE ASSESSMENT

5th August 2022

	Name	Signature	Date
Reviewed by	D. A. Blythe	[redacted]	5th August 2022
Issue Status	**Final**		
Purpose	**For Client's information**		

Prepared by

DAB Geotechnics Ltd.,
Ellington, MORPETH,
Northumberland, NE61 5ES
Tel. No. 07711 168524
E-mail dblythe735822@btinternet.co.uk

FORMER BUTTERWELL SURFACE MINE AND COAL DISPOSAL POINT

FLOOD RISK AND DRAINAGE ASSESSMENT

Table of Contents

		Page
PREAMBLE		1
1.	DEVELOPMENT DESCRIPTION AND LOCATION	1
1a.	Type of Development and Location	1
1b.	Vulnerability	1
1c.	Local Development Documents	2
1d.	Sequential/Exception Test	2
2.	DEFINITION OF FLOOD HAZARD	3
2a.	Sources of Flooding	3
2b.	How Flooding Could Occur	3
2c.	Existing Surface Drainage	3
3.	PROBABILITY	4
3a.	Flood Zones	4
3b.	Strategic Flood Risk Assessment	4
3c.	Probability of Flooding	4
3d.	Runoff	4
4.	CLIMATE CHANGE	5
5.	DETAILED DEVELOPMENT PROPOSALS	6
5a.	Details	6
5b.	Siting	6
6.	FLOOD RISK MANAGEMENT	7
7.	OFF-SITE IMPACTS	11
7a.	Impact of Flood Prevention Measures	11
7b.	Runoff	11
8.	RESIDUAL RISKS	12
8a.	Residual Flood Related Risks	12
8b.	Management of Residual Risks	12
REFERENCES		13
FIGURES		
APPENDIX		

FLOOD RISK AND DRAINAGE ASSESSMENT

PREAMBLE

DAB Geotechnics Ltd. has been commissioned by Barney Corrigan (Planning Consultant) acting on behalf of N. B. Clark Ltd. to compile a flood risk assessment for the a proposed development at the former Butterwell Surface Mine and Coal Disposal Point. The assessment has been carried out in accordance with the revised National Planning Policy Framework (**NPPF**) (Department for Communities and Local Government, 2021) and the National Planning Policy Guidance (**NPPG**) document, *'Flood Risk & Coastal Change'* (Department for Communities and Local Government, 2014). It is set out in the order shown on the proforma provided in Appendix B of the revised guidance document for PPS25: *'Development and Flood Risk'* (Department for Communities and Local Government, 2009) with identical section headings and numbering where possible. This proforma raises all of the pertinent questions with regard to flood risk. There is no corresponding document for the NPPF.

1. DEVELOPMENT DESCRIPTION AND LOCATION

1a. Type of Development and Location

N. B. Clark Ltd. proposes to develop part of the former Butterwell Surface Mine and Coal Disposal Point for the importation of primary aggregates using the existing railhead. Inert construction and demolition wastes will also be imported for the production of secondary aggregates, soil and soil making material. The development will include the further restoration of approximately 24ha of land to improve the soil cover and the erection of offices including a warden's residence (bungalow).

The Site covers an area of 29.45ha and lies approximately 3.5km WSW of Ellington and 7.5km north-east of Morpeth in the County of Northumberland (**Figure 1**). It is bounded to the north, north-east and north-west by a rail loop that extends from the East Coast Main Line (**ECML**). This lies a short distance to the west. Restored agricultural land lies to the south. The Site encompasses the footprint of the offices, car park, plant yard and water treatment area of the former surface mine as well as the coal stocking area and railhead. Access to the Site will continue to be gained from the C125 public road.

The National Grid Reference for the approximate centre of the Site is 424550 591100 (1/50,000 Ordnance Survey Sheet No. 81 Alnwick, Morpeth & Surrounding Area).

1b. Vulnerability

Table 2 of the NPPG classifies mineral processing and non-hazardous waste treatment and commercial sites as, *'less vulnerable'*, development. However, the proposed warden's residence is *'more vulnerable'*.

1c. Local Development Documents

Northumberland County Council has compiled a Local Plan (2016-2036) which was adopted as recently as March 2022. This includes policies that are relevant to the development proposal, including flood risk.

Flood risk in the area of interest is discussed and assessed in two documents, namely: the, *'Wansbeck and Blyth Catchment Flood Management Plan'* (**CFMP**) (Environment Agency, 2009) and the Northumberland County Council Level 1 Strategic Flood Risk Assessment (**SFRA**) (Scott Wilson, 2010).

The CFMP notes that there are around 200 properties at risk of flooding in the catchment sub-area referred to as, *'Wansbeck, Font and Lyne'*, within which the Site is located. The area is, however, predominantly rural in character and the risk of flooding is generally low. The Environment Agency has implemented Policy 6 in the sub-area so that, *'action will be taken where there is a low to moderate flood risk to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.'*

The River Lyne is classified as a, *'Main River'*, with a defined channel that lacks any flood defences in the area of interest. The river is generally more susceptible to short duration, locally intense rain storms because its response is quicker than that of the Rivers Wansbeck and Blyth.

1d. Sequential/Exception Test

With regard to the sequential test, the proposed development is shown to lie in Flood Zone 1 on the UK Government's Flood Map and cannot therefore be moved to an area of lower flood risk. Table 3 of the NPPG shows that an exception test is not required for, *'less vulnerable'*, or, *'more vulnerable'*, developments in Flood Zone 1.

2. DEFINITION OF FLOOD HAZARD

2a. Sources of Flooding

The Site is not at risk of flooding from rivers or, '*blue-line*', watercourses (**Figure 2**). It lies at an elevation of between 25 and 37m above Ordnance Datum and at least 3-4m above that of the River Lyne which is located not less than 570m to the north-east. There is no risk of marine flooding. There are no canals or reservoirs that might serve as a potential source of flooding.

The ground surface generally falls towards the south-east, but the flow of surface runoff from areas to the north and north-west of the Site is curtailed or prevented by the existing drainage along the ECML and the rail loop that extend along the perimeter. The risk of surface water flooding on the Site is generally low and very limited in extent (**Figure 3**) and is confined largely to the area around the existing water treatment lagoons in the south-east where the risk is considered to be high.

No groundwater will be encountered because the development will not entail any deep excavations. Groundwater levels in the backfilled surface mine excavations and the surrounding strata are controlled well below ground surface by the continued abstraction of mine water at Lynemouth. This is carried out by the Coal Authority. No groundwater flooding occurred prior to surface mining operations and the deep excavations were already dewatered. There is no reason to suppose that any such flooding will now occur.

Areas of hardstanding are already present on the Site and apart from the further restoration of the open ground in the north-east all the proposed operations will be confined to these areas.

2b. How Flooding Could Occur

Standing water may well form on the Site when there is prolonged rainfall. This will be function of the rate of infiltration into the partly restored open ground that extends across most of the Site and the efficiency of the surface drainage system in the areas of hard standing (2.81ha).

2c. Existing Surface Drainage

There are existing drainage channels on the Site that will be adapted and used as part of the proposed development. Additional drainage will be installed in the area of partly restored land after additional volumes of soil have been applied.

3. PROBABILITY

3a. Flood Zones

The UK Government's Flood Map (**Figure 2**) confirms that the Site is located in Flood Zone 1. Areas of higher flood risk lie downstream of the Site along the River Lyne. Measures are therefore required to prevent any increased risk if the Site is developed as proposed.

3b. Strategic Flood Risk Assessment

A Strategic Flood Risk Assessment has been prepared for the area administered by Northumberland County Council (Scott Wilson, 2010). This confirms that the Site lies in Flood Zone 1.

3c. Probability of Flooding

The principle risk of flooding at the Site relates to the efficiency of the surface drainage system and its capacity to deal with surface runoff. However, the consequences of partial inundation of the restoration and processing areas are minor and are accepted by the developer.

3d. Runoff

Surface runoff that is drained or pumped from the Site will be treated prior to its discharge, subject to the agreement of the Environment Agency and the Lead Local Flood Authority (**LLFA**).

4. CLIMATE CHANGE

Surface runoff at the Site will increase as a consequence of the greater intensities of rainfall that are likely to occur as the climate changes. The UK Government has recently posted new climate change factors and a summary of the peak rainfall allowances for the Northumberland Rivers Management Catchment area is provided in **Table 1**.

Return Period	Tees Catchment	Total potential change anticipated for the 2050's	Total potential change anticipated for the 2070's
1 in 30 year (3.3%)	Upper End	35%	40%
	Central	20%	30%
1 in 100 year (1%)	Upper End	40%	45%
	Central	25%	30%

Table 1 Environment Agency Climate Change Factors (UK Government, 2022)

A 45% uplift factor has been used to determine the attenuation storage required at the Site during its anticipated lifetime (2070's and beyond). Predicted increases in river flows will not affect the Site because of its elevation above the River Lyne.

5. DETAILED DEVELOPMENT PROPOSALS

5a. Details

It is proposed to develop part of the former Butterwell Surface Mine Site and Coal Disposal Point for the receipt of primary aggregate using the existing railhead facility; the erection of plant for the recycling of inert construction and demolition waste; and the production of secondary aggregates and soil materials. Restoration of the backfilled surface mine workings will also be completed by using soils recovered from inert waste recycling and the importation of topsoil from construction sites. The intention is to increase the existing 400mm covering layer of subsoil to 600mm and provide approximately 300mm of topsoil over an area of approximately 24ha of land. This is located to the north-west of the proposed mineral and waste processing area. The development will also include the erection of office and workshop facilities, a security office/warden's bungalow and ancillary infrastructure.

Use will be made of the existing system of surface drainage channels to create a freshwater lagoon. The intention is to collect as much water as possible on the Site for use in mineral and waste processing and minimize mains supply.

5b. Siting

The location of the proposed development is governed by its proximity to a rail loading facility and the source of the raw materials. The Site was previously used for the recovery of coal and other mineral reserves by surface mining and the storage, processing and loading of minerals into road and rail wagons.

6. FLOOD RISK MANAGEMENT

Drainage Details

Details of the proposed drainage layout at the Site are shown on Drawing No. BDP/3B, an extract of which is presented as **Figure 4**. Full use will be made of the existing drainage channels, but these will be modified to allow the creation of a large freshwater lagoon. This will be used to supply the mineral washing plant and reduce the demand on mains supply. Suitable oil and silt traps will be installed around the proposed car park, office and workshop area. Consideration will be given to rainfall harvesting around the offices, workshop and warden's bungalow. This *'grey water'* can then be used for washing down vehicles and as a supply for staff welfare facilities. Foul water will be managed using underground septic tanks that will be emptied as and when required.

Surface runoff from the mineral and waste processing area will be directed through one of two existing treatment lagoons. The second lagoon will be adapted and, if required, enlarged to provide storm water storage. This will be allowed to partly fill during storm events and pumped out through the settlement lagoon when weather conditions permit. Discharge flows will be controlled at the prescribed rate using a proprietary flow control mechanism. The lagoons have been in place since 1979 and have continued to perform adequately throughout the operation of British Coal's storage, processing and rail loading facility and the development of UK Coal's surface mine when much greater demands were placed on their capacity. Controls were previously set on the pH, suspended solids and iron content of the discharge water as part of the Environment Agency's consent. There will be no potential sources of acidity or iron oxides during the proposed development and the principal contaminant is expected to be inert suspended solids (i.e. silt, sand and clay sized particles derived from the processing of primary and secondary aggregates).

There is a risk that discharge flows from the area requiring additional restoration could be contaminated with suspended solids. The risk may persist until vegetative cover is established. Sediment loads are unlikely to be excessive given to low surface gradients. It will also be possible to retain material by creating small bunds of deposited soil and by excavating temporary drainage channels and sumps. The proposed freshwater lagoon will be used to remove any remaining material by settlement and provide attenuation capacity. A flow control mechanism will be provided on the discharge and it will be classified as a trade effluent until such time that the restoration works are completed. However, it will revert to natural drainage in common with other parts of the former Butterwell surface mine as soon as vegetative cover is established.

Catchments and Catchment Characteristics

The catchment areas and catchment characteristics for the proposed Site have been determined using the Flood Estimation Handbook (FEH) (NERC, 1999) and the FEH web service (Centre for Ecology and Hydrology, 2022). Details are provided in **Table 2** and **Figure 5**. (Note that the catchment boundaries have been modified during the early development of the Site and the construction of various drainage channels.) The parameter values for Catchment Areas A and B are very similar, but attention has been focused on Area A as this covers the majority of the Site.

Catchment Descriptor	Catchment		Description
	A	B	
AREA	1.595	0.51	Catchment drainage area (km^2).
FARL	1	1	Index of flood attenuation due to reservoirs and lakes.
PROPWET	0.33	0.33	Index of proportion of time that soils are wet.
ALTBAR	41	37	Mean catchment altitude (m above sea level).
ASPBAR	98	114	Index representing the dominant aspect of catchment slopes.
ASPVAR	0.81	0.8	Index describing the invariability in aspect of catchment slopes.
BFIHOST	0.317	0.312	Base flow index derived using the HOST classification.
BFIHOST19	0.331		Base flow index derived using the HOST classification including rare soil types.
DPLBAR	1.35	0.88	Index describing catchment size and drainage path configuration (km).
DPSBAR	16.3	21.4	Index of catchment steepness (m/km).
LDP	3.08	1.57	Longest drainage path (km).
RMED-1H	8.9	8.9	Median annual maximum 1 hour rainfall (mm).
RMED-1D	32.8	32.5	Median annual maximum 1 day rainfall (mm).
RMED-2D	40.8	40.3	Median annual maximum 2 day rainfall (mm).
SAAR61-90	686	683	1961-90 standard period average annual rainfall (mm)
SAAR41-70	692	686	1941-70 standard period average annual rainfall (mm)
SPRHOST	41.02	39.7	Standard percentage runoff derived using HOST classification.
URBCONC1990	-999999	-999999	Index of concentration of urban and suburban land cover (1990).
URBCONC2000	0		Index of concentration of urban and suburban land cover (2000).
URBEXT1990	0	0	FEH index of fractional urban extent (1990).
URBEXT2000	0		FEH index of fractional urban extent (2000).
URBLOC1990	-999999	-999999	Index of location of urban and suburban land cover (1990).
URBLOC2000	-999999		Index of location of urban and suburban land cover (2000).

Note. UK soils have been delineated according to their hydrological properties to produce the twenty-nine class Hydrology of Soil Types (HOST) classification. The HOST dataset is available as a 1km grid which records, for each grid square, the percentage of the 1km x 1km area given to each HOST class present. Boorman et al. (1995) give standard percentage runoff (SPR) and base flow index (BFI) values for each HOST class.

Table 2 Catchment Characteristics

Greenfield Runoff Rates

The greenfield runoff rates for the Site have been determined using the Revitalised Flood Hydrograph Method (ReFH2.3) (Wallingford Hydrosolutions Ltd., 2016, 2019). The SuDS Manual (Woods et al., 2015) recommends the use of the FEH Statistical and Revitalised FSR/FEH (ReFH2) methods as these are now considered to provide more reliable results.

Plot scale equations were first selected and the areal reduction factor (ARF) was set to unity. A default seasonality of a winter storm was selected and a development catchment area of 50ha (0.5 km^2) was applied for the Site. The software was used to estimate the time to peak (T_p) in hours and the dimensionless base flow parameter (B_L). The catchment area was then reset to the actual values for the Site (29.45ha) and the peak flows for a range of storm return periods determined using the estimated values of T_p and B_L for 50ha (1.993 hours and 30.605). This procedure effectively rescales the results as recommended in the SUDS guidance on model parameters for developments of less than 50ha in area. The peak flow rates, which were calculated using the 2013 rainfall model data, were then converted to a runoff rate in units of litres per second per hectare as follows:

Greenfield runoff rate (l/s/ha) = 10 x Peak Flow/Area

where the peak flow is measured in m^3/s and the area is expressed in km^2. The results are shown in **Table 3**.

Return Period (Years)	Peak Flow as rural (m^3/s)	Greenfield Runoff Rate (l/s/ha)	Peak Flow as Rural plus 45% Climate Change Factor (m^3/s)
1	0.118	4.2	0.176
2	0.133	4.7	0.200
5	0.188	6.7	0.286
10	0.228	8.1	0.350
30	0.296	10.5	0.459
50	0.331	11.8	0.518
75	0.363	12.9	0.570
100	0.388	13.8	0.610
200	0.454	16.1	0.720
1000	0.667	23.6	1.078

Table 3 'As Rural' Peak Flows and Greenfield Runoff Rates (as determined using ReFH2.3 software)

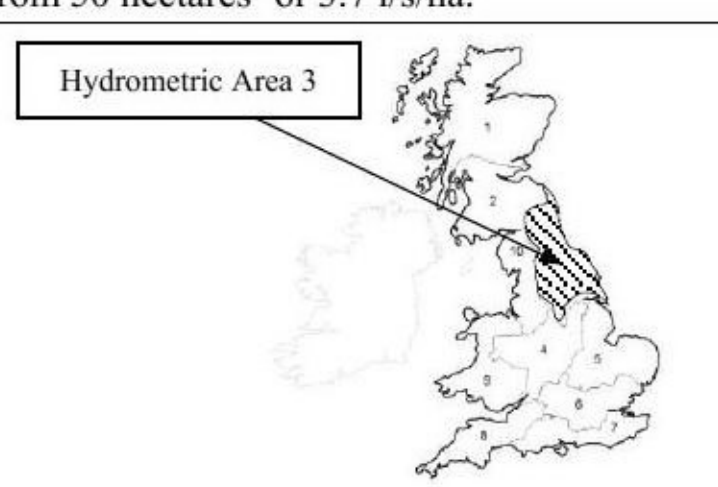
Table 3 also provides details of uplifted peak flow rates using a climate change factor of 45%. This represents the upper limit allowance for climate change during the 2070's and beyond (UK Government, 2022).

The greenfield runoff rates have also been estimated using the methodology described in the Institute of Hydrology report no. 124 (NERC, 1994) and the results are presented in **Table 4**. It can be seen that the estimated flow rates are lower than those determined using the ReFH2.3 software. The value Q_{BAR} is roughly equivalent to Q2.3 which using the ReFH2.3 software is about 5 l/s/ha.

Area 29.45 hectares or 0.20 km^2 — Average Annual Rainfall (SAAR) 686mm
Soil Factor 0.42 — Average flow (QBAR) 0.185 m^3/s from 50 hectares* or 3.7 l/s/ha.

Table 4.3 *UK growth curve factors*

Region	Hydrometric Area	Return period						
		2	5	10	25	50	100	500
NW	1	0.90	1.20	1.45	1.81	2.12	2.48	3.25
	2	0.91	1.11	1.42	1.81	2.17	2.63	3.45
	3	0.94	1.25	1.45	1.70	1.90	2.08	2.73
	9	0.93	1.21	1.42	1.71	1.94	2.18	2.86
	10	0.93	1.19	1.38	1.64	1.85	2.08	2.73
SE	4	0.89	1.23	1.49	1.87	2.20	2.57	3.62
	5	0.89	1.29	1.65	2.25	2.83	3.56	5.02
	6/7	0.88	1.28	1.62	2.14	2.62	3.19	4.49
	8	0.88	1.23	1.49	1.84	2.12	2.42	3.41
Ireland		0.95	1.20	1.37	1.60	1.77	1.96	2.40



NERC, 1975

Return Period (Years)	2	5	10	25	50	100	500
Growth Factor (Hydrometric Area 3)	0.94	1.25	1.45	1.70	1.90	2.08	2.73
Flow rate (l/s/ha)	3.3	4.4	5.1	6.0	6.7	7.3	9.6

* As per IoH124 methodology

Table 4 Estimated Greenfield Runoff Rates

Runoff and Attenuation Volumes

The runoff volumes from the Site have been determined using the rational formula. The runoff coefficient for areas of hard cover (2.81ha) was assumed to be 1, whilst that of the partly restored ground was estimated to be 0.67 using an average surface gradient of 1v in 52h (1.1°) and the nomogram presented as **Figure 6**. The weighted average for the whole Site (29.45ha) is 0.70.

A simple input-output model has been used to estimate the runoff and attenuation volumes for a given discharge rate. Use has been made of the FEH 2013 rainfall model. **The precise discharge rate from the Site will be determined by the LLFA, but for the purposes of this exercise it was assumed to be equivalent to QBAR (3.7 l/s/ha) as determined using the IoH124 method**.

Area of partly restored opencast backfill (26.64ha) = 3.7 x 26.64 = 99 l/s
Area of hard cover (2.81ha - mineral processing area, offices, warden's bungalow, workshop and yard, hardcored laydown area, internal and access roads) = 3.7 x 2.81 = 10 l/s
Whole site = 3.7 x 29.45 = 109 l/s.

Note that a discharge rate of 3.7 l/s/ha is actually lower than Q1 determined using ReFH2.3 software so there will be compliance with the guidelines provided in DEFRA's, *'Non-Statutory Technical Standards for Sustainable Drainage Systems'* (DEFRA, 2015) for greenfield sites. This is despite the fact that part of the Site has already been partly developed. The required attenuation volumes are detailed in **Tables 5** and **6** and specimen calculation sheets are provided in the **Appendix**.

DISCHARGE RATE 99 l/s								
Existing Rainfall Intensities								
Return Period (years)	**1**	**2**	**5**	**10**	**20**	**30**	**50**	**100**
Storage (cubic metres)	1,580	1,975	3,348	4,348	5,419	6,098	7,048	8,555
Existing Rainfall Intensities plus 45% Uplift for Climate Change								
Return Period (years)	**1**	**2**	**5**	**10**	**20**	**30**	**50**	**100**
Storage (cubic metres)	3,073	3,715	5,871	7,452	9,161	10,263	11,827	14,346

Table 5 Calculated Attenuation Volumes for the Partly Restored Surface Mine Backfill

DISCHARGE RATE 10 l/s								
Existing Rainfall Intensities								
Return Period (years)	**1**	**2**	**5**	**10**	**20**	**30**	**50**	**100**
Storage (cubic metres)	352	423	660	835	1,024	1,147	1,321	1,603
Existing Rainfall Intensities plus 45% Uplift for Climate Change								
Return Period (years)	**1**	**2**	**5**	**10**	**20**	**30**	**50**	**100**
Storage (cubic metres)	653	768	1,140	1,419	1,728	1,931	2,224	2,710

Table 6 Calculated Attenuation Volumes for the Areas of Hard Cover

If the discharges from the restoration area are controlled at the rates shown, capacity to attenuate up to 14,346m^3 of water will be provided in the freshwater storage lagoon as shown on Drawing No. 3B. Similarly, not less than 2,710m^3 of capacity will be provided in the storm balancing lagoon for drainage from the areas of hard cover.

7. OFF-SITE IMPACTS

7a. Impact of Flood Prevention Measures

There will be no works at the Site that will impact flood defences nor will any be constructed. The aim is solely to prevent any increased risk of downstream flooding by controlling discharge flows.

7b. Runoff

The rate and volume of surface runoff from the Site will be higher than for greenfield conditions, because of the existing area of hardstanding and the partly restored condition of some of the land. The runoff will, however, be attenuated so that the discharge flows are maintained at or below greenfield rates, or at some other rate approved by the LLFA.

8. RESIDUAL RISKS

8a. Residual Flood Related Risks

The Site is elevated well above the flood plain of the River Lyne. Therefore the residual risk of flooding from this source (i.e. in the event of a flood of greater than 0.1% AEP) is negligible.

If a severe rainstorm should occur that generates runoff in excess of the permitted discharge rate and the attenuation capacity of the attenuation lagoons, areas of the Site will be allowed to flood. Such flooding will only be temporary and will not impact adjacent properties and members of the public.

8b. Management of Residual Risks

Residual risks of flooding will be managed by N. B. Clark Ltd.

REFERENCES

Boorman, D. B., Hollis, J. M. and Lilly, A. (1995), 'Hydrology of Soil Types: a Hydrology of soil Types: a Hydrologically Based Classification of the Soils of the United Kingdom'. IH Report No. 126. Institute of Hydrology, Wallingford.

Centre for Ecology and Hydrology (2022), FEH web service www.fehweb.ceh.ac.uk

Department for Communities and Local Government (2009), 'Development and Flood Risk'. Revised guidance document for PPS25. London.

Department for Communities and Local Government (2021), 'National Planning Policy Framework'. Revised version. 75p. London.

Department for Communities and Local Government (2014), 'National Planning Policy Guidance: Flood Risk and Coastal Change'. March. 23p. London.

Department for Environment, Food and Rural Affairs (2015), 'Sustainable Drainage Systems. Non-statutory technical standards for sustainable drainage systems'. March. 3p.

Environment Agency (2009), 'Wansbeck and Blyth Catchment Flood Management Plan'.

National Coal Board (1982), 'Technical Management of Water in the Coal Mining Industry'. 130p. Mining Department.

Natural Environment Research Council (1975), 'Flood Studies Report'. London.

Natural Environment Research Council (1994), 'Flood Estimation for Small Catchments'. Institute of Hydrology Report No. 124. Institute of Hydrology, Wallingford.

Natural Environment Research Council (1999), 'Flood Estimation Handbook, with WIN-FAP FEH Software and FEH CD-ROM for Catchment Descriptors'. Centre for Ecology and Hydrology, Wallingford.

Northumberland County Council (2022), internet website www.northumberland.gov.uk.

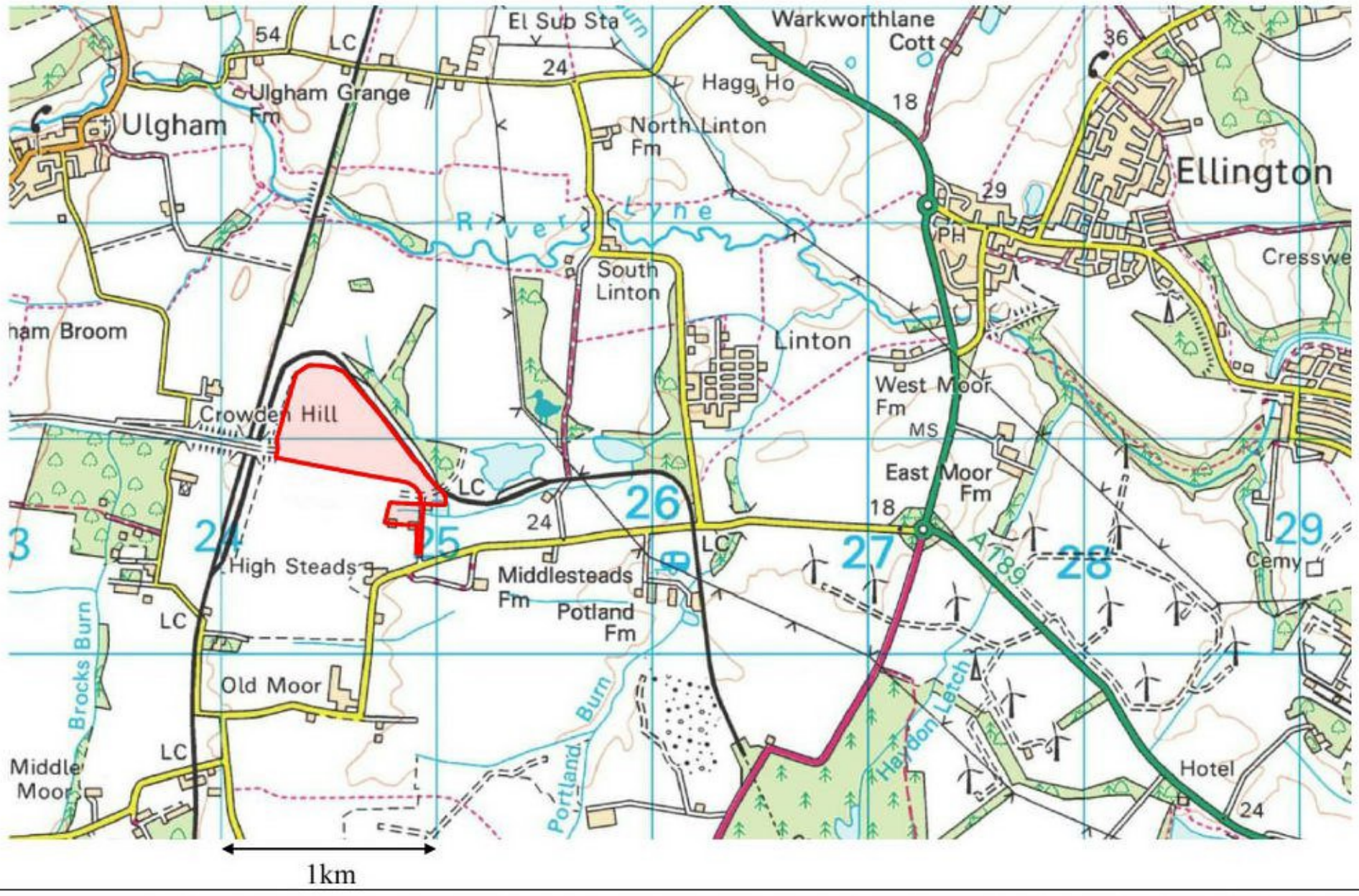
UK Government (2022). www.flood-map-for-planning-services.gov.uk and www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

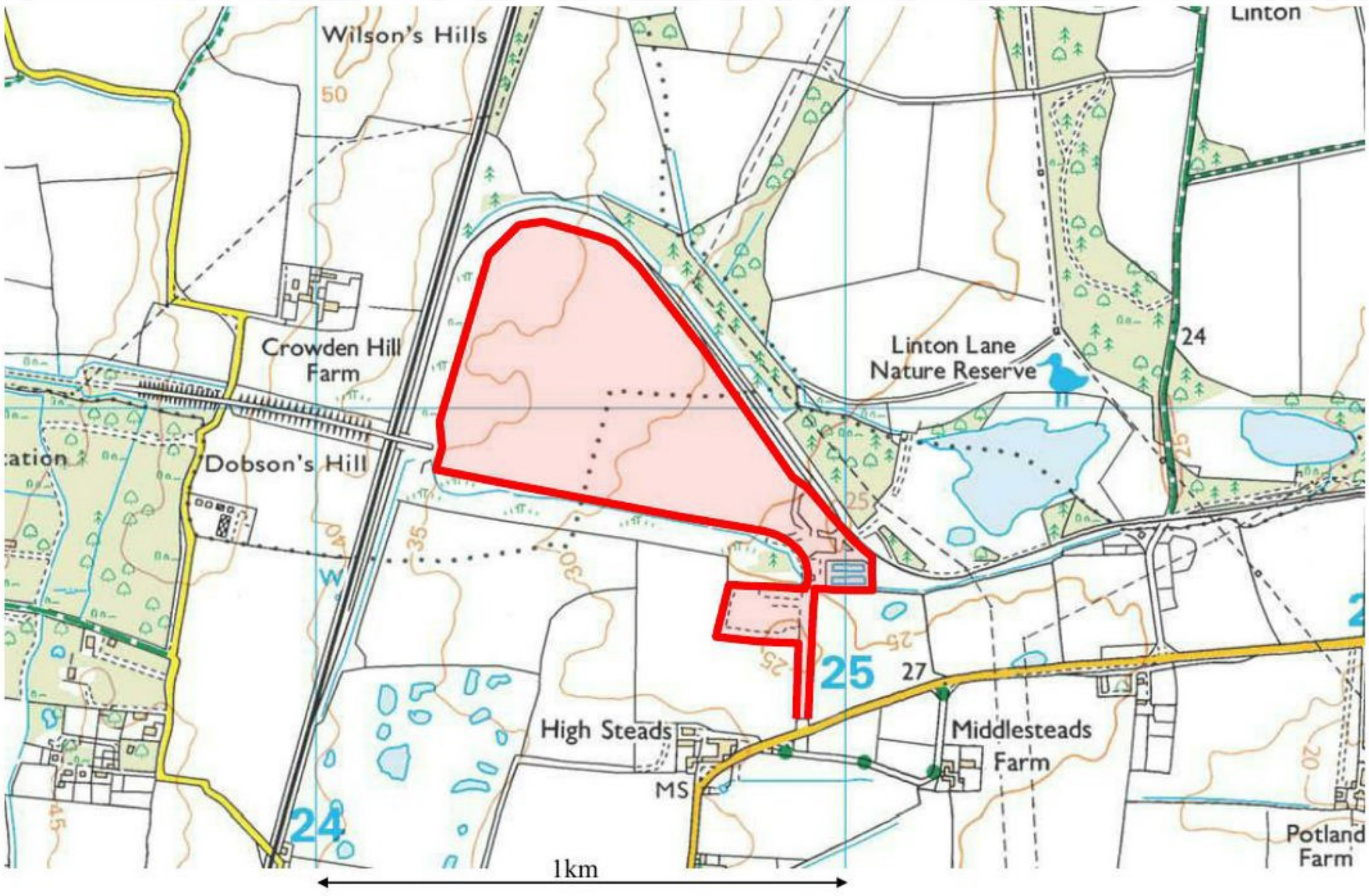
Wallingford Hydrosolutions Ltd. (2016), The Revitalised Flood Hydrograph Model ReFH2.2: Technical Guidance. 67p.

Wallingford Hydrosolutions Ltd. (2019), ReFH2.3 software.

Woods Ballard, B, Wilson, S, Udale-Clarke, H, Illman, S, Scott, T, Ashley, R, Kellagher, R. (2015), 'The SuDS Manual'. CIRIA Report C753.

FIGURES





Extracts of OS map reproduced with the Permission of Controller of H. M. Stationery Office © Crown Copyright. All rights reserved.
Licence No. 100052240 DAB Geotechnics Ltd.

Figure 1 Location

DAB Geotechnics Ltd.	Former Butterwell Surface Mine & Coal Disposal Site Flood Risk Assessment	Date: 18th May 2022



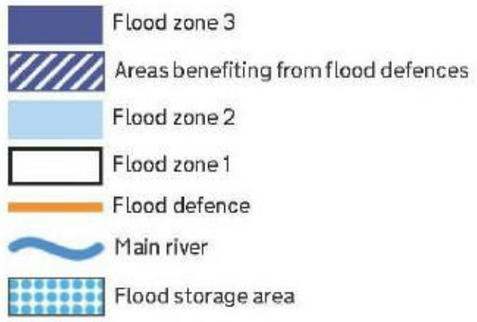


Figure 2 Extract of UK Government Flood Map – Fluvial Flooding (UK Government, 2022)

DAB Geotechnics Ltd.

Former Butterwell Surface Mine & Coal Disposal Point Flood Risk Assessment

Date: 18th May 2022



Figure 3 Extract of UK Government Flood Map – Surface Water (UK Government, 2022)

DAB Geotechnics Ltd.

Former Butterwell Surface Mine & Coal Disposal Point
Flood Risk Assessment

Date: 18th May 2022



Figure 4 Extract of Drawing No. BDP/3B

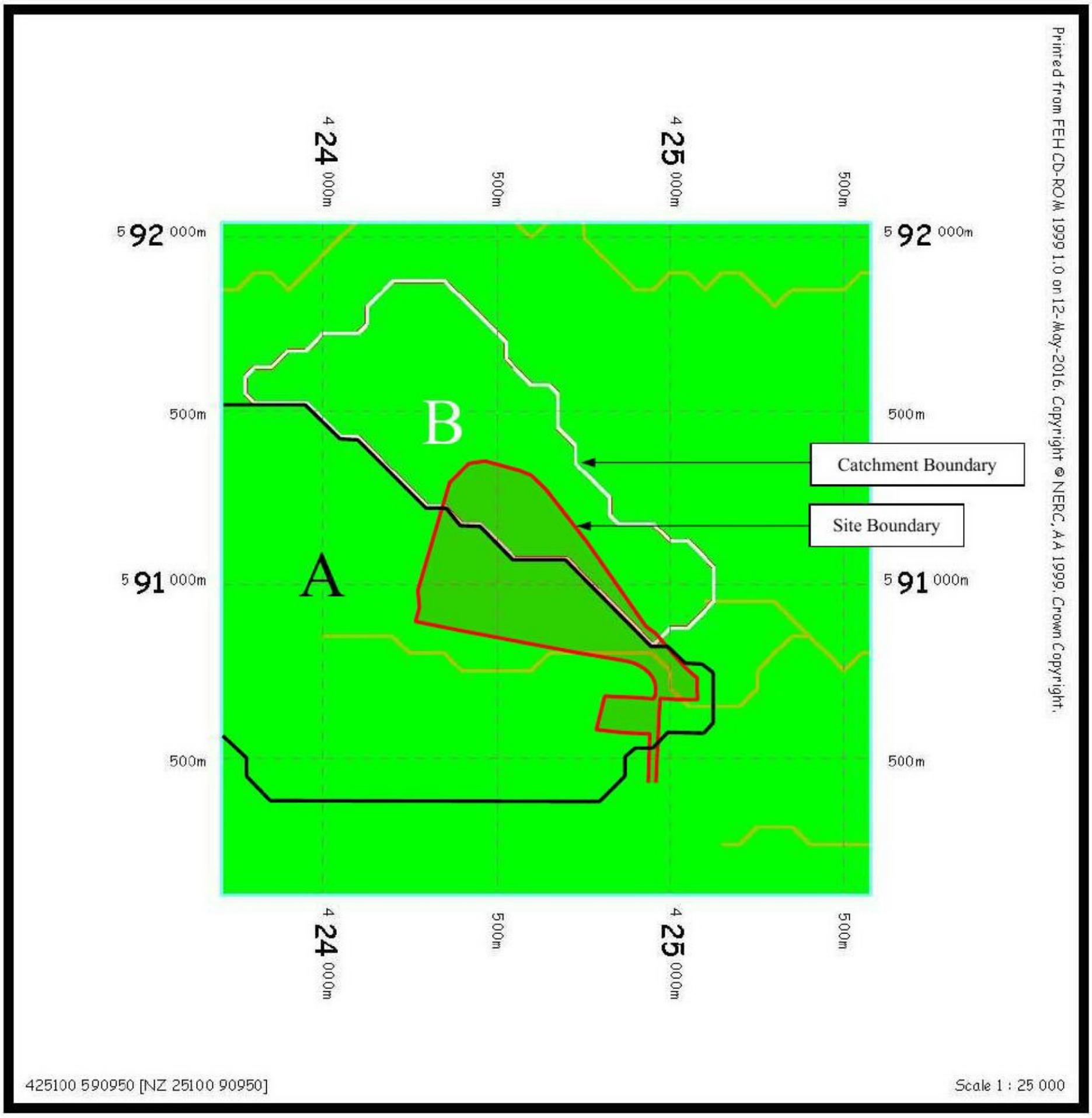


Figure 5 Catchment Boundaries

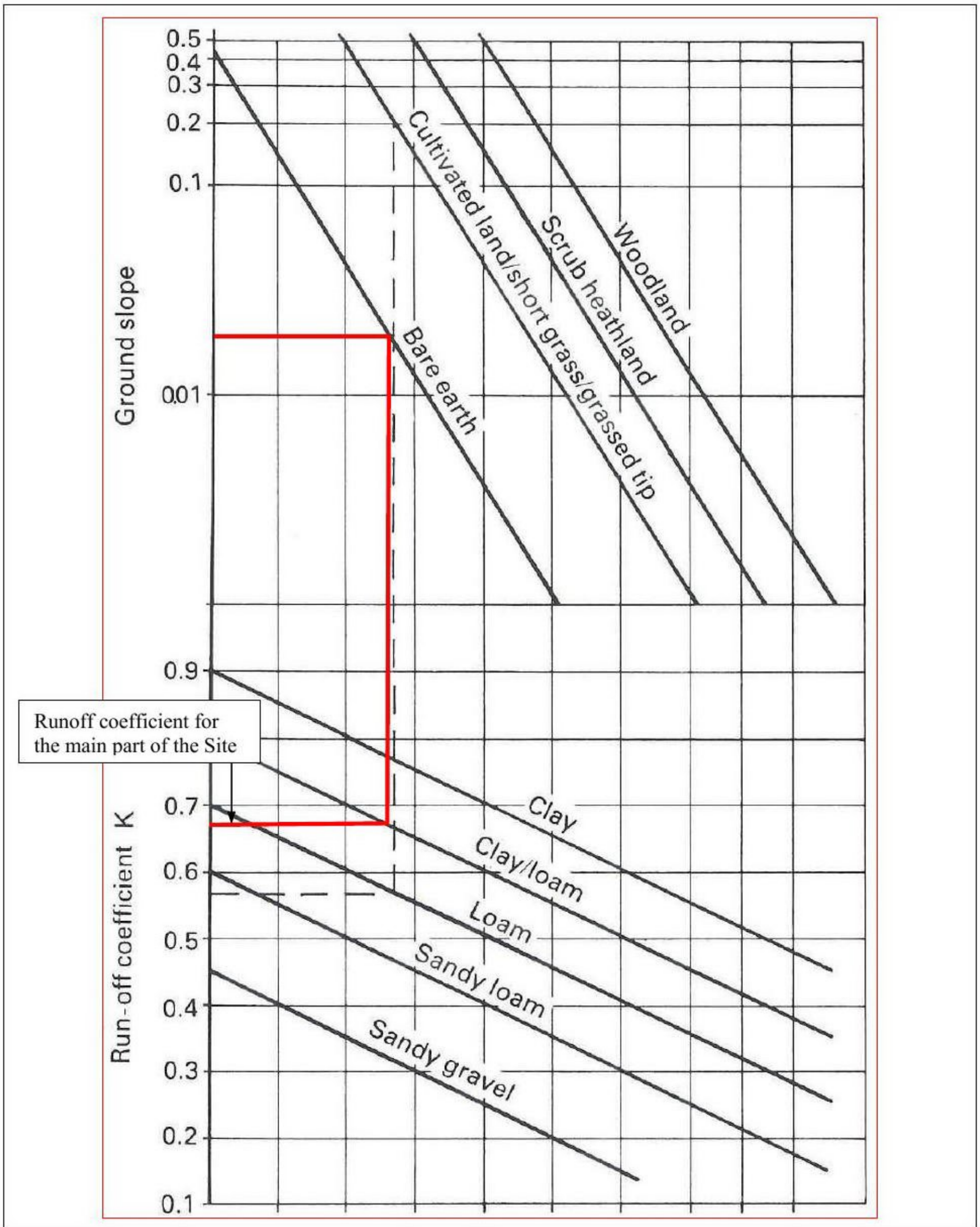


Figure 6 Nomogram for Determining Runoff Coefficients (NCB, 1982)

APPENDIX

PROJECT NAME Former Butterwell D.P. & Surface Mine Site

RAINFALL DATA FROM FEH CD-ROM

DURATION			TOTAL RAINFALL (mm)											
			Return Period (years)											
minutes	hours	days	1	2	5	10	20	30	50	75	100	150	200	500
15	0.25	0.010	4.620	5.72	9.14	11.53	13.93	15.37	17.35	18.90	20.01	21.76	23.09	27.92
30	0.50	0.021	6.210	7.61	12.20	15.70	18.95	21.07	23.82	26.02	27.63	30.11	32.00	39.13
45	0.75	0.031	7.220	8.82	14.25	18.30	22.23	24.64	28.05	30.71	32.62	35.64	37.92	46.39
60	1.00	0.042	8.020	9.82	15.83	20.21	24.72	27.43	31.10	34.11	36.33	39.75	42.35	51.87
75	1.25	0.052	9.010	10.93	17.25	21.82	26.56	29.40	33.20	36.39	38.77	42.36	45.12	55.26
90	1.50	0.063	10.030	12.01	18.52	23.21	28.08	31.00	34.89	38.21	40.70	44.42	47.28	57.88
105	1.75	0.073	11.020	13.03	19.66	24.44	29.40	32.38	36.34	39.75	42.33	46.16	49.10	60.07
120	2.00	0.083	11.970	13.98	20.70	25.55	30.56	33.59	37.62	41.12	43.77	47.68	50.70	61.98
135	2.25	0.094	12.730	14.77	21.63	26.56	31.65	34.74	38.86	42.44	45.17	49.18	52.30	63.87
150	2.50	0.104	13.430	15.50	22.48	27.49	32.65	35.80	40.00	43.67	46.45	50.57	53.77	65.61
165	2.75	0.115	14.080	16.18	23.27	28.36	33.59	36.78	41.07	44.80	47.65	51.87	55.15	67.23
180	3.00	0.125	14.690	16.82	24.01	29.17	34.46	37.71	42.07	45.87	48.77	53.09	56.44	68.74
195	3.25	0.135	15.270	17.42	24.71	29.93	35.29	38.58	43.01	46.88	49.83	54.24	57.66	70.16
210	3.50	0.146	15.820	17.99	25.37	30.65	36.06	39.40	43.91	47.83	50.83	55.32	58.81	71.50
225	3.75	0.156	16.340	18.54	25.99	31.33	36.81	40.19	44.76	48.74	51.78	56.36	59.91	72.77
240	4.00	0.167	16.830	19.05	26.59	31.99	37.51	40.94	45.57	49.61	52.69	57.35	60.96	73.98
255	4.25	0.177	17.300	19.55	27.16	32.60	38.20	41.66	46.36	50.45	53.57	58.30	61.97	75.14
270	4.50	0.188	17.750	20.03	27.71	33.19	38.85	42.36	47.12	51.25	54.40	59.22	62.93	76.25
285	4.75	0.198	18.180	20.49	28.24	33.76	39.48	43.03	47.84	52.02	55.21	60.10	63.86	77.32
300	5.00	0.208	18.600	20.93	28.74	34.31	40.09	43.68	48.55	52.76	55.99	60.95	64.75	78.35
315	5.25	0.219	19.000	21.35	29.23	34.83	40.68	44.30	49.22	53.48	56.74	61.76	65.61	79.34
330	5.50	0.229	19.390	21.76	29.70	35.34	41.24	44.90	49.88	54.18	57.47	62.56	66.45	80.30
345	5.75	0.240	19.760	22.16	30.16	35.83	41.79	45.49	50.51	54.85	58.17	63.32	67.26	81.23
360	6.00	0.250	20.120	22.55	30.60	36.31	42.32	46.05	51.13	55.51	58.86	64.07	68.04	82.13
375	6.25	0.260	20.480	22.92	31.03	36.78	42.84	46.60	51.72	56.14	59.53	64.79	68.80	83.01
390	6.50	0.271	20.820	23.29	31.44	37.23	43.33	47.13	52.30	56.76	60.18	65.49	69.53	83.86
405	6.75	0.281	21.150	23.65	31.84	37.67	43.82	47.64	52.86	57.36	60.81	66.17	70.25	84.68
420	7.00	0.292	21.480	23.99	32.23	38.10	44.29	48.14	53.40	57.95	61.43	66.83	70.95	85.49
435	7.25	0.302	21.790	24.33	32.61	38.52	44.75	48.63	53.93	58.52	62.03	67.48	71.63	86.27
450	7.50	0.313	22.100	24.65	32.98	38.92	45.19	49.10	54.45	59.08	62.62	68.11	72.29	87.04
465	7.75	0.323	22.400	24.97	33.34	39.32	45.63	49.57	54.96	59.62	63.20	68.73	72.94	87.79
480	8.00	0.333	22.690	25.28	33.70	39.71	46.06	50.02	55.45	60.16	63.76	69.33	73.57	88.52
495	8.25	0.344	22.980	25.59	34.04	40.09	46.47	50.46	55.94	60.68	64.31	69.92	74.19	89.23
510	8.50	0.354	23.260	25.89	34.38	40.46	46.88	50.90	56.41	61.19	64.85	70.50	74.80	89.93
525	8.75	0.365	23.530	26.18	34.70	40.82	47.28	51.32	56.87	61.69	65.38	71.06	75.40	90.62
540	9.00	0.375	23.800	26.46	35.03	41.18	47.67	51.74	57.33	62.18	65.90	71.62	75.98	91.29
555	9.25	0.385	24.060	26.74	35.34	41.53	48.05	52.14	57.77	62.66	66.40	72.16	76.55	91.95
570	9.50	0.396	24.310	27.01	35.65	41.87	48.42	52.54	58.21	63.13	66.90	72.70	77.11	92.60
585	9.75	0.406	24.560	27.27	35.95	42.20	48.79	52.93	58.64	63.60	67.39	73.22	77.66	93.23
600	10.00	0.417	24.810	27.53	36.25	42.53	49.15	53.32	59.06	64.05	67.87	73.74	78.20	93.85
615	10.25	0.427	25.050	27.79	36.54	42.85	49.51	53.70	59.47	64.50	68.35	74.24	78.73	94.47
630	10.50	0.438	25.290	28.04	36.82	43.17	49.85	54.07	59.87	64.94	68.81	74.74	79.26	95.07
645	10.75	0.448	25.520	28.28	37.10	43.48	50.20	54.43	60.27	65.37	69.27	75.23	79.77	95.66
660	11.00	0.458	25.750	28.52	37.38	43.78	50.53	54.79	60.67	65.80	69.72	75.71	80.28	96.24
675	11.25	0.469	25.970	28.76	37.65	44.08	50.86	55.14	61.05	66.22	70.16	76.18	80.78	96.82
690	11.50	0.479	26.190	28.99	37.91	44.38	51.19	55.49	61.43	66.63	70.60	76.65	81.27	97.38
705	11.75	0.490	26.400	29.22	38.17	44.67	51.51	55.83	61.81	67.03	71.03	77.11	81.75	97.94
720	12.00	0.500	26.610	29.44	38.43	44.95	51.82	56.17	62.18	67.43	71.45	77.56	82.23	98.48
735	12.25	0.510	26.820	29.66	38.68	45.23	52.14	56.50	62.54	67.83	71.86	78.01	82.70	99.02
750	12.50	0.521	27.020	29.87	38.93	45.50	52.44	56.83	62.90	68.21	72.27	78.45	83.16	99.56
765	12.75	0.531	27.220	30.08	39.18	45.77	52.74	57.15	63.25	68.59	72.67	78.88	83.61	100.09
780	13.00	0.542	27.420	30.29	39.42	46.04	53.04	57.46	63.60	68.97	73.07	79.30	84.06	100.60
795	13.25	0.552	27.610	30.49	39.66	46.30	53.33	57.78	63.94	69.34	73.46	79.73	84.51	101.12
810	13.50	0.563	27.800	30.69	39.89	46.55	53.62	58.09	64.28	69.70	73.84	80.14	84.95	101.62
825	13.75	0.573	27.990	30.88	40.12	46.81	53.91	58.39	64.62	70.06	74.23	80.55	85.38	102.12
840	14.00	0.583	28.170	31.08	40.35	47.06	54.19	58.69	64.95	70.42	74.60	80.96	85.81	102.61
855	14.25	0.594	28.360	31.27	40.57	47.30	54.47	58.99	65.28	70.77	74.97	81.36	86.23	103.10
870	14.50	0.604	28.540	31.46	40.80	47.55	54.74	59.28	65.60	71.12	75.34	81.76	86.65	103.58
885	14.75	0.615	28.710	31.64	41.01	47.79	55.01	59.57	65.92	71.47	75.70	82.15	87.06	104.05
900	15.00	0.625	28.890	31.83	41.23	48.03	55.28	59.86	66.23	71.81	76.06	82.54	87.47	104.52
915	15.25	0.635	29.060	32.01	41.44	48.26	55.55	60.14	66.54	72.14	76.42	82.92	87.88	104.98
930	15.50	0.646	29.230	32.18	41.65	48.49	55.81	60.42	66.85	72.48	76.77	83.30	88.28	105.44
945	15.75	0.656	29.400	32.36	41.86	48.72	56.07	60.70	67.16	72.80	77.12	83.68	88.67	105.89
960	16.00	0.667	29.560	32.53	42.07	48.95	56.32	60.97	67.46	73.13	77.46	84.05	89.06	106.34
975	16.25	0.677	29.730	32.71	42.27	49.17	56.58	61.25	67.75	73.45	77.80	84.42	89.45	106.78
990	16.50	0.688	29.890	32.87	42.47	49.40	56.83	61.51	68.05	73.77	78.14	84.78	89.84	107.21
1005	16.75	0.698	30.050	33.04	42.67	49.62	57.07	61.78	68.34	74.09	78.48	85.15	90.22	107.65
1020	17.00	0.708	30.210	33.21	42.86	49.83	57.32	62.04	68.63	74.40	78.81	85.50	90.59	108.07
1035	17.25	0.719	30.360	33.37	43.06	50.05	57.56	62.30	68.92	74.71	79.14	85.86	90.97	108.49
1050	17.50	0.729	30.520	33.53	43.25	50.26	57.80	62.56	69.20	75.02	79.46	86.21	91.34	108.91
1065	17.75	0.740	30.670	33.69	43.44	50.47	58.04	62.82	69.48	75.32	79.78	86.56	91.70	109.33
1080	18.00	0.750	30.820	33.85	43.62	50.68	58.27	63.07	69.76	75.62	80.10	86.91	92.07	109.73
1095	18.25	0.760	30.970	34.01	43.81	50.89	58.50	63.32	70.03	75.92	80.42	87.25	92.43	110.14
1110	18.50	0.771	31.120	34.17	43.99	51.10	58.73	63.57	70.30	76.22	80.74	87.60	92.79	110.53
1125	18.75	0.781	31.260	34.32	44.17	51.30	58.96	63.82	70.58	76.52	81.06	87.94	93.15	110.93
1140	19.00	0.792	31.410	34.48	44.35	51.50	59.18	64.06	70.84	76.81	81.37	88.28	93.51	111.32
1155	19.25	0.802	31.550	34.63	44.53	51.70	59.41	64.31	71.11	77.10	81.68	88.61	93.86	111.70

DURATION			TOTAL RAINFALL (mm)											
			Return Period (years)											
minutes	hours	days	1	2	5	10	20	30	50	75	100	150	200	500
1170	19.50	0.813	31.690	34.78	44.71	51.90	59.63	64.55	71.37	77.38	81.99	88.95	94.21	112.08
1185	19.75	0.823	31.830	34.93	44.88	52.10	59.85	64.78	71.63	77.67	82.29	89.28	94.55	112.46
1200	20.00	0.833	31.970	35.08	45.05	52.30	60.07	65.02	71.89	77.95	82.60	89.61	94.89	112.84
1215	20.25	0.844	32.110	35.22	45.22	52.49	60.28	65.26	72.15	78.23	82.90	89.93	95.23	113.21
1230	20.50	0.854	32.250	35.37	45.39	52.68	60.49	65.49	72.40	78.51	83.19	90.25	95.57	113.58
1245	20.75	0.865	32.380	35.51	45.56	52.87	60.71	65.72	72.65	78.79	83.49	90.57	95.90	113.94
1260	21.00	0.875	32.520	35.65	45.72	53.06	60.91	65.95	72.90	79.06	83.78	90.89	96.24	114.30
1275	21.25	0.885	32.650	35.79	45.89	53.25	61.12	66.17	73.15	79.33	84.07	91.20	96.56	114.66
1290	21.50	0.896	32.780	35.93	46.05	53.43	61.33	66.40	73.40	79.60	84.36	91.52	96.89	115.02
1305	21.75	0.906	32.910	36.07	46.21	53.61	61.53	66.62	73.64	79.87	84.65	91.83	97.21	115.37
1320	22.00	0.917	33.040	36.21	46.37	53.80	61.74	66.84	73.88	80.13	84.93	92.13	97.54	115.72
1335	22.25	0.927	33.170	36.34	46.53	53.98	61.94	67.06	74.13	80.40	85.22	92.44	97.85	116.06
1350	22.50	0.938	33.290	36.48	46.68	54.16	62.14	67.28	74.36	80.66	85.50	92.74	98.17	116.41
1365	22.75	0.948	33.420	36.61	46.84	54.33	62.33	67.50	74.60	80.92	85.77	93.04	98.48	116.75
1380	23.00	0.958	33.540	36.74	46.99	54.51	62.53	67.71	74.84	81.18	86.05	93.34	98.79	117.09
1395	23.25	0.969	33.660	36.87	47.15	54.68	62.72	67.93	75.07	81.43	86.32	93.64	99.10	117.42
1410	23.50	0.979	33.780	37.00	47.30	54.86	62.92	68.14	75.30	81.69	86.60	93.93	99.41	117.76
1425	23.75	0.990	33.910	37.13	47.45	55.03	63.11	68.35	75.53	81.94	86.87	94.22	99.72	118.09
1440	24.00	1.000	34.020	37.26	47.60	55.20	63.30	68.55	75.76	82.19	87.13	94.51	100.02	118.41
1455	24.25	1.010	34.140	37.38	47.74	55.36	63.49	68.76	75.99	82.44	87.40	94.80	100.31	118.74
1470	24.50	1.021	34.260	37.50	47.89	55.53	63.67	68.96	76.21	82.68	87.66	95.08	100.61	119.06
1485	24.75	1.031	34.370	37.63	48.03	55.69	63.86	69.16	76.44	82.93	87.92	95.36	100.90	119.39
1500	25.00	1.042	34.480	37.75	48.17	55.85	64.04	69.36	76.66	83.17	88.18	95.63	101.19	119.70
1515	25.25	1.052	34.600	37.87	48.31	56.01	64.22	69.56	76.88	83.41	88.43	95.91	101.48	120.02
1530	25.50	1.063	34.710	37.98	48.45	56.17	64.40	69.76	77.10	83.65	88.69	96.18	101.76	120.34
1545	25.75	1.073	34.820	38.10	48.59	56.32	64.58	69.95	77.32	83.89	88.94	96.46	102.04	120.65
1560	26.00	1.083	34.930	38.22	48.73	56.48	64.76	70.15	77.53	84.12	89.19	96.72	102.32	120.96
1575	26.25	1.094	35.040	38.33	48.86	56.63	64.94	70.34	77.75	84.36	89.44	96.99	102.60	121.27
1590	26.50	1.104	35.150	38.45	49.00	56.79	65.11	70.53	77.96	84.59	89.69	97.26	102.88	121.57
1605	26.75	1.115	35.250	38.56	49.13	56.94	65.29	70.72	78.17	84.82	89.93	97.52	103.16	121.88
1620	27.00	1.125	35.360	38.67	49.27	57.09	65.46	70.91	78.39	85.05	90.18	97.78	103.43	122.18
1635	27.25	1.135	35.460	38.78	49.40	57.24	65.63	71.10	78.60	85.28	90.42	98.05	103.70	122.48
1650	27.50	1.146	35.570	38.90	49.53	57.39	65.80	71.29	78.80	85.51	90.66	98.30	103.97	122.78
1665	27.75	1.156	35.670	39.01	49.66	57.54	65.97	71.47	79.01	85.74	90.90	98.56	104.24	123.07
1680	28.00	1.167	35.780	39.11	49.79	57.69	66.14	71.66	79.22	85.96	91.14	98.82	104.51	123.37
1695	28.25	1.177	35.880	39.22	49.92	57.83	66.31	71.84	79.42	86.19	91.38	99.07	104.77	123.66
1710	28.50	1.188	35.980	39.33	50.05	57.98	66.48	72.02	79.63	86.41	91.61	99.32	105.03	123.95
1725	28.75	1.198	36.080	39.44	50.17	58.12	66.64	72.20	79.83	86.63	91.85	99.57	105.29	124.24
1740	29.00	1.208	36.180	39.54	50.30	58.27	66.81	72.38	80.03	86.85	92.08	99.82	105.55	124.53
1755	29.25	1.219	36.280	39.65	50.43	58.41	66.97	72.56	80.23	87.07	92.31	100.07	105.81	124.81
1770	29.50	1.229	36.380	39.75	50.55	58.55	67.14	72.74	80.43	87.28	92.54	100.32	106.07	125.10
1785	29.75	1.240	36.480	39.86	50.67	58.69	67.30	72.92	80.63	87.50	92.77	100.56	106.32	125.38
1800	30.00	1.250	36.580	39.96	50.80	58.83	67.46	73.09	80.82	87.71	92.99	100.81	106.58	125.66
1815	30.25	1.260	36.670	40.06	50.92	58.97	67.62	73.27	81.02	87.93	93.22	101.05	106.83	125.94
1830	30.50	1.271	36.770	40.17	51.04	59.11	67.78	73.44	81.22	88.14	93.45	101.29	107.08	126.22
1845	30.75	1.281	36.860	40.27	51.16	59.24	67.94	73.61	81.41	88.35	93.67	101.53	107.33	126.49
1860	31.00	1.292	36.960	40.37	51.28	59.38	68.09	73.79	81.60	88.56	93.89	101.77	107.58	126.77
1875	31.25	1.302	37.050	40.47	51.40	59.52	68.25	73.96	81.79	88.77	94.11	102.00	107.82	127.04
1890	31.50	1.313	37.150	40.57	51.52	59.65	68.41	74.13	81.98	88.98	94.33	102.24	108.07	127.31
1905	31.75	1.323	37.240	40.67	51.64	59.78	68.56	74.30	82.17	89.19	94.55	102.47	108.31	127.58
1920	32.00	1.333	37.330	40.76	51.75	59.92	68.71	74.46	82.36	89.39	94.77	102.70	108.55	127.85
1935	32.25	1.344	37.420	40.86	51.87	60.05	68.87	74.63	82.55	89.60	94.98	102.93	108.79	128.12
1950	32.50	1.354	37.520	40.96	51.99	60.18	69.02	74.80	82.74	89.80	95.20	103.16	109.03	128.38
1965	32.75	1.365	37.610	41.05	52.10	60.31	69.17	74.96	82.92	90.00	95.41	103.39	109.27	128.65
1980	33.00	1.375	37.700	41.15	52.22	60.44	69.32	75.13	83.11	90.20	95.62	103.62	109.51	128.91
1995	33.25	1.385	37.790	41.25	52.33	60.57	69.47	75.29	83.29	90.40	95.84	103.85	109.74	129.17
2010	33.50	1.396	37.880	41.34	52.44	60.70	69.62	75.45	83.48	90.60	96.05	104.07	109.98	129.43
2025	33.75	1.406	37.960	41.43	52.56	60.83	69.77	75.62	83.66	90.80	96.26	104.30	110.21	129.69
2040	34.00	1.417	38.050	41.53	52.67	60.96	69.92	75.78	83.84	91.00	96.46	104.52	110.44	129.95
2055	34.25	1.427	38.140	41.62	52.78	61.08	70.07	75.94	84.02	91.20	96.67	104.74	110.67	130.20
2070	34.50	1.438	38.230	41.71	52.89	61.21	70.21	76.10	84.20	91.39	96.88	104.96	110.90	130.46
2085	34.75	1.448	38.310	41.80	53.00	61.34	70.36	76.26	84.38	91.59	97.08	105.18	111.13	130.71
2100	35.00	1.458	38.400	41.90	53.11	61.46	70.50	76.42	84.56	91.78	97.29	105.40	111.36	130.96
2115	35.25	1.469	38.490	41.99	53.22	61.58	70.65	76.57	84.73	91.97	97.49	105.62	111.58	131.21
2130	35.50	1.479	38.570	42.08	53.33	61.71	70.79	76.73	84.91	92.17	97.69	105.83	111.81	131.46
2145	35.75	1.490	38.660	42.17	53.44	61.83	70.93	76.89	85.09	92.36	97.90	106.05	112.03	131.71
2160	36.00	1.500	38.740	42.26	53.54	61.95	71.08	77.04	85.26	92.55	98.10	106.26	112.26	131.96
2175	36.25	1.510	38.820	42.35	53.65	62.08	71.22	77.20	85.44	92.74	98.30	106.48	112.48	132.21
2190	36.50	1.521	38.910	42.43	53.76	62.20	71.36	77.35	85.61	92.93	98.49	106.69	112.70	132.45
2205	36.75	1.531	38.990	42.52	53.86	62.32	71.50	77.50	85.78	93.11	98.69	106.90	112.92	132.69
2220	37.00	1.542	39.070	42.61	53.97	62.44	71.64	77.66	85.95	93.30	98.89	107.11	113.14	132.94
2235	37.25	1.552	39.160	42.70	54.07	62.56	71.78	77.81	86.13	93.49	99.09	107.32	113.35	133.18
2250	37.50	1.563	39.240	42.78	54.18	62.68	71.92	77.96	86.30	93.67	99.28	107.53	113.57	133.42
2265	37.75	1.573	39.320	42.87	54.28	62.79	72.05	78.11	86.47	93.86	99.48	107.73	113.79	133.66
2280	38.00	1.583	39.400	42.96	54.39	62.91	72.19	78.26	86.63	94.04	99.67	107.94	114.00	133.90
2295	38.25	1.594	39.480	43.04	54.49	63.03	72.33	78.41	86.80	94.22	99.86	108.15	114.21	134.13
2310	38.50	1.604	39.560	43.13	54.59	63.15	72.46	78.56	86.97	94.40	100.05	108.35	114.43	134.37
2325	38.75	1.615	39.640	43.21	54.69	63.26	72.60	78.71	87.14	94.59	100.24	108.55	114.64	134.61
2340	39.00	1.625	39.720	43.29	54.80	63.38	72.74	78.85	87.30	94.77	100.43	108.76	114.85	134.84
2355	39.25	1.635	39.800	43.38	54.90	63.49	72.87	79.00	87.47	94.95	100.62	108.96	115.06	135.07
2370	39.50	1.646	39.880	43.46	55.00	63.61	73.00	79.15	87.63	95.13	100.81	109.16	115.27	135.30
2385	39.75	1.656	39.960	43.54	55.10	63.72	73.14	79.29	87.80	95.30	101.00	109.36	115.48	135.54
2400	40.00	1.667	40.030	43.63	55.20	63.84	73.27	79.44	87.96	95.48	101.19	109.56	115.68	135.77
2415	40.25	1.677	40.110	43.71	55.30	63.95	73.40	79.58	88.12	95.66	101.37	109.76	115.89	135.99
2430	40.50	1.688	40.190	43.79	55.40	64.06	73.53	79.73	88.29	95.84	101.56	109.96	116.09	136.22
2445	40.75	1.698	40.260	43.87	55.49	64.17	73.66	79.87	88.45	96.01	101.74	110.15	116.30	136.45
2460	41.00	1.708	40.340	43.95	55.59	64.29	73.80	80.01	88.61	96.19	101.93	110.35	116.50	136.68

DURATION			TOTAL RAINFALL (mm)											
			Return Period (years)											
minutes	hours	days	1	2	5	10	20	30	50	75	100	150	200	500
2475	41.25	1.719	40.420	44.03	55.69	64.40	73.93	80.15	88.77	96.36	102.11	110.54	116.71	136.90
2490	41.50	1.729	40.490	44.11	55.79	64.51	74.06	80.30	88.93	96.53	102.29	110.74	116.91	137.13
2505	41.75	1.740	40.570	44.19	55.88	64.62	74.18	80.44	89.09	96.71	102.47	110.93	117.11	137.35
2520	42.00	1.750	40.640	44.27	55.98	64.73	74.31	80.58	89.25	96.88	102.66	111.12	117.31	137.57
2535	42.25	1.760	40.720	44.35	56.08	64.84	74.44	80.72	89.40	97.05	102.84	111.32	117.51	137.79
2550	42.50	1.771	40.790	44.43	56.17	64.95	74.57	80.86	89.56	97.22	103.02	111.51	117.71	138.01
2565	42.75	1.781	40.860	44.51	56.27	65.06	74.70	81.00	89.72	97.39	103.19	111.70	117.91	138.23
2580	43.00	1.792	40.940	44.59	56.36	65.16	74.82	81.13	89.87	97.56	103.37	111.89	118.10	138.45
2595	43.25	1.802	41.010	44.67	56.46	65.27	74.95	81.27	90.03	97.73	103.55	112.08	118.30	138.67
2610	43.50	1.813	41.080	44.74	56.55	65.38	75.07	81.41	90.19	97.90	103.73	112.26	118.49	138.89
2625	43.75	1.823	41.160	44.82	56.64	65.49	75.20	81.55	90.34	98.07	103.90	112.45	118.69	139.11
2640	44.00	1.833	41.230	44.90	56.74	65.59	75.32	81.68	90.49	98.23	104.08	112.64	118.88	139.32
2655	44.25	1.844	41.300	44.97	56.83	65.70	75.45	81.82	90.65	98.40	104.25	112.83	119.08	139.54
2670	44.50	1.854	41.370	45.05	56.92	65.80	75.57	81.95	90.80	98.57	104.43	113.01	119.27	139.75
2685	44.75	1.865	41.440	45.13	57.02	65.91	75.70	82.09	90.95	98.73	104.60	113.20	119.46	139.96
2700	45.00	1.875	41.520	45.20	57.11	66.02	75.82	82.22	91.10	98.90	104.77	113.38	119.65	140.18
2715	45.25	1.885	41.590	45.28	57.20	66.12	75.94	82.36	91.26	99.06	104.95	113.56	119.84	140.39
2730	45.50	1.896	41.660	45.35	57.29	66.22	76.06	82.49	91.41	99.22	105.12	113.75	120.03	140.60
2745	45.75	1.906	41.730	45.43	57.38	66.33	76.19	82.62	91.56	99.39	105.29	113.93	120.22	140.81
2760	46.00	1.917	41.800	45.50	57.47	66.43	76.31	82.76	91.71	99.55	105.46	114.11	120.41	141.02
2775	46.25	1.927	41.870	45.57	57.56	66.53	76.43	82.89	91.86	99.71	105.63	114.29	120.60	141.23
2790	46.50	1.938	41.940	45.65	57.65	66.64	76.55	83.02	92.00	99.87	105.80	114.47	120.79	141.44
2805	46.75	1.948	42.010	45.72	57.74	66.74	76.67	83.15	92.15	100.03	105.97	114.65	120.97	141.64
2820	47.00	1.958	42.070	45.79	57.83	66.84	76.79	83.28	92.30	100.19	106.14	114.83	121.16	141.85
2835	47.25	1.969	42.140	45.87	57.92	66.94	76.91	83.41	92.45	100.35	106.30	115.01	121.34	142.05
2850	47.50	1.979	42.210	45.94	58.01	67.05	77.03	83.54	92.59	100.51	106.47	115.18	121.53	142.26
2865	47.75	1.990	42.280	46.01	58.10	67.15	77.15	83.67	92.74	100.67	106.64	115.36	121.71	142.46
2880	48.00	2.000	42.350	46.08	58.18	67.25	77.26	83.80	92.89	100.83	106.80	115.54	121.89	142.67
2895	48.25	2.010	42.410	46.15	58.27	67.35	77.38	83.93	93.03	100.99	106.97	115.71	122.07	142.87
2910	48.50	2.021	42.480	46.23	58.36	67.45	77.50	84.06	93.17	101.14	107.13	115.89	122.26	143.07
2925	48.75	2.031	42.550	46.30	58.45	67.55	77.62	84.19	93.32	101.30	107.30	116.06	122.44	143.26
2940	49.00	2.042	42.610	46.37	58.53	67.65	77.73	84.31	93.46	101.45	107.46	116.23	122.61	143.46
2955	49.25	2.052	42.680	46.44	58.62	67.75	77.85	84.44	93.60	101.61	107.62	116.40	122.79	143.66
2970	49.50	2.063	42.740	46.51	58.70	67.85	77.96	84.57	93.75	101.76	107.78	116.58	122.97	143.86
2985	49.75	2.073	42.810	46.58	58.79	67.94	78.08	84.69	93.89	101.91	107.94	116.75	123.15	144.05
3000	50.00	2.083	42.870	46.64	58.88	68.04	78.19	84.82	94.03	102.07	108.10	116.92	123.33	144.25
3015	50.25	2.094	42.940	46.71	58.96	68.14	78.31	84.94	94.17	102.22	108.26	117.09	123.50	144.44
3030	50.50	2.104	43.000	46.78	59.05	68.24	78.42	85.07	94.31	102.37	108.42	117.26	123.68	144.64
3045	50.75	2.115	43.070	46.85	59.13	68.34	78.54	85.19	94.45	102.52	108.58	117.43	123.86	144.83
3060	51.00	2.125	43.130	46.92	59.21	68.43	78.65	85.32	94.59	102.67	108.74	117.60	124.03	145.02
3075	51.25	2.135	43.200	46.99	59.30	68.53	78.76	85.44	94.73	102.82	108.90	117.76	124.20	145.22
3090	51.50	2.146	43.260	47.06	59.38	68.63	78.88	85.57	94.87	102.97	109.06	117.93	124.38	145.41
3105	51.75	2.156	43.320	47.12	59.47	68.72	78.99	85.69	95.00	103.12	109.21	118.10	124.55	145.60
3120	52.00	2.167	43.390	47.19	59.55	68.82	79.10	85.81	95.14	103.27	109.37	118.26	124.72	145.79
3135	52.25	2.177	43.450	47.26	59.63	68.92	79.21	85.94	95.28	103.42	109.53	118.43	124.90	145.98
3150	52.50	2.188	43.510	47.32	59.71	69.01	79.32	86.06	95.42	103.57	109.68	118.60	125.07	146.17
3165	52.75	2.198	43.580	47.39	59.80	69.11	79.44	86.18	95.55	103.72	109.84	118.76	125.24	146.36
3180	53.00	2.208	43.640	47.46	59.88	69.20	79.55	86.30	95.69	103.87	109.99	118.92	125.41	146.55
3195	53.25	2.219	43.700	47.52	59.96	69.30	79.66	86.42	95.83	104.01	110.15	119.09	125.58	146.73
3210	53.50	2.229	43.760	47.59	60.04	69.39	79.77	86.54	95.96	104.16	110.30	119.25	125.75	146.92
3225	53.75	2.240	43.820	47.66	60.13	69.48	79.88	86.66	96.10	104.31	110.46	119.42	125.92	147.11
3240	54.00	2.250	43.890	47.72	60.21	69.58	79.99	86.78	96.23	104.45	110.61	119.58	126.09	147.29
3255	54.25	2.260	43.950	47.79	60.29	69.67	80.10	86.90	96.36	104.60	110.76	119.74	126.26	147.48
3270	54.50	2.271	44.010	47.85	60.37	69.77	80.21	87.02	96.50	104.74	110.91	119.90	126.42	147.66
3285	54.75	2.281	44.070	47.92	60.45	69.86	80.31	87.14	96.63	104.89	111.07	120.06	126.59	147.85
3300	55.00	2.292	44.130	47.98	60.53	69.95	80.42	87.26	96.77	105.03	111.22	120.22	126.76	148.03
3315	55.25	2.302	44.190	48.05	60.61	70.04	80.53	87.38	96.90	105.17	111.37	120.38	126.92	148.21
3330	55.50	2.313	44.250	48.11	60.69	70.14	80.64	87.50	97.03	105.32	111.52	120.54	127.09	148.40
3345	55.75	2.323	44.310	48.18	60.77	70.23	80.75	87.62	97.16	105.46	111.67	120.70	127.26	148.58
3360	56.00	2.333	44.370	48.24	60.85	70.32	80.85	87.73	97.30	105.60	111.82	120.86	127.42	148.76
3375	56.25	2.344	44.430	48.31	60.93	70.41	80.96	87.85	97.43	105.75	111.97	121.02	127.58	148.94
3390	56.50	2.354	44.490	48.37	61.01	70.50	81.07	87.97	97.56	105.89	112.12	121.18	127.75	149.12
3405	56.75	2.365	44.550	48.43	61.09	70.60	81.18	88.09	97.69	106.03	112.27	121.34	127.91	149.30
3420	57.00	2.375	44.610	48.50	61.17	70.69	81.28	88.20	97.82	106.17	112.41	121.49	128.07	149.48
3435	57.25	2.385	44.670	48.56	61.24	70.78	81.39	88.32	97.95	106.31	112.56	121.65	128.24	149.66
3450	57.50	2.396	44.730	48.62	61.32	70.87	81.49	88.43	98.08	106.45	112.71	121.81	128.40	149.84
3465	57.75	2.406	44.790	48.69	61.40	70.96	81.60	88.55	98.21	106.59	112.86	121.96	128.56	150.02
3480	58.00	2.417	44.850	48.75	61.48	71.05	81.70	88.67	98.34	106.73	113.00	122.12	128.72	150.20
3495	58.25	2.427	44.910	48.81	61.56	71.14	81.81	88.78	98.47	106.87	113.15	122.27	128.88	150.37
3510	58.50	2.438	44.970	48.87	61.63	71.23	81.91	88.90	98.60	107.01	113.29	122.43	129.04	150.55
3525	58.75	2.448	45.020	48.94	61.71	71.32	82.02	89.01	98.72	107.15	113.44	122.58	129.20	150.73
3540	59.00	2.458	45.080	49.00	61.79	71.41	82.12	89.12	98.85	107.29	113.58	122.73	129.36	150.90
3555	59.25	2.469	45.140	49.06	61.87	71.50	82.23	89.24	98.98	107.42	113.73	122.89	129.52	151.08
3570	59.50	2.479	45.200	49.12	61.94	71.58	82.33	89.35	99.11	107.56	113.87	123.04	129.68	151.25
3585	59.75	2.490	45.260	49.18	62.02	71.67	82.43	89.47	99.23	107.70	114.02	123.19	129.84	151.43
3600	60.00	2.500	45.310	49.25	62.10	71.76	82.54	89.58	99.36	107.84	114.16	123.35	130.00	151.60

GROUNDWATER INFLOW	0.0	l/s

CATCHMENT AREA	266400	m^2
RUNOFF COEFFICIENT	0.67	
PERMITTED DISCHARGE RATE	99	l/s

Groundwater Volume (m^3)	STORAGE REQUIRED - Surface and Groundwater (m^3)								
	1 year	**2 year**	**5 year**	**10 year**	**20 year**	**30 year**	**50 year**	**100 year**	**200 year**
0	1107	1391	2276	2895	3516	3889	4401	5090	5887
0	1429	1791	2979	3885	4726	5275	5987	6973	8104
0	1601	2015	3421	4469	5486	6110	6992	8175	9547
0	1719	2185	3741	4874	6041	6743	7693	9046	10604
0	1886	2383	4019	5202	6428	7163	8147	9588	11232
0	2061	2574	4259	5472	6733	7488	8495	9999	11702
0	2228	2749	4464	5702	6985	7756	8781	10332	12084
0	2385	2905	4645	5900	7196	7981	9024	10615	12409
0	2493	3021	4796	6072	7389	8189	9255	10888	12734
0	2585	3121	4927	6224	7559	8374	9461	11131	13025
0	2664	3207	5042	6360	7713	8539	9649	11352	13293
0	2733	3284	5145	6480	7849	8690	9819	11553	13538
0	2794	3350	5237	6588	7975	8826	9973	11738	13765
0	2847	3409	5319	6685	8085	8950	10117	11908	13973
0	2892	3462	5390	6772	8190	9065	10248	12065	14169
0	2930	3505	5456	6854	8282	9170	10368	12211	14351
0	2963	3545	5515	6922	8372	9267	10484	12350	14524
0	2990	3580	5568	6986	8451	9359	10591	12475	14683
0	3012	3610	5616	7044	8525	9444	10688	12596	14835
0	3032	3635	5656	7098	8594	9523	10783	12709	14976
0	3046	3654	5694	7143	8657	9594	10867	12814	15109
0	3058	3671	5726	7186	8713	9660	10949	12913	15238
0	3065	3686	5756	7224	8766	9724	11023	13006	15358
0	3069	3698	5781	7259	8814	9780	11094	13095	15471
0	3073	3704	5803	7291	8860	9833	11158	13179	15578
0	3072	3711	5820	7319	8898	9881	11219	13258	15678
0	3068	3715	5835	7344	8935	9924	11275	13332	15776
0	3064	3714	5847	7366	8968	9964	11326	13404	15868
0	3056	3713	5856	7385	8998	10002	11374	13470	15954
0	3047	3707	5862	7400	9023	10034	11419	13534	16036
0	3035	3700	5867	7414	9047	10067	11462	13595	16115
0	3021	3691	5871	7426	9069	10094	11500	13650	16189
0	3007	3683	5870	7435	9086	10119	11537	13704	16261
0	2990	3671	5868	7442	9104	10144	11570	13754	16329
0	2971	3657	5862	7446	9118	10164	11600	13802	16396
0	2952	3640	5858	7450	9130	10183	11630	13848	16457
0	2930	3624	5850	7452	9139	10198	11655	13888	16515
0	2906	3605	5841	7450	9146	10212	11679	13928	16571
0	2881	3583	5829	7447	9152	10224	11702	13966	16624
0	2857	3561	5818	7443	9156	10236	11721	14001	16675
0	2830	3539	5804	7437	9160	10245	11738	14036	16723
0	2803	3515	5787	7431	9159	10252	11753	14066	16771
0	2773	3488	5770	7422	9161	10256	11767	14096	16814
0	2744	3461	5754	7410	9157	10260	11781	14124	16857
0	2712	3434	5735	7399	9153	10261	11791	14148	16897
0	2680	3404	5713	7387	9150	10263	11800	14173	16935
0	2645	3375	5691	7373	9143	10262	11809	14195	16970
0	2610	3342	5669	7357	9135	10260	11816	14215	17005
0	2575	3310	5645	7340	9128	10257	11820	14232	17037
0	2538	3276	5620	7321	9117	10253	11824	14249	17067
0	2501	3241	5596	7302	9105	10247	11825	14263	17095
0	2463	3206	5569	7282	9094	10238	11827	14278	17122
0	2423	3169	5542	7260	9080	10232	11826	14290	17150
0	2383	3131	5512	7236	9066	10223	11825	14299	17174
0	2344	3091	5483	7214	9052	10211	11824	14311	17196
0	2301	3054	5453	7190	9035	10200	11820	14317	17219
0	2261	3014	5421	7163	9019	10188	11816	14324	17238
0	2219	2974	5392	7139	8999	10174	11810	14331	17258
0	2173	2932	5357	7112	8980	10160	11804	14335	17275

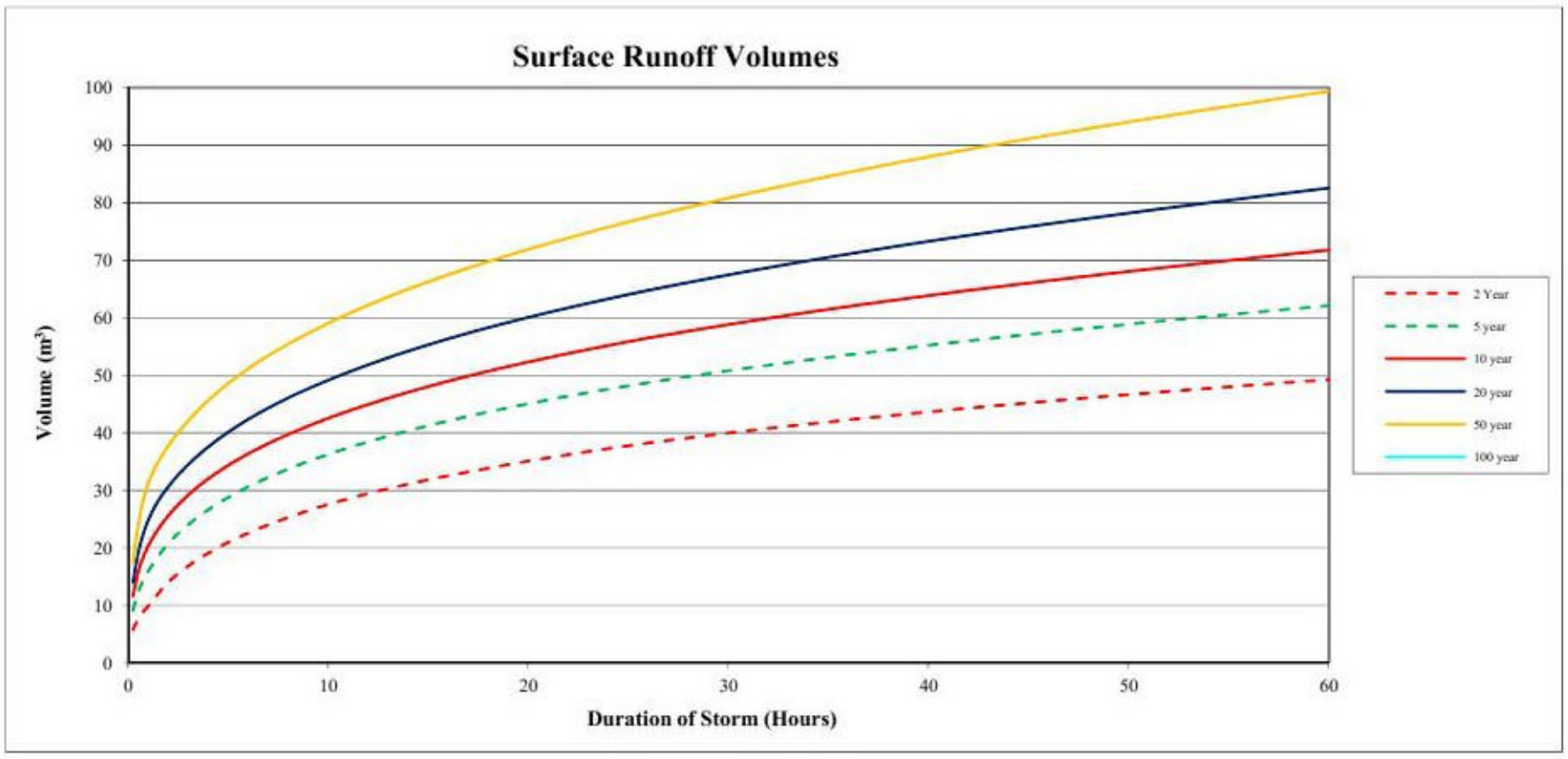
Groundwater Volume (m^3)	STORAGE REQUIRED - Surface and Groundwater (m^3)								
	1 year	2 year	5 year	10 year	20 year	30 year	50 year	100 year	200 year
0	2131	2892	5325	7085	8961	10146	11795	14339	17292
0	2086	2849	5290	7055	8942	10130	11786	14343	17309
0	2041	2804	5255	7025	8920	10113	11777	14344	17323
0	1996	2762	5220	6996	8898	10096	11768	14346	17335
0	1948	2717	5186	6966	8874	10077	11757	14345	17347
0	1903	2674	5148	6934	8852	10060	11743	14344	17359
0	1855	2626	5111	6904	8827	10039	11731	14343	17371
0	1807	2581	5074	6872	8800	10019	11717	14342	17380
0	1760	2536	5034	6838	8776	9998	11703	14338	17387
0	1709	2489	4996	6805	8749	9976	11689	14334	17396
0	1662	2441	4956	6771	8722	9954	11672	14328	17402
0	1612	2393	4917	6736	8695	9932	11656	14322	17407
0	1561	2345	4874	6701	8666	9908	11639	14315	17413
0	1511	2298	4834	6666	8636	9883	11620	14309	17417
0	1461	2250	4792	6632	8606	9859	11601	14303	17421
0	1408	2200	4749	6594	8577	9835	11584	14296	17425
0	1358	2152	4707	6557	8545	9808	11562	14288	17429
0	1305	2102	4664	6520	8515	9783	11543	14279	17431
0	1252	2052	4621	6482	8483	9756	11521	14270	17432
0	1199	2001	4576	6445	8451	9727	11499	14258	17431
0	1146	1951	4531	6408	8419	9700	11478	14250	17430
0	1093	1898	4486	6368	8384	9673	11456	14238	17429
0	1040	1848	4441	6328	8349	9643	11431	14224	17428
0	985	1795	4396	6288	8317	9614	11407	14213	17424
0	932	1742	4348	6248	8280	9584	11383	14199	17423
0	877	1689	4303	6208	8245	9552	11358	14184	17417
0	821	1636	4255	6165	8210	9522	11334	14170	17413
0	766	1583	4208	6123	8173	9490	11307	14156	17407
0	710	1531	4160	6083	8138	9458	11280	14140	17403
0	655	1475	4112	6041	8101	9426	11256	14126	17394
0	597	1422	4062	5998	8063	9394	11226	14109	17388
0	541	1367	4014	5953	8023	9361	11199	14090	17379
0	483	1311	3964	5910	7986	9327	11172	14073	17370
0	425	1256	3916	5865	7946	9295	11142	14054	17362
0	367	1200	3866	5823	7909	9260	11113	14037	17353
0	312	1145	3816	5778	7869	9225	11083	14018	17344
0	251	1090	3766	5733	7829	9188	11054	13996	17332
0	193	1032	3713	5685	7789	9153	11024	13977	17318
0	135	973	3662	5640	7746	9116	10992	13955	17307
0	74	918	3610	5592	7707	9078	10962	13933	17293
0	14	860	3557	5544	7664	9041	10930	13912	17279
0	-44	802	3504	5497	7622	9004	10898	13887	17265
0	-105	741	3451	5449	7579	8966	10866	13865	17248
0	-166	683	3398	5399	7536	8926	10834	13841	17231
0	-226	625	3345	5351	7494	8889	10799	13817	17215
0	-287	565	3290	5301	7451	8849	10767	13792	17198
0	-348	507	3237	5253	7406	8809	10732	13768	17182
0	-411	446	3182	5203	7364	8769	10697	13741	17165
0	-471	385	3129	5153	7319	8729	10665	13716	17146
0	-535	325	3073	5102	7274	8689	10630	13689	17126
0	-595	267	3018	5052	7229	8649	10593	13662	17107
0	-658	206	2962	5002	7183	8607	10558	13636	17088
0	-719	143	2907	4951	7138	8567	10524	13609	17069
0	-782	82	2851	4899	7093	8524	10486	13582	17047
0	-846	22	2796	4848	7048	8482	10451	13552	17025
0	-909	-39	2738	4795	7000	8439	10414	13525	17003
0	-972	-102	2682	4745	6955	8397	10377	13495	16982
0	-1035	-163	2627	4692	6908	8354	10339	13466	16960
0	-1098	-226	2569	4639	6863	8312	10302	13436	16938
0	-1162	-287	2511	4587	6815	8269	10265	13407	16914
0	-1225	-350	2455	4534	6767	8224	10225	13375	16892
0	-1291	-413	2397	4481	6719	8182	10187	13345	16867
0	-1354	-474	2339	4428	6672	8137	10150	13315	16843
0	-1420	-537	2281	4372	6624	8092	10110	13283	16819
0	-1483	-600	2223	4320	6574	8049	10070	13251	16794
0	-1549	-664	2165	4267	6526	8004	10030	13219	16767
0	-1612	-727	2107	4211	6478	7959	9990	13187	16743
0	-1678	-790	2049	4156	6428	7914	9951	13155	16716
0	-1744	-856	1988	4103	6378	7866	9911	13122	16689
0	-1809	-919	1930	4047	6330	7821	9871	13088	16662

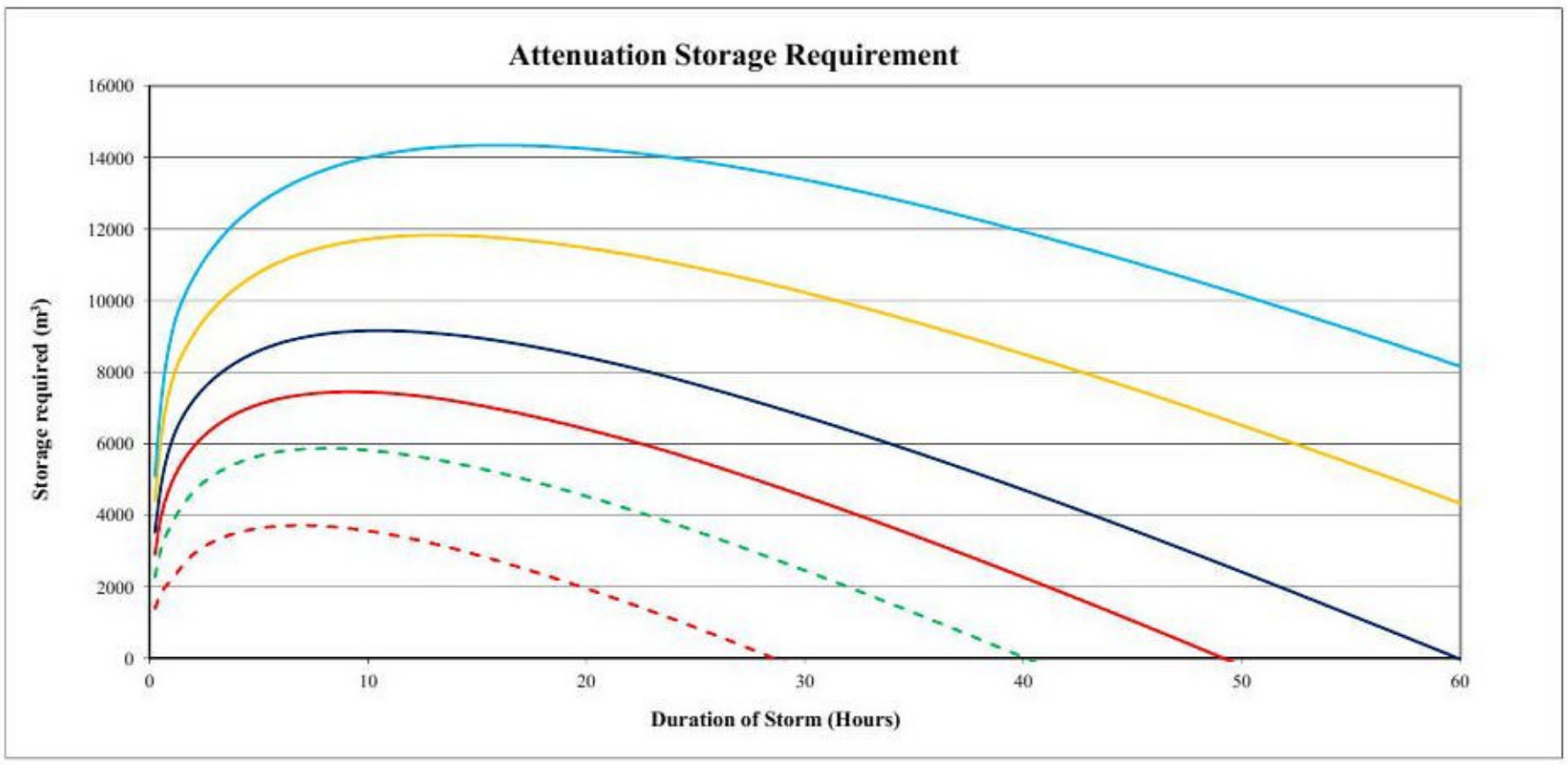
Groundwater Volume (m^3)	STORAGE REQUIRED - Surface and Groundwater (m^3)								
	1 year	2 year	5 year	10 year	20 year	30 year	50 year	100 year	200 year
0	-1873	-982	1872	3992	6280	7776	9831	13055	16635
0	-1938	-1048	1812	3937	6230	7728	9788	13021	16608
0	-2004	-1111	1754	3881	6179	7683	9748	12986	16581
0	-2070	-1174	1693	3826	6129	7635	9706	12954	16551
0	-2136	-1240	1632	3770	6079	7588	9666	12919	16524
0	-2204	-1306	1574	3715	6029	7543	9623	12884	16495
0	-2270	-1369	1514	3659	5978	7495	9581	12847	16465
0	-2336	-1435	1453	3601	5928	7447	9538	12812	16436
0	-2402	-1501	1393	3546	5875	7399	9496	12777	16406
0	-2470	-1567	1332	3490	5825	7352	9453	12740	16376
0	-2536	-1630	1271	3432	5772	7304	9411	12705	16347
0	-2602	-1696	1211	3374	5722	7254	9366	12668	16315
0	-2670	-1762	1150	3319	5669	7206	9323	12631	16285
0	-2736	-1827	1089	3261	5616	7158	9281	12596	16253
0	-2804	-1893	1026	3203	5566	7108	9236	12559	16223
0	-2873	-1959	966	3147	5513	7060	9193	12521	16191
0	-2938	-2027	905	3089	5460	7010	9148	12481	16159
0	-3007	-2093	842	3031	5407	6960	9103	12444	16127
0	-3075	-2159	781	2973	5354	6912	9058	12407	16095
0	-3141	-2225	718	2915	5301	6862	9015	12369	16060
0	-3209	-2293	657	2857	5248	6812	8970	12329	16028
0	-3278	-2359	594	2796	5193	6761	8925	12292	15996
0	-3346	-2425	533	2738	5140	6711	8877	12252	15961
0	-3415	-2493	470	2680	5087	6661	8832	12212	15926
0	-3483	-2559	407	2622	5032	6611	8787	12172	15894
0	-3551	-2627	344	2562	4979	6560	8742	12132	15859
0	-3620	-2696	283	2504	4926	6507	8694	12092	15824
0	-3688	-2762	220	2443	4871	6457	8649	12053	15790
0	-3757	-2830	157	2385	4815	6407	8602	12013	15755
0	-3825	-2898	93	2324	4762	6354	8556	11973	15720
0	-3896	-2964	30	2266	4707	6304	8509	11933	15683
0	-3964	-3033	-33	2206	4651	6251	8461	11890	15648
0	-4033	-3101	-96	2145	4596	6201	8416	11850	15611
0	-4104	-3169	-162	2084	4540	6148	8368	11808	15576
0	-4172	-3238	-225	2026	4488	6095	8321	11768	15539
0	-4240	-3306	-289	1966	4432	6042	8273	11725	15504
0	-4311	-3375	-352	1905	4377	5992	8225	11683	15467
0	-4380	-3443	-418	1844	4319	5939	8177	11640	15429
0	-4451	-3511	-481	1784	4263	5886	8130	11600	15392
0	-4519	-3580	-544	1723	4208	5833	8079	11558	15355
0	-4590	-3648	-610	1663	4152	5780	8032	11515	15317
0	-4661	-3717	-673	1602	4097	5727	7984	11470	15280
0	-4730	-3785	-739	1539	4039	5672	7934	11428	15240
0	-4801	-3853	-802	1478	3983	5619	7886	11385	15203
0	-4872	-3924	-868	1417	3925	5566	7838	11343	15163
0	-4940	-3993	-934	1357	3870	5513	7788	11298	15125
0	-5011	-4061	-997	1294	3812	5458	7738	11255	15085
0	-5082	-4132	-1063	1233	3756	5405	7690	11210	15048
0	-5153	-4201	-1128	1170	3698	5349	7640	11167	15008
0	-5224	-4269	-1192	1109	3643	5297	7590	11122	14968
0	-5292	-4340	-1257	1048	3585	5241	7539	11077	14928
0	-5363	-4408	-1323	985	3527	5188	7492	11035	14888
0	-5434	-4479	-1389	922	3469	5133	7441	10990	14848
0	-5505	-4548	-1455	861	3413	5077	7391	10945	14809
0	-5576	-4619	-1521	798	3355	5025	7341	10899	14769
0	-5647	-4690	-1587	735	3297	4969	7291	10854	14729
0	-5718	-4758	-1652	674	3239	4914	7238	10809	14689
0	-5789	-4829	-1718	611	3181	4858	7187	10764	14646
0	-5863	-4900	-1784	548	3123	4803	7137	10719	14606
0	-5934	-4968	-1850	485	3065	4747	7087	10671	14564
0	-6005	-5039	-1916	424	3007	4692	7034	10626	14524
0	-6076	-5110	-1981	361	2949	4636	6984	10581	14481
0	-6147	-5181	-2050	298	2888	4581	6933	10533	14439
0	-6220	-5252	-2116	234	2830	4525	6881	10488	14396
0	-6291	-5321	-2181	171	2772	4470	6828	10441	14356
0	-6362	-5392	-2247	108	2714	4415	6777	10396	14314
0	-6436	-5463	-2316	45	2654	4356	6725	10348	14269
0	-6507	-5534	-2381	-18	2595	4301	6672	10300	14226
0	-6580	-5605	-2450	-82	2535	4246	6621	10252	14184
0	-6651	-5676	-2516	-148	2477	4188	6569	10205	14141

Groundwater Volume (m^3)	STORAGE REQUIRED - Surface and Groundwater (m^3)								
	1 year	2 year	5 year	10 year	20 year	30 year	50 year	100 year	200 year
0	-6725	-5749	-2581	-211	2416	4132	6516	10157	14099
0	-6796	-5820	-2650	-274	2358	4074	6463	10109	14054
0	-6869	-5891	-2716	-337	2297	4019	6410	10062	14011
0	-6940	-5962	-2784	-400	2239	3961	6357	10014	13969
0	-7014	-6033	-2852	-466	2179	3905	6304	9966	13924
0	-7085	-6104	-2918	-529	2118	3847	6251	9919	13878
0	-7159	-6175	-2987	-593	2060	3792	6198	9871	13836
0	-7232	-6249	-3052	-658	2000	3734	6143	9821	13791
0	-7303	-6320	-3121	-722	1939	3675	6090	9773	13746
0	-7377	-6391	-3189	-785	1878	3620	6037	9725	13703
0	-7450	-6464	-3258	-851	1818	3562	5984	9675	13658
0	-7521	-6535	-3323	-914	1760	3504	5929	9627	13613
0	-7595	-6606	-3392	-980	1699	3446	5876	9577	13568
0	-7668	-6680	-3460	-1043	1638	3388	5823	9529	13523
0	-7742	-6751	-3529	-1109	1578	3330	5768	9479	13478
0	-7816	-6822	-3594	-1175	1517	3272	5715	9431	13433
0	-7887	-6895	-3663	-1238	1456	3214	5659	9381	13387
0	-7960	-6966	-3731	-1304	1396	3156	5604	9331	13342
0	-8034	-7040	-3800	-1367	1335	3098	5551	9281	13295
0	-8107	-7111	-3868	-1433	1272	3040	5496	9233	13250
0	-8181	-7184	-3936	-1498	1211	2982	5443	9183	13204
0	-8254	-7255	-4005	-1564	1151	2924	5387	9132	13157
0	-8328	-7329	-4073	-1627	1090	2865	5332	9082	13112
0	-8402	-7400	-4142	-1693	1029	2807	5276	9032	13067
0	-8475	-7474	-4210	-1759	966	2747	5224	8981	13019
0	-8549	-7545	-4278	-1825	906	2689	5168	8931	12971
0	-8622	-7618	-4347	-1891	845	2631	5113	8881	12926
0	-8696	-7692	-4415	-1954	784	2573	5057	8831	12878
0	-8769	-7763	-4484	-2020	721	2512	5002	8778	12831
0	-8843	-7836	-4555	-2085	660	2454	4946	8727	12786
0	-8917	-7910	-4623	-2151	597	2393	4891	8677	12738
0	-8990	-7981	-4691	-2217	537	2335	4835	8627	12690
0	-9064	-8054	-4760	-2283	473	2277	4780	8574	12643
0	-9137	-8128	-4828	-2349	413	2217	4724	8524	12595
0	-9211	-8201	-4899	-2415	350	2159	4669	8471	12547
0	-9287	-8272	-4967	-2480	289	2098	4611	8421	12499
0	-9361	-8346	-5036	-2546	226	2037	4556	8368	12452
0	-9434	-8420	-5104	-2612	165	1979	4500	8317	12404
0	-9508	-8493	-5175	-2680	102	1919	4445	8265	12356
0	-9581	-8567	-5244	-2746	39	1861	4387	8214	12309
0	-9657	-8638	-5312	-2812	-22	1800	4331	8161	12261

STORAGE REQUIRED FOR DISCHARGE LIMITED TO				99	l/s			
Return Period (years)	**1**	**2**	**5**	**10**	**20**	**30**	**50**	**100**
Storage (cubic metres)	3,073	3,715	5,871	7,452	9,161	10,263	11,827	14,346

Note: A **45** % increase in rainfall has been applied to cater for possible climate change.





DAB Geotechnics Ltd.

N B CLARK LTD.

FORMER BUTTERWELL SURFACE MINE AND COAL DISPOSAL POINT

PHASE 1 CONTAMINATION ASSESSMENT (DESK STUDY REPORT)

DAB Geotechnics Ltd.

FORMER BUTTERWELL SURFACE MINE AND COAL DISPOSAL POINT

PHASE 1 CONTAMINATION ASSESSMENT (DESK STUDY REPORT)

30th March 2023

	Name	Signature	Date
Reviewed by	D. A. Blythe		30th March 2023
Issue Status	**Final**		
Purpose	**For Client's information**		

Prepared by

DAB Geotechnics Ltd.,
Ellington, MORPETH,
Northumberland, NE61 5ES
Tel. No. 07711 168524
E-mail dblythe735822@btinternet.co.uk

FORMER BUTTERWELL SURFACE MINE AND COAL DISPOSAL POINT PHASE 1 CONTAMINATION ASSESSMENT (DESK STUDY REPORT)

Table of Contents

		Page
1.	INTRODUCTION	1
1.1	Background	1
1.2	Location and Topography	1
1.3	Purpose and Aims of this Assessment	1
2.	SOURCES OF INFORMATION	2
2.1	Ordnance Survey	2
2.2	Landmark Envirocheck Data	2
2.3	British Geological Survey	2
2.4	National Coal Board, British Coal and UK Coal Mining Ltd. Documents	2
2.5	Coal Authority	3
2.6	Planning Application Documents	3
2.7	Aerial Photographs	3
3.	HISTORICAL DEVELOPMENT	4
4.	EXISTING SITE CONDITIONS AND ENVIRONMENTAL SETTING	7
4.1	Walkover Inspection	7
4.2	Geology	8
4.2.1	British Geological Survey	8
4.2.2	Plans Compiled by the National Coal Board and UK Coal Mining Ltd.	8
4.2.3	Coal Authority Mining Report and Interactive Map	10
4.3	Hydrology	10
4.3.1	Catchment and Drainage	10
4.3.2	Sampling and Chemical Analysis	10
4.3.3	Surface Water Abstractions	17
4.4	Hydrogeology	17
5.	IMPLICATIONS FOR DEVELOPMENT	19
6.	RISK ASSESSMENT AND HAZARD RATING	20
6.1	Risk to Potential Receptors	20
6.2	Hazard Rating	22
7.	SUMMARY AND CONCLUSIONS	23
8.	REFERENCES	24

FIGURES
PHOTOGRAPHS
APPENDIX A Historical OS Maps
APPENDIX B Envirocheck Report
APPENDIC C Chemical Analysis Certificates

1. INTRODUCTION

1.1 Background

N. B. Clark Ltd. proposes to develop part of the former Butterwell Surface Mine and Coal Disposal Point (**DP**) for the importation of primary aggregates and inert wastes, and the production of secondary aggregates, soil and soil making material. Use will be made of the existing rail link and road network. The development will include the further restoration of approximately 24ha of land and the erection of a warden's residence, workshop and offices.

1.2 Location and Topography

The Site covers a total area of 29.45ha and lies approximately 3.5km WSW of Ellington and 7.5km north-east of Morpeth in the County of Northumberland (**Figure 1**). It is bounded to the north, north-east and north-west by a rail loop that extends from the East Coast Main Line (**ECML**) a short distance to the west. Restored agricultural land lies to the south. The Site encompasses the footprint of the offices, car park, plant yard and water treatment area of the former opencast site as well as the coal stocking area and railhead. Access to the Site will continue to be gained from the C125 public road.

The National Grid Reference for the approximate centre of the Site is 424550 591100 (1/50,000 Ordnance Survey Sheet No. 81 Alnwick, Morpeth & Surrounding Area).

The Site occupies part of Northumberland's coastal plain. Surface elevations range from 137m above Ordnance Datum (**AOD**) in the north-west to 124m AOD in the south-east.

1.3 Purpose and Aims of this Assessment

The aims of the Phase 1 Contamination Assessment are as follows:

(i) to review in detail the previous historical uses of the Site and to identify all potential sources and areas of contamination;

(ii) to review information with respect to the geological setting of the Site in order to identify any potential hazards that may exist;

(iii) to review information relating to the environmental setting of the Site in order to aid in the understanding of the nature, extent and behaviour of any contaminants that might be present; and

(iv) to obtain sufficient information to allow a preliminary environmental risk rating to be assigned to the Site.

2. SOURCES OF INFORMATION

2.1 Ordnance Survey

Early editions of the 1/2500 and 1/10,560 scale Ordnance Survey (**OS**) maps have been obtained for the Site and are presented in **Appendix A**.

2.2 Landmark Envirocheck Data

A Landmark Envirocheck report is presented in **Appendix B**. This is based on a radial search area of up to 1km and is centred on Grid Ref. 424930 590680 in the south-eastern part of the Site. It focuses on the proposed mineral processing area and the location of the associated offices, workshop and warden's residence.

2.3 British Geological Survey

The geology of the Site has been determined by reference to the following British Geological Survey (**BGS**) publications:

1/63,360 scale Geological Map, Sheet No. 9 (Rothbury). Solid Edition (1966);
1/50,000 scale Geological Map, Sheet No. 9, Bedrock and Superficial Edition (2009);
1/10,560 scale Geological Maps, Sheet Nos. NZ60NE & SE; and

'Geology of the Rothbury District' (Lawrence et al., 2011).

Two archive borehole logs have also been downloaded from the BGS's internet website (British Geological Survey, 2023).

2.4 National Coal Board, British Coal and UK Coal Mining Ltd. Documents

An examination has been made of the ground investigation boreholes (nos. 1, 2, A22, A23, A802, B803, B101-B108, C804, D001 and D002), soil laboratory test results and reports for the National Coal Board (**NCB**) disposal point that once occupied the Site (Northumbrian Drilling Contractors Geotechnical Data Ref. Nos. 21/N/129, March 1975 and 006/N/499, April 1980). Additional investigations were carried out for an unbuilt DP extension in 1993. These included the drilling of borehole nos. D1-D8, the excavation of trial pit nos. TP1 to TP4 and further testing and reporting (Norwest Holst Ground Investigation Report Ref. No. JI/TW/F9526). The relevant 1/10,560 scale Old Workings Plans (nos. NZ29SW and NZ29SE) have also been examined.

Reference has been made to a number of archive plans that were prepared by UK Coal Mining Ltd. (**UK Coal**) as part of its opencast development at the DP site (2011-2016). These are listed as follows:

1/2500 scale Existing Features Plan (Dwg. No. 188/D01);
1/2500 scale Site Plan (Dwg. No. 188/D02);
1/2500 scale Geological Plan;
1/2500 scale Drift Thickness Plan;
1/2500 scale Sand & Gravel Thickness Plan; and
1/2500 scale Rockhead Levels Plan.

The plans are based on the results of some 255 rotary boreholes drilled to determine the coal reserves and the nature and thickness of the overburden. The opencast excavations were extended from the Ashington (D/E) to the Top Yard (G1) coal seam

2.5 Coal Authority

The Coal Authority's interactive map viewer has been used to confirm the presence of old workings at depth beneath the Site. Reference has also been made to a CON29M Mining Report. Full details are given in the Coal Mining Risk Assessment Report (DAB Geotechnics Ltd., 2022a).

2.6 Planning Application Documents

Planning application documents have been provided by N. B. Clarke Ltd. Particular attention has been drawn to Figures 3A and 3B and the latter is presented as **Figure 2** in this report.

2.7 Aerial Photographs

A number of historical aerial photographs have been examined to confirm the extent of more recent developments at the Site.

3. HISTORICAL DEVELOPMENT

Table 1 provides a summary of the details shown on the historical editions of the Ordnance Survey Maps presented in **Appendix A**.

Map Edition and Scale	Recorded Details
1866 1/10,560	The Site is shown to comprise a series of agricultural field enclosures. Linton tile works is recorded about 900m to the north-east. An unnamed tributary of the River Lyne is shown to cross the Site in an easterly direction.
1895 1/2500	The 1/2500 scale map confirms that the land use in the central part of the Site was agricultural. The unnamed tributary of the River Lyne is shown to follow an easterly course.
1897 1/2500	The details shown on this map are similar to those recorded on the 1895 edition.
1898 1/10,560	The land use at the Site appears unchanged. Linton tile works had been closed and the area is identified as old clay pits, but a brick works had been established about 400m to the east close to an old shaft. Linton Colliery had been constructed with a rail link running NNW-SSE.
1923 1/2500	The details shown on this map are similar to those recorded on the 1895 edition.
1924 1/10,560	No changes are recorded on the Site. The surface buildings at Linton Colliery had been extended and housing erected for its employees. A colliery spoil tip is shown on the site of the brickworks. The rail network had been extended around the colliery. The clay pits at the former Linton tile works are no longer recorded.
1938 1/10,560	Coverage is restricted to the Linton Colliery area where little or no development appears to have occurred since 1924.
1940-1951 1/10,000	The land use at the Site remains unchanged. A shaft is recorded to the south of the Site at Old Moor. The rail system had been extended to the old shaft on the north-western side of Linton Colliery to allow further tipping. The existing tip had been enlarged and further tipping is shown to the north. The road around High Stead and Middle Stead had been completely re-aligned and straightened along its course to the east.
1951 1/10,000	Coverage is restricted to the area around Linton Colliery. Few or no changes are recorded since the publication of the 1941-1950 map.
1957-1958 1/2500	A mineral railway line is shown to have been constructed across the central part of the Site close to the unnamed tributary of the River Lyne. A small area of waterlogged ground is shown to the north of the line.
1966-1969 1/10,000	A mineral railway is shown to extend across the Site to a newly established Longhirst Drift mine. The spoil tips at Linton Colliery had been extended. The Site otherwise remains in agricultural use.
1974 1/10,000	Coverage is restricted to the area south-east of the Site only.
1978-1985 1/2500	The east-west rail link to Longhirst Drift was removed prior to the construction of the Disposal Point which is shown in its completed form on the 1978-1985 map. A rail loop had been built to serve the DP and provide a connection with the ECML. Four water treatment lagoons are shown together with the internal haul road to Linton Lane opencast site. This extends to the north-east.

Table 1 Summary of Details Shown on Early Editions of the OS Maps

Map Edition and Scale	Recorded Details
1980-1985 1/10,000	Only partial coverage of the Site is provided. Linton Colliery is no longer operational. The rail sidings are shown as having been removed, but the main system remains largely intact. A small lake is recorded to the east of the Site. This was formed as a result of mining subsidence. Two of the water treatment lagoons at the former Butterwell DP are shown close by.
1990 1/2500	The map records that little or no change had occurred on the Site since 1978-1985. However, an additional water storage pond had been constructed to the north of the treatment lagoons at the DP site.
1991 1/2500	No coverage provided.
1992 1/10,000	All the railway lines around Linton Colliery had been removed by 1992 and the Linton Lane opencast site was being developed on land to the west. The West Linton opencast development is also shown to the north of the Site, although this would have been at least partly restored by this time. The full extent of the former Butterwell DP is recorded, together with the internal haul roads to West Linton and Linton Lane opencast sites. Butterwell surface mine was accessed to the west using the bridge crossing over the ECML. Only one building is shown to remain on the Longhirst Drift site. The size of the lake to the east of the Site remains unchanged.
1994 1/2500	No changes are recorded on the Site since the publication of the 1990 1/2500 scale map.
2000 1/10,000	The lake to the east of the Site is shown to have marginally increased in size. A second lake is recorded to the south-west of Linton. Details of the Disposal Point are clearly recorded with the access road, four water treatment lagoons and other storage ponds. All the opencast workings to the north of the Site are shown as having been restored. The haul road and bridge crossing over the ECML to Butterwell surface mine has been retained even though this site had also been largely restored.
2022 (Street View) 1/10.000	The Longhirst Drift site is shown to have been restored with the creation of a number of ponds. The original DP buildings and infrastructure had been removed, though the water treatment lagoons had been retained, if only in a slightly modified form, together with the access road. This followed the development of UK Coal's opencast site.

Table 1 cont'd. Summary of Details Shown on Early Editions of the OS Maps

The NCB (later British Coal) constructed a coal disposal point on the Site during the mid to late 1970's. This was designed to receive raw coal from the nearby Butterwell, Stobswood, West Linton and Linton Lane opencast sites and process it for dispatch by road and rail. The development comprised the construction of coal stocking areas, reception hoppers, crushing equipment and rapid loading bunkers. It was noted that the land was previously in agricultural use, but was poorly drained and occasionally flooded due to mining subsidence. A water treatment area comprising four settlement lagoons was constructed and a permitted discharge point established on an unnamed tributary of the River Lyne. Oxidation of the inherent sulphide content in the coal led to the creation of acid runoff in the stocking area and this was treated using an automatic lime dosing plant linked to the settlement lagoons.

In later years, mobile crushing and screening equipment were also used to assist in the processing and blending of coal. The DP continued to operate after the privatisation of the coal industry and the sale of its assets to RJB Mining Ltd. (later UK Coal).

Coal crushing and screening operations ceased and the stocking grounds were cleared when mineral extraction was completed at Stobswood site. UK Coal later secured planning permission to recover the underlying opencast coal reserves at the DP. Aerial photographs of the Site dating from 2007, 2013 and 2022 are presented as **Figures 3**, **4** and **5**. These show the Site before, during and after opencast mining. The permitted maximum extent of the excavations is marked by an orange line. It can be seen that the opencast workings extended across most of the stocking area and that overburden was stored in its remaining part. Remnant deposits of coal and stocking area 'carpet' (poor quality coal and mudstone) were removed and tipped as backfill in the opencast workings. The static coal processing and loading installation was demolished and the concrete crushed and buried at depth. Inert waste that had been deposited to the north of the former Longhirst Drift (around Grid Ref.424360 590450) was similarly treated. This material was subject to a detailed site investigation entailing the excavation of 10 trial pits, sampling and chemical analysis. No evidence of contamination was found and this was reported as part of the planning application for the opencast development. A new processing and loading area was created to dispatch the extracted coal. This has been retained together with the rail link and will be used as part of the proposed development. The water treatment area was slightly modified and the dosing plant dismantled because of the absence of acidic runoff.

The southern part of UK Coal's opencast site was restored to agriculture and areas of ecological interest. A mixture of subsoil and glacial clay was spread across its northern part, but no topsoil was applied because it was intended to development the area for commercial and/or industrial purposes. There are some volumes of stored topsoil remaining alongside the ECML and the north-western perimeter of the Site (**Figure 5**). UK Coal's offices and workshop were removed to leave an area of hardstanding. This will be used as part of the proposed development.

4. EXISTING SITE CONDITIONS AND ENVIRONMENTAL SETTING

4.1 Walkover Inspection

A walkover inspection of the Site was carried out on the 2nd December during which a number of electronic images were taken. These are presented as **Photographs 1** to **15**.

Land previously occupied by UK Coal's offices, car park and plant yard comprises an area of tarmacadam and concrete hardstanding (**Photographs 1** and **2**). There was no visual or olfactory evidence of any fuel or lubrication oil spills at the time of the inspection. These materials were stored in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001. The developer's 'laydown' area (**Photograph 3**) lies immediately to the north and remains completely undeveloped.

The proposed mineral processing area (**Photographs 4**, **5** and **6**) comprises concrete hardstanding that was constructed at the time of UK Coal's opencast development. It occupies land that was wooded and previously undeveloped when the Site was occupied by a coal disposal point (**Figure 3**). The hardstanding was used as a coal processing, stockpiling and rail loading area (**Figure 4**). It was retained because there were plans to use it as part of the proposed Highthorn opencast development. All traces of coal were removed and there is no evidence to suggest that the area is contaminated.

The rail link (**Photograph 7**) lies outside the Site boundary. The line is founded on stone ballast, but apart from oil leakage from diesel electric locomotives, any contamination is likely to be limited and largely immobile. The line has only been used for coal traffic during its entire history. Since it was last used, there will have been some natural degradation of any oil based products.

The Site inspection was carried out during a period of very wet weather. The runoff from the northern part of the Site was observed to be clear (**Photographs 8** and **9**) as was the water in the unnamed tributary of the River Lyne (**Photograph 10**). The latter runs approximately west to east through the Site. However, the water in the treatment lagoons and in the discharge channel (**Photographs 11** and **12**) was found to be discoloured by a white to light brownish grey suspension. A number of samples were taken on the 26th January and 16th March 2023 and these were analysed by Chemtech Ltd. in a fully accredited chemical laboratory. The results are provided in **Appendix C** and are summarized in **Tables 2** and **4** (Section 4.5) where their compliance with Environmental Quality and UK Drinking Water Standards has been assessed and further comment provided. Reference has also been made to the Environment Agency's water quality results for the River Lyne.

The water from the Site discharges into an area of reed and rush growth (**Photograph 13**) that extends for some distance downstream. This will doubtless remove most of the suspended solids. Sampling was not extended off-Site where open water might be accessible because there are other inflows and potential contamination from agricultural land.

The 24 hectare of open land in the northern part of the Site (**Photograph 14**) supports a sparse vegetative cover and is presently devoid of any drainage. Infiltration rates are low owing to the low permeability of the subsoil and glacial cover that was applied across the backfilled opencast excavations. The four concrete blocks shown in **Photograph 15** mark the end of an electricity cable which may have been disconnected.

4.2 Geology

4.2.1 British Geological Survey

The 1/50,000 scale BGS geological map records that glacial till or 'boulder clay' extends across the entire Site, but in its northern and western parts there is a covering layer of made ground. Areas of backfilled opencast workings are shown to lie to the north and north-east. Since the compilation of this map, a large part of the Site was subject to opencast mining by UK Coal.

The 1/63,360 and 1/50,000 scale maps record that the Site is underlain by strata of the Upper Carboniferous, Pennine Middle Coal Measures Formation. These comprise an interbedded succession of mudstones, siltstones, sandstones, coal seams and seatearths. The strata are shown to dip at between 3 and 5° (1v in 19h to 1v in 11h) towards the east and south-east. The area is crossed by WNW-ESE and NE-SW normal faults of varying displacement.

There are details of only two boreholes held in the BGS's archive that provide information relevant to this study. Their locations are shown on **Figure 6**. Borehole no. NZ29SW27 is located on the south side of the C125 public road at High Steads Farm and records 12.90m of glacial cover. Borehole no. NZ29SW76 was removed during UK Coal's opencast mining operations, but the log shows a rockhead depth of 18.21m.

4.2.2 Plans Compiled by the National Coal Board and UK Coal Mining Ltd.

4.2.2.1 Superficial Deposits

An extract of UK Coal's 1/2500 scale Drift Thickness Plan is presented as **Figure 6**. This records the total thickness of superficial deposits prior to UK Coal's opencast mining and is based on exploratory drilling. The drift thicknesses recorded in the two BGS boreholes and those drilled as part of the ground investigations for the DP have been added. Exploratory drilling showed that deposits ranged in thickness from just over 10m beneath the southern part of the opencast site to 24.70m immediately north of the rail loop.

By far the majority of the superficial cover at UK Coal's opencast site comprised glacial till with some fluvio-glacial sand and gravel. The following is a summary of the succession recorded in the DP ground investigation boreholes:

Soil Description	Recorded Thickness (m)
Soft to stiff and sometimes very stiff, orange brown and brown mottled sandy CLAY with much fine to coarse gravel and occasional pockets of dense, moist, fine to medium sand.	0.00 – 3.80
Soft, brown, laminated, sandy CLAY.	0.00 – 1.80
Firm to very stiff, brown and grey brown, silty, sandy CLAY with fine to coarse gravel. Occasional sand bands, and sandstone cobbles and boulders.	2.50 – 17.05
Firm, brown, laminated CLAY.	0.00 – 0.10
Firm, brown sandy CLAY with sand bands.	0.00 – 0.80
Medium to very dense, light brown to brown, laminated SILT and fine to coarse, clayey SAND with fine to medium gravel.	0.00 – 6.25
Hard to very hard, brown to dark grey, silty, sandy CLAY with fine to coarse gravel. Occasional large boulders.	0.00 – 4.30

Relatively thin deposits of made ground were found to extend across the former coal stocking, processing and loading areas at the time of the DP ground investigation. The 1/2500 scale Sand & Gravel Thickness Plan shows that prior to opencast mining the majority of the glacial sand and gravel deposits were less than 1m in thickness.

Figure 6 shows the permitted extent of UK Coal's surface excavations where the superficial cover was effectively removed and placed as backfill together with large volumes of bedrock. The proposed mineral processing area, workshop, offices and warden's bungalow lie outside the backfill and will be founded on glacial deposits of over 12m in thickness.

4.2.2.2 Bedrock Strata

UK Coal's 1/2500 scale Geological Plan records that the bedrock strata dip towards the south-east at between 1v in 15h (3.8º) and 1v in 9h (6.3º). Minor NNW-SSE and WNW-ESE trending faults are shown to extend through the excavation area with displacements of approximately 2m towards the south and south-west. The ENE-WSW trending High Steads Fault is displayed along the southern margin of the excavations. This has a displacement of about 41m to the north.

The permitted opencast excavations extended from above the Ashington (D/E) down to the Top Yard (G1) coal seam. The latter formed the excavation pavement, although extraction was restricted to the Bottom Main (F2) and Ashington (D/E) seams in the west and north-east respectively. Abandoned mine workings were exposed in the Ashington High Main (D/E), Diamond (E), Top Main (F1) and Top Yard (G1) coal seams. Exploratory drilling also confirmed that there were extensive workings in the Bottom Yard (G2) beneath most of the excavations.

The NCB's 1/10,560 scale Old Workings Plans show that the proposed Site is underlain by workings in the Ashington (D/E), High Main (E), Top Main (F1), Bottom Yard (G2), Low Main (J), Brass Thill (K) and Hutton (L) seams. The shallowest lies at a base depth of about 17m below ground surface in the mineral processing area and roughly 20m where it is proposed to construct the workshop, offices and warden's bungalow.

4.2.3 Coal Authority Mining Report and Interactive Map

The Coal Authority's CON29M Mining Report (Appendix C in the Coal Mining Risk Assessment Report) raises a number of important points which are summarized below. Further comments are based on the details shown on the Coal Authority's interactive map.

(i) Records show that seven coal seams have been extracted at depths of up to 160m beneath the Site. These were last worked in 1965 and comprise a mixture of total (longwall and shortwall) extraction and goafed pillared workings. Uncharted workings may be present, but none were encountered during UK Coal's opencast mining operations.

(ii) The Coal Authority's interactive map shows that the Site is underlain by past shallow workings, but it is unclear whether this takes into account UK Coal's opencast excavations.

(iii) There are no records of any mine gas emissions at the Site.

The risk of mine gas emission is discussed in the Coal Mining Risk Assessment Report (DAB Geotechnics Ltd., 2022a). The Envirocheck report records that the Site lies within a lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). No radon protective measures are considered necessary in the construction of new dwellings or extensions.

4.3 Hydrology

4.3.1 Catchment and Drainage

The Site lies in the catchment of the River Lyne which is classified as a, *'Main River'*. A small tributary flows from west to east and passes beneath the main access road to the south of the proposed mineral processing area. There are existing drainage channels that will be adapted and used as part of the proposed development. Additional drainage will be installed in the northern part of the Site after further volumes of soil have been deposited to complete its restoration. A Flood Risk and Drainage Assessment Report has been compiled for the Site (DAB Geotechnics Ltd., 2022b).

4.3.2 Sampling and Chemical Analysis

Attention has been drawn to the colour of the water in the treatment lagoons and discharge channel. **Table 2** provides details of the chemical analysis results for five water samples taken in and around the water treatment area on the 26th January 2023. Testing was carried out by Chemtech Ltd. using UKAS accredited procedures. Comparison has been made with the latest Environmental Quality Standards (**EQS** values) for freshwater and exceedances are highlighted in yellow. Where there is no corresponding EQS, reliance has been placed on UK Drinking Water Standards (**UKDWS**) and non-compliant test results are highlighted in green.

Sample Number and Location		1. Close to Inlet	2. Southern Lagoon	3. Northern Lagoon	4. Outlet (from Northern Lagoon)	5. Tributary of River Lyne	River Lyne at Ulgham Grange	River Lyne at Lynemouth	Water Quality Standards
Date Sampled		26/01/23	26/01/23	26/01/23	26/01/23	26/01/23	2017-2020	2020-2022	
Antimony (total)	µg/l Sb	0.3	0.5	0.4	0.4	0.4			5 (UKDWS)
Arsenic (total)	µg/l As	0.62	0.85	0.74	0.75	0.64			50 (AA EQS) $ 10 (UKDWS)
Boron (total)	µg/l B	30	27	26	25	33			2000 (AA EQS) & 1000 (UKDWS)
Cadmium (total)	µg/l Cd	<0.07	0.10	<0.07	<0.07	<0.07			0.15 (AA EQS)[2]
Calcium (total)	mg/l Ca	1142	1283	913	909	1181	58.3-73	-	250 (UKDWS)
Chromium (total)	µg/l Cr	1.3	1.4	2.1	2.1	1.6			3.40 (AA EQS)[3]
Copper (total)	µg/l Cu	2.4	3.6	3.3	2.9	2.7			1 (AA EQS)[4]
Iron (total)	µg/l Fe	350	512	1834	2072	145			1000 (AA EQS)
Lead (total)	µg/l Pb	3.6	5.8	4.5	4.6	3.3	<30-210	-	1.2 (AA EQS)[4]
Magnesium (total)	mg/l Mg	288	287	219	221	284	7.88-14.1	-	50 (UKDWS)
Manganese (total)	µg/l Mn	12.0	10.7	12.9	12.4	3.8			30 (AA EQS)[4] & 50 (UKDWS)
Mercury (total)	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008			0.07 (Max) (EQS)
Nickel (total)	µg/l Ni	1.5	2.0	2.3	2.2	1.7			4 (AA EQS)[4]
Potassium (total)	mg/l K	24.7	26.8	26.9	26.5	25.1			12 (UKDWS)
Sodium (total)	mg/l Na	254	524	227	222	389			200 (UKDWS)
Zinc (total)	µg/l Zn	12	11	13	12	4			10.9 (AA EQS)[4]
Hardness (by calculation)[1]	mg/l $CaCO_3$	-	-	-	-	-	145-258		
pH	units	8.0	8.1	8.1	8.1	8.3	7.61-8.32	7.62-8.23	6-9 (EQS)
Temperature							2.9-16.6	0.9-17.0	
Electrical conductivity	µS/cm	686	608	536	519	746	242-620	546-1897	2500 (UKDWS)
Chloride	mg/l Cl	39.0	35.9	27.4	26.0	44.7			250 (AA EQS)
Nitrate	mg/l NO_3	<0.3	<0.3	<0.3	<0.3	<0.3	2.45-4.10	0.87-8.52	50 (UKDWS)
Sulphate	mg/l SO_4	111	98	84	78	109			400 (AA EQS) & 250 (UKDWS)
Alkalinity (settled)	mg/l $CaCO_3$	186	162	148	144	216	64-190	130-210	
Suspended solids	mg/l	8.5	18	35	29	35.5			
Chemical Oxygen Demand (total)	mg/l O_2	18	19	29	27	41			
Dissolved Oxygen	mg/l O_2	10.7	10.8	10.9	11.1	12.7	6.88-14.20	6.30-13.90	
Dissolved Organic Carbon	mg/l C	42	38	33	32	53			

AA – Annual average [1]Calculated using 2.497[Ca] + 4.118[Mg [2] Based on 100-150 mg/l $CaCO_3$] [3] Based on Chromium VI [4] Bioavailable. UKDWS UK Drinking Water Standards Denotes total concentration

Table 2 Surface Water Sample Analysis Results

Total concentrations were measured because of the visible presence of what appears to be a chemical precipitate. The water will not be used for public supply, but it is very hard and does carry total concentrations of calcium, magnesium, sodium and potassium that exceed the UKDWS. There are no EQS values for these substances (i.e. no perceived adverse environmental impact) and none are currently proposed.

The pH of the samples indicates slightly alkaline conditions. This together with the water hardness and the calcium and magnesium concentrations reflects the residual impact of lime dosing when the Site was operated as a coal stocking, processing and loading facility. Samples 1 and 5 were taken in close proximity to the water treatment area so it would appear that the ground has also been affected. The discolouration is due mainly to the precipitation of calcium, magnesium and other metallic compounds which the measurement of total concentrations takes into consideration. The pH values are all EQS compliant. The maximum permissible suspended solids concentration was 50 mg/l (pH 5-9) when the DP was operational and 60 mg/l (pH 6-9, iron 3 mg/l, maximum discharge flow 80 l/s) during opencast operations (ref. no. NE/EPRKP3825GB/001). The fact that the solids remain in suspension suggests that they are at least partly colloidal and that the lagoons cannot provide the settlement capacity even at relatively low flows. Filtration using straw bales or a reed bed would likely resolve the problem. Currently the water discharges into an area of reeds and rushes before it enters the unnamed tributary of the River Lyne. (Note that this watercourse is almost entirely sourced within the Site.) The watercourse is also subject to rush and reed growth and it wasn't possible to access open water for some considerable distance downstream of the discharge point on the 26th January.

The analysis results show that the total concentrations of cadmium, which has strong chemical affinities with zinc, are all compliant with the published EQS value. The same applies with regard to mercury and nickel. The iron concentrations exceed the EQS in two of the samples taken at the Site. It is entirely possible that some of the suspended solids are made up of iron oxy-hydroxide as soluble Fe^{2+} ions usually oxidise to Fe^{3+} on contact with air. These solids can be filtered if not settled.

Environmental Quality Standards for the protection of aquatic life were derived under previous legislation (i.e. the Dangerous Substance Directive 76/464/EEC) and several of these were expressed as hardness bandings to reflect apparent changes in toxicity with water hardness. The limits for copper, for example, were are follows:

0-50 mg/l $CaCO_3$	1 μg/l	100-250 mg/l $CaCO_3$	10 μg/l
50-100 mg/l $CaCO_3$	6 μg/l	>250 mg/l $CaCO_3$	28 μg/l

On this basis, the water samples at Butterwell DP would be compliant with respect to copper.

Better understanding of the impact of dissolved metals now shows that their toxicity is dependent on a range of other water quality parameters, principally pH and dissolved organic carbon (**DOC**). These parameters influence the concentration of metals responsible for toxic effects in flora and fauna (i.e. their bioavailable concentrations). This supports the long established view that measured total and dissolved concentrations have limited relevance to potential environmental risk. If the metals ions bind to other ions, such as carbonate (CO_3^{2-}) or DOC then it reduces their ability to bind to the organism. The effect appears to decrease where the DOC concentrations are higher than about 30 mg/l, Sodium (Na^+) and calcium (Ca^{2+}) ions can compete with potentially toxic metals to limit their effect. The presence of iron and aluminium can also have an impact due to their very high affinity for complexation by DOC.

Inorganic lead compounds have low solubility in natural waters, but this increases with greater acidity. The measured pH levels in **Table 2** are all slightly alkaline so the dissolved concentrations are expected to be low. The bioavailable concentrations represent a small fraction of the dissolved component and an even smaller part of the total values measured at the Site. They have been roughly estimated using an Environment Agency screening tool and the measured DOC values. The results are presented in **Table 3**.

Sample date 26th January 2023

Sample No.	Measured Total Lead Concentration (µg/l Pb)	Dissolved Organic Carbon (mg/l C)	Site Specific PNEC Dissolved Pb (µg/l Pb)	BioF	Available Lead Concentration (µg/l Pb)
1	3.6	42	24	0.05	0.18
2	5.8	38	24	0.05	0.29
3	4.5	33	24	0.05	0.23
4	4.6	32	24	0.05	0.23
5	3.3	53	24	0.05	0.17

PNEC - Predicted No Effect Concentration.
In all cases the measured DOC concentrations exceed 20 mg/l which is used to calculate a site specific PNEC value. A value of 20 mg/l has therefore been used in the calculations.

BioF - the bioavailability factor is the ratio of the 'Reference HC5' value calculated from water chemistry parameters reflecting high bioavailability ('reference conditions') divided by the Local HC5, the value calculated from water chemistry parameters from a local site. Through the use of a BioF, differences in bioavailability are accounted for by adjustments to the monitoring data, but the bioavailable EQS remains the same.

The HC5 is the 5th percentile of a species sensitivity distribution. This value therefore protects 95% of the species. The HC5 is commonly used as the scientific basis for setting EQS's. If a full biotic ligand model is available, the HC5 can be normalized to account for the bioavailability conditions (as a local HC5 and reference HC5). A local HC5 is a bioavailability corrected HC5. This means that the local HC5 takes the bioavailability conditions at a specific site into account.

Table 3 Estimated Available Lead Concentrations for Samples of 26th January 2023

The calculations should be carried out using measured dissolved concentrations which would provide even lower results, but in any event the results show that they fall well below 1.2 µg/l (i.e. they are compliant with the standard).

A second round of sampling was carried out on the 16th March 2023. Testing was again carried out by Chemtech Ltd., but on this occasion dissolved concentrations were considered. The results are presented in **Table 4** where comparison is again made with EQS and UKDWS values. There was a greater inflow and outflow of water at the time of sampling and this has clearly affected the results. Variations are to be expected where surface runoff from any site naturally drains to its point of discharge. The calcium and pH values are higher than might be expected, again indicating the impact of historic lime dosing, but without adverse effect on the environment. The suspended solids concentrations are certainly low enough to comply with the terms of a stringent discharge permit. The only exceedances, highlighted in yellow, relate to the copper concentrations. Note that all the lead concentrations fall below 1 µg/l so further assessment is not required. The concentrations of iron are also quite low. However, use has been made of the Environment Agency's M-BAT spreadsheet to further assess the concentrations of copper, zinc, manganese and nickel. The measured pH values and the calcium and DOC concentrations were input to derive site specific PNEC and bioavailable concentrations for the three metals. The results are presented in **Table 5**. Measured concentrations that exceed the derived PNEC values (Predicted No Effect Concentrations) are highlighted in yellow and copper is again identified as non-compliant. Where this is not the case, the spreadsheet calculations have derived bioavailable concentrations. It can be seen that these are much smaller than the measured dissolved concentrations.

Ambient background concentrations should also be accounted for as part of the EQS compliance assessment for zinc. Data have been published for various catchments in the UK. A background level of 2 µg/l is quoted for the River Tyne which must take into consideration the effects of historic metal and coal mining. There are no data for the River Lyne, but an allowance of 1 µg/l would seem reasonable based on the allowance made by the Scottish Environment Protection Agency for all watercourses in Scotland. Background levels of copper should also be taken into account and if a similar figure is acceptable, sample non-compliance at Butterwell DP becomes very marginal. Unfortunately, there are no data to make any kind of assessment and so it is not known whether the elevated copper concentrations are unique to this Site. It is not known whether similar assessments been made for any of the discharges into the River Lyne or its tributaries..

Sample Number and Location		1. Inlet Water	2. Southern Lagoon	3. Northern Lagoon	4. Outlet (from Northern Lagoon)	5. Tributary of River Lyne	River Lyne at Ulgham Grange	River Lyne at Lynemouth	Water Quality Standards
Date Sampled		16/03/23	16/03/23	16/03/23	16/03/23	16/03/23	2017-2020	2020-2022	
Antimony (total)	µg/l Sb	0.3	0.3	0.4	0.3	0.5			5 (UKDWS)
Arsenic (total)	µg/l As	0.51	0.57	0.67	0.51	0.46			50 (AA EQS) $ 10 (UKDWS)
Boron (total)	µg/l B	33	24	54	39	54			2000 (AA EQS) & 1000 (UKDWS)
Cadmium (total)	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07			0.15 (AA EQS)[2]
Calcium (total)	mg/l Ca	84	82	116	81	76	58.3-73	-	250 (UKDWS)
Chromium (total)	µg/l Cr	<0.2	<0.2	0.2	<0.2	<0.2			3.40 (AA EQS)[3]
Copper (total)	µg/l Cu	2.2	2.5	2.7	1.9	2.3			1 (AA EQS)[4]
Iron (total)	µg/l Fe	37	26	35	27	9			1000 (AA EQS)
Lead (total)	µg/l Pb	<0.2	<0.2	<0.2	<0.2	<0.2	<30-210	-	1.2 (AA EQS)[4]
Magnesium (total)	mg/l Mg	24	23	32	20	18	7.88-14.1	-	50 (UKDWS)
Manganese (total)	µg/l Mn	10.3	5.9	14.3	8.3	20.3			30 (AA EQS)[4] & 50 (UKDWS)
Mercury (total)	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008			0.07 (Max) (EQS)
Nickel (total)	µg/l Ni	1.3	1.6	1.7	1.3	1.5			4 (AA EQS)[4]
Potassium (total)	mg/l K	4.2	4.3	5.7	3.8	3.1			12 (UKDWS)
Sodium (total)	mg/l Na	15.9	19.0	22.6	17.2	20.7			200 (UKDWS)
Zinc (total)	µg/l Zn	1	<1	<1	<1	2			10.9 (AA EQS)[4]
Hardness (by calculation)[1]	mg/l $CaCO_3$	309	299	421	285	264	145-258		
pH	units	8.2	8.2	8.3	8.3	8.4	7.61-8.32	7.62-8.23	6-9 (EQS)
Temperature							2.9-16.6	0.9-17.0	
Electrical conductivity	µS/cm	612	589	626	595	567	242-620	546-1897	2500 (UKDWS)
Chloride	mg/l Cl	43.2	43.3	45.3	46.6	30.9			250 (AA EQS)
Nitrate	mg/l NO_3	12.8	5.2	14.1	20.8	0.6	2.45-4.10	0.87-8.52	50 (UKDWS)
Sulphate	mg/l SO_4	114.4	108.9	106.8	81.4	66.0			400 (AA EQS) & 250 (UKDWS)
Alkalinity (settled)	mg/l $CaCO_3$	138	128	134	140	190	64-190	130-210	
Suspended solids	mg/l	11	35	15	25	12			
Chemical Oxygen Demand (total)	mg/l O_2	19	22	19	12	18			
Dissolved Oxygen	mg/l O_2						6.88-14.20	6.30-13.90	
Dissolved Organic Carbon	mg/l C	39	35	38	37	50			

AA – Annual average [1]Calculated using dissolved 2.497[Ca] + 4.118[Mg [2] Based on 100-150 mg/l $CaCO_3$] [3] Based on Chromium VI [4] Bioavailable. UKDWS UK Drinking water standards

Table 4 Surface Water Sample Analysis Results

Sample No.	Location	Derived PNEC (µg/l)	Derived Bioavailable Concentration (µg/l)	Measured Concentration (µg/l)	Notes
Copper					
1	Inlet	1.0	-	2.2	PNEC derived using DOC concentration of 15 mg/l and in the case of sample 3 a calcium concentration of 93 mg/l, as otherwise the measured values exceed valid ranges for copper.
2	Southern Lagoon	1.0	-	2.5	
3	Northern Lagoon	1.0	-	2.7	
4	Outlet	1.0	-	1.9	
5	Unnamed tributary	1.0	-	2.3	
Zinc					
1	Inlet	89.35	0.12	1	PNEC derived using a DOC concentration of 20 mg/l and a pH of 8 as otherwise the measured values exceed valid ranges for zinc.
2	Southern Lagoon	89.49	0.12	<1*	
3	Northern Lagoon	87.55	0.12	<1*	
4	Outlet	89.56	0.12	<1*	
5	Unnamed tributary	89.91	0.14	2	
Nickel					
1	Inlet	23.03	0.23	1.3	PNEC derived using DOC concentrations of 20 and in the case of sample 3 a calcium concentration of 88 mg/l, as otherwise the measured values exceed valid ranges for nickel.
2	Southern Lagoon	22.55	0.28	1.6	
3	Northern Lagoon	21.24	0.32	1.7	
4	Outlet	19.59	0.27	1.3	
5	Unnamed tributary	18.55	0.39	1.5	
Manganese					
1	Inlet	149.07	8.5	10.3	PNEC derived using a DOC concentration of 20 and a pH of 8 as otherwise the measured values exceed valid ranges for manganese.
2	Southern Lagoon	149.07	4.87	5.9	
3	Northern Lagoon	123	14.30	14.3	
4	Outlet	123	8.3	8.3	
5	Unnamed tributary	123	20.3	20.3	

PNEC - Predicted No Effect Concentration. *A value of 1 was used in the calculations.

Table 5 Results of M-BAT Analysis using Dissolved Concentrations of Copper, Zinc, Nickel and Manganese

What is the source of the copper? The concentrations are very low in real terms. Coal Measures strata contain inherent sulphides; predominantly iron pyrites with much lower proportions of galena (PbS), sphalerite (ZnS), chalcopyrite ($CuFeS_2$), arsenopyrire (FeAsS) and millerite (NiS). These decompose through exposure and bacterial activity to form soluble sulphates, which in the case of iron hydrolyse to create insoluble oxyhydroxides. The reactions create acidic conditions, but in Northumberland there is usually, but not always, sufficient carbonate material to provide a suitable buffer. The mine water that lies at depth beneath the Site is more or less pH neutral as a consequence. Acid runoff was created when large volumes of coal were stored on the Site and this will have been accompanied by elevated metal and sulphate concentrations. Lime treatment was required to neutralize the water prior to discharge.

All the coal has been removed, even from the concrete hardstanding. A cover of subsoil and glacial clay has been applied across the Site as part of its restoration. Hard cover is present elsewhere. The subsoil and glacial clay contain fragments of Coal Measures rock materials and remain exposed over a wide area in the north-west. However, if this material was the source of the contamination, it would be expected that there would also be elevated concentrations of nickel, zinc, lead and sulphate. The sulphate concentrations are all well below the EQS for both sets of results so it is not thought that sulphide decomposition is a problem at the Site. The idea that the Site has inherited, *'coal mining legacies'*, is not accepted. However, the placement of topsoil and the establishment of vegetative cover might serve to improve the situation.

Runoff from the proposed mineral processing and stockpiling areas should not give rise to any impact on discharge water quality provided that only inert materials are imported as proposed. This will be a requirement of any waste licensing at the Site. The principal contaminant in the runoff will be inert suspended solids which can be removed by simple settlement in silt traps, sumps and the existing lagoons.

More sampling and testing will be carried out to determine compliance with the Site discharge consent or permit. The Agency will also carry out its own sampling as part of its statutory duties. Indeed, the quality of the discharge water was monitored throughout the period of opencast mining and restoration at the Site. There are no reports of any breeches of the Agency's discharge consent conditions and there is no reason to suppose there will be any problems during the course of the proposed development.

The discharge consent for the Site (ref. no. NE/EPRKP3825GB/001) was transferred from UK Coal to Harworth Estates Mines Property Ltd. on the 8th December 2016. It has since been transferred to N. B. Clark Ltd. The local authority pollution, prevention and controls (PPC) licences held for the purposes of coal processing have also been surrendered. The recorded pollution incident (no. 45712) does not refer to any historical activities at the Site.

4.3.3 Surface Water Abstractions

The Landmark Envirocheck report (**Appendix B**) records that water is abstracted from the River Lyne under the terms of a permit or licence held in the name of M. Dungait & Sons (licence number 1/22/04/022). This abstraction will not be impacted by the proposed development because it is located upstream of the Site. There are no recorded unlicensed abstractions.

4.4 Hydrogeology

The superficial deposits at the Site are classified as a Secondary Aquifer by the Environment Agency, but given the predominance of glacial till, they are unlikely to represent an important source of water, even at a local level. The bedrock strata are classified as a Secondary Aquifer – A and comprise, '*fractured or potentially fractured rocks, which do not have a high primary permeability, or other formations of variable permeability including unconsolidated deposits.'* These do not produce large quantities of water for abstraction, but they are important for local supplies and in supplying base flows to rivers.

Groundwater levels at the Site were previously controlled by large scale pumping at Ellington Colliery. This was facilitated by the interconnection of old mine workings. Pumping ended when the colliery was closed in August 2005 and the water was then allowed to slowly recover and flood the workings. Nonetheless, it was still possible for UK Coal to carry out its opencast mining operations without the need for groundwater abstraction. Monitoring carried out before the commencement of opencast mining confirmed the presence of dewatered strata and it was estimated that the excavations would be dry to at least -33.31m AOD (i.e. 33.31 below OD), as indeed proved to be the case. Since that time, the Coal Authority has established its own pumping operations at the former Lynemouth Colliery where it maintains the water level at around -34m AOD. The Site lies about 5.3km to the west of the colliery and it is estimated that the underlying mine workings will now be flooded to a level of between -28.7m AOD and -23.4m AOD based on hydraulic gradients of 1v in 1000h and 1v in 500h respectively. This means that the groundwater lies at about 49 to 55m below ground surface where it is proposed to erect buildings and carry out mineral processing at the Site. It follows therefore that there are no mine water discharges at or around the Site or are there likely to be within the lifetime of the proposed development.

The licensed groundwater abstractions held by M. Dungait & Sons of Manor Farm, Ulgham (licence nos. 1/22/04/025 and 1/22/04/025/R01) are located some distance to the north-west of the Site and will not be impacted by the development. This is because there are no plans to abstract water or deposit contaminated materials and also applies to any unlicensed abstractions. There are no source protection zones.

There would appear to be only one former landfill site within the Envirocheck search area. This was located at Rear Rose Cottage, Longhirst at Grid Ref. 425700 590500, about 800m south-east of the Site. The site received household waste, but was closed some time ago. Again, there will be no adverse impact because there are no plans to abstract groundwater.

5. IMPLICATIONS FOR DEVELOPMENT

The Site remained largely in agricultural use until the construction of the DP by the National Coal Board in the 1970's. None of the coal that was previously stored or processed at the Site was combusted and so it is highly unlikely that there has been any significant contamination by potentially harmful derivatives such as phenols and polycyclic aromatic hydrocarbons (PAH's). The stockpiles were regularly monitored and any heating associated with the natural oxidation of the coal was detected at an early stage (e.g. by observing the presence of water vapour and measuring the temperature using a probe). Any such effects were mitigated by compacting the outer surface of the stockpile to prevent further air ingress. There are no records of burning coal having to be removed and treated. It was in the operators' best interest not to lose coal.

Natural sulphides present in the coal were subject to oxidation and acidification. The runoff was routinely treated using an automatic lime batching plant located adjacent to the existing lagoons. This was removed when the Site was developed for opencast mining and much smaller volumes of coal were stored for much shorter periods of time on a purpose built concrete pad underlain by in-situ glacial material. The hardstanding will be used for the proposed mineral processing operations. The original DP buildings and the associated stocking area were completely removed and the materials buried at depth as part of the opencast mining operation.

All the railway lines that were constructed around the Site were used solely for the transportation of coal. There were no coke works at Linton Colliery or any of the other mines in the area so the risk of rail wagons importing potentially hazardous contaminants ito the area is considered to be low. The rail link to the DP was only ever used by diesel-electric locomotives, none of which were re-fuelled or serviced adjacent to the Site.

There is no evidence of any oil spills or contamination in the area of UK Coal's former plant maintenance, car park and offices. In any event, the concrete and tarmacadam cover will have prevented significant migration as would the underlying in-situ glacial till. Fuel and lubricating oils were stored in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001. This will continue to be the case during the course of the proposed development.

The risk of mine gas migration has been considered in the Coal Mining Risk Assessment (DAB Geotechnics Ltd., 2022a).

It is proposed to import only fully certificated inert waste materials and primary aggregates onto the Site. These materials will be crushed, screened and washed in a purpose built installation. The discharge water will be treated and discharged into a tributary of the River Lyne subject to the approval and conditions set by the Lead Local Flood Authority and the Environment Agency.

To summarize, there is no evidence to suggest that the Site is grossly contaminated and it will not become so as a consequence of the proposed development.

6. RISK ASSESSMENT AND HAZARD RATING

6.1 Risk to Potential Receptors

It is proposed to use part of the former Butterwell Surface Mine and Coal Disposal Point for the importation and processing of primary aggregates, inert construction and demolition waste and the production of secondary aggregates, soils and soil making materials. An area of land covering some 24ha in the northern part of the Site will be further restored to agriculture using suitable topsoil material. This land was previously set aside for industrial or commercial development. An assessment has been carried out based on the risk to potential receptors. The approach adopted in this report is based on CIRIA report C552 (CIRIA, 2001). For each of the pollution linkages, an estimate is made of: the potential severity of the risk and the likelihood of the risk occurring. The risk severity classification is shown in **Table 4**.

Severe	Acute risks to human health. Catastrophic damage to buildings/property (e.g. by explosion). Major pollution of controlled waters (watercourses or groundwater).
Medium	Chronic (long-term) risk to human health. Pollution of sensitive controlled waters (surface waters or aquifers). Significant effects on sensitive ecosystems or species.
Mild	Pollution of non-sensitive waters. Significant damage to buildings or structures.
Minor	Requirement for protective equipment during site works to mitigate health effects. Damage to non-sensitive ecosystems or species. Minor damage to buildings or structures.

Table 4 Severity of Risk

The probability of the risk occurring is based on the criteria given in **Table 5**.

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

Table 5 Probability of Risk Occurring

An overall evaluation of the level of risk is gained from a comparison of the severity and probability as presented in **Table 6**. **Table 7** provides details of a risk assessment based on the proposed end land use and can be used to evaluate the likelihood of the receptor being affected.

		Severity			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low Likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Table 6 Comparison of Severity and Probability

Source(s)	Pathway(s)	Receptor(s)	Severity	Probability	Risk
Organic contamination in soils from historic activities related to the production and processing of coal.	Ingestion, inhalation and dermal contact via permeable soils.	Human health: Site operatives.	Minor	Unlikely	Very low risk
		Human health: future Site users	Minor	Unlikely	Very low risk
	Direct contact via permeable soils.	Existing and future services/infrastructure (e.g. plastic pipes and ducting)	Minor	Unlikely	Very low risk
	Root uptake.	Vegetation	Minor	Unlikely	Very low risk
Inorganic contamination in soils from historic activities related to the production and processing of coal.	Ingestion, inhalation and dermal contact via permeable soils.	Human health: Site operatives.	Minor	Low likelihood	Very low risk
		Human health: future Site users	Minor	Low likelihood	Very low risk
	Direct contact via permeable soils.	Existing and future services/infrastructure (e.g. plastic pipes and ducting)	Minor	Unlikely	Very low risk
	Root uptake.	Vegetation	Minor	Likely	Low risk
Leachable contamination, dissolved hydrocarbon and inorganic compounds (from historic and proposed activities on the Site).	Root uptake.	Vegetation	Minor	Low likelihood	Very low risk
	Lateral migration via permeable soils.	Existing surface watercourses	Minor	Likely	Low risk
Mine gas from coal workings, radon gas, soil gas and vapour.	Migration through permeable soils.	Human health: Site operatives, visitors and neighbouring properties.	Minor	Mine gas: unlikely where thick deposits of glacial material remain and even where subsoil covers opencast backfill. Radon gas: likely, but concentrations so low no protective measures deemed necessary. Soil gases and vapours: unlikely, no organic contamination.	Low to very low risk

Table 7 Risk Assessment based on Proposed End Land Use

6.2 Hazard Rating

The assessment of potential contamination has also been carried out by means of a broad contamination hazard rating based on the land use history, but without the benefit of an intrusive investigation. There are three risk ratings for historical land use:

High - *the nature of the historical land use is such that the presence of significant contamination is considered very likely and can be regarded as undesirable*.

Medium - *the nature of the historical land use is such that the presence of contamination is considered likely, the significance of which will depend on the degree of contamination*.

Low - *the nature of the historical land use is such that general contamination occurring on the site is unlikely to be present a significant risk*.

A hazard rating has also been devised to put into context the significance of contamination due to the current land uses. The occurrence of one or more of the factors listed below will determine the appropriate site rating.

High - *the nature of the potential contaminants arising from current uses is such that with highly permeable strata, potentially significant groundwater movements, sensitive adjacent land uses and with little or no mitigation measures undertaken, it is considered highly likely that a significant hazard exists to the site users, buildings, services and groundwater, both on and off the site*.

Medium - *the nature of the potential contaminants arising from current uses is such that with permeable strata, possible groundwater movements, similarly sensitive adjacent land uses, and with mitigation measures undertaken, it is considered likely that a hazard exists to site users, buildings, services and groundwater, both on and off the site*.

Low - *the nature of the potential contaminants arising from current uses is such that with low permeability strata, minor groundwater movements, less sensitive adjacent land uses and with mitigation measures undertaken, it is considered unlikely that any significant hazard exists to site users, buildings, services and groundwater, both on and off the site*.

Based on the findings of this assessment, the Site can be given a LOW historical contamination rating. This rating is awarded because it was used for agricultural purposes until the 1970's. It was then used only for coal stocking, processing and dispatch. After the removal of all the coal, most of the area was then subject to opencast mining which removed the surface materials and placed them at depth. The Site is presently comprises partly restored open land and areas of hard cover and for this reason the current land use hazard rating is considered to be LOW.

A qualitative source-pathway-receptor assessment has been undertaken and a conceptual model has been produced. This is presented as **Figure 7**. There are presently no significant contaminant sources on the Site. This situation will not change if it is developed as planned.

7. SUMMARY AND CONCLUSIONS

1. N. B. Clark Ltd. proposes to develop part of the former Butterwell Surface Mine and Coal Disposal Point for the importation of primary aggregates and inert wastes, and the production of secondary aggregates, soil and soil making material. Use will be made of the existing areas of hard cover as well as the adjacent rail link and road network. The development will include the further restoration of approximately 24ha of land and the erection of a warden's residence, workshop and offices.

2. A large part of the Site was previously used for the importation, processing and storage of coal from a number of former opencast sites. The coal was then dispatched by rail using a purpose built loading facility. Opencast mining was later carried out at the Site during which all traces of the coal stocking ground were removed and the static processing equipment and rail loading facility were demolished. All the demolition and coal carpet materials were buried at depth as part of the permitted development. The opencast workings were then restored to agriculture and nature conservation. However, 24ha of land in the northern part of the Site was only partly restored and set aside for possible commercial and industrial development. The rail link and adjacent concrete hardstanding were also retained for possible later use.

3. The existing water treatment area will be adapted for use during the proposed operation of the Site to remove suspended solids. These are expected to be the principal contaminant as all imported materials will be inert. The water in the lagoon and discharge channel is currently discoloured by a white to light brownish grey suspension. Sampling and chemical analysis has shown that the water has been affected by lime dosing that was previously undertaken to neutralise acidic runoff from coal stocking areas. This appears to have affected the adjacent unnamed tributary of the River Lyne. The analysis results show that the quality of the water does vary with the flow rate through the lagoon system, as might be expected, but measured total and dissolved concentrations of cadmium, lead, nickel, chromium, manganese and mercury are shown to fall below the corresponding EQS's for fresh water with or without further assessment based on bioavailability. The same can be said for zinc, but not in the case of copper, the source of which remains unclear. There are no background levels for this metal which makes further assessment as to its environmental impact very difficult. Nonetheless, even if the contamination is unique to the Site, there will be significant levels of dilution downstream and it is not thought that the concentrations are likely to have an adverse impact on the environment. The provision of a topsoil and vegetative cover in the northern part of the Site may resolve the situation, but otherwise it will very difficult to find a sustainable solution. The proposed development will not add to the problem provided that the imported materials are inert as will be required by any waste management licence that the Environment Agency may grant.

4. The Site has been assigned a LOW historical contamination rating based on the findings of this assessment. It is also concluded that the current land use hazard rating is LOW. There are no significant sources of contamination on the Site that represent more than a low to very low risk to potential receptors.

8. REFERENCES

British Geological Survey (2022). Internet website. www.bgs.ac.uk

Coal Authority (2022), Internet website and interactive map. www.mapapps2.bgs.ac.uk

DAB Geotechnics Ltd. (2022a), Former Butterwell Surface Mine and Coal Disposal Site - Coal Mining Risk Assessment (including Ground Gas Protection Report) Report to N. B. Clark Morpeth Ltd.

DAB Geotechnics Ltd. (2022b), Former Butterwell Surface Mine and Coal Disposal Site – Flood Risk & Drainage Assessment. Report to N. B. Clark Morpeth Ltd.

Environment Agency (2008), 'Environmental Quality Standards for Trace Metals in the Aquatic Environment'. Science Report SCO30194. Bristol. 177p.

Environment Agency (2010), 'The importance of dissolved organic carbon in the assessment of environmental quality standard compliance for copper and zinc.' Science Report SC080021. Bristol.

European Union (2019), 'Technical Guidance for implementing Environmental Quality Standards (EQS) for metals. Consideration of metal bioavailability and natural background concentration in assessing compliance'. Common Implementation Strategy for the Water Framework Directive (2000/60/EC) Guidance Document No. 38. 125p.

Lawrence, D. J. D., Dean, M. T., Entwisle, D. C., Kimbell, G. S. and Butcher, A. (2011), 'Geology of the Rothbury District'. British Geological Survey, Keyworth, Nottingham. 37p.

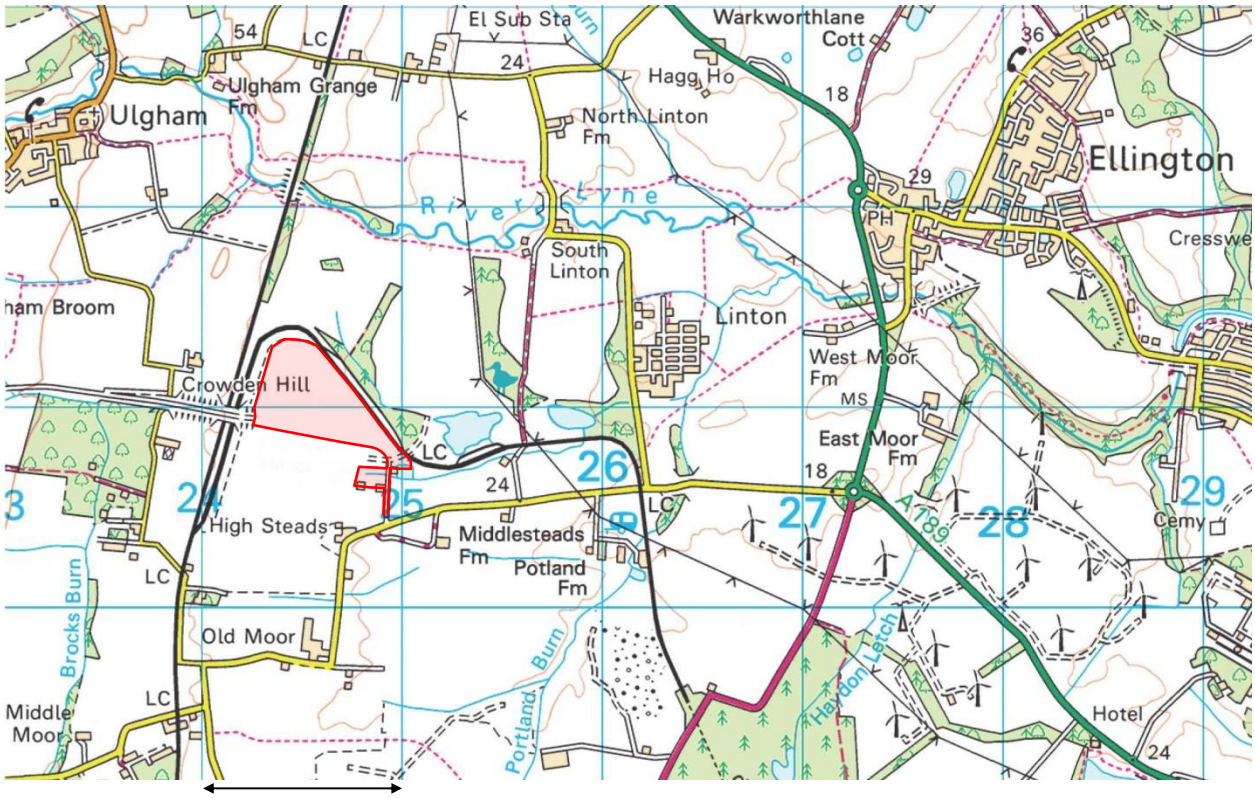
Northumbrian Drilling Contractors (1975 and 1980), Geotechnical Data - Butterwell Disposal Point, Ref. Nos. 21/N/129 and 006/N/499. Reports prepared for National Coal Board.

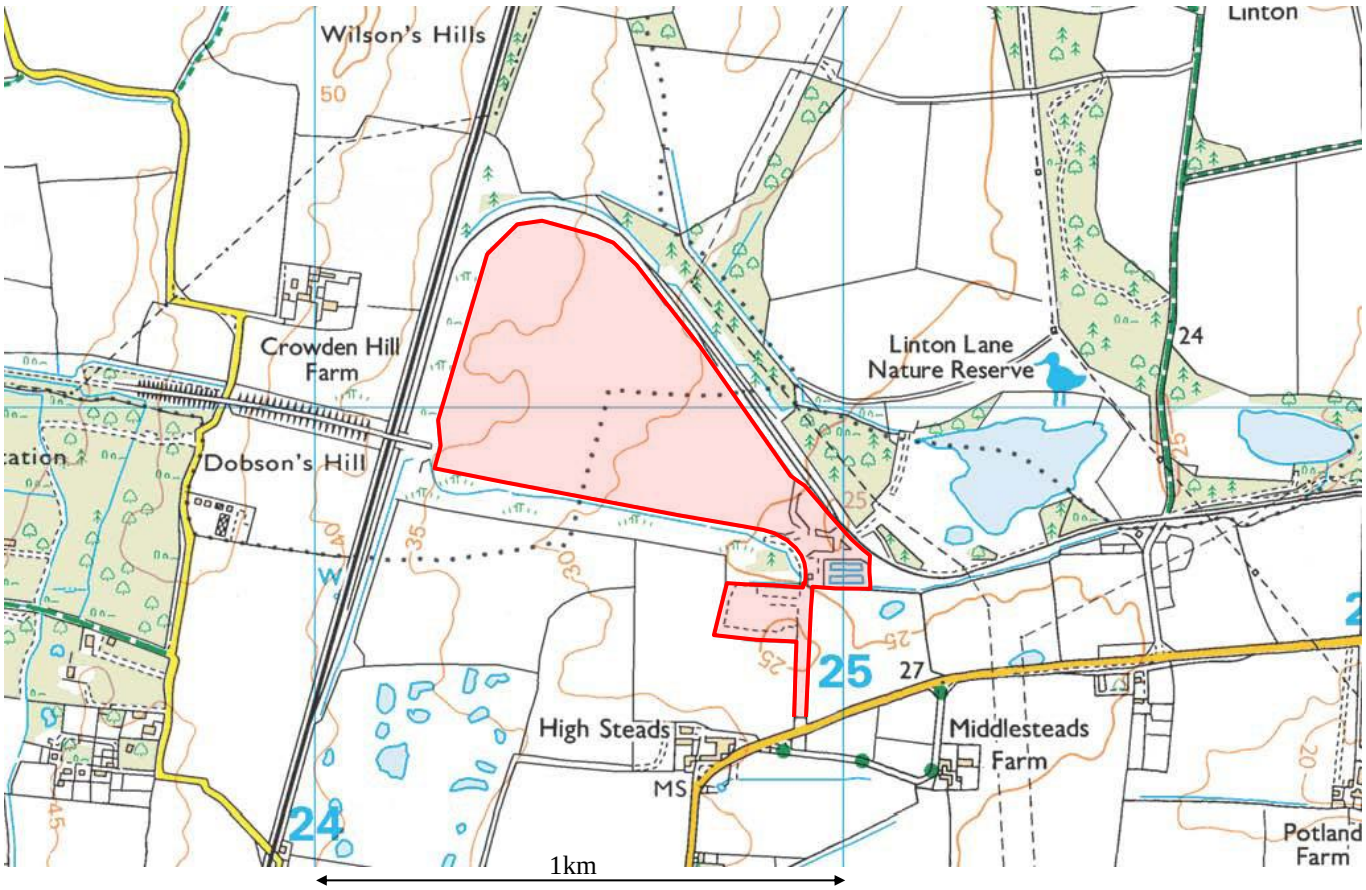
Norwest Holst Soil Engineering Ltd. (1993), 'Ground Investigation Report for Butterwell DP, Ref. No. JI/TW/F9526). Report prepared for British Coal Corporation.

Scottish Environment Protection Agency (2020), 'Supporting Guidance WAT-SG-53 Environmental Quality Standards and Discharges to Surface Water'. Version 7.1, April. 34p.

Water Framework Directive United Kingdom Technical Advisory Group (WFD-UKTAG) (2014), 'UKTAG River & Lake Assessment Method Specific Pollutants (Metals), Metal Bioavailability Assessment Tool (M-BAT). 11p.

FIGURES





Extracts of OS map reproduced with the Permission of Controller of H. M. Stationery Office © Crown Copyright. All rights reserved. Licence No. 100052240 DAB Geotechnics Ltd.

Figure 1 Location

DAB Geotechnics Ltd.	Former Butterwell Surface Mine & Coal Disposal Site Phase 1 Contamination Assessment	Date: 30th November 2022



Extracts of OS map reproduced with the Permission of Controller of H. M. Stationery Office © Crown Copyright. All rights reserved.
Licence No. 100052240 DAB Geotechnics Ltd.

Figure 2 Extract of Drawing No. BDP/3B

DAB Geotechnics Ltd.	Former Butterwell Surface Mine & Coal Disposal Site Phase 1 Contamination Assessment	Date: 30th November 2022

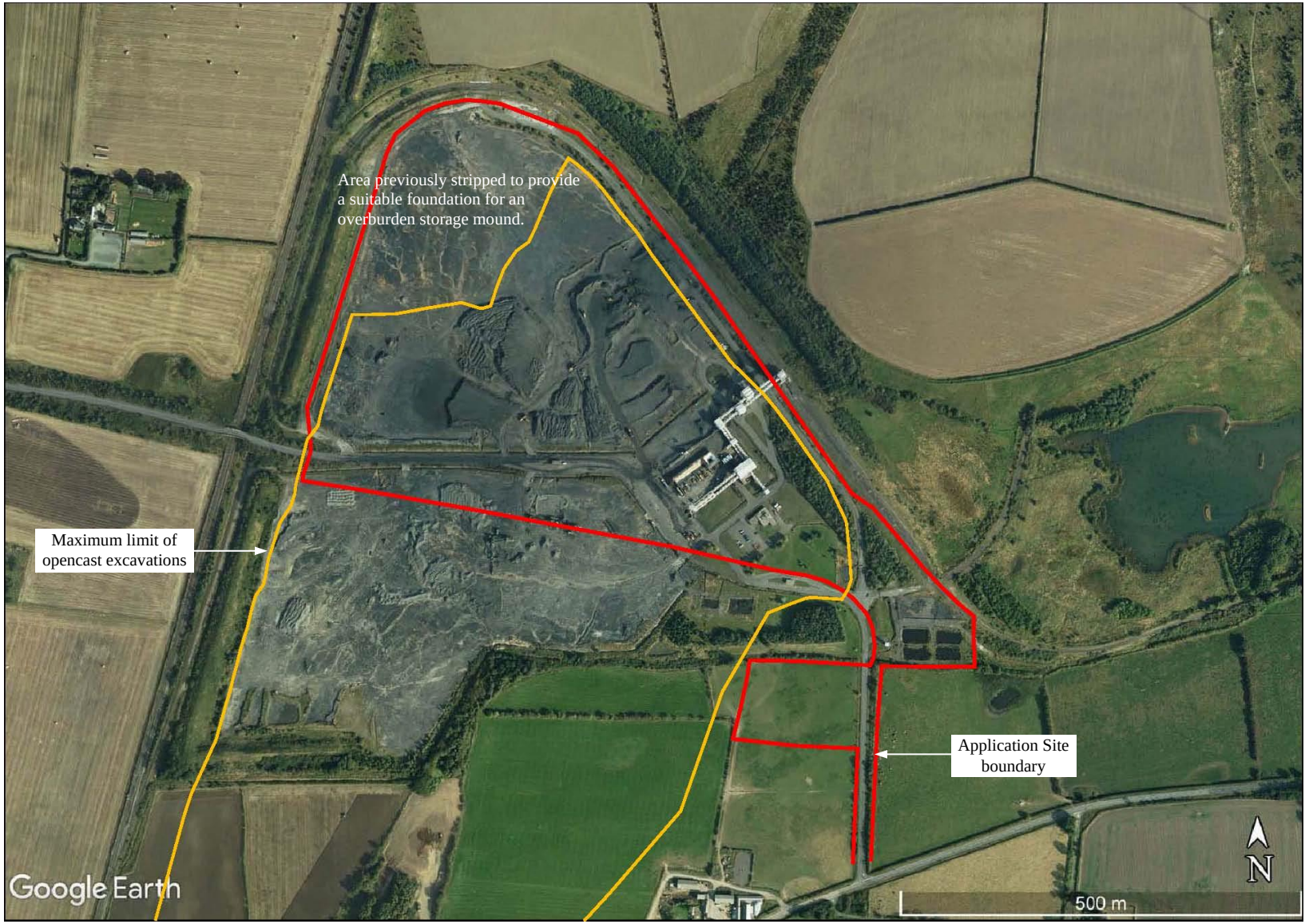


Figure 3 Aerial Photograph of the Site in 2007

DAB Geotechnics Ltd.	Former Butterwell Surface Mine & Coal Disposal Site - Phase 1 Contamination Assessment	Date: 10th December 2022



Figure 4 Aerial Photograph of the Site in 2013

DAB Geotechnics Ltd.	Former Butterwell Surface Mine & Coal Disposal Site - Phase 1 Contamination Assessment	Date: 10th December 2022

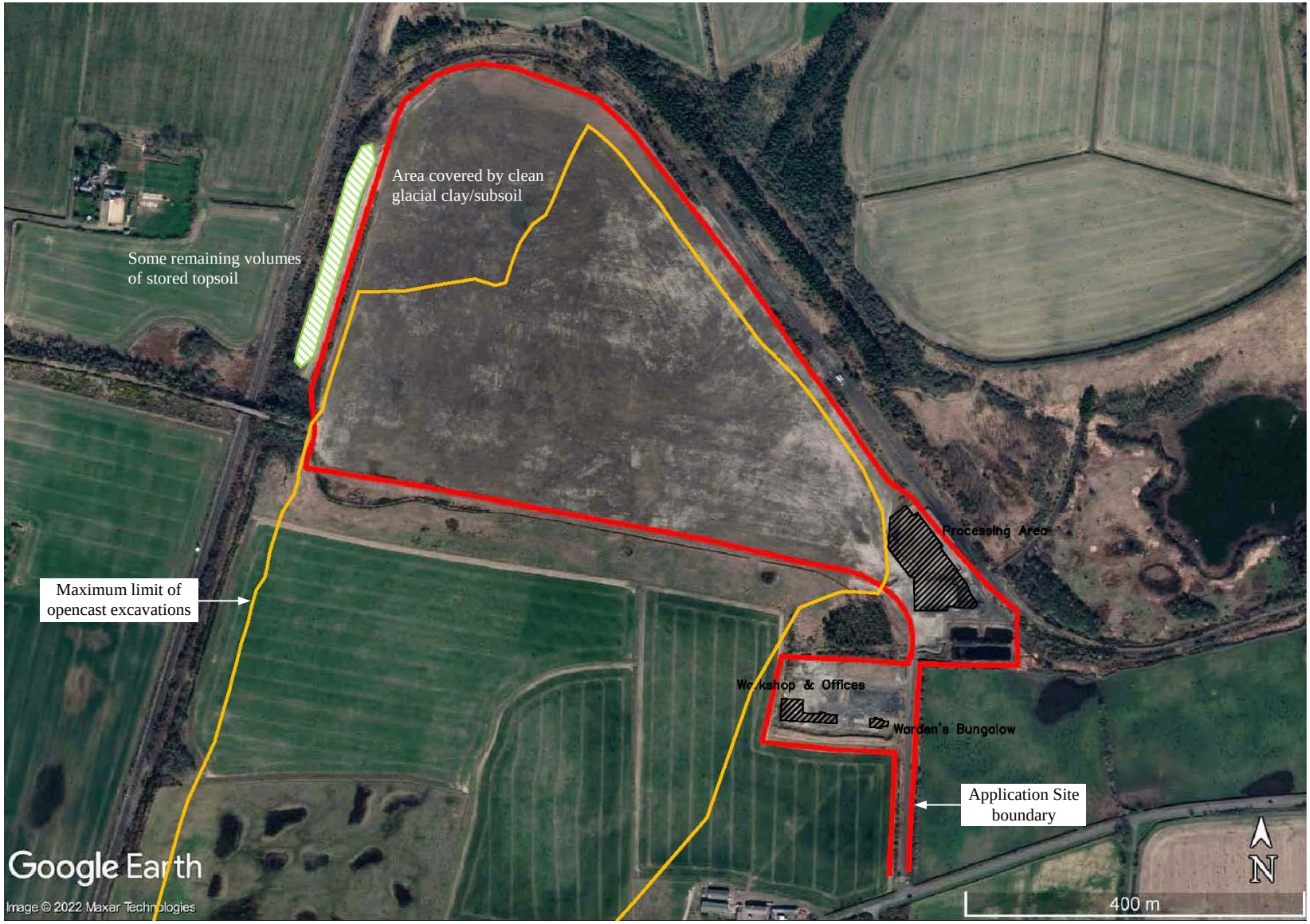
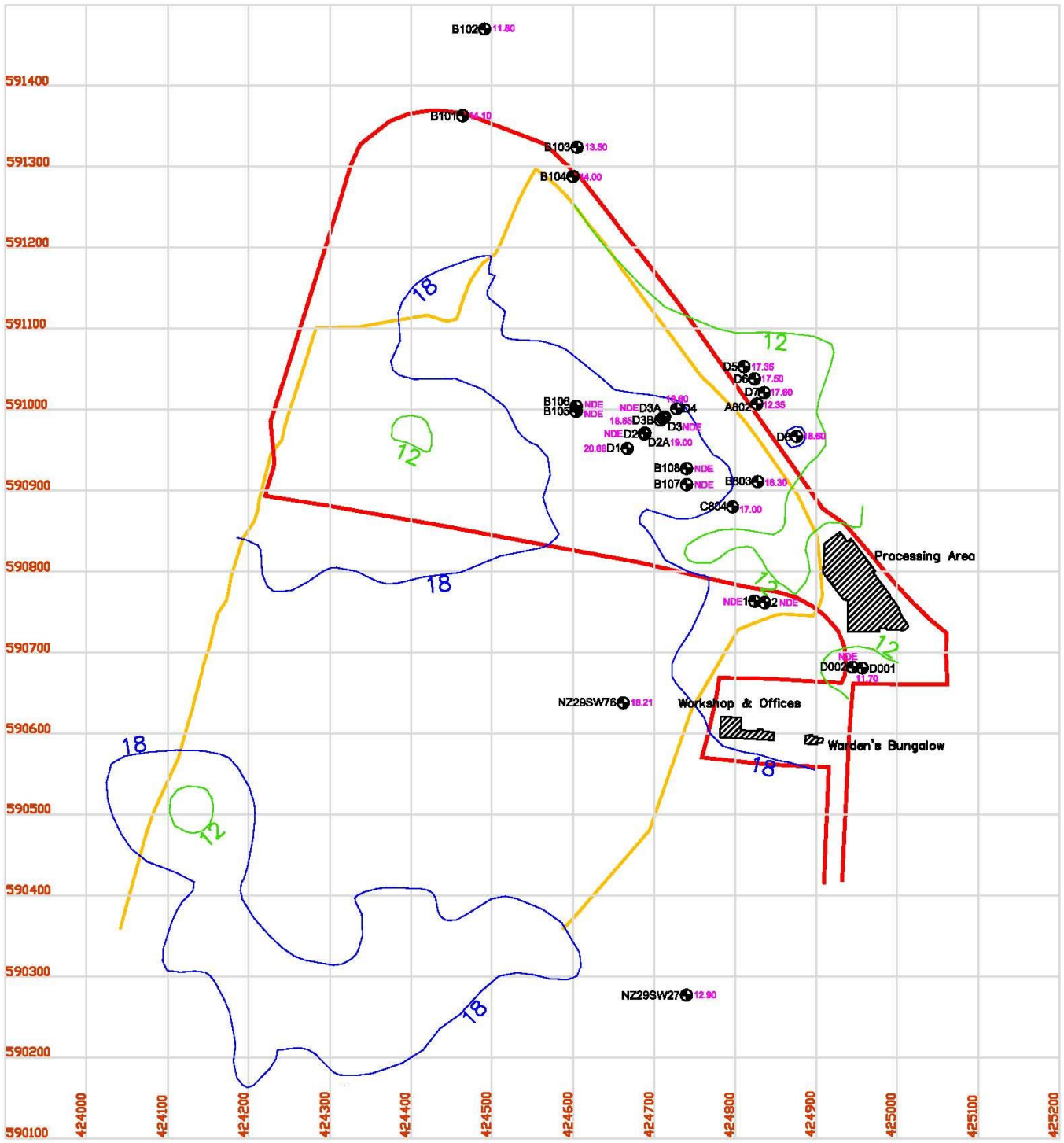


Figure 5 Aerial Photograph of the Site in 2022

DAB Geotechnics Ltd.	Former Butterwell Surface Mine & Coal Disposal Site - Phase 1 Contamination Assessment	Date: 10th December 2022



Site Boundary

Maximum permitted limit of UK Coal's opencast excavations

Contours of superficial cover thickness (in metres) prior to opencast mining 12 18

Ground investigation borehole on former DP site and BGS archive borehole D3B 18.65
with superficial cover thickness in metres (NDE = not deep enough)

Figure 6 Superficial Cover Thickness

DAB Geotechnics Ltd.	Former Butterwell Surface Mine & Coal Disposal Site Phase 1 Contamination Assessment	Date: 30th November 2022

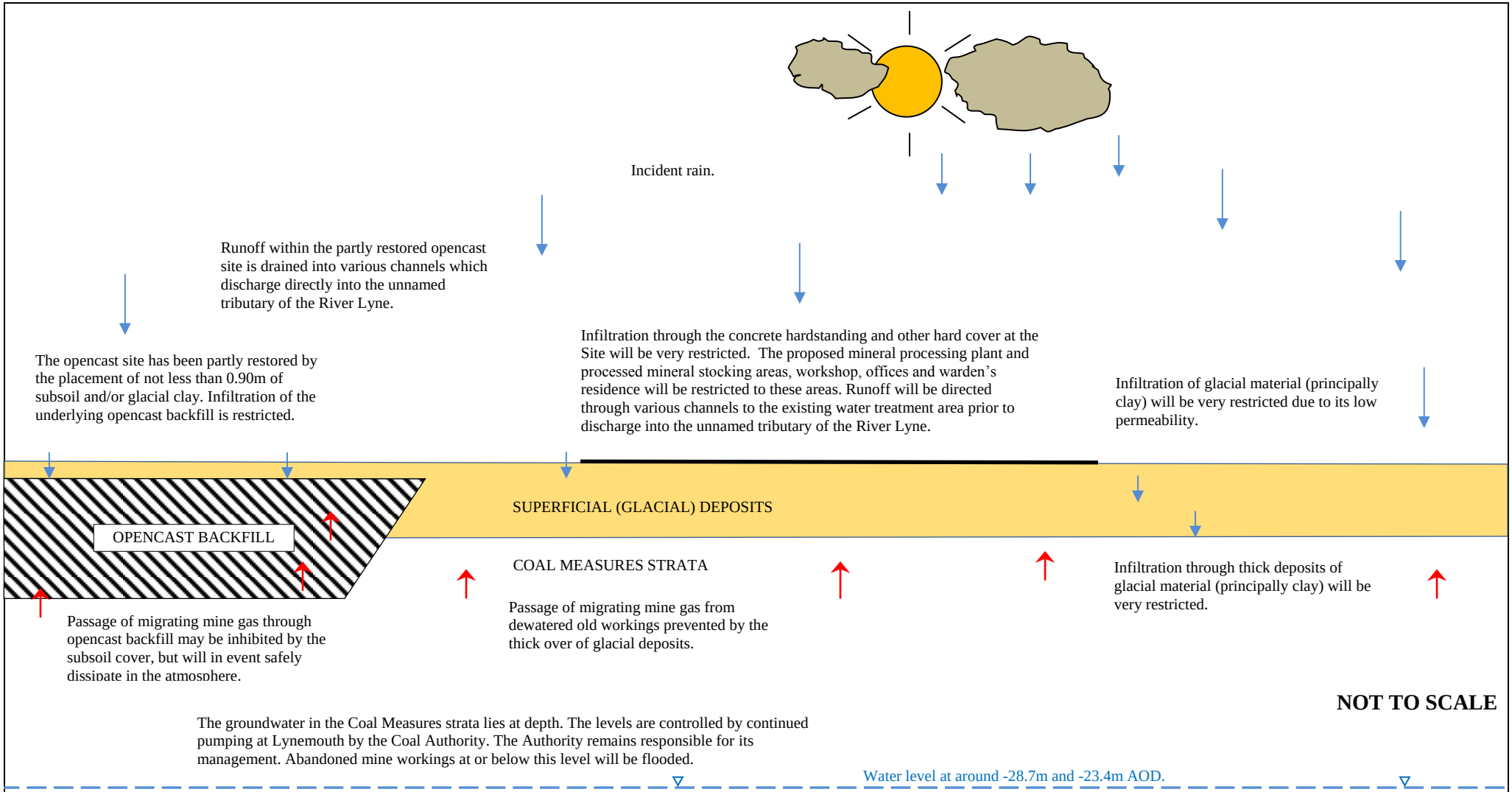


Figure 7 Conceptual Model

DAB Geotechnics Ltd.	Former Butterwell Surface Mine & Coal Disposal Site - Phase 1 Contamination Assessment	Date: 10th December 2022

PHOTOGRAPHS





Photograph 2 (above). The site of the former workshop which comprises concrete hardstanding (2nd December 2022).



Photograph 1 (above).
The former office and workshop area which will be adopted for the same use (2nd December 2022).

Photograph 3 (left).
The proposed 'laydown' area (2nd December 2022).





Photograph 4 (above). Looking north-east towards the proposed aggregate processing and stocking areas (2nd December 2022).

Photograph 5 (left). Looking north across the proposed processing and aggregate stocking areas from the access road. Both areas already comprise concrete hardstanding having been used during the production of coal at the former Butterwell DP surface mine (2nd December 2022).



Photograph 6. Looking south-east into the proposed recovery area where aggregates will be discharged from the processing plant and then transferred to the stocking area. This area comprises concrete hardstanding and is partly covered by recently accumulated surface runoff (2nd December 2022).



Photograph 7. Looking north-north-west along the existing rail link with the proposed aggregate stocking and unloading area (concrete hardstanding) on the left (2nd December 2022).



Photograph 8. The flow of surface water from the area of open land in the northern part of the Site (2nd December 2022).



Photograph 9. The south-easterly flowing drainage channel that receives runoff from the open land that forms the northern part of the Site (2nd December 2022).



Photograph 10. The unnamed tributary of the River Lyne that runs west to east across the Site. Here, it is seen flowing east from the culvert that extends beneath the access road (2nd December 2022).





Photograph 11 (above). The two remaining water treatment lagoons at the Site. The inflowing water was observed to be clear, but is here discoloured (2nd December 2022).

Photograph 12 (left). The discharge channel from the water treatment area (2nd December 2022).

Photograph 13 (below). The thickly area where the water from the treatment area discharges into the unnamed tributary of the River Lyne (2nd December 2022).







Photograph 14 (above). Looking north-north-west across open land across which only subsoil and glacial till has been spread. The rail link lies to the right on an embankment and the concrete blocks shown in Photograph 15 are located in the distance to the left of the perimeter fence (2nd December 2022).

Photograph 15 (left). Four concrete blocks that demarcate a live electric supply which was cut off once coal processing ceased operation. These were erected by Northern Electric and the cable is sealed with a 'pot end'. It has been left in place in case a new supply is required. A pole mounted transformer is located on the opposite side of the adjacent rail siding The cable therefore enters the Site at right angles to the rail lines (2nd December 2022).

APPENDIX A

Historical OS Maps

Order Number: 300463013
Customer Ref. 22010
National Grid Reference: 424930 590680
Search Buffer 1000

File Name	Map Series Name	Published Dates	Source Scale	Survey Date	Revision Date	Addition Date	Edition Date	Published Date
300463013_1_A_EHM_County_Series_10560_ehm-ntb-10560_1-2-1a_301336894.gif	Northumberland	1898	1:10,560	1859	1896		1898	
300463013_1_A_EHM_County_Series_10560_ehm-ntb-10560_1-1a_301336902.gif	Northumberland	1866	1:10,560	1859				1866
300463013_1_A_EHM_County_Series_10560_ehm-ntb-10560_2-PRa_301336910.gif	Northumberland	1938	1:10,560	1859		1938	1921	
300463013_1_A_EHM_County_Series_10560_ehm-ntb-10560_2-2-1a_301336922.gif	Northumberland	1924	1:10,560	1859	1921		1924	
300463013_1_A_EHM_OS_Plan_10000_ehm-ng-10000_1b_301336880.gif	Ordnance Survey Plan	1951	1:10,560		1940			1951
300463013_1_A_EHM_OS_Plan_10000_ehm-ng-10000_3a_301336882.gif	Ordnance Survey Plan	1974	1:10,000	1972				1974
300463013_1_A_EHM_OS_Plan_10000_ehm-ng-10000_4a_301336892.gif	Ordnance Survey Plan	1980-1985	1:10,000	1977-1981	1978-1983			1980-1985
300463013_1_A_EHM_OS_Plan_10000_ehm-ng-10000_2a_301336912.gif	Ordnance Survey Plan	1966-1969	1:10,560	1959-1967				1967-1969
300463013_1_A_EHM_OS_Plan_10000_ehm-ng-10000_1a_301336914.gif	Ordnance Survey Plan	1940-1951	1:10,560		1940			1950-1951
300463013_1_A_EHM_OS_Plan_10000_ehm-ng-10000_5a_301336916.gif	Ordnance Survey Plan	1992	1:10,000	1989-1991	1991			1992
300463013_1_A_10k_CRM_1999_10kcrm_l00001_301336888.gif	10K Raster Mapping	2000	1:10,000					

File Name	Map Series Name	Published Dates	Source Scale
300463013_1_A13_County_Series_2500_ep5-2500_b6_301336884.gif	Ordnance Survey Plan	1990	1:2,500
300463013_1_A13_County_Series_2500_ep5-2500_a5_301336886.gif	Ordnance Survey Plan	1957-1958	1:2,500
300463013_1_A13_County_Series_2500_ntb-2500_ep3_301336890.gif	Northumberland	1923	1:2,500
300463013_1_A13_County_Series_2500_ntb-2500_ep2_301336898.gif	Northumberland	1897	1:2,500
300463013_1_A13_County_Series_2500_ntb-2500_ep1_301336904.gif	Northumberland	1895	1:2,500
300463013_1_A13_County_Series_2500_ntb-2500_ep1-a_301336908.gif	Northumberland	1895	1:2,500
300463013_1_A13_County_Series_2500_ntb-2500_ep1-b_301336920.gif	Northumberland	1895	1:2,500
300463013_1_A13_SIM_2500_sm-2500_1_301336896.gif	Additional SIMs	1957-1958	1:2,500
300463013_1_A13_SIM_2500_sm-2500_3_301336900.gif	Additional SIMs	1991	1:2,500
300463013_1_A13_SIM_2500_sm-2500_2_301336906.gif	Additional SIMs	1978-1985	1:2,500
300463013_1_A13_Superplan_2500_sp-2500_1_301336918.gif	Large-Scale National Grid Data	1994	1:2,500

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
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
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
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. Rural District Boundary
Civil Parish Boundary

Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Electricity Transmission Line
Pole
Sloping Masonry
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
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
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping

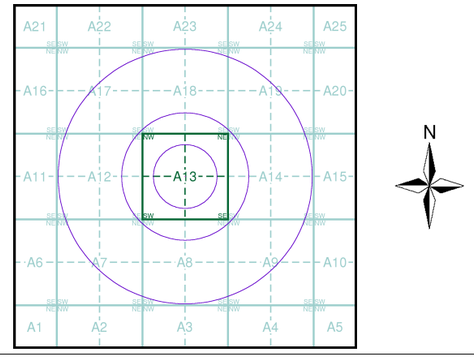
Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

Envirocheck®
LANDMARK INFORMATION GROUP®

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Northumberland	1:10,560	1866	2
Northumberland	1:10,560	1898	3
Northumberland	1:10,560	1924	4
Northumberland	1:10,560	1938	5
Ordnance Survey Plan	1:10,000	1940 - 1951	6
Ordnance Survey Plan	1:10,000	1951	7
Ordnance Survey Plan	1:10,000	1966 - 1969	8
Ordnance Survey Plan	1:10,000	1974	9
Ordnance Survey Plan	1:10,000	1980 - 1985	10
Ordnance Survey Plan	1:10,000	1992	11
10K Raster Mapping	1:10,000	2000	12
Street View	Variable		13

Historical Map - Slice A



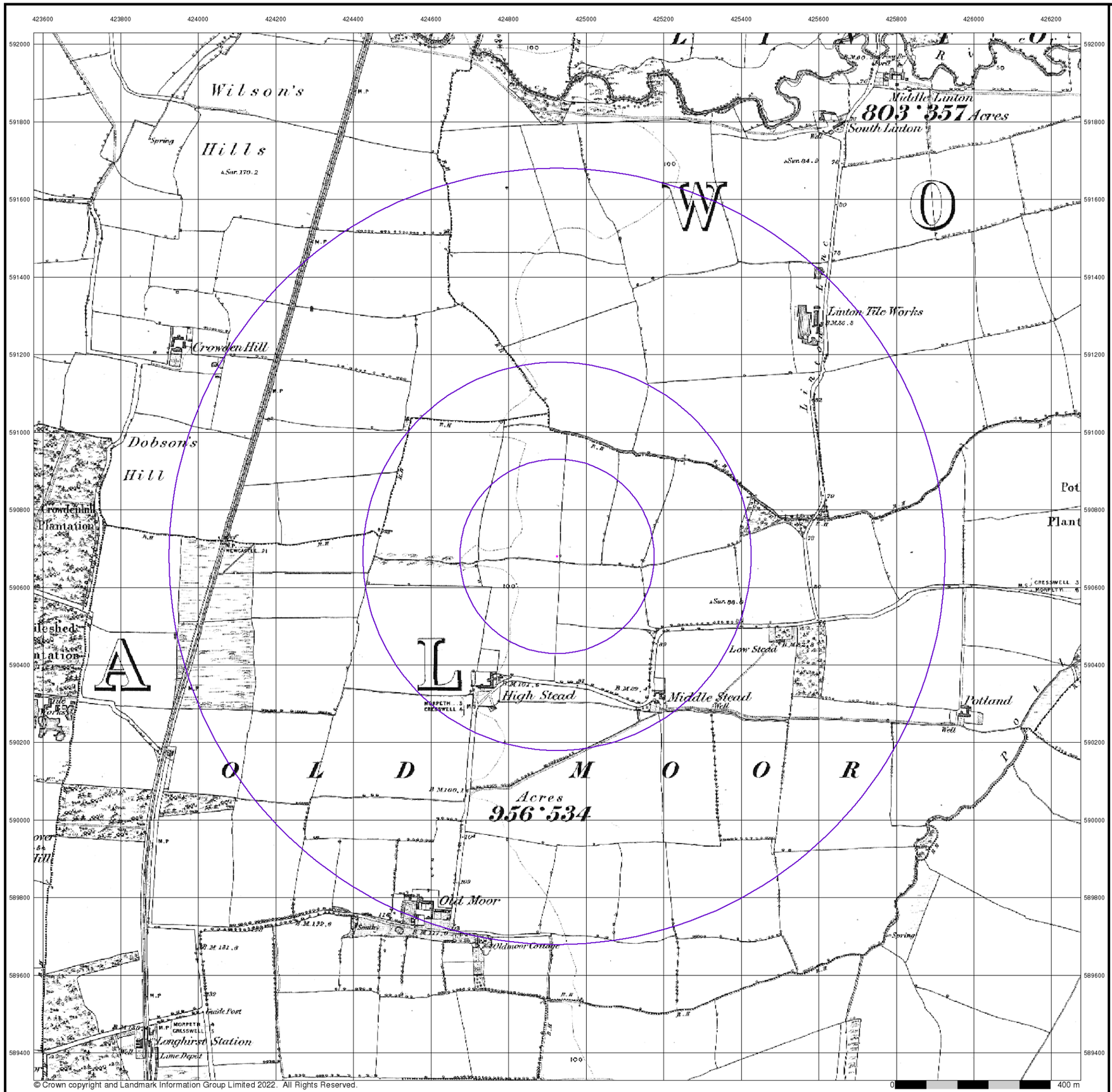
Order Details

Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

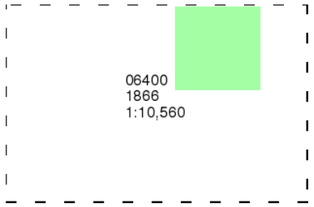
Northumberland

Published 1866

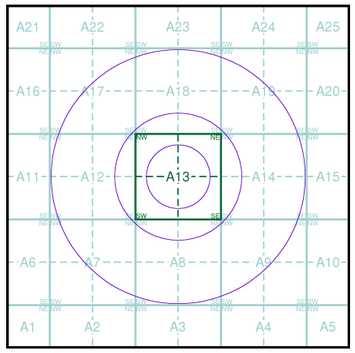
Source map scale - 1:10,560

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

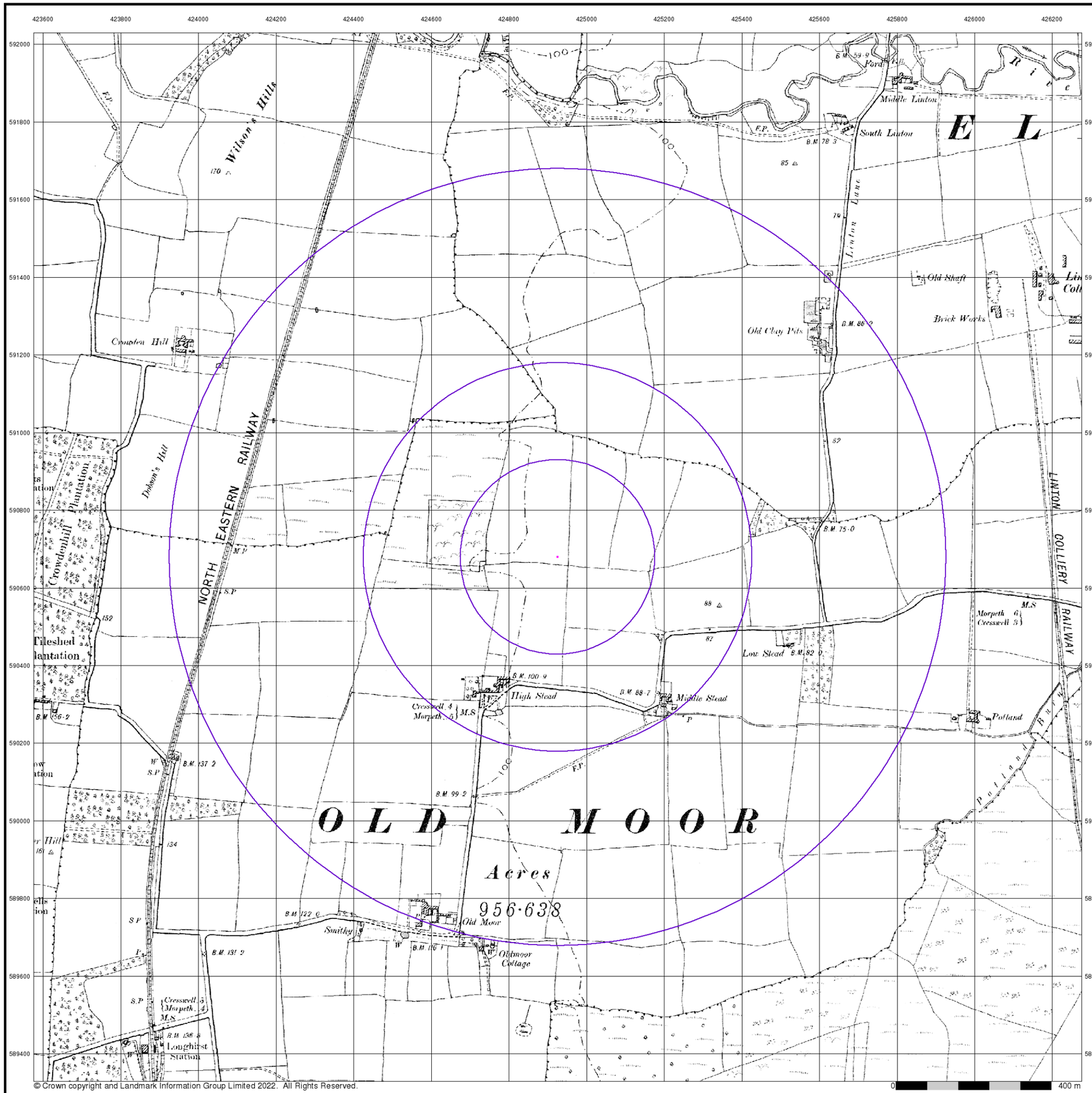
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



Envirocheck®

LANDMARK INFORMATION GROUP®

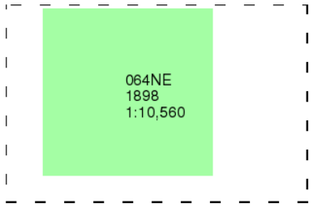
Northumberland

Published 1898

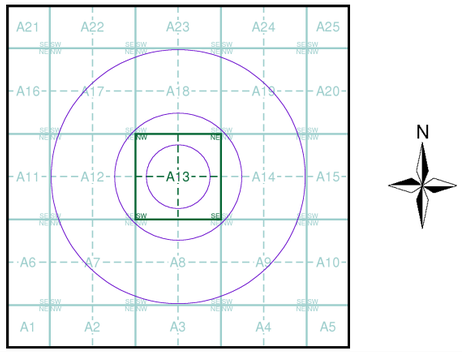
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

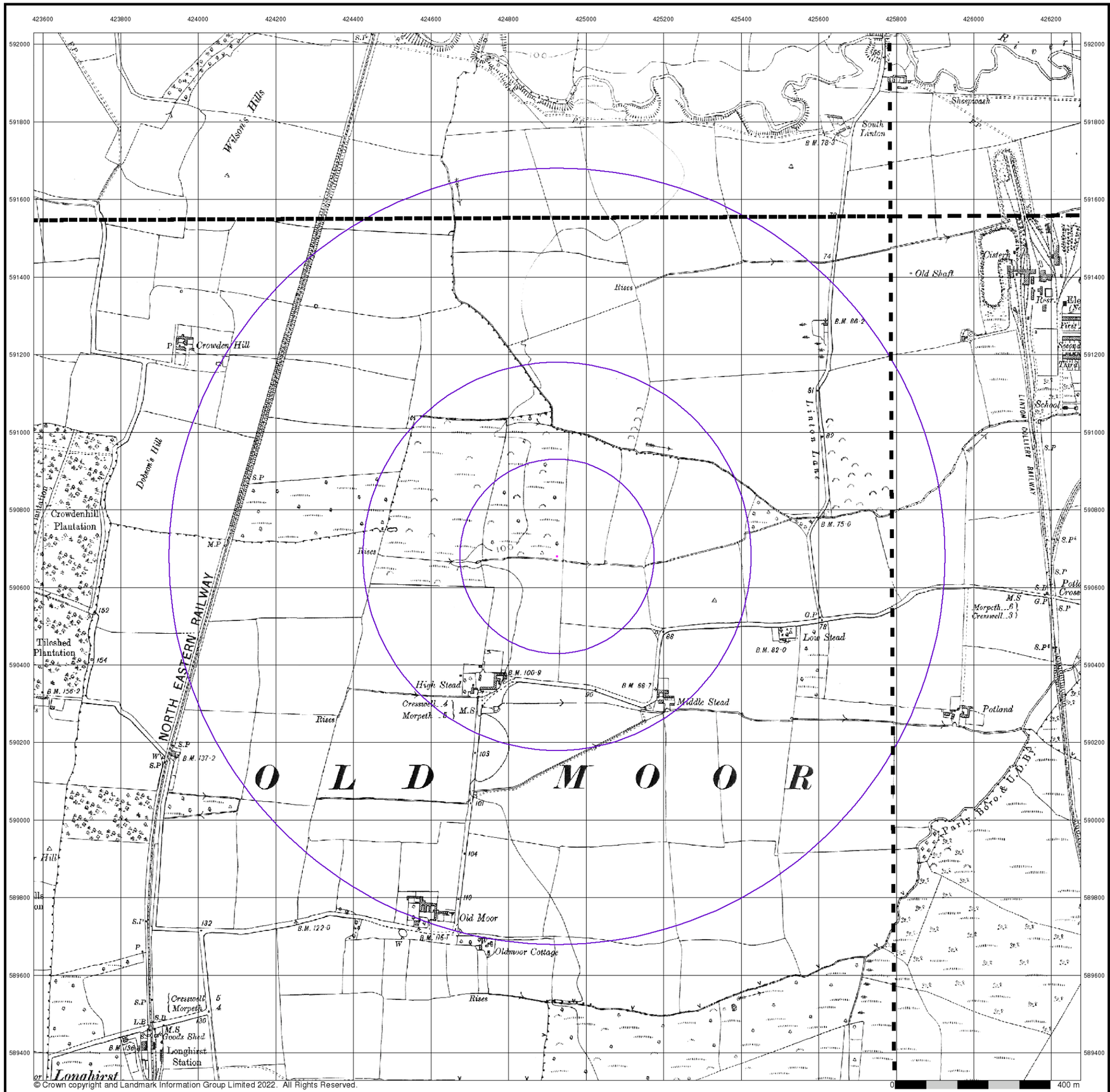
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

Northumberland

Published 1924

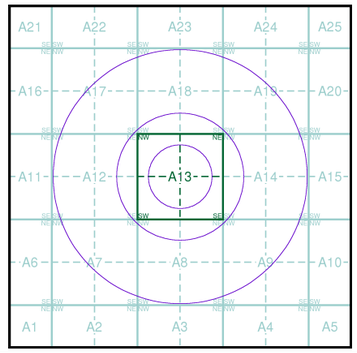
Source map scale - 1:10,560

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)

060NE 1924 1:10,560	061NW 1924 1:10,560
060SE 1924 1:10,560	061SW 1924 1:10,560

Historical Map - Slice A



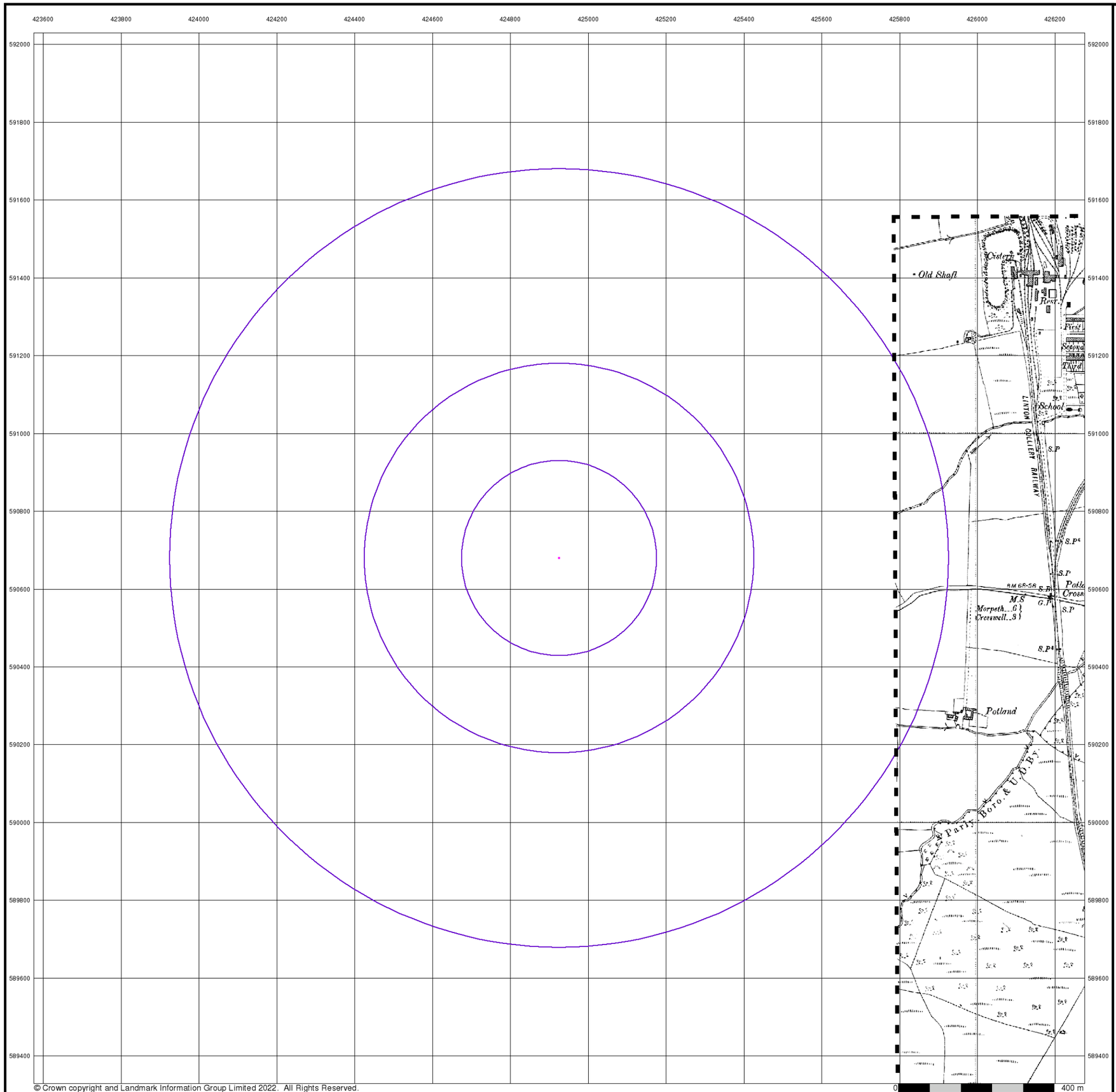
Order Details

Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

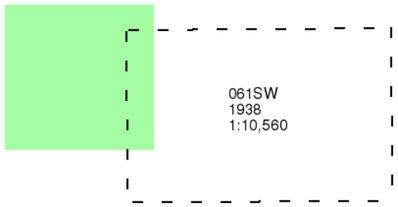
Northumberland

Published 1938

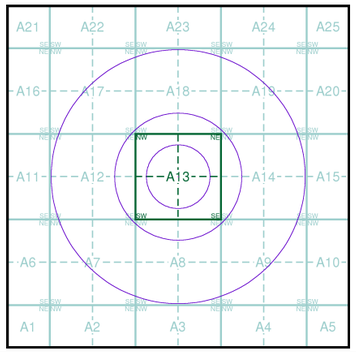
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

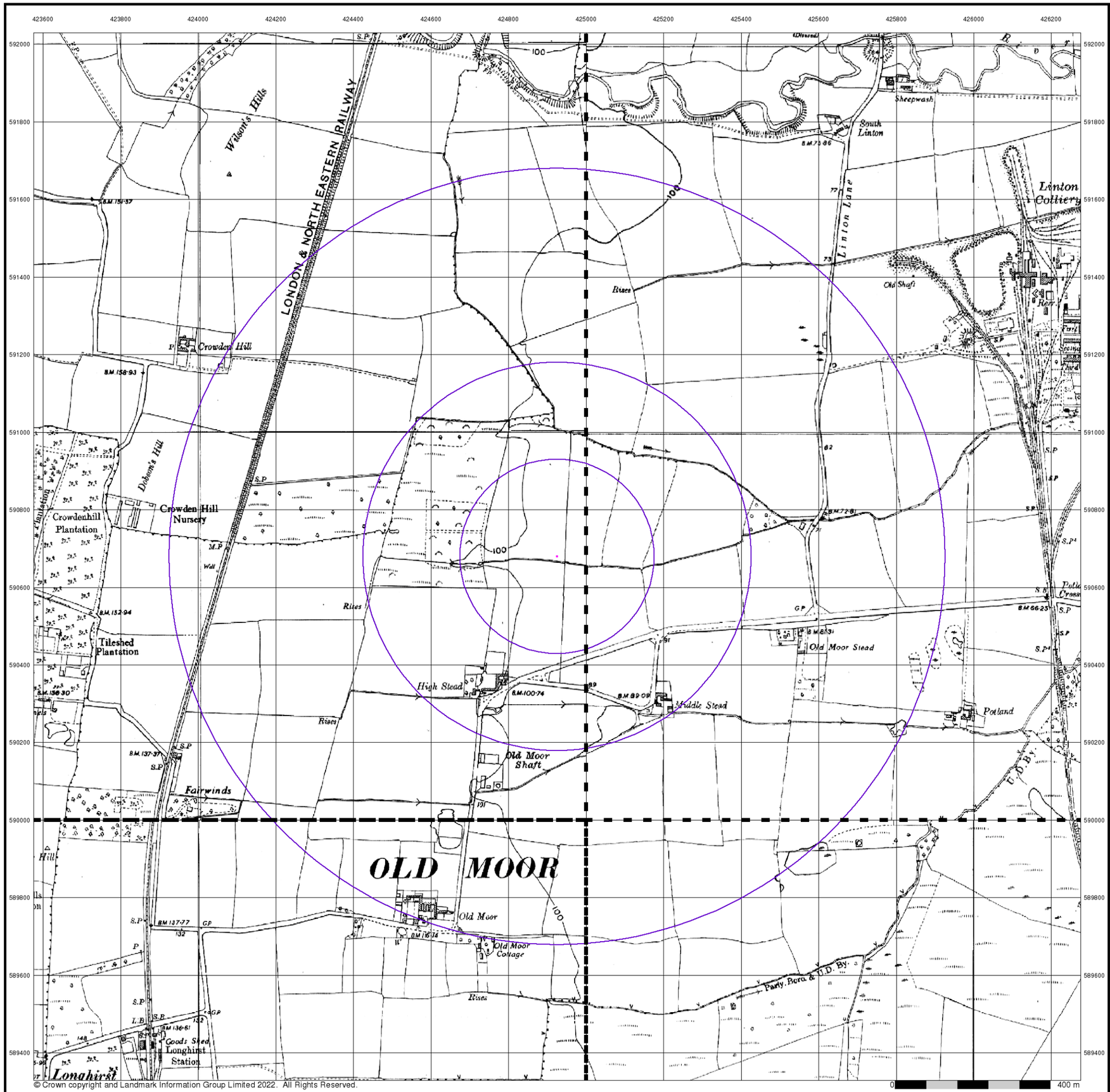
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

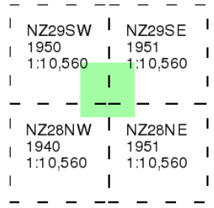
Ordnance Survey Plan

Published 1940 - 1951

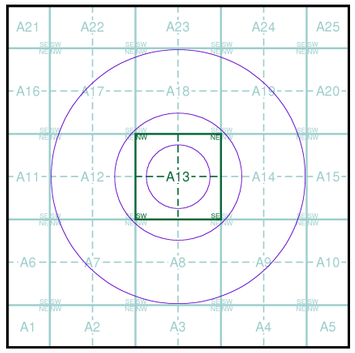
Source map scale - 1:10,000

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)



Historical Map - Slice A



Order Details

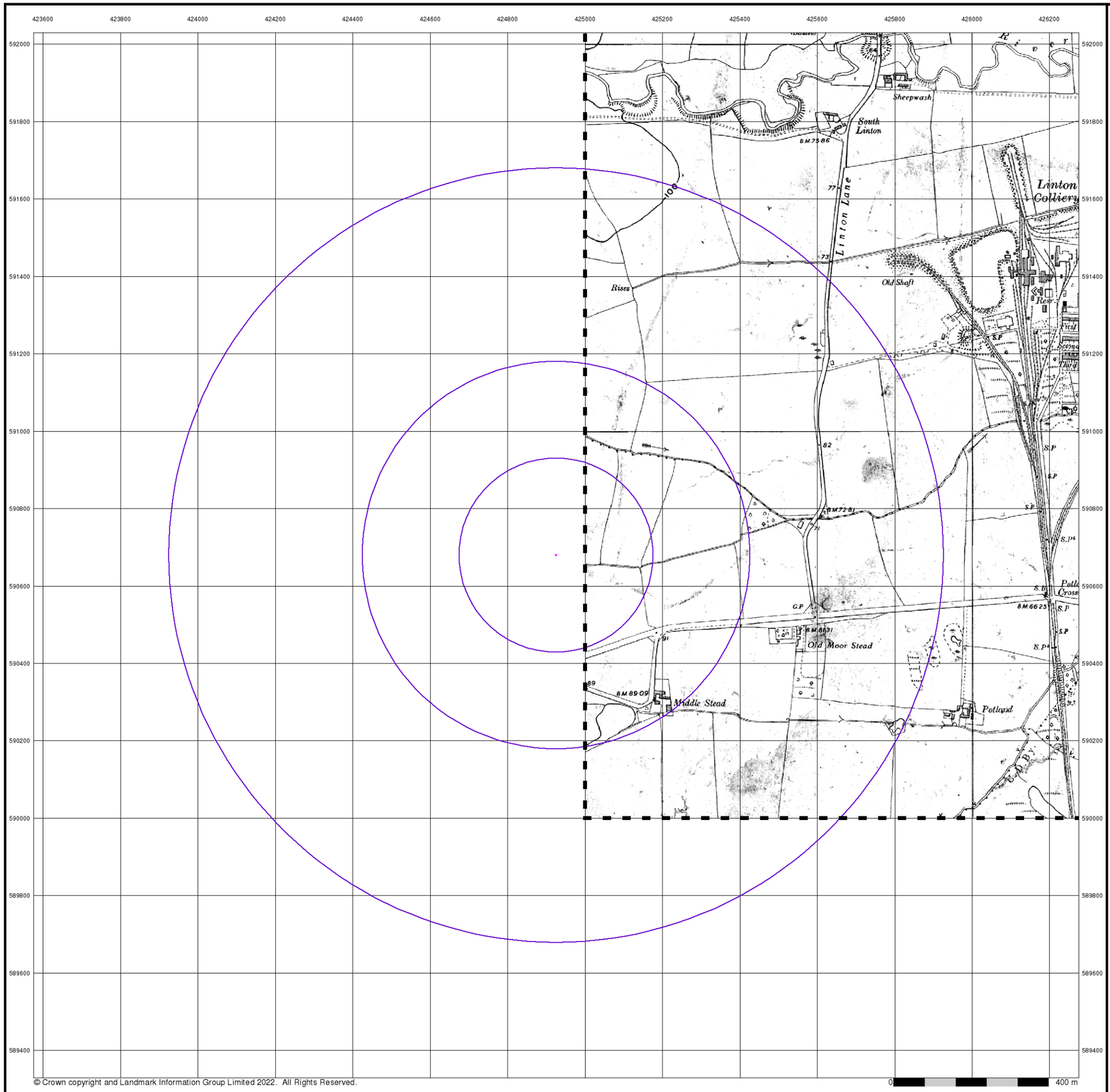
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

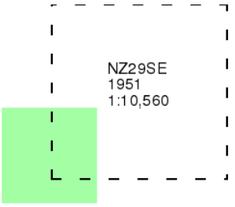
Ordnance Survey Plan

Published 1951

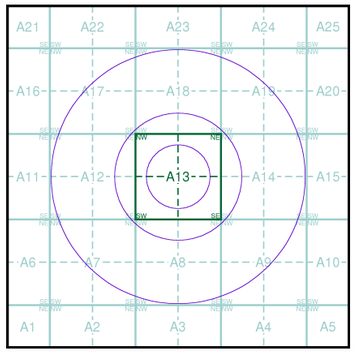
Source map scale - 1:10,000

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)



Historical Map - Slice A



Order Details

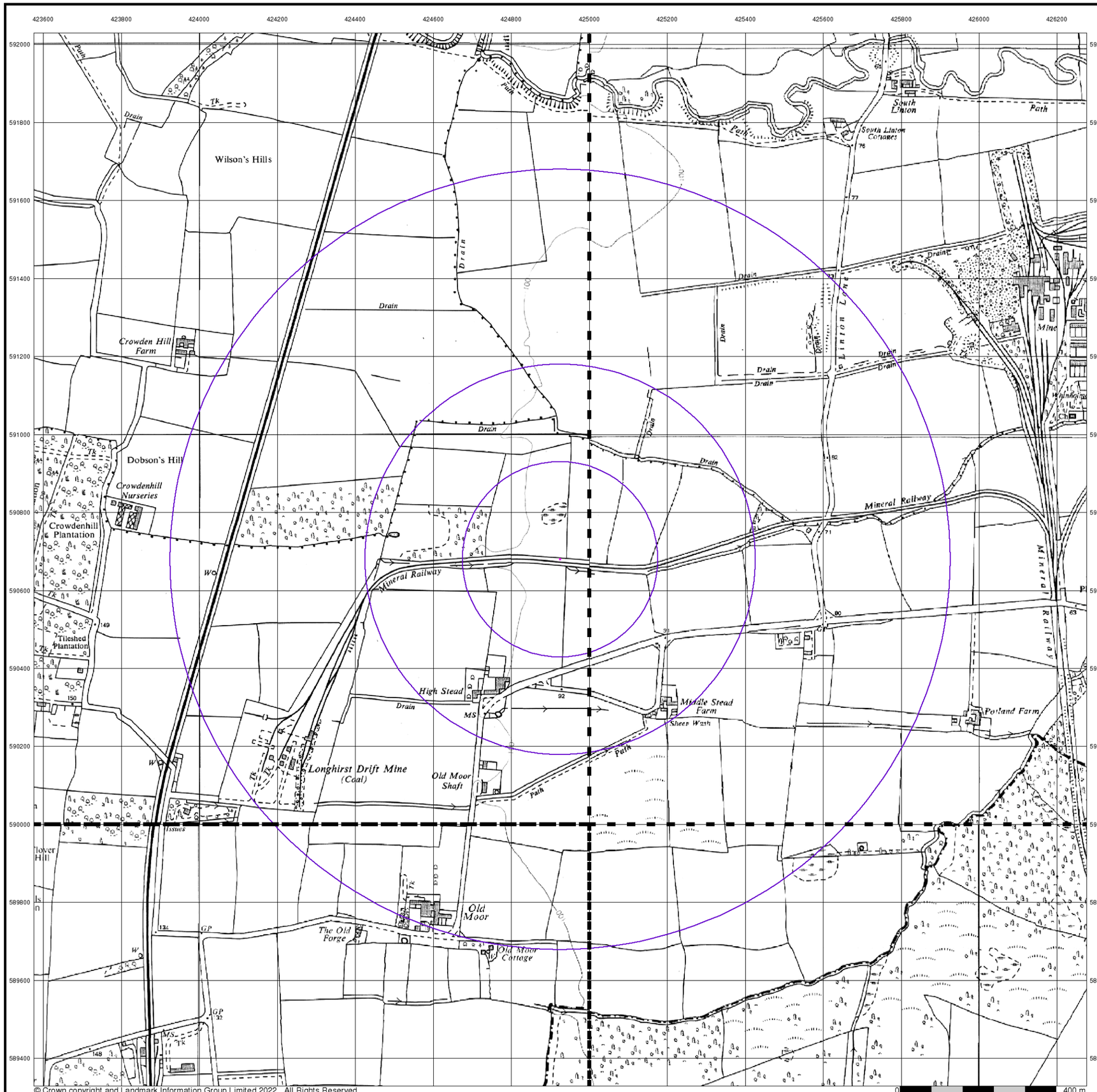
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

Ordnance Survey Plan

Published 1966 - 1969

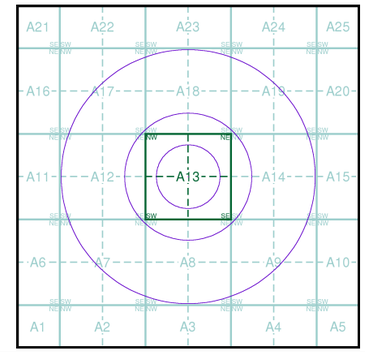
Source map scale - 1:10,000

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)

NZ29SW 1969 1:10,560	NZ29SE 1966 1:10,560
NZ28NW 1969 1:10,560	NZ28NE 1967 1:10,560

Historical Map - Slice A



Order Details

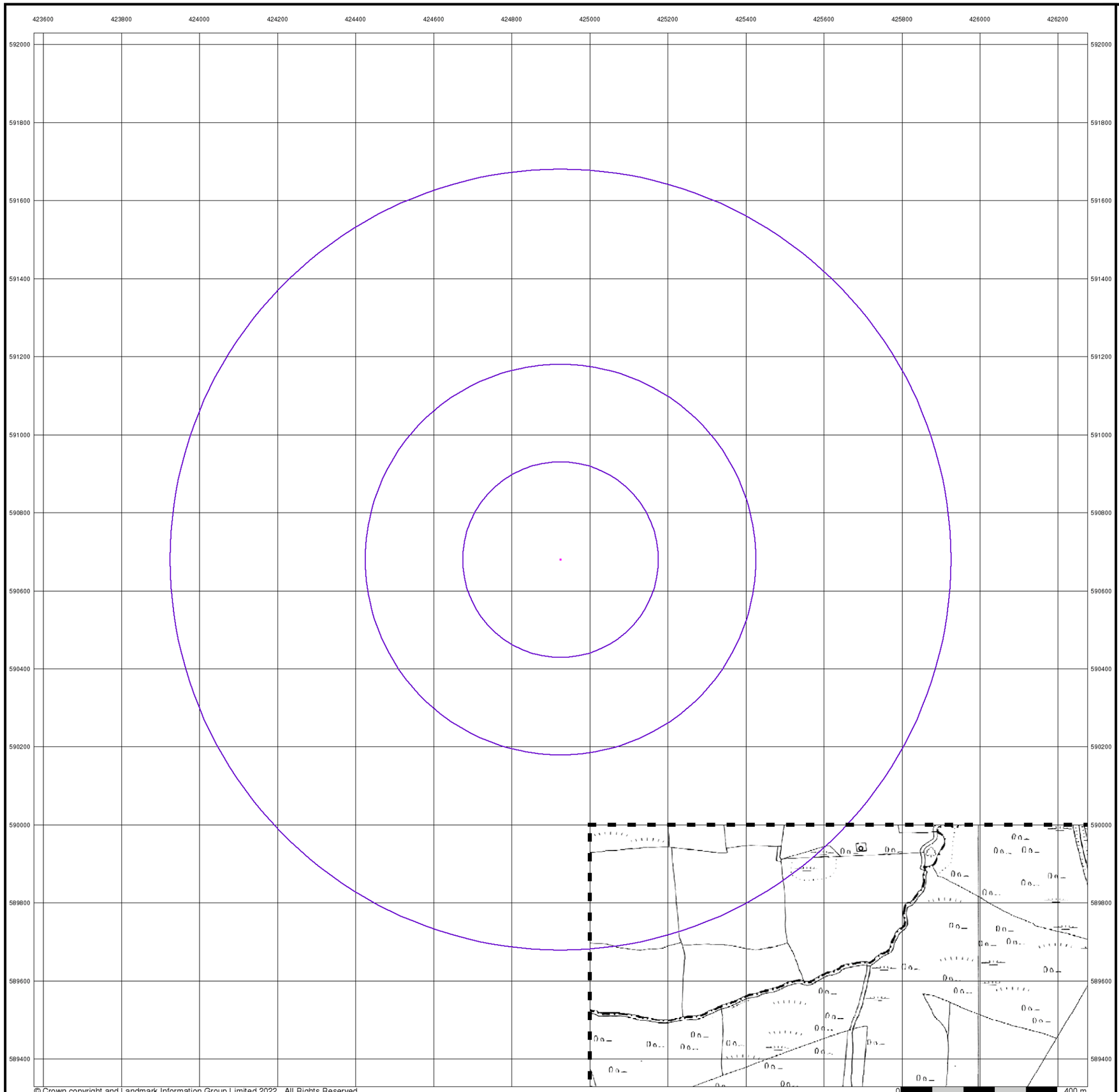
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

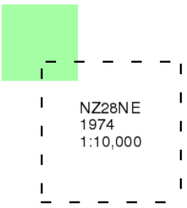
Ordnance Survey Plan

Published 1974

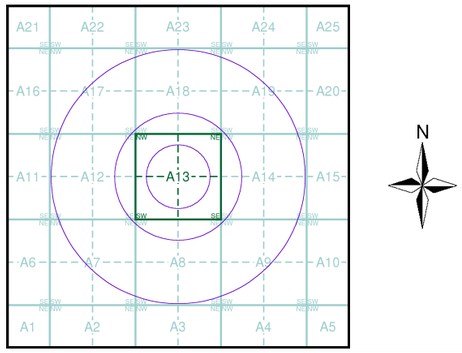
Source map scale - 1:10,000

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)



Historical Map - Slice A



Order Details

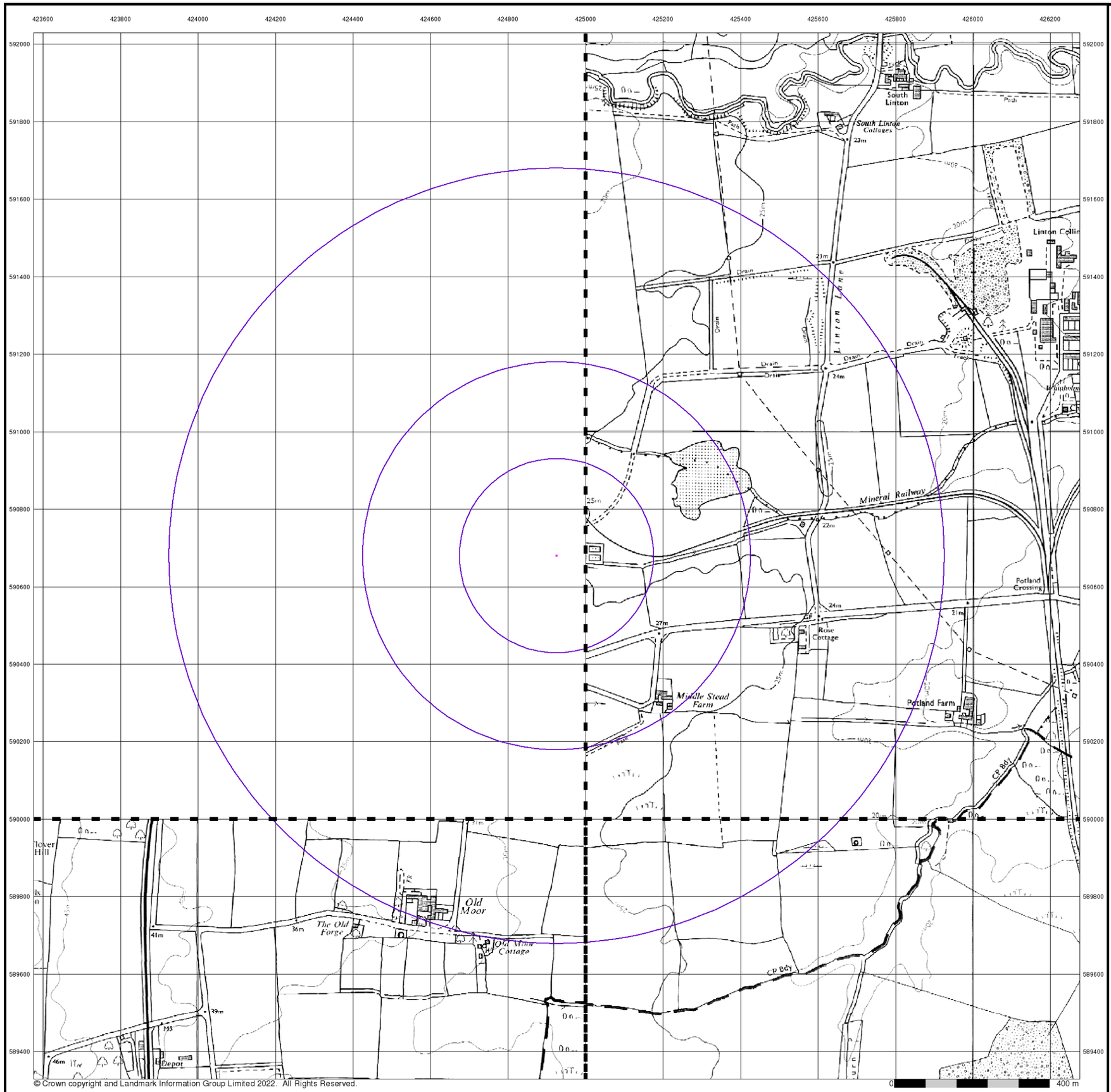
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

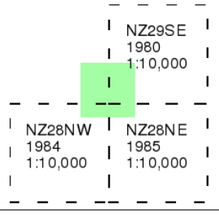
Ordnance Survey Plan

Published 1980 - 1985

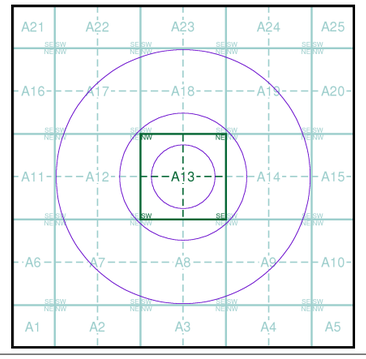
Source map scale - 1:10,000

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)



Historical Map - Slice A



Order Details

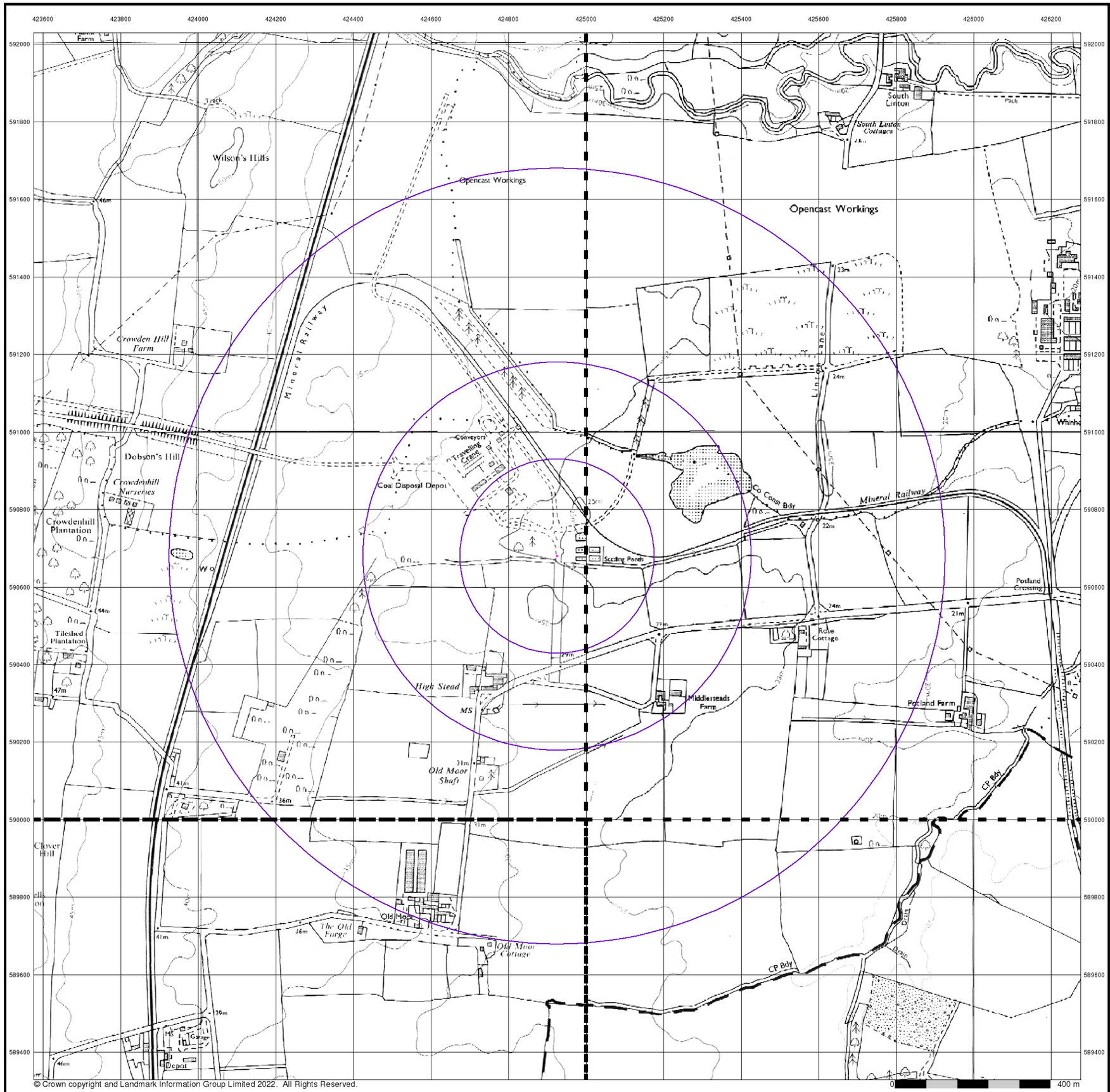
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

Ordnance Survey Plan

Published 1992

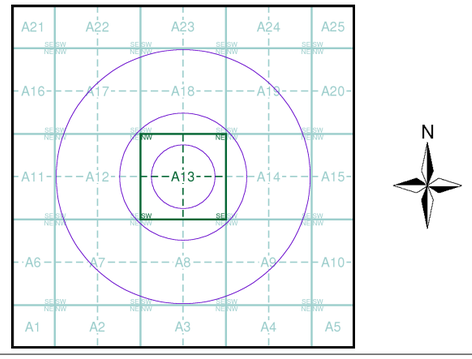
Source map scale - 1:10,000

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)

NZ29SW 1992 1:10,000	NZ29SE 1992 1:10,000
NZ28NW 1992 1:10,000	NZ28NE 1992 1:10,000

Historical Map - Slice A



Order Details

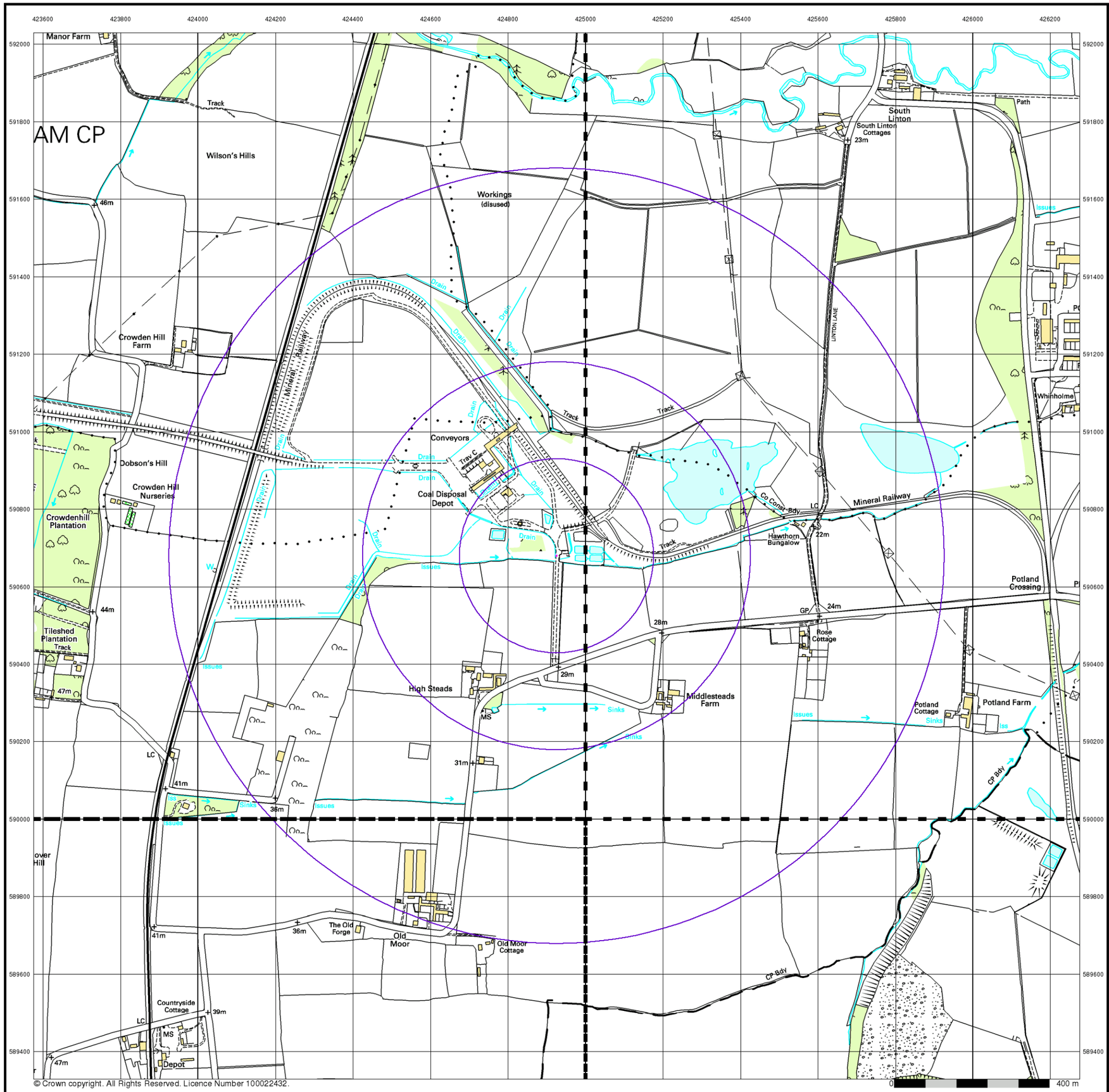
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark INFORMATION GROUP

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



© Crown copyright. All Rights Reserved. Licence Number 100022432.

Envirocheck®

LANDMARK INFORMATION GROUP®

10k Raster Mapping

Published 2000

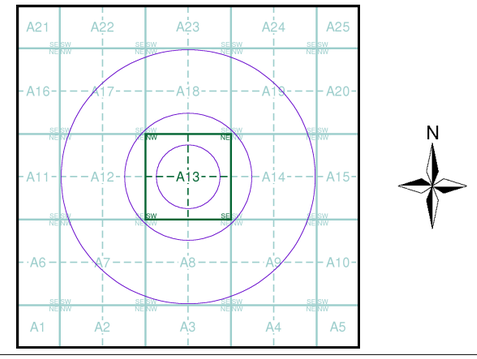
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

NZ29SW 2000 1:10,000	NZ29SE 2000 1:10,000
NZ28NW 2000 1:10,000	NZ28NE 2000 1:10,000

Historical Map - Slice A



Order Details

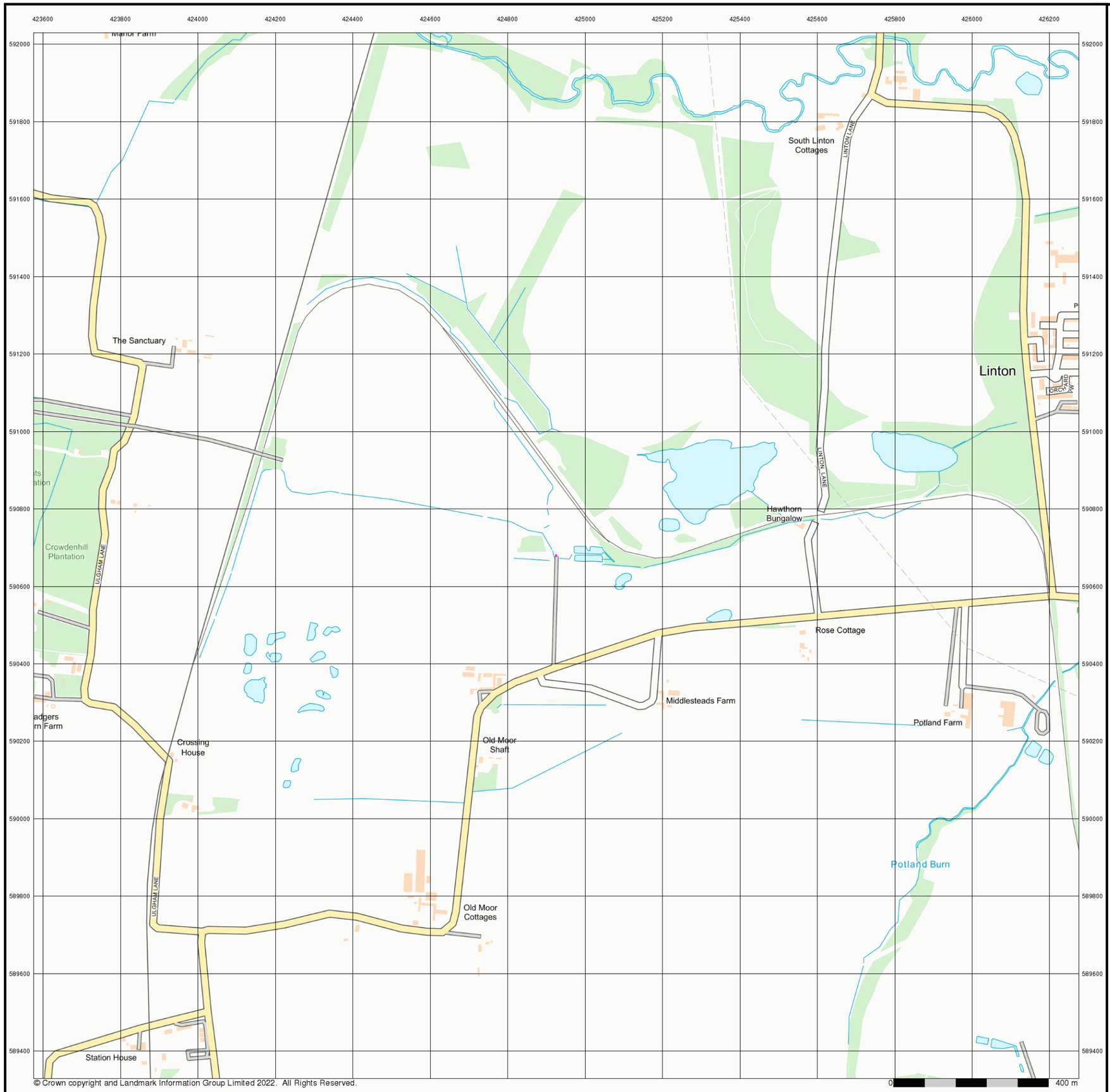
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

Street View

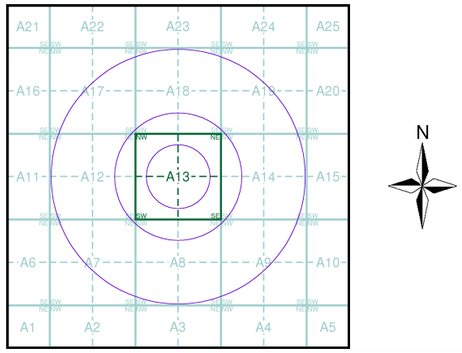
Published 2022

Source map scale - 1:10,000

Street View is a street-level map for the whole of Great Britain produced by the Ordnance Survey. These maps are provided at a nominal scale of 1:10,000

Map Name(s) and Date(s)

Street View Map - Slice A



Order Details

Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

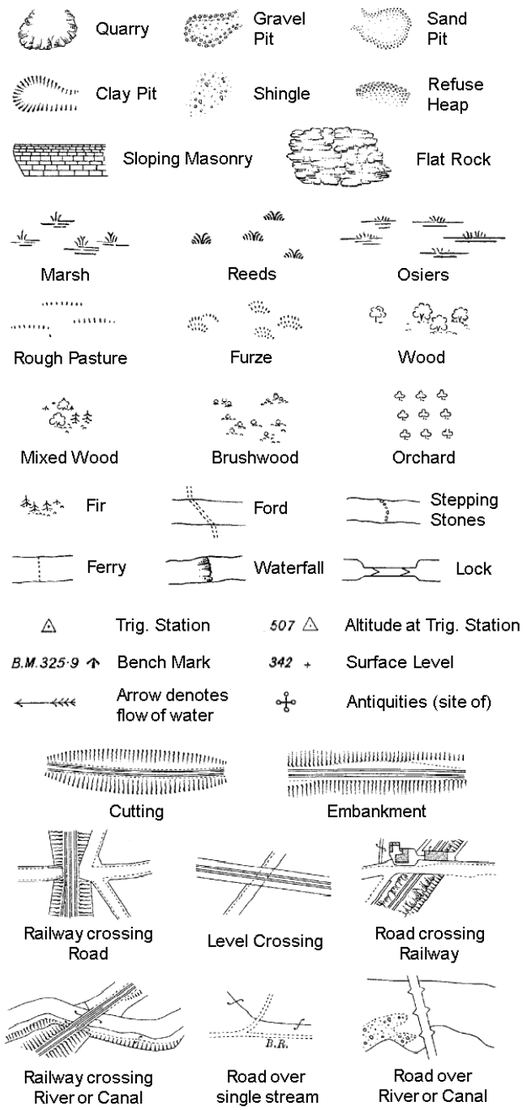
Site at 424550, 591100

Landmark® INFORMATION GROUP

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

Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



County Boundary (Geographical)

County & Civil Parish Boundary

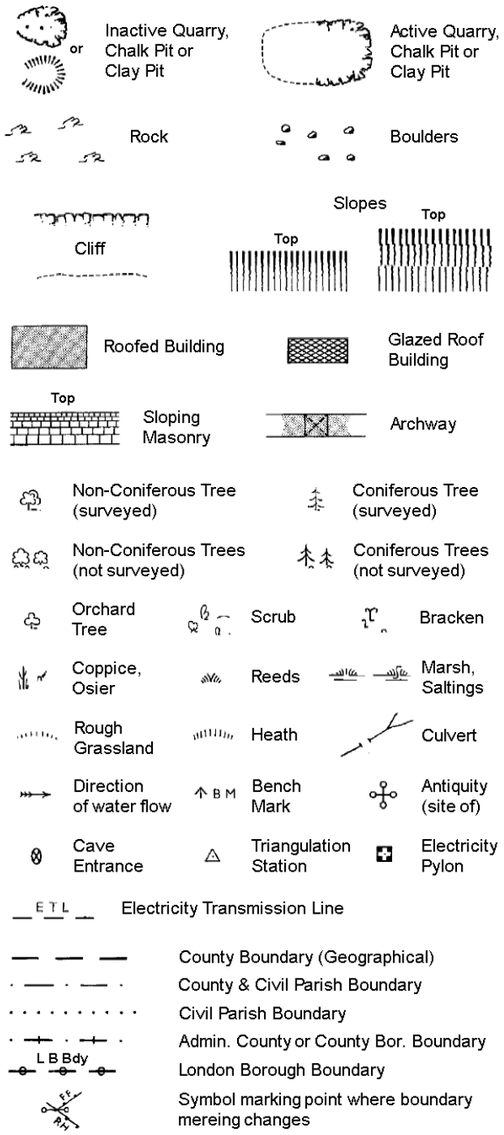
Administrative County & Civil Parish Boundary

Co. Boro. Bdy. County Borough Boundary (England)

Co. Burgh Bdy. County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



County Boundary (Geographical)

County & Civil Parish Boundary

Civil Parish Boundary

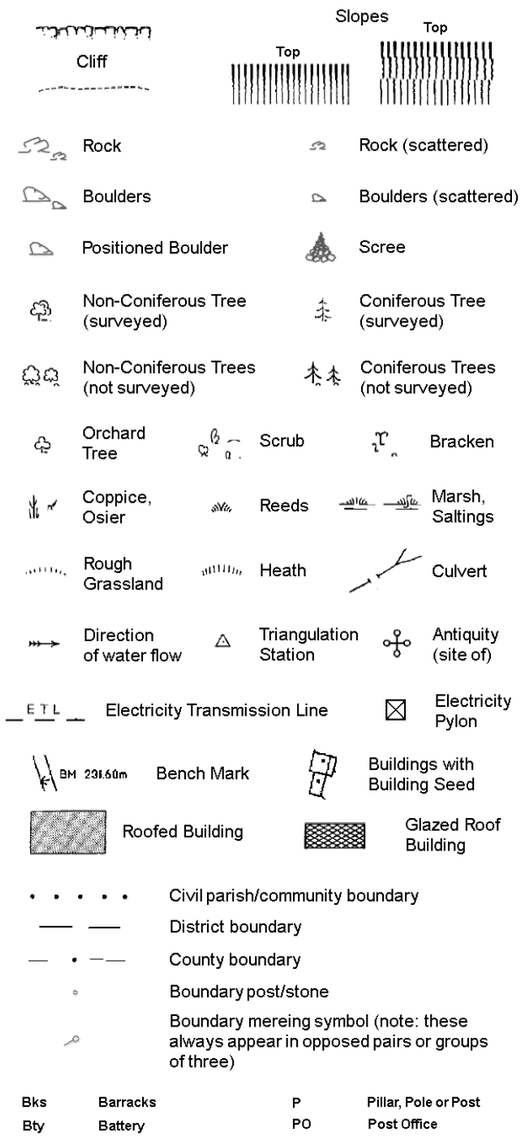
Admin. County or County Bor. Boundary

L B Bdy London Borough Boundary

Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



Civil parish/community boundary

District boundary

County boundary

Boundary post/stone

Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

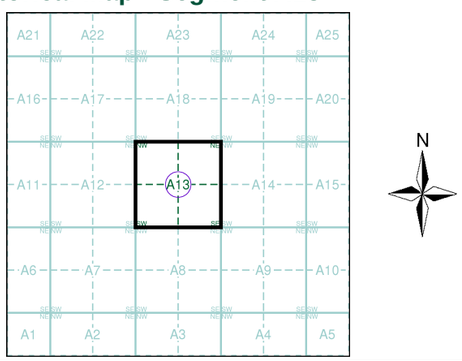
Envirocheck®

LANDMARK INFORMATION GROUP®

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Northumberland	1:2,500	1895	2
Northumberland	1:2,500	1895	3
Northumberland	1:2,500	1895	4
Northumberland	1:2,500	1897	5
Northumberland	1:2,500	1923	6
Ordnance Survey Plan	1:2,500	1957 - 1958	7
Additional SIMs	1:2,500	1957 - 1958	8
Additional SIMs	1:2,500	1978 - 1985	9
Ordnance Survey Plan	1:2,500	1990	10
Additional SIMs	1:2,500	1991	11
Large-Scale National Grid Data	1:2,500	1994	12

Historical Map - Segment A13



Order Details

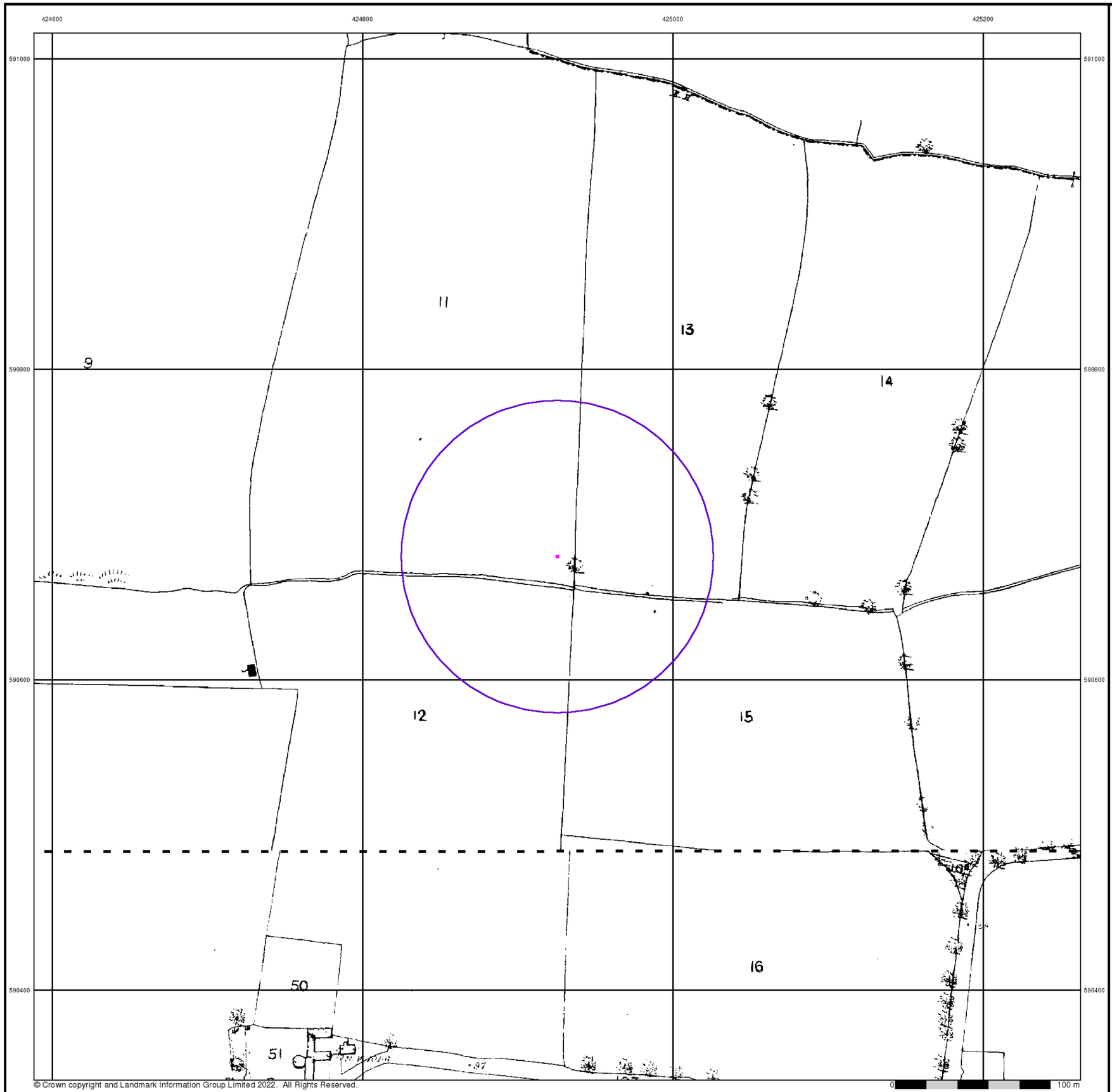
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

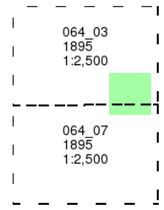
Northumberland

Published 1895

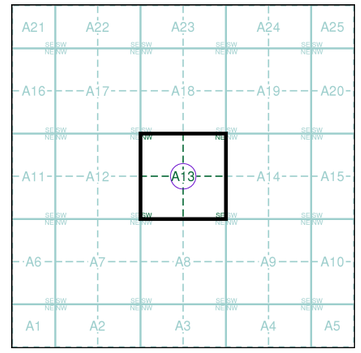
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

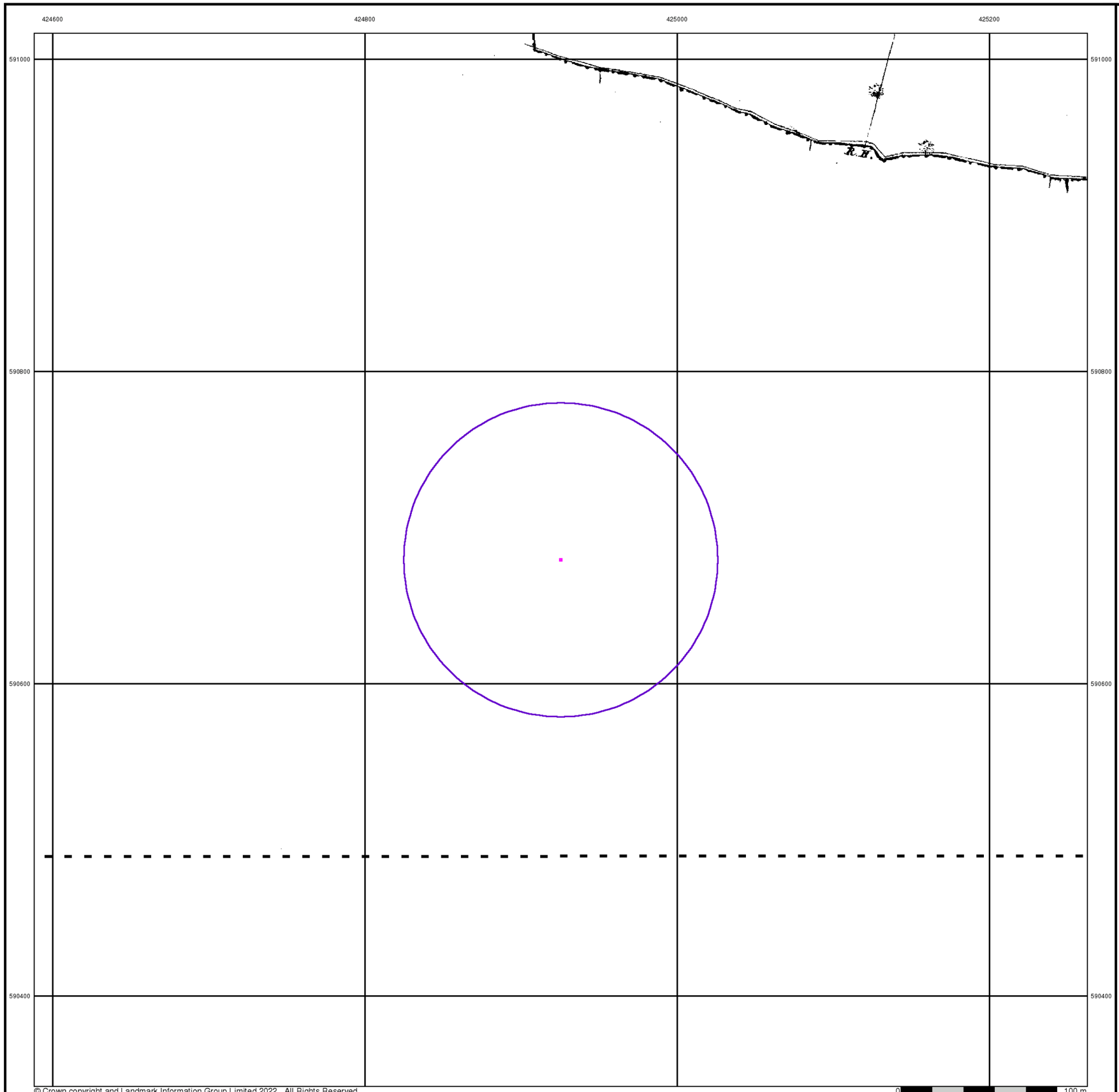
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

Landmark INFORMATION GROUP®

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

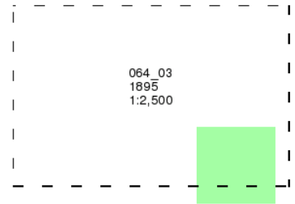
Northumberland

Published 1895

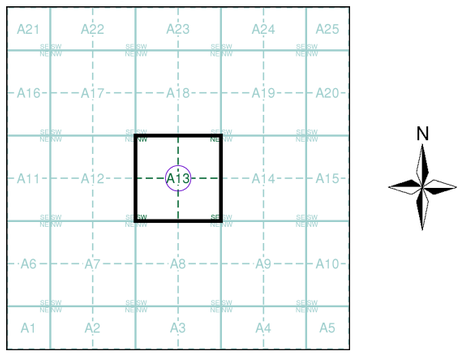
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

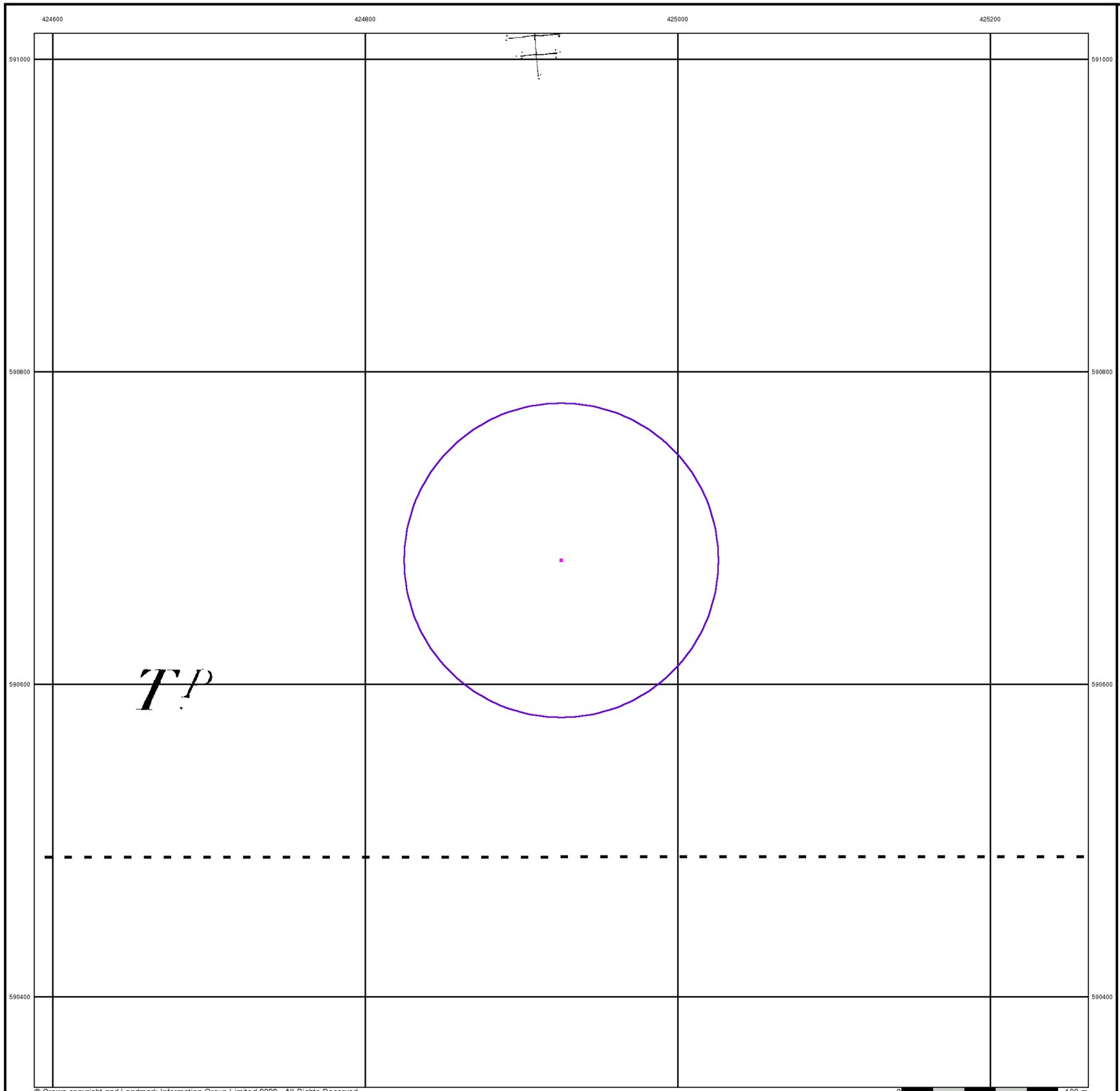
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

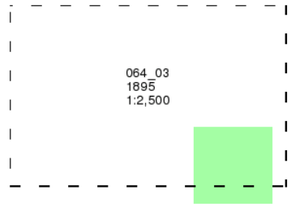
Northumberland

Published 1895

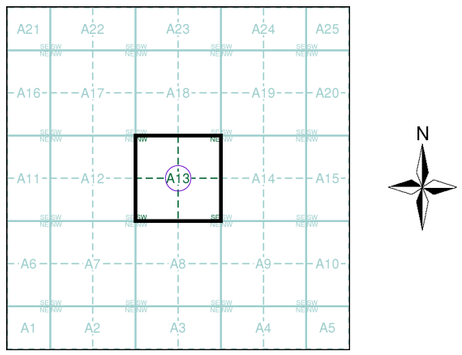
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

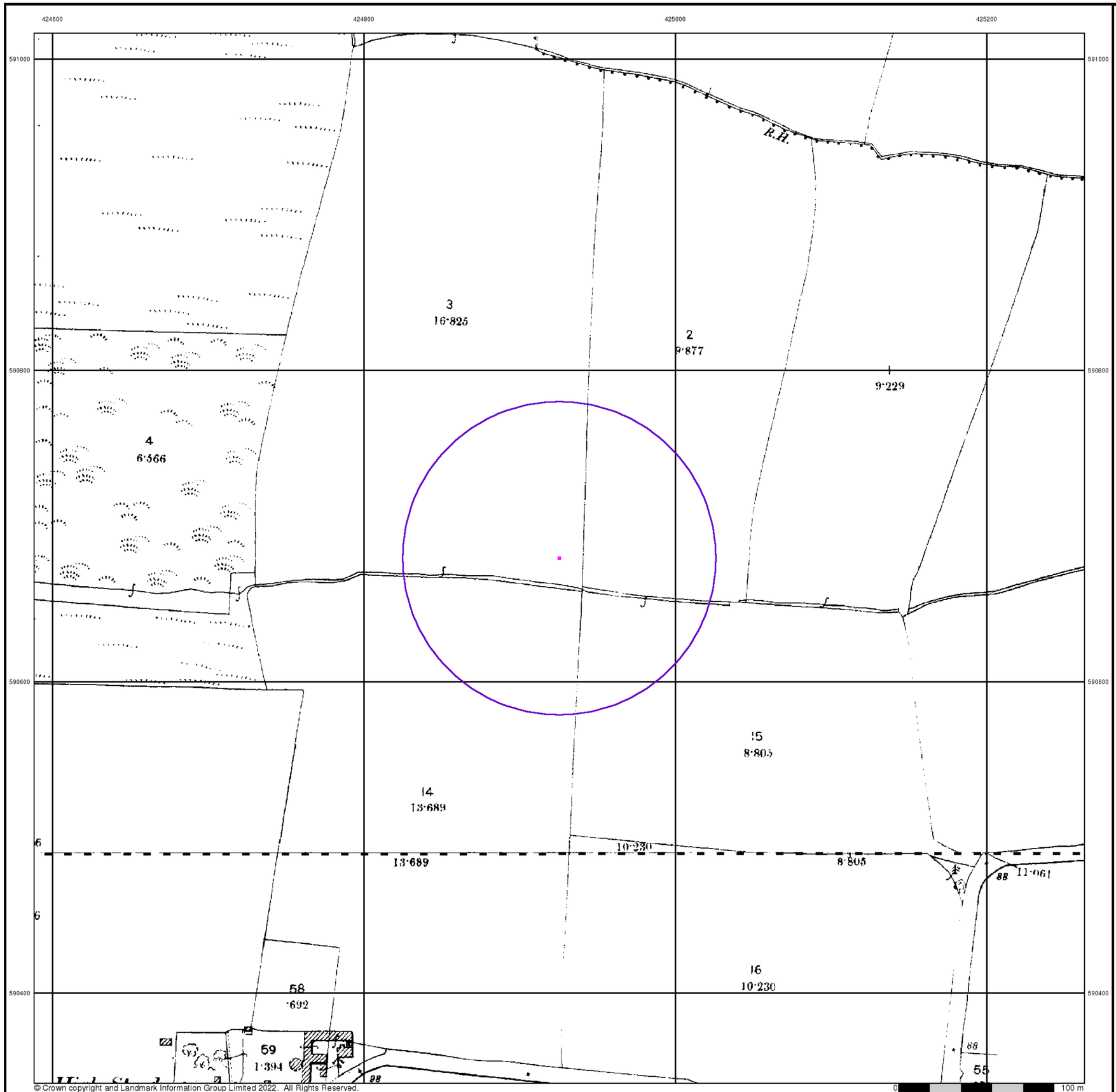
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

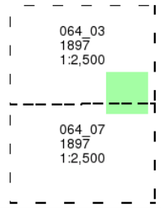
Northumberland

Published 1897

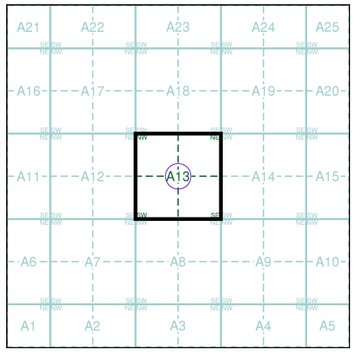
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

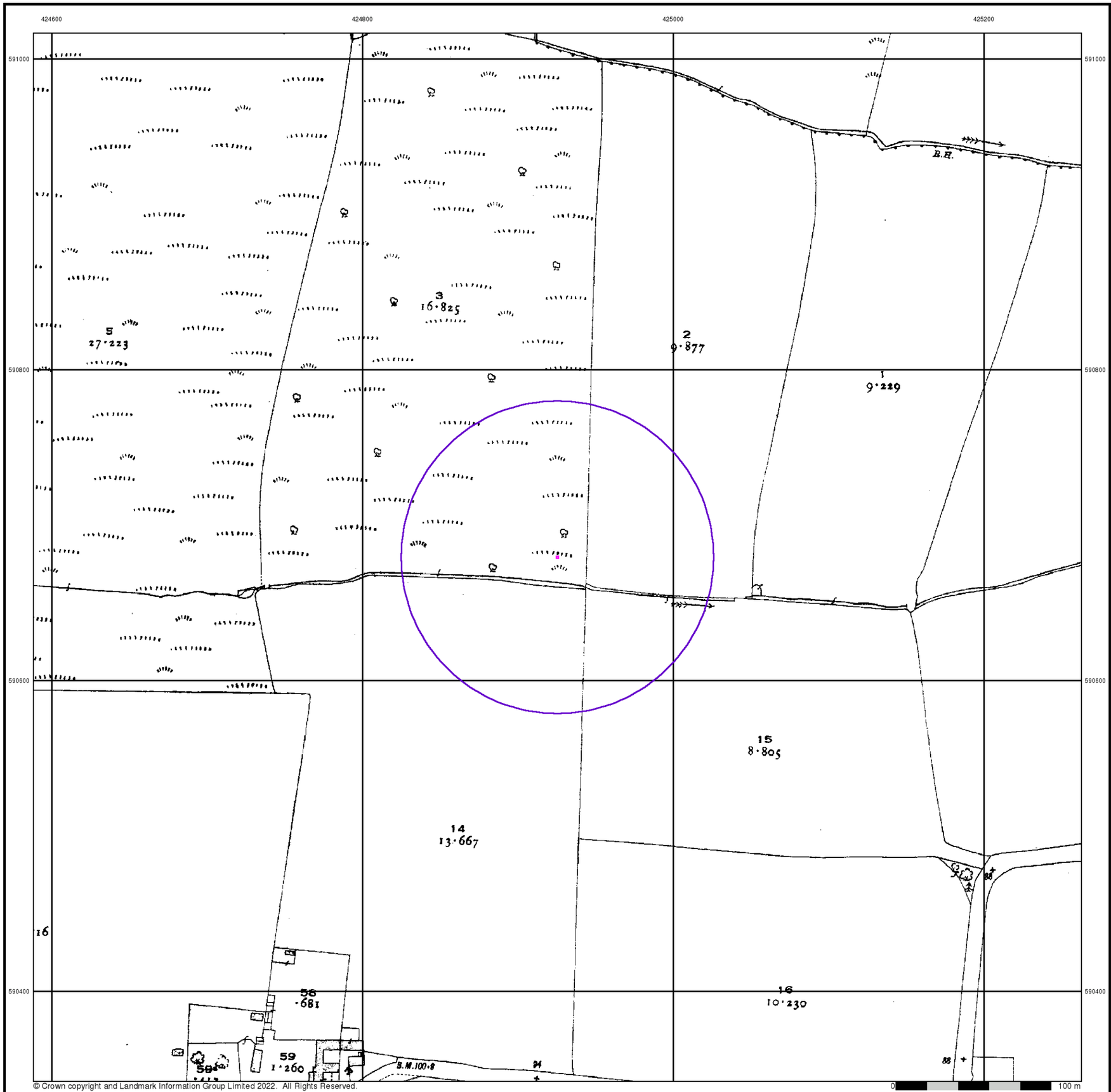
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

Landmark INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

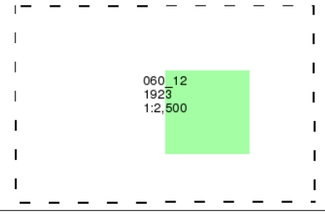
Northumberland

Published 1923

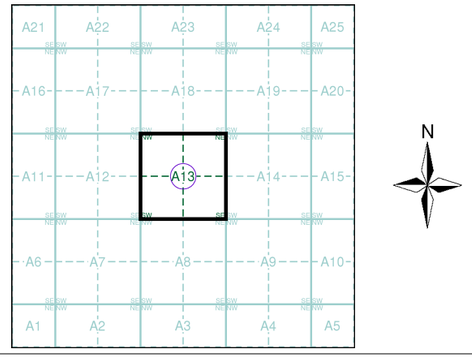
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

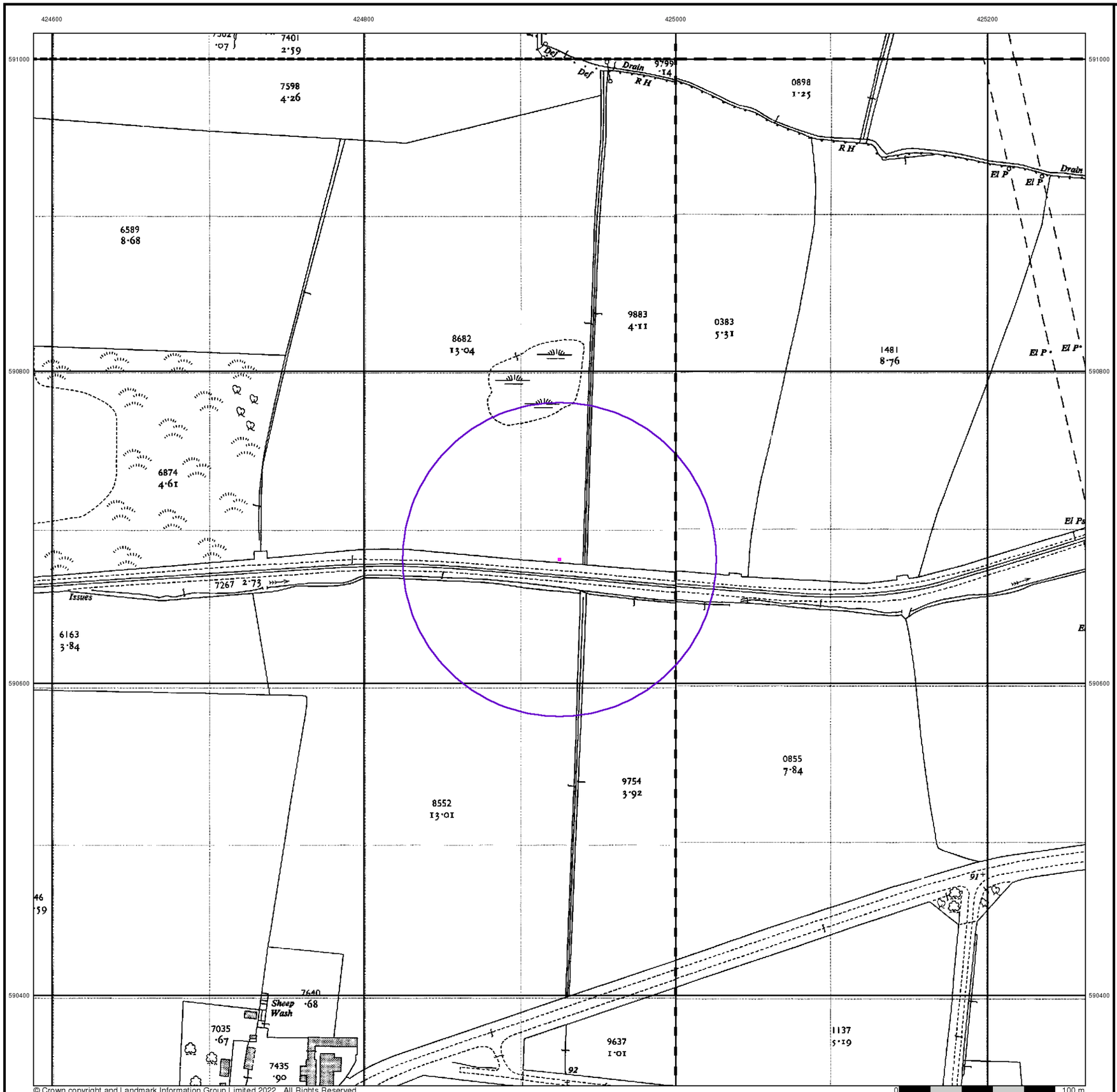
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

Landmark INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

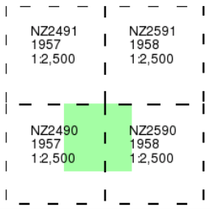
Ordnance Survey Plan

Published 1957 - 1958

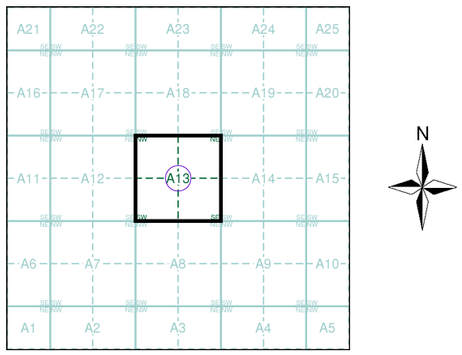
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

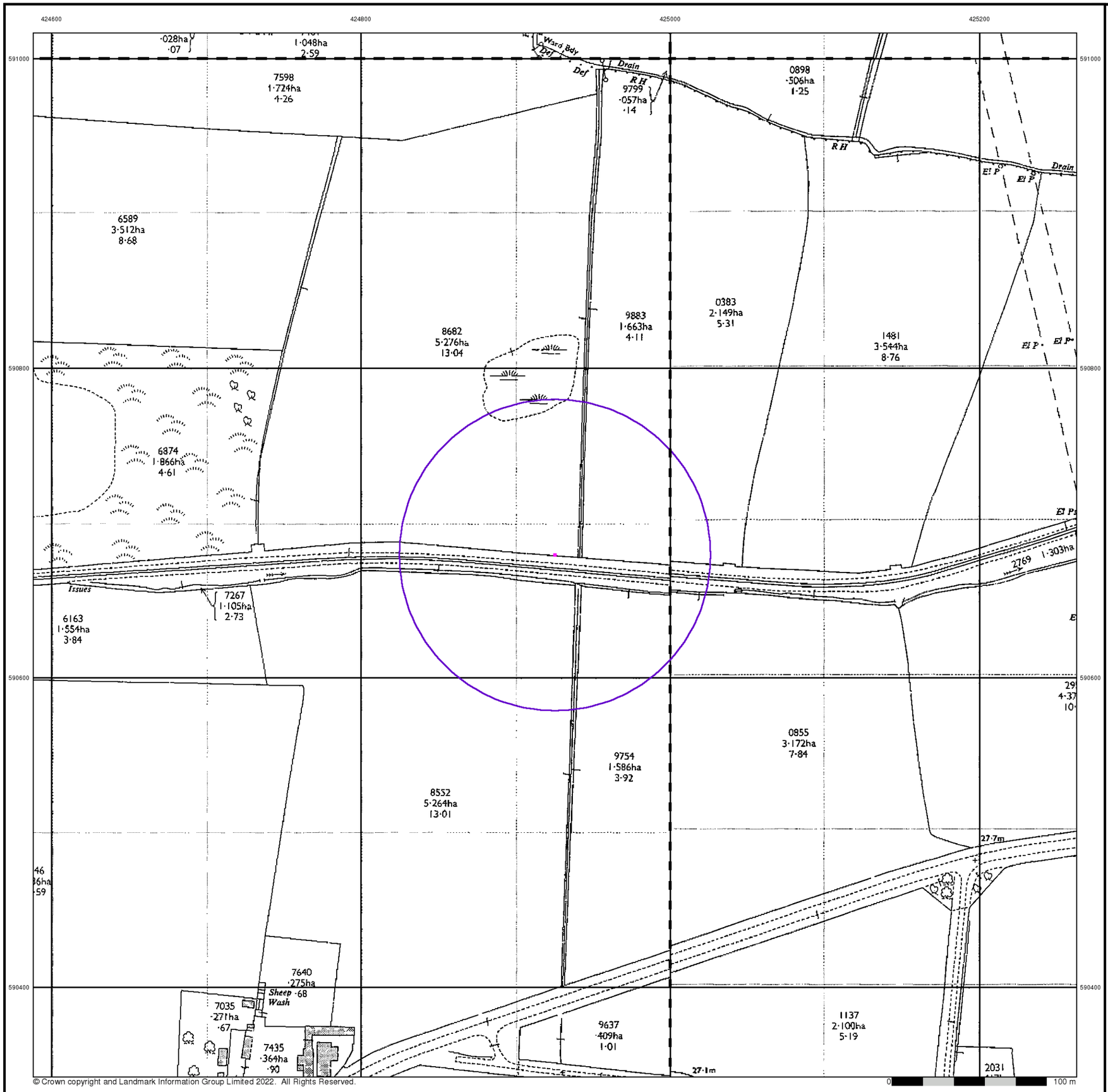
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

Additional SIMs

Published 1957 - 1958

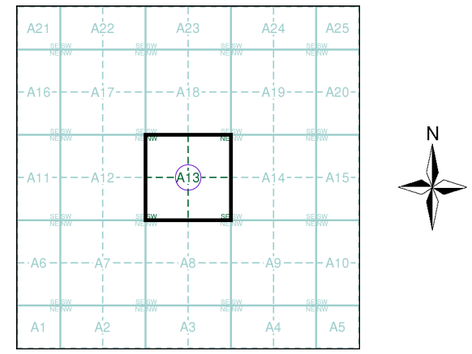
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

NZ2491 1957 1:2,500	NZ2591 1958 1:2,500
NZ2490 1957 1:2,500	NZ2590 1958 1:2,500

Historical Map - Segment A13



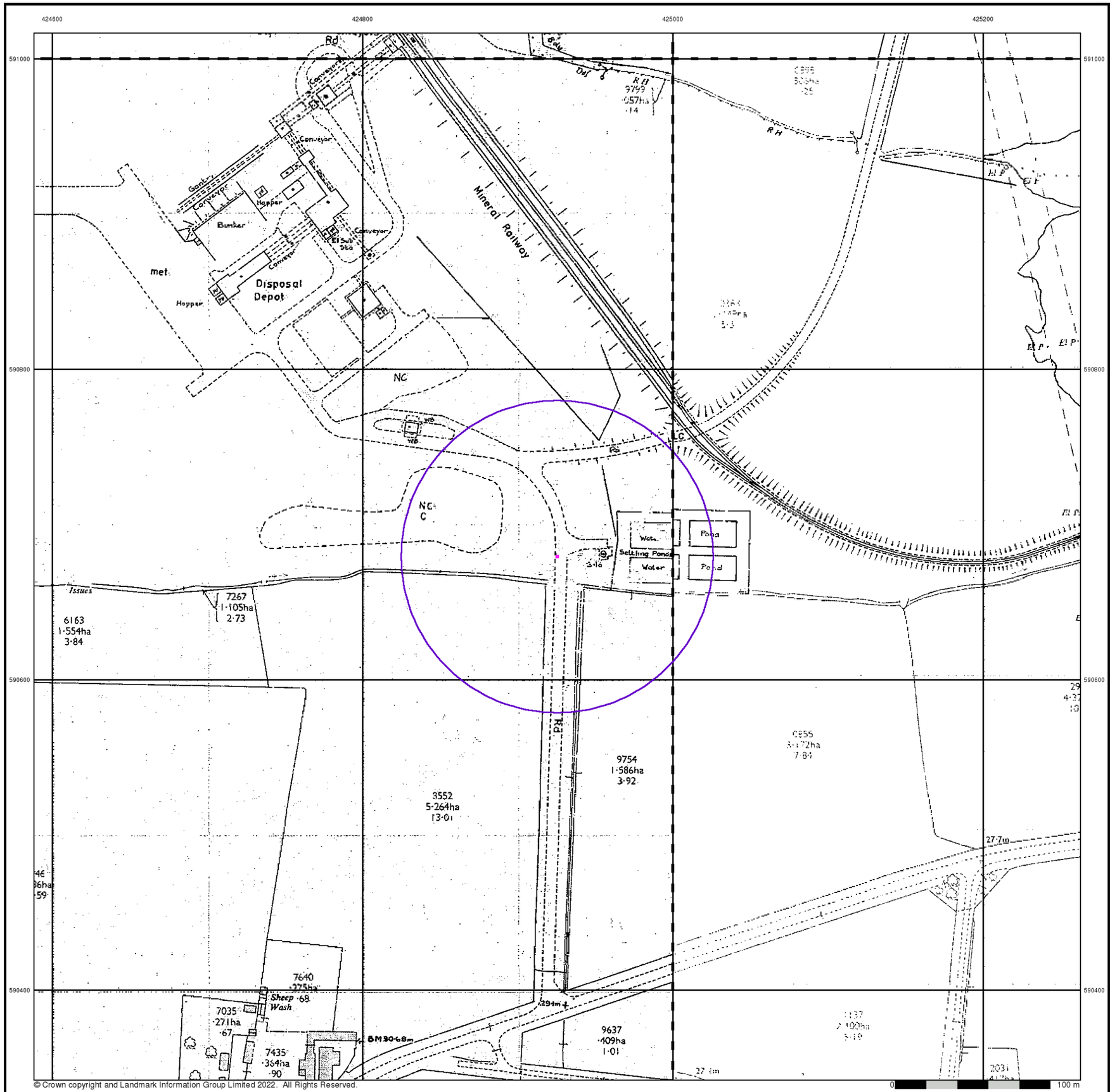
Order Details

Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

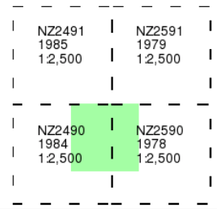
Additional SIMs

Published 1978 - 1985

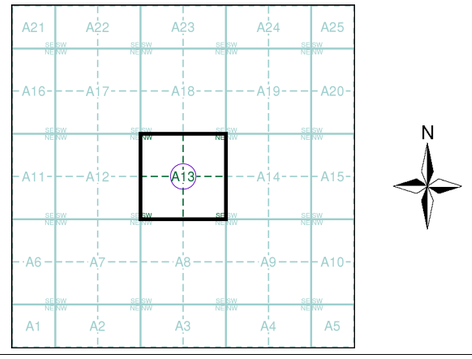
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



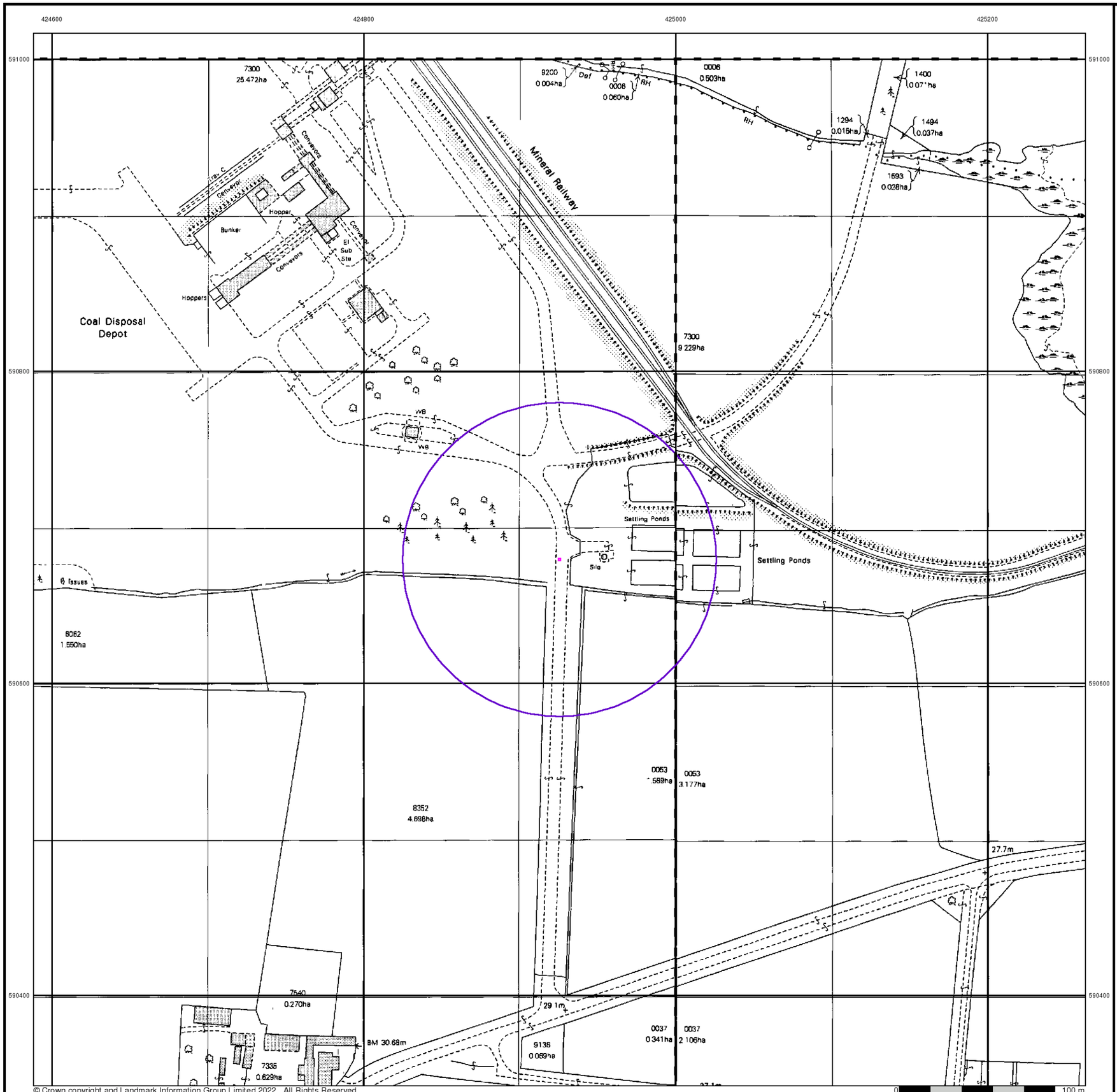
Order Details

Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

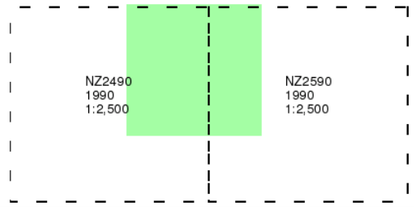
Ordnance Survey Plan

Published 1990

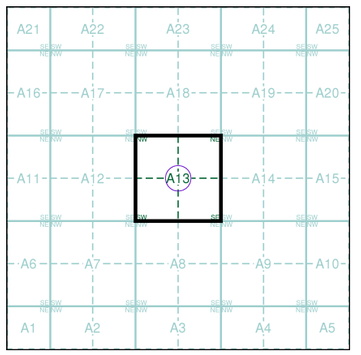
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

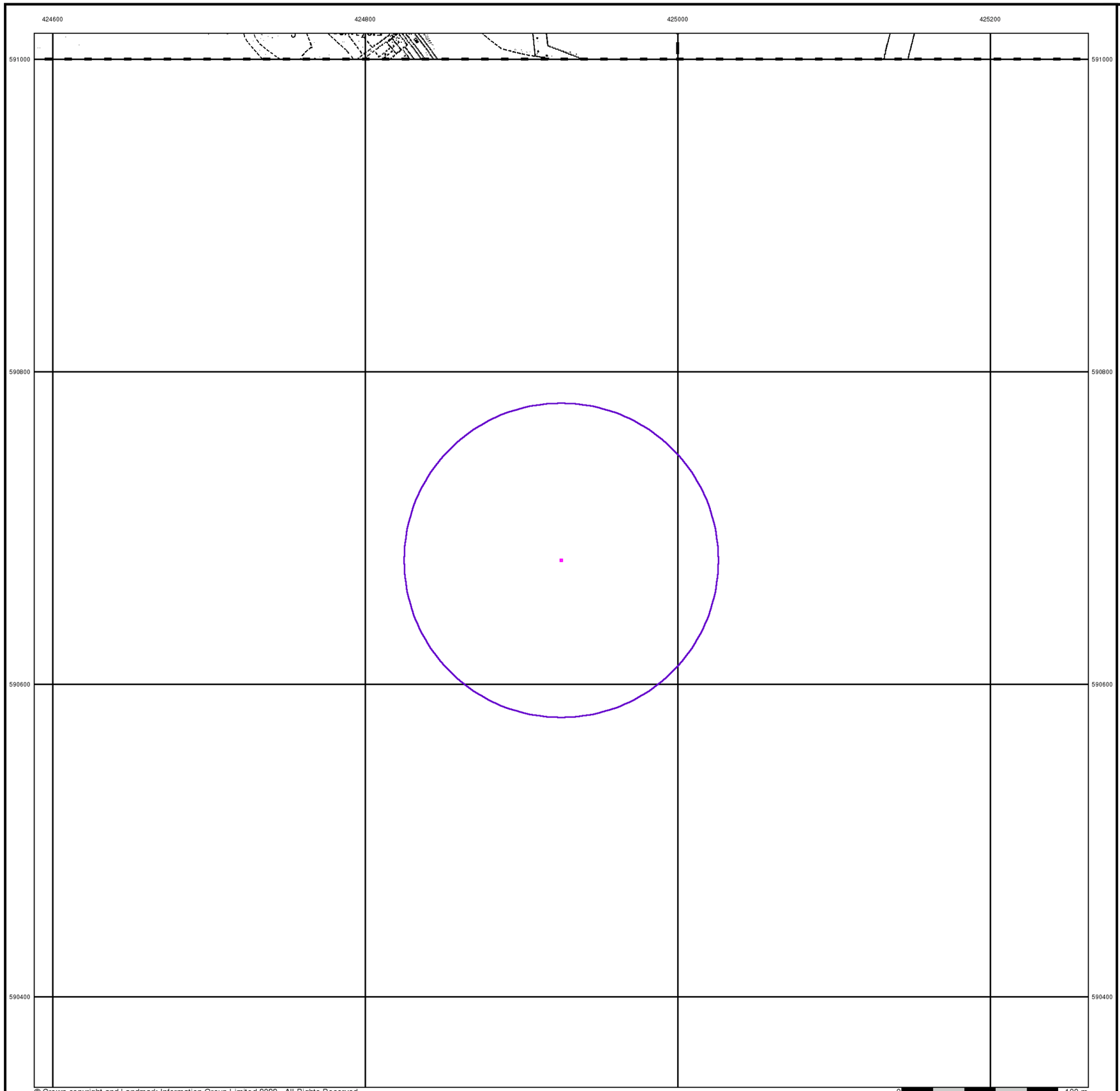
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown copyright and Landmark Information Group Limited 2022. All Rights Reserved.

Envirocheck®

LANDMARK INFORMATION GROUP®

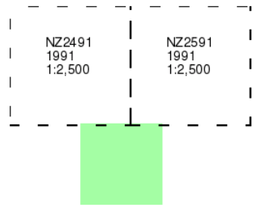
Additional SIMs

Published 1991

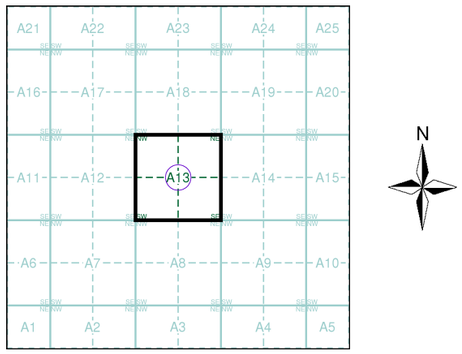
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

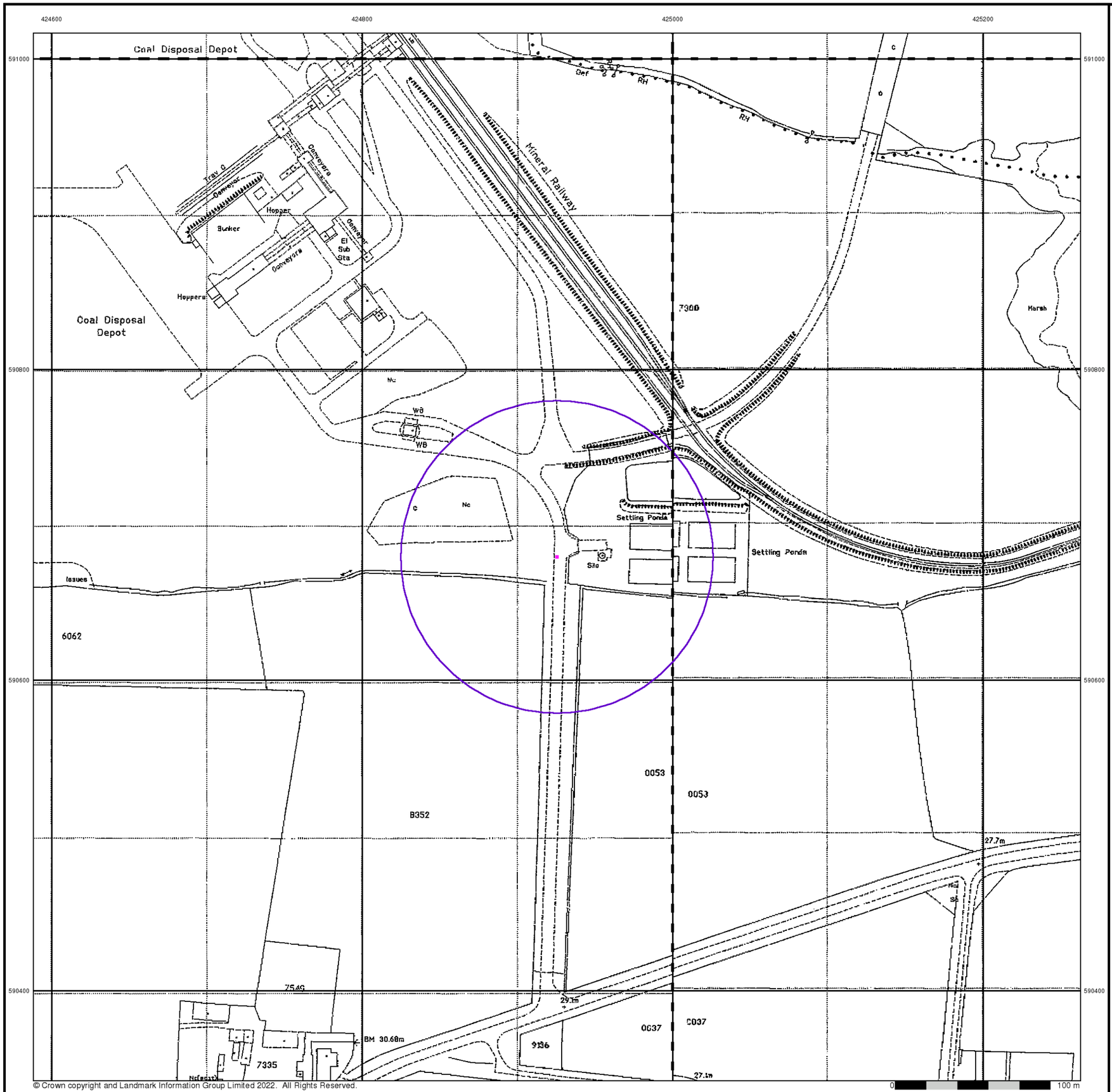
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



Envirocheck®

LANDMARK INFORMATION GROUP®

Large-Scale National Grid Data

Published 1994

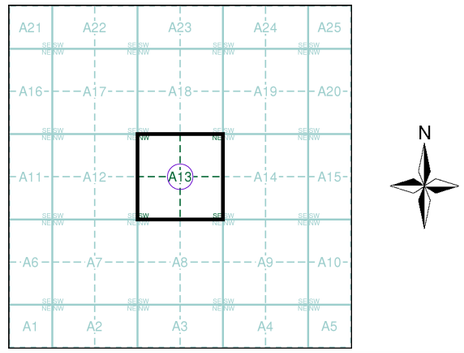
Source map scale - 1:2,500

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

NZ2491 1994 1:2,500	NZ2591 1994 1:2,500
NZ2490 1994 1:2,500	NZ2590 1994 1:2,500

Historical Map - Segment A13



Order Details

Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	100

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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

APPENDIX B

Envirocheck Report

Envirocheck®
LANDMARK INFORMATION GROUP®

Envirocheck® Report:

Datasheet

Order Details:

Order Number:
300463013_1_1

Customer Reference:
22010

National Grid Reference:
424930, 590680

Slice:
A

Site Area (Ha):
0.01

Search Buffer (m):
1000

Site Details:

Site at 424550, 591100

Client Details:

Dr D A Blythe,
DAB Geotechnics Ltd.,
Ellington,
MORPETH,
Northumberland,
NE61 5ES.

Prepared For:

N B Clark Morpeth Ltd.,
Unit 20B,
Coopies Haugh Lane,
Coopies Lane Industrial Estate,
MORPETH,
Northumberland, NE61 6JN.

Envirocheck®
LANDMARK INFORMATION GROUP®

Contents

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	12
Hazardous Substances	-
Geological	13
Industrial Land Use	-
Sensitive Land Use	-
Data Currency	15
Data Suppliers	20
Useful Contacts	21

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.
In this datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

Copyright Notice

© Landmark Information Group Limited 2022. The Copyright on the information and data and its format as contained in this Envirocheck® Report ("Report") is the property of Landmark Information Group Limited ("Landmark") and several other Data Providers, including (but not limited to) Ordnance Survey, British Geological Survey, the Environment Agency/Natural Resources Wales and Natural England, and must not be reproduced in whole or in part by photocopying or any other method. The Report is supplied under Landmark's Terms and Conditions accepted by the Customer.
A copy of Landmark's Terms and Conditions can be found with the Index Map for this report. Additional copies of the Report may be obtained from Landmark, subject to Landmark's charges in force from time to time. The Copyright, design rights and any other intellectual rights shall remain the exclusive property of Landmark and /or other Data providers, whose Copyright material has been included in this Report.
© Environment Agency & United Kingdom Research and Innovation 2022. © Natural Resources Wales & United Kingdom Research and Innovation 2022.

Natural England Copyright Notice

Site of Special Scientific Interest, National Nature Reserve, Ramsar, Special Protection Area, Special Conservation Area, Marine Nature Reserve data (derived from Ordnance Survey 1:10000 raster) is provided by, and used with the permission of, Natural England who retain the copyright and Intellectual Property Rights for the data.

Scottish Natural Heritage Copyright

Contains SNH information licensed under the Open Government Licence v3.0.

Ove Arup Copyright Notice

The Mining Instability data was obtained on licence from Ove Arup & Partners Limited (for further information, contact mining.review@arup.com). No reproduction or further use of such Data is to be made without the prior written consent of Ove Arup & Partners Limited. The supplied Mining Instability data is derived from publicly available records and other third party sources and neither Ove Arup & Partners nor Landmark warrant the accuracy or completeness of such information or data.

Stantec Copyright Notice

The cavity data presented has been extracted from the PBA (now Stantec UK Ltd) enhanced version of the original DEFRA national cavity databases. Stantec UK Ltd retain the copyright & intellectual property rights in the data. Whilst all reasonable efforts are made to check that the information contained in the cavity databases is accurate we do not warrant that the data is complete or error free. The information is based upon our own researches and those collated from a number of external sources and is continually being augmented and updated by Stantec UK Ltd. In no event shall Stantec UK Ltd or Landmark be liable for any loss or damage including, without limitation, indirect or consequential loss or damage arising from the use of this data.

Radon Potential dataset Copyright Notice

Information supplied from a joint dataset compiled by The British Geological Survey and Public Health England.

Natural Resources Wales Copyright Notice

Contains Natural Resources Wales information © Natural Resources Wales and Database Right. All rights Reserved. Contains Ordnance Survey Data. Ordnance Survey Licence number 100019741. Crown Copyright and Database Right. Contains Natural Resources Wales information © Natural Resources Wales and Database Right. All rights Reserved. Some features of this information are based on digital spatial data licensed from the Centre for Ecology & Hydrology © NERC (CEH). Defra, Met Office and DARD Rivers Agency © Crown copyright. © Cranfield University. © James Hutton Institute. Contains OS data © Crown copyright and database right 2022. Land & Property Services © Crown copyright and database right.

Report Version v53.0

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1		Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 1		2		
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 1			2	
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 2		Yes		
Pollution Incidents to Controlled Waters					
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality					
River Quality Biology Sampling Points					
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register	pg 2			1	
Water Abstractions	pg 2				(*6)
Water Industry Act Referrals					
Groundwater Vulnerability Map	pg 3	Yes	n/a	n/a	n/a
Groundwater Vulnerability - Soluble Rock Risk			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 3	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 3	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences				n/a	n/a
Flooding from Rivers or Sea without Defences				n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 4		26	19	19

Envirocheck®
LANDMARK INFORMATION GROUP®

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites	pg 12				1
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)					
Local Authority Landfill Coverage	pg 12	2	n/a	n/a	n/a
Local Authority Recorded Landfill Sites	pg 12				2
Registered Landfill Sites					
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites					
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					
Geological					
BGS 1:625,000 Solid Geology	pg 13	Yes	n/a	n/a	n/a
BGS Recorded Mineral Sites	pg 13			1	3
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas	pg 13	Yes	n/a	n/a	n/a
Mining Instability	pg 13	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 13	Yes	Yes	n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 13		Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 14	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 14	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 14	Yes	Yes	n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a

Envirocheck®
LANDMARK INFORMATION GROUP®

Summary

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Industrial Land Use					
Contemporary Trade Directory Entries					
Fuel Station Entries					
Gas Pipelines					
Underground Electrical Cables					
Sensitive Land Use					
Ancient Woodland					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones					
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NW (W)	227	1	424700 590700
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NE (NE)	298	1	425050 590950
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding to Occur at Surface	A13NE (N)	322	1	424950 591000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	379	1	425000 591050
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SE (N)	422	1	424950 591100
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A13NW (NW)	457	1	424600 591000
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (W)	459	1	424500 590850
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A12NE (W)	481	1	424450 590750
	BGS Groundwater Flooding Susceptibility Flooding Type: Potential for Groundwater Flooding of Property Situated Below Ground Level	A18SW (N)	488	1	424800 591150
1	**Discharge Consents** Operator: Johnsons (Chopwell) Ltd Property Type: MINING OF COAL + LIGNITE Location: Butterwell Disposal Point, Coal Sto, Longhirst, Nr Morpeth, Northumberland Authority: Environment Agency, North East Region Catchment Area: South Northumberland Reference: 224/0637 Permit Version: 1 Effective Date: 6th March 1989 Issued Date: 6th March 1989 Revocation Date: 13th June 2013 Discharge Type: Trade Discharge - Process Water Discharge Environment: Freshwater Stream/River Receiving Water: Potland Burn, Tributary Of **Status: Revoked under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A13SE (E)	156	2	425080 590660
1	**Discharge Consents** Operator: Harworth Estates Mines Property Limited Property Type: MINING OF COAL + LIGNITE Location: Buterwell D. P. Surface Mine, Linton, Morpeth, Northumberland, Ne61 5sg Authority: Environment Agency, North East Region Catchment Area: Not Supplied Reference: Eprkp3825gb Permit Version: 1 Effective Date: 8th September 2011 Issued Date: 8th September 2011 Revocation Date: Not Supplied Discharge Type: Trade Discharges - Site Drainage Discharge Environment: Freshwater Stream/River Receiving Water: Trib Of Potland Burn **Status: New issued under EPR 2010** Positional Accuracy: Located by supplier to within 10m	A13SE (E)	168	2	425088 590639
2	**Local Authority Pollution Prevention and Controls** Name: Butterwell Disposal Point Surface Mine Scheme Occs Location: Linton, Morpeth, NE61 1JW Authority: Northumberland Council, Environmental Health Department Permit Reference: EPSE13/020 Dated: 22nd March 2004 Process Type: Local Authority Pollution Prevention and Control Description: PG3/5 Coal, coke and coal product processes **Status: Permitted** Positional Accuracy: Located by supplier to within 10m	A13NW (NW)	269	3	424746 590879

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
2	**Local Authority Pollution Prevention and Controls** Name: Johnsons (Chopwell) Ltd Location: Butterwell Disposal Point, Linton, MORPETH, Northumberland, NE61 Authority: Northumberland Council, Environmental Health Department Permit Reference: PPC(B)001 Dated: 19th December 1991 Process Type: Local Authority Pollution Prevention and Control Description: PG3/16 Mobile screening and crushing processes **Status: Permitted** Positional Accuracy: Manually positioned to the address or location	A13NW (NW)	269	3	424776 590903
	Nearest Surface Water Feature	A13NW (W)	5	-	424921 590680
3	**Substantiated Pollution Incident Register** Authority: Environment Agency - North East Region, North East Area Incident Date: 29th November 2001 Incident Reference: 45712 Water Impact: Category 4 - No Impact Air Impact: Category 3 - Minor Incident Land Impact: Category 2 - Significant Incident Positional Accuracy: Located by supplier to within 10m Pollutant: Specific Waste Materials: Commercial Waste Pollutant: Specific Waste Materials: Household Waste	A7NE (SW)	492	2	424580 590330
	Water Abstractions Operator: Dungait Farms Licence Number: 1/22/04/025/R01 Permit Version: 1 Location: Borehole - Coal Measures - Ulgham Authority: Environment Agency, North East Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Manor Farm, Ulgham, Morpeth, Northumberland Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 1st April 2019 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A21SE (NW)	1568	2	423897 591862
	Water Abstractions Operator: Dungait Farms Licence Number: 1/22/04/025 Permit Version: 2 Location: Borehole - Coal Measures - Ulgham Authority: Environment Agency, North East Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Manor Farm, Ulgham, Morpeth, Northumberland Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 10th August 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A21SE (NW)	1571	2	423890 591860
	Water Abstractions Operator: Dungait Farms Licence Number: 1/22/04/025 Permit Version: 2 Location: Borehole - Coal Measures - Ulgham Authority: Environment Agency, North East Region Abstraction: General Agriculture: Transfer Between Sources Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Manor Farm, Ulgham, Hebron, Morpeth Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 10th August 2016 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A21SE (NW)	1571	2	423890 591860

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: M Dungait & Sons Licence Number: 1/22/04/025 Permit Version: 1 Location: Borehole - Coal Measures - Ulgham Authority: Environment Agency, North East Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Manor Farm, Ulgham, Morpeth, Northumberland Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 1st April 2009 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A21SE (NW)	1571	2	423890 591860
	Water Abstractions Operator: M Dungait & Sons Licence Number: 1/22/04/025 Permit Version: 1 Location: Borehole - Coal Measures - Ulgham Authority: Environment Agency, North East Region Abstraction: General Agriculture: Transfer Between Sources Abstraction Type: Water may be abstracted from a single point Source: Groundwater Daily Rate (m3): Not Supplied Yearly Rate (m3): Not Supplied Details: Manor Farm, Ulgham, Hebron, Morpeth Authorised Start: 01 April Authorised End: 30 September Permit Start Date: 1st April 2009 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 10m	A21SE (NW)	1571	2	423890 591860
	Water Abstractions Operator: M Dungait & Sons Licence Number: 1/22/04/022 Permit Version: 100 Location: River Lyne Authority: Environment Agency, North East Region Abstraction: General Agriculture: Spray Irrigation - Direct Abstraction Type: Water may be abstracted from a single point Source: Surface Daily Rate (m3): 192 Yearly Rate (m3): 9000 Details: Ulgham Manor Farm, Northumberland Authorised Start: 01 April Authorised End: 31 October Permit Start Date: 24th April 1996 Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A22NE (N)	1738	2	424300 592300
	Groundwater Vulnerability Map Combined Classification: Secondary Superficial Aquifer - Medium Vulnerability Combined Vulnerability: Medium Combined Aquifer: Productive Bedrock Aquifer, Productive Superficial Aquifer Pollutant Speed: Intermediate Bedrock Flow: Well Connected Fractures Dilution: 300-550 mm/year Baseflow Index: <40% Superficial Patchiness: >90% Superficial Thickness: >10m Superficial Recharge: Low	A13NE (NE)	0	4	424925 590679
	Groundwater Vulnerability - Soluble Rock Risk None				
	Bedrock Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A13NE (NE)	0	4	424925 590679
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - Undifferentiated	A13NE (NE)	0	4	424925 590679
	Extreme Flooding from Rivers or Sea without Defences None				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
4	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 73.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (W)	5	5	424921 590680
5	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 13.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SW (S)	8	5	424925 590672
6	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 8.0 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SW (SW)	9	5	424921 590673
7	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 41.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SE (SE)	12	5	424934 590672
8	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 124.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SW (S)	16	5	424923 590664
9	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 8.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SW (S)	16	5	424921 590665
10	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.3 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SW (SW)	20	5	424912 590665
11	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 92.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SW (SW)	22	5	424909 590666

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
12	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 13.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (NW)	68	5	424891 590737
13	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 149.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (NW)	68	5	424891 590737
14	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 15.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (NW)	77	5	424895 590750
15	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 26.2 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (N)	80	5	424909 590757
16	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 38.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NE (E)	89	5	425014 590688
17	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 15.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SE (E)	106	5	425030 590671
18	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 17.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (N)	106	5	424907 590783
19	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 23.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SE (E)	121	5	425045 590669
20	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 41.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SE (E)	122	5	425044 590655

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
21	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 9.6 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (N)	123	5	424903 590800
22	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 25.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NE (E)	127	5	425051 590687
23	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 223.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (N)	132	5	424902 590809
24	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 9.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SE (E)	145	5	425069 590669
25	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.2 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SE (E)	152	5	425076 590663
26	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 9.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SE (E)	156	5	425079 590660
27	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 467.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13SE (E)	163	5	425086 590653
28	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 12.3 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (NW)	203	5	424748 590778
29	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 371.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (NW)	215	5	424736 590780

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
30	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 203.2 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NE (N)	309	5	425015 590975
31	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 171.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (N)	316	5	424883 590992
32	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 27.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NE (N)	319	5	424941 590997
33	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 275.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (N)	328	5	424915 591006
34	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 5.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (N)	334	5	424818 590995
35	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 296.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NE (NE)	334	5	425135 590939
36	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 95.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A13NW (N)	339	5	424815 591000
37	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 264.2 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A8NW (S)	385	5	424925 590295
38	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 143.3 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A8NE (S)	408	5	425054 590293

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
39	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A8NW (S)	409	5	424790 590294
40	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 16.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A8NW (S)	410	5	424786 590294
41	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 8.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A8NW (S)	423	5	424774 590285
42	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 3.7 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A18SW (N)	429	5	424792 591086
43	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 7.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A18SW (N)	431	5	424789 591088
44	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A18SW (N)	436	5	424781 591090
45	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 658.1 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A18SW (N)	438	5	424784 591093
46	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 118.2 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A8NE (SE)	481	5	425175 590269
47	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 363.8 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A8NE (SE)	482	5	425197 590282

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
48	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 852.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A8NE (S)	490	5	425096 590221
49	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 127.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A14NW (E)	531	5	425430 590843
50	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 36.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A14NW (E)	531	5	425430 590843
51	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 115.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A14NW (E)	536	5	425423 590878
52	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 163.6 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A18SW (N)	573	5	424765 591230
53	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 125.3 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A18SW (N)	573	5	424765 591230
54	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 4.6 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A12NE (W)	579	5	424370 590839
55	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 194.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A12NE (W)	583	5	424366 590840
56	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 460.5 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A14NW (E)	611	5	425530 590765

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
57	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 173.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A18SW (N)	692	5	424695 591331
58	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 149.8 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A18SW (N)	692	5	424695 591331
59	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 24.9 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A12NW (W)	745	5	424215 590902
60	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 318.9 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A9NW (SE)	764	5	425560 590255
61	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 293.4 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A12NW (W)	769	5	424190 590901
62	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 6.5 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A12SW (W)	839	5	424088 590639
63	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 117.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A12SW (W)	840	5	424087 590632
64	**OS Water Network Lines** Watercourse Form: Lake Watercourse Length: 169.0 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A14NE (E)	868	5	425751 590947
65	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 194.7 Watercourse Level: Not Supplied Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A7NE (SW)	889	5	424299 590049

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
66	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 8.4 Watercourse Level: Underground Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A12SW (W)	893	5	424046 590523
67	**OS Water Network Lines** Watercourse Form: Inland river Watercourse Length: 108.7 Watercourse Level: On ground surface Permanent: True Watercourse Name: Not Supplied Catchment Name: Lyne and Druridge Bay Coast Primacy: 1	A12SW (W)	898	5	424044 590515

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
68	**Historical Landfill Sites** Licence Holder: Not Supplied Location: Longhirst, Northumberland Name: Rear Rose Cottage Operator Location: Not Supplied Boundary Accuracy: As Supplied Provider Reference: EAHLD06475 First Input Date: Not Supplied Last Input Date: 31st December 1962 Specified Waste Type: Deposited Waste included Commercial and Household Waste EA Waste Ref: 0 Regis Ref: Not Supplied WRC Ref: 2900/0212 BGS Ref: Not Supplied Other Ref: PD 023	A14SE (E)	770	2	425675 590504
	Local Authority Landfill Coverage Name: Castle Morpeth Borough Council - Has supplied landfill data		0	7	424925 590679
	Local Authority Landfill Coverage Name: Northumberland County Council - Has supplied landfill data		0	6	424925 590679
69	**Local Authority Recorded Landfill Sites** Location: Rear Rose Cottage, Longhirst Reference: PD23 Authority: Northumberland County Council (now part of Northumberland Council) **Last Reported Status:** **Closed** Types of Waste: Household Date of Closure: Not Supplied Positional Accuracy: Located by supplier to within 100m Boundary Quality: Not Applicable	A14SE (E)	796	6	425700 590500
69	**Local Authority Recorded Landfill Sites** Location: Rear Rose Cottage, Longhirst Reference: PD23 Authority: Castle Morpeth Borough Council (now part of Northumberland Council), Environmental Health Department **Last Reported Status:** **Closed** Types of Waste: Household Date of Closure: 31/12/1960 Positional Accuracy: Located by supplier to within 100m Boundary Quality: Not Applicable	A14SE (E)	796	7	425701 590501

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Pennine Middle Coal Measures Formation And South Wales Middle Coal Measures Formation (Undifferentiated)	A13NE (NE)	0	1	424925 590679
70	**BGS Recorded Mineral Sites** Site Name: Butterwell Disposal Point Surface Mine Location: Ashington, Northumberland Source: British Geological Survey, National Geoscience Information Service Reference: 165384 Type: Opencast **Status: Ceased** Operator: Ukcsmr Ltd. Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Coal - Opencast Positional Accuracy: Located by supplier to within 10m	A13SW (SW)	252	1	424710 590550
71	**BGS Recorded Mineral Sites** Site Name: Linton Occs Location: Linton, Morpeth, Northumberland Source: British Geological Survey, National Geoscience Information Service Reference: 5231 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Coal - Opencast Positional Accuracy: Located by supplier to within 10m	A18NE (N)	802	1	425025 591475
72	**BGS Recorded Mineral Sites** Site Name: Linton Tile Works Location: Linton, Morpeth, Northumberland Source: British Geological Survey, National Geoscience Information Service Reference: 115519 Type: Opencast **Status: Ceased** Operator: Unknown Operator Operator Location: Not Supplied Periodic Type: Quaternary, Devensian Geology: Till, Devensian Commodity: Common Clay and Shale Positional Accuracy: Located by supplier to within 10m	A19SW (NE)	874	1	425564 591275
73	**BGS Recorded Mineral Sites** Site Name: Longhirst Drift Mine Location: Longhirst, Ashington, Northumberland Source: British Geological Survey, National Geoscience Information Service Reference: 5151 Type: Underground **Status: Ceased** Operator: Individual'S Name Withheld Operator Location: Not Supplied Periodic Type: Carboniferous Geology: Pennine Middle Coal Measures Formation Commodity: Coal - Deep Positional Accuracy: Located by supplier to within 10m	A7NW (SW)	887	1	424215 590150
	Coal Mining Affected Areas Description: In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A13NE (NE)	0	8	424925 590679
	Mining Instability Mining Evidence: Inconclusive Coal Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A13NE (NE)	0	-	424925 590679
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	1	424925 590679
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (E)	75	1	425000 590679
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	1	424925 590679

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (E)	75	1	425000 590679
	Potential for Compressible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NW (NW)	219	1	424728 590773
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	1	424925 590679
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A13NE (E)	75	1	425000 590679
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	1	424925 590679
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (E)	75	1	425000 590679
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	1	424925 590679
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A13NE (E)	75	1	425000 590679
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	1	424925 590679
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A13NE (E)	75	1	425000 590679
	Radon Potential - Radon Affected Areas Affected Area: The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level). Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	1	424925 590679
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	1	424925 590679

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
Northumberland Council - Environmental Health Department	January 2020	Annually
Environment Agency - Head Office	June 2020	Annually
Wansbeck District Council (now part of Northumberland Council) - Environmental Health Department	September 2017	Not Applicable
Castle Morpeth Borough Council (now part of Northumberland Council) - Environmental Health Department	September 2017	
Discharge Consents		
Environment Agency - North East Region	April 2022	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - North East Region	March 2013	
Integrated Pollution Controls		
Environment Agency - North East Region	January 2009	
Integrated Pollution Prevention And Control		
Environment Agency - North East Region	April 2022	Quarterly
Local Authority Integrated Pollution Prevention And Control		
Wansbeck District Council (now part of Northumberland Council) - Economic and Environment Services	May 2009	Not Applicable
Northumberland Council - Environmental Health Department	May 2014	Variable
Castle Morpeth Borough Council (now part of Northumberland Council) - Environmental Health Department	September 2008	Not Applicable
Local Authority Pollution Prevention and Controls		
Wansbeck District Council (now part of Northumberland Council) - Economic and Environment Services	May 2009	Not Applicable
Northumberland Council - Environmental Health Department	May 2014	Annually
Castle Morpeth Borough Council (now part of Northumberland Council) - Environmental Health Department	September 2008	Not Applicable
Local Authority Pollution Prevention and Control Enforcements		
Wansbeck District Council (now part of Northumberland Council) - Economic and Environment Services	May 2009	Not Applicable
Northumberland Council - Environmental Health Department	May 2014	Variable
Castle Morpeth Borough Council (now part of Northumberland Council) - Environmental Health Department	September 2008	Not Applicable
Nearest Surface Water Feature		
Ordnance Survey	June 2022	
Pollution Incidents to Controlled Waters		
Environment Agency - North East Region	December 1998	
Prosecutions Relating to Authorised Processes		
Environment Agency - North East Region	July 2015	
Prosecutions Relating to Controlled Waters		
Environment Agency - North East Region	March 2013	
Registered Radioactive Substances		
Environment Agency - North East Region	June 2016	As notified
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points		
Environment Agency - Head Office	April 2012	
River Quality Chemistry Sampling Points		
Environment Agency - Head Office	April 2012	
Substantiated Pollution Incident Register		
Environment Agency - North East Region - North East Area	April 2022	Quarterly
Environment Agency - North East Region - Northumbria Area	April 2022	Quarterly
Water Abstractions		
Environment Agency - North East Region	July 2022	Quarterly

Data Currency

Agency & Hydrological	Version	Update Cycle
Water Industry Act Referrals Environment Agency - North East Region	October 2017	
Groundwater Vulnerability Map Environment Agency - Head Office	June 2018	As notified
Bedrock Aquifer Designations Environment Agency - Head Office	January 2018	Annually
Superficial Aquifer Designations Environment Agency - Head Office	January 2018	Annually
Source Protection Zones Environment Agency - Head Office	July 2022	Bi-Annually
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	August 2022	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	August 2022	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	August 2022	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	August 2022	Quarterly
Flood Defences Environment Agency - Head Office	August 2022	Quarterly
OS Water Network Lines Ordnance Survey	July 2022	Quarterly
BGS Groundwater Flooding Susceptibility British Geological Survey - National Geoscience Information Service	May 2013	As notified

Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	November 2002	As notified
Historical Landfill Sites		
Environment Agency - Head Office	April 2022	Quarterly
Integrated Pollution Control Registered Waste Sites		
Environment Agency - North East Region	January 2009	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - North East Region - North East Area	April 2022	Quarterly
Environment Agency - North East Region - Northumbria Area	April 2022	Quarterly
Licensed Waste Management Facilities (Locations)		
Environment Agency - North East Region - North East Area	April 2022	Quarterly
Environment Agency - North East Region - Northumbria Area	April 2022	Quarterly
Local Authority Landfill Coverage		
Castle Morpeth Borough Council (now part of Northumberland Council) - Environmental Health Department	February 2003	Not Applicable
Northumberland County Council (now part of Northumberland Council)	February 2003	Not Applicable
Wansbeck District Council (now part of Northumberland Council) - Economic and Environment Services	February 2003	Not Applicable
Local Authority Recorded Landfill Sites		
Castle Morpeth Borough Council (now part of Northumberland Council) - Environmental Health Department	October 2018	
Northumberland County Council (now part of Northumberland Council)	October 2018	
Wansbeck District Council (now part of Northumberland Council) - Economic and Environment Services	October 2018	
Registered Landfill Sites		
Environment Agency - North East Region - North East Area	March 2006	Not Applicable
Environment Agency - North East Region - Northumbria Area	March 2006	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - North East Region - North East Area	April 2018	
Environment Agency - North East Region - Northumbria Area	April 2018	
Registered Waste Treatment or Disposal Sites		
Environment Agency - North East Region - North East Area	June 2015	
Environment Agency - North East Region - Northumbria Area	June 2015	

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH)		
Health and Safety Executive	January 2022	Bi-Annually
Explosive Sites		
Health and Safety Executive	March 2017	Annually
Notification of Installations Handling Hazardous Substances (NIHHS)		
Health and Safety Executive	August 2001	
Planning Hazardous Substance Enforcements		
Castle Morpeth Borough Council (now part of Northumberland Council) - Planning Department	August 2009	Not Applicable
Wansbeck District Council (now part of Northumberland Council)	February 2009	Not Applicable
Northumberland County Council (now part of Northumberland Council) - Minerals Waste and Development Control	October 2008	Annual Rolling Update
Northumberland Council - Planning Department	October 2015	Variable
Planning Hazardous Substance Consents		
Castle Morpeth Borough Council (now part of Northumberland Council) - Planning Department	August 2009	Not Applicable
Wansbeck District Council (now part of Northumberland Council)	February 2009	Not Applicable
Northumberland County Council (now part of Northumberland Council) - Minerals Waste and Development Control	October 2008	Annual Rolling Update
Northumberland Council - Planning Department	October 2015	Variable

Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	January 2009	As notified
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	May 2022	Bi-Annually
CBSCB Compensation District Cheshire Brine Subsidence Compensation Board (CBSCB) Cheshire Brine Subsidence Compensation Board (CBSCB)	August 2011 November 2020	As notified
Coal Mining Affected Areas The Coal Authority - Property Searches	March 2014	Annual Rolling Update
Mining Instability Ove Arup & Partners	June 1998	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	May 2015	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	April 2020	As notified
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	As notified
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	January 2019	As notified
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	Annually
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	Annually
Industrial Land Use	**Version**	**Update Cycle**
Contemporary Trade Directory Entries Thomson Directories	July 2022	Quarterly
Fuel Station Entries Catalist Ltd - Experian	June 2022	Quarterly
Gas Pipelines National Grid	October 2021	Bi-Annually
Underground Electrical Cables National Grid	May 2021	Bi-Annually

Sensitive Land Use	Version	Update Cycle
Ancient Woodland		
Natural England	February 2021	Bi-Annually
Areas of Adopted Green Belt		
Castle Morpeth Borough Council (now part of Northumberland Council) - Planning Department	July 2022	Quarterly
Northumberland Council - Planning Department	July 2022	Quarterly
Wansbeck District Council (now part of Northumberland Council)	July 2022	Quarterly
Areas of Unadopted Green Belt		
Castle Morpeth Borough Council (now part of Northumberland Council) - Planning Department	July 2022	Quarterly
Northumberland Council - Planning Department	July 2022	Quarterly
Wansbeck District Council (now part of Northumberland Council)	July 2022	Quarterly
Areas of Outstanding Natural Beauty		
Natural England	August 2022	Bi-Annually
Environmentally Sensitive Areas		
Natural England	January 2017	
Forest Parks		
Forestry Commission	April 1997	Not Applicable
Local Nature Reserves		
Natural England	February 2021	Bi-Annually
Marine Nature Reserves		
Natural England	July 2019	Bi-Annually
National Nature Reserves		
Natural England	January 2021	Bi-Annually
National Parks		
Natural England	February 2018	Bi-Annually
Nitrate Sensitive Areas		
Natural England	April 2016	Not Applicable
Nitrate Vulnerable Zones		
Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	April 2016	
Environment Agency - Head Office	June 2017	Bi-Annually
Ramsar Sites		
Natural England	August 2020	Bi-Annually
Sites of Special Scientific Interest		
Natural England	February 2021	Bi-Annually
Special Areas of Conservation		
Natural England	July 2020	Bi-Annually
Special Protection Areas		
Natural England	February 2021	Bi-Annually

Data Suppliers

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Stantec UK Ltd	

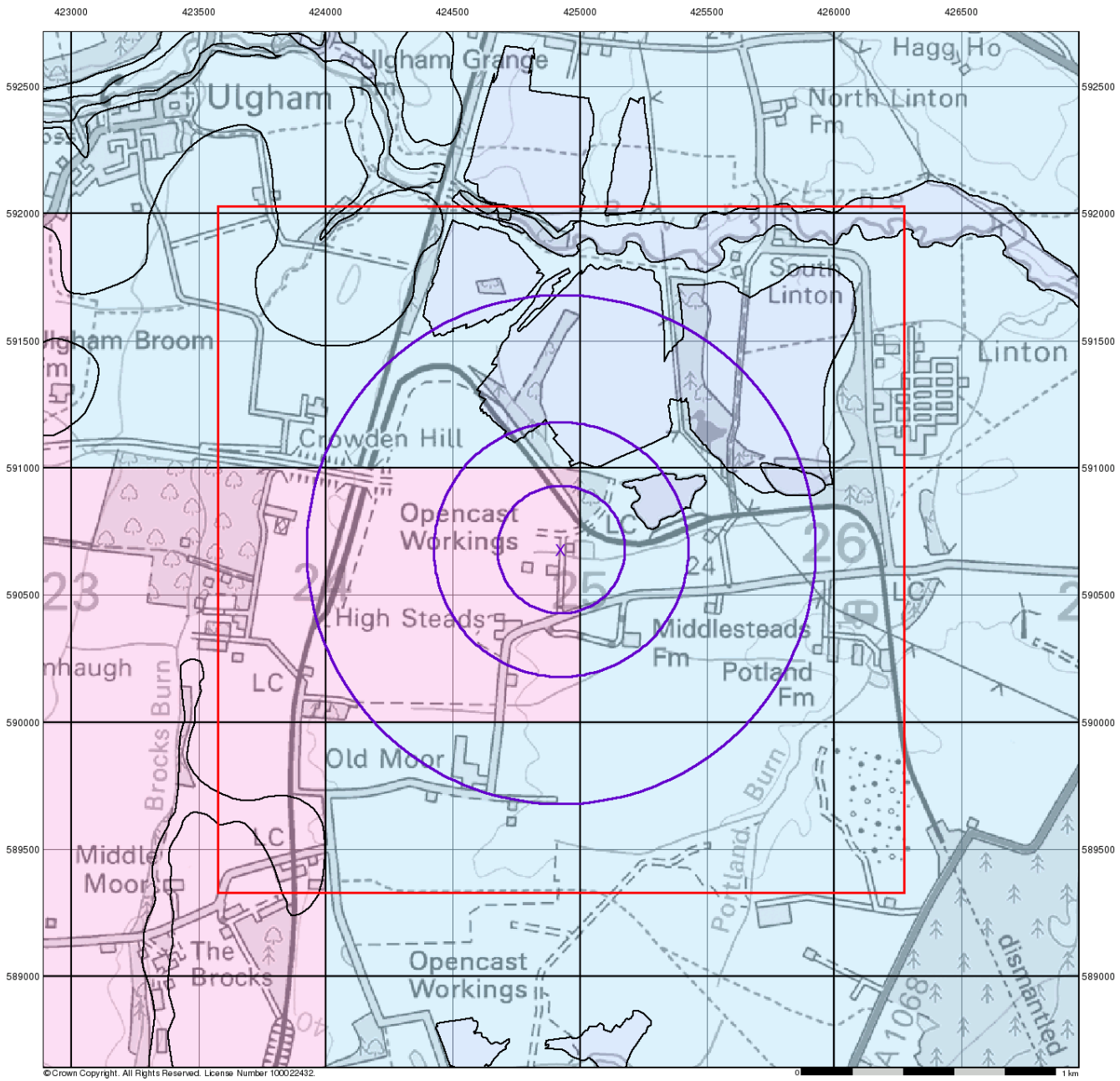
Useful Contacts

Contact	Name and Address	Contact Details
1	**British Geological Survey - Enquiry Service** British Geological Survey, Environmental Science Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	**Environment Agency - National Customer Contact Centre (NCCC)** PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk
3	**Northumberland Council - Environmental Health Department** County Hall, Morpeth, Northumberland, NE61 2EF	Telephone: 0845 600 6400 Email: ask@northumberland.gov.uk Website: www.northumberland.gov.uk
4	**Environment Agency - Head Office** Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: 01454 624400 Fax: 01454 624409
5	**Ordnance Survey** Adanac Drive, Southampton, Hampshire, SO16 0AS	Telephone: 03456 05 05 05 Email: customerservices@ordnancesurvey.co.uk Website: www.ordnancesurvey.gov.uk
6	**Northumberland County Council (now part of Northumberland Council)** County Hall, Morpeth , Northumberland, NE61 2EF	Telephone: 01670 533000 Fax: 01670 534160 Website: www.northumberland.gov.uk
7	**Castle Morpeth Borough Council (now part of Northumberland Council) - Environmental Health Department** County Hall, Morpeth, Northumberland, NE61 2EF	Telephone: 0845 600 6400 Website: www.northumberland.gov.uk
8	**The Coal Authority - Property Searches** 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	Telephone: 0345 762 6848 Fax: 01623 637 338 Email: groundstability@coal.gov.uk Website: www2.groundstability.com
9	**Wansbeck District Council (now part of Northumberland Council)** County Hall, Morpeth, Northumberland, NE61 2EF	Telephone: 0845 600 6400 Website: www.northumberland.gov.uk
10	**Natural England** County Hall, Spetchley Road, Worcester, WR5 2NP	Telephone: 0300 060 3900 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
-	**Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards** Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	**Landmark Information Group Limited** Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.

Order Number: 300463013
Customer Ref: 22010
National Grid Reference: 424930 590680

Map ID	Easting	Northing	Distance	Quadrant Reference	Quadrant Reference	Bearing Reference	BGS Reference	Drilled Length (m)	Borehole Name
74	424930	590690	12	A13	NE	NE	NZ29SW13890/D002	4	Buterwell Disposal Point D002
75	424957	590681	32	A13	NE	E	NZ29SW13890/D001	13	Buterwell Disposal Point D001
76	425061	590701	138	A13	NE	E	NZ29SE124	49.83	Linton Colliery U/G Bh
77	425043	590602	141	A13	SE	SE	NZ29SE113	9.81	Linton U/G 4
78	424676	590636	254	A13	SW	W	NZ29SW77	642.82	Longhurst Drift 1a
79	425160	590570	259	A13	SE	SE	NZ29SE115	55	Old Longhirst Junction Acc No.136 U/G Bh
80	424662	590638	267	A13	SW	W	NZ29SW76	22.86	Longhurst Drift 1
81	425291	590782	380	A14	NW	E	NZ29SE125	98.3	Linton Colliery U/G Bh
82	425096	591025	386	A18	SE	NE	NZ29SE112/A	68.91	Linton Colliery 2 U/G Bh
82	425096	591025	386	A18	SE	NE	NZ29SE112/B	188.09	Linton Colliery 2 U/G Bh
83	424561	590910	432	A12	NE	NW	NZ29SW83	39.62	Longhurst Drift 7
84	424740	590277	444	A8	NW	SW	NZ29SW27	152.4	High Steads Fame
85	424461	590586	474	A12	SE	W	NZ29SW49	45.72	Linton Ii Opencast 69
86	425425	590822	520	A14	NW	E	NZ29SE128	80.01	Borehole Near Linton
87	425342	591005	529	A14	NW	NE	NZ29SE121	12.6	Linton Coll Beaumont Seam U/G
87	425335	591023	535	A19	SW	NE	NZ29SE122	12.34	Linton Coll Beaumont Seam U/G
88	424459	590986	559	A12	NE	NW	NZ29SW111	215.8	Longhurst Drift No 103
89	424378	590549	563	A12	SE	W	NZ29SW82	72.54	Longhurst Drift 2
89	424365	590545	577	A12	SE	W	NZ29SW112	252.07	Longhurst Drift No 101
89	424352	590528	594	A12	SE	W	NZ29SW108	113.39	Longhurst Mine No 100
90	424352	590608	578	A12	SE	W	NZ29SW100	20.73	Longhurst Mine S/Bh No 952
91	424720	590122	595	A8	NW	S	NZ29SW28	99.67	Old Moor Shaft
92	424275	590731	653	A12	NE	W	NZ29SW48	36.58	Linton Ii Opencast 50
93	424790	591330	665	A18	SW	N	NZ29SW13920/A30	Not Supplied	West Linton O.C.C.S. A30
94	425060	591340	675	A18	SE	N	NZ29SE13920/A31	Not Supplied	West Linton O.C.C.S. A31
95	425619	590778	701	A14	NE	E	NZ29SE114	9.91	Linton U/G 7
96	425451	591186	730	A19	SW	NE	NZ29SE130	57.81	Borehole 3 Near Linton
97	424805	591425	756	A18	NW	N	NZ29SW13920/A29	Not Supplied	West Linton O.C.C.S. A29
98	425320	591332	763	A19	SW	NE	NZ29SE157	38.79	Longhirst Drift
99	424870	589910	772	A8	SW	S	NZ28NW7	17.78	Linton Colliery West Drift
100	425320	591346	775	A19	SW	NE	NZ29SE158	29.57	Longhirst Drift
101	425090	589910	787	A8	SE	S	NZ28NE381	8.22	Pegswood Colliery 45/28 U/G 169d
102	424144	590533	796	A12	SW	W	NZ29SW50	57.91	Linton Ii Opencast 74
103	424100	590693	826	A12	NW	W	NZ29SW2	89	Crowden Hill Farm
104	424830	589840	845	A8	SW	S	NZ28NW46	34.92	Acc No 135 U/G Upover
105	424911	591560	881	A18	NW	N	NZ29SW96	166.73	Linton U/G 17/50
105	424916	591561	882	A18	NW	N	NZ29SW81	68.58	Linton Colliery U/G 4
106	424920	589790	890	A8	SW	S	NZ28NW111	26.11	Pegswood Colliery U/G 194d
107	424194	591233	918	A17	SW	NW	NZ29SW3	32.31	Crowden Hill
108	424002	590481	945	A12	SW	W	NZ29SW80	50.6	Longhurst Drift 5
109	424920	589730	950	A8	SW	S	NZ28NW11	20.34	Linton Colliery West Drift
110	425580	591370	952	A19	NW	NE	NZ29SE111	70	Linton Colliery 3
111	423966	590748	962	A12	NW	W	NZ29SW79	30.48	Longhurst Drift 4
112	425210	589760	963	A8	SE	S	NZ28NE382	7.92	Pegswood Colliery 45/28 170d
113	425898	590812	982	A14	NE	E	NZ29SE102/A	24.11	Acc. No. 69 U/G Up Bh
114	425898	590812	982	A14	NE	E	NZ29SE102/B	31.41	Acc. No. 69 U/G Bh
115	424990	591664	987	A18	NE	N	NZ29SW13920/A28	Not Supplied	West Linton O.C.C.S. A28



Envirocheck®

LANDMARK INFORMATION GROUP®

Groundwater Vulnerability

General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

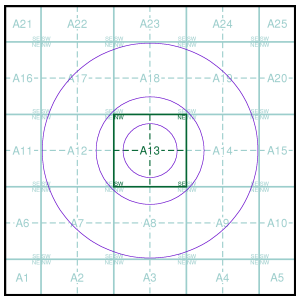
Agency and Hydrological

Bedrock Aquifers	Superficial Aquifers
High Vulnerability, Principal Aquifer	High Vulnerability, Principal Aquifer
High Vulnerability, Secondary Aquifer	High Vulnerability, Secondary Aquifer
Medium Vulnerability, Principal Aquifer	Medium Vulnerability, Principal Aquifer
Medium Vulnerability, Secondary Aquifer	Medium Vulnerability, Secondary Aquifer
Low Vulnerability, Principal Aquifer	Low Vulnerability, Principal Aquifer
Low Vulnerability, Secondary Aquifer	Low Vulnerability, Secondary Aquifer

Unproductive Aquifer

Soluble Rock

Site Sensitivity Context Map - Slice A



Order Details

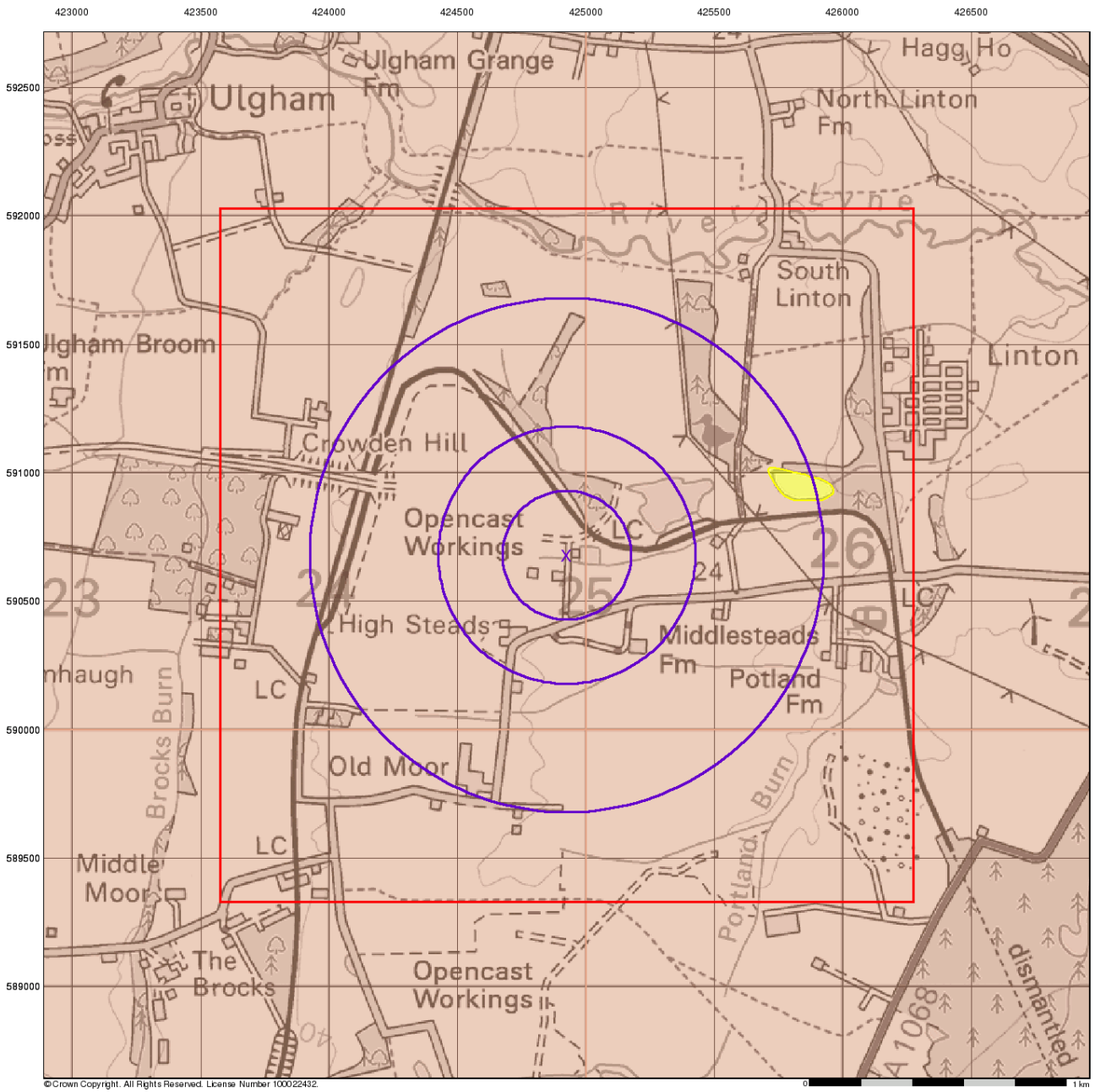
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



Envirocheck®

LANDMARK INFORMATION GROUP®

Bedrock Aquifer Designation

General

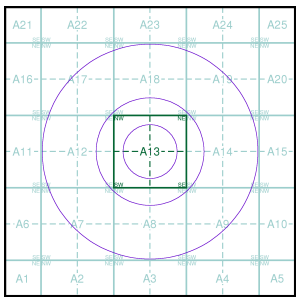
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



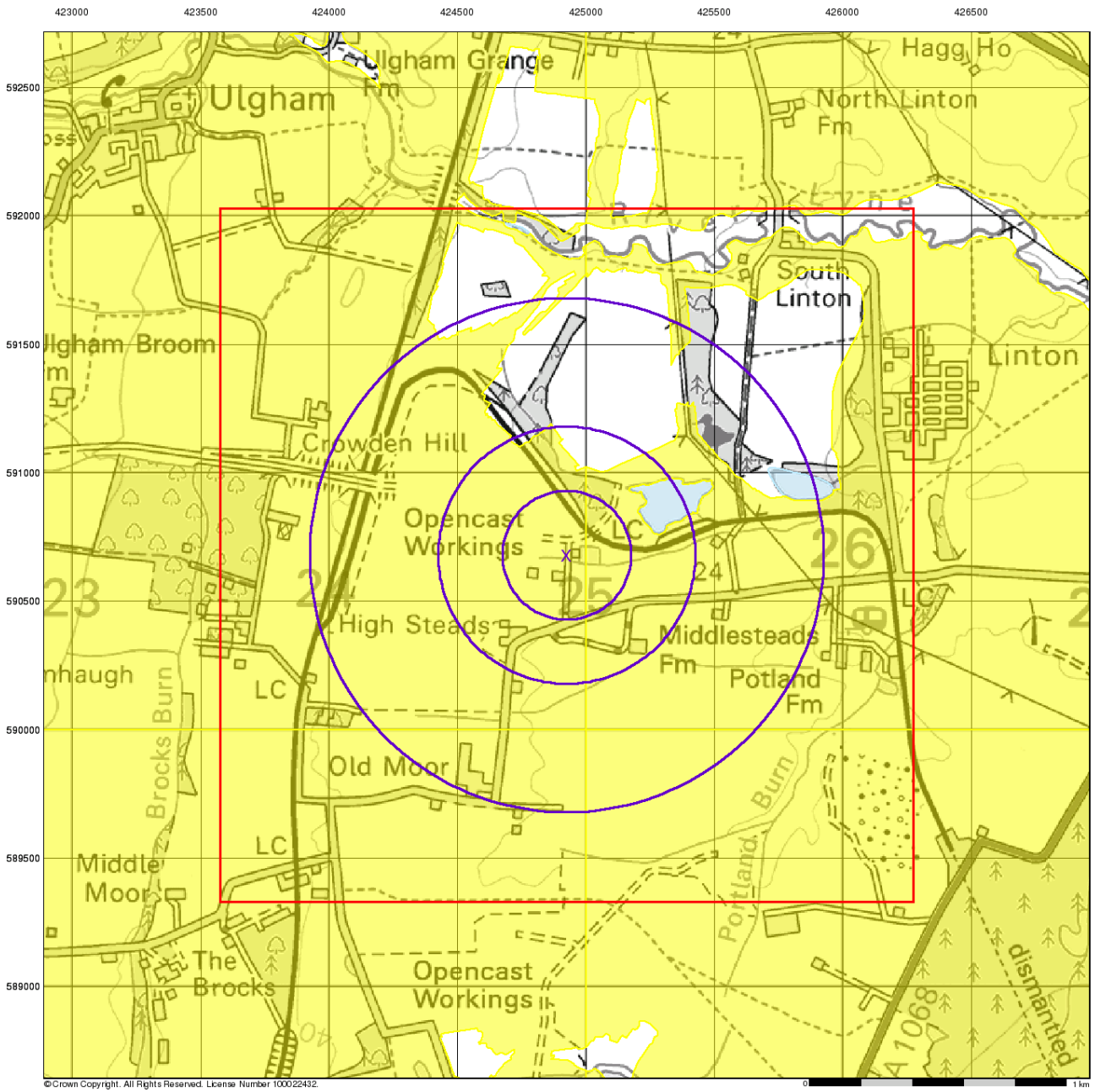
Order Details

Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

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



Envirocheck®

LANDMARK INFORMATION GROUP®

Superficial Aquifer Designation

General

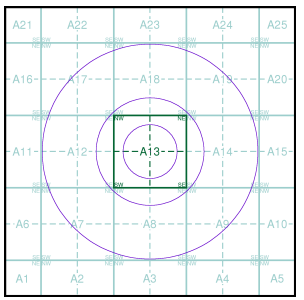
Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice | Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown
- Unknown (Lakes and Landslip)

Site Sensitivity Context Map - Slice A



Order Details

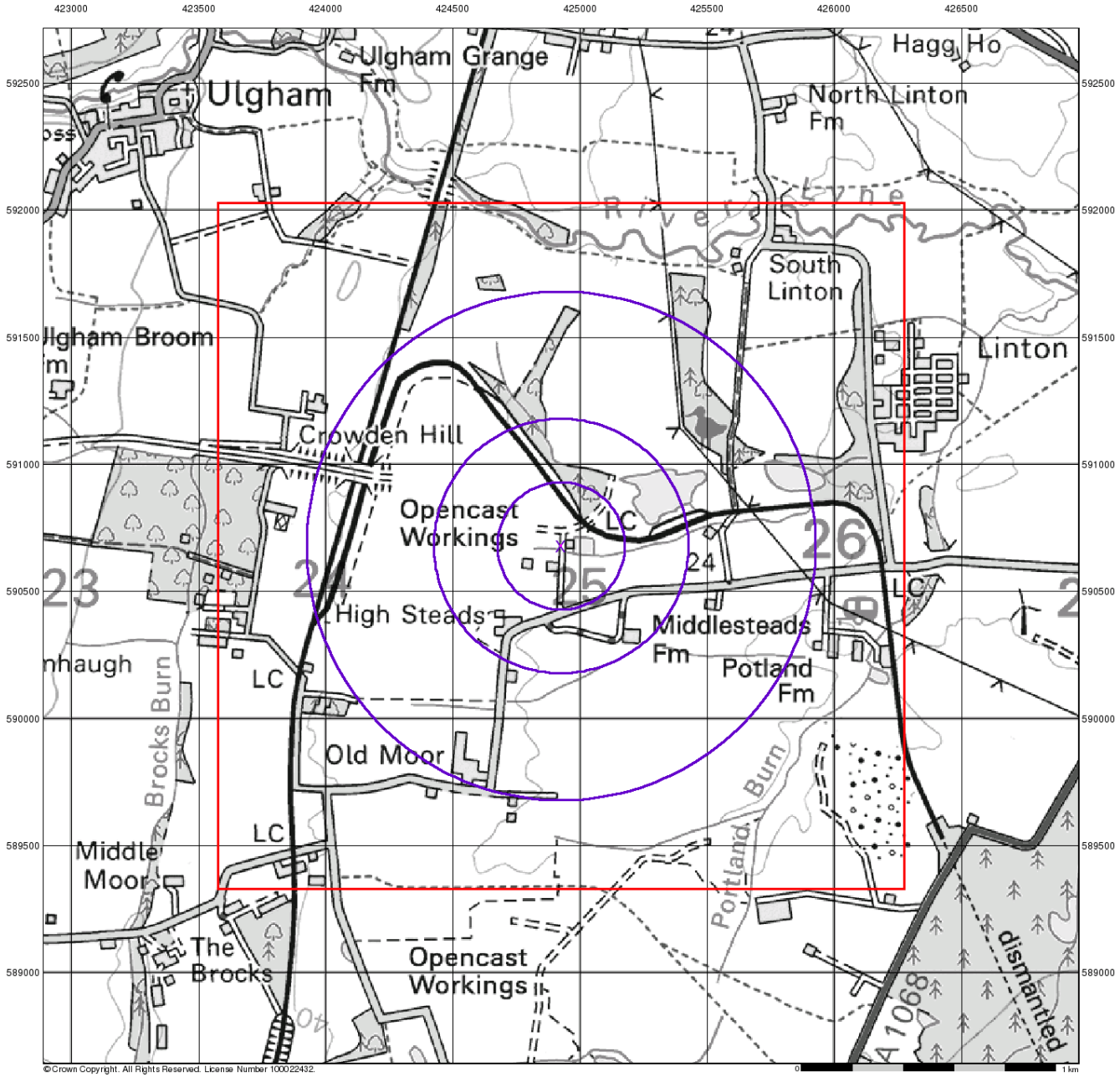
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



Envirocheck®

LANDMARK INFORMATION GROUP®

Source Protection Zones

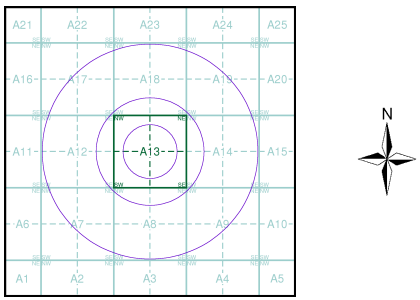
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

Site Sensitivity Context Map - Slice A



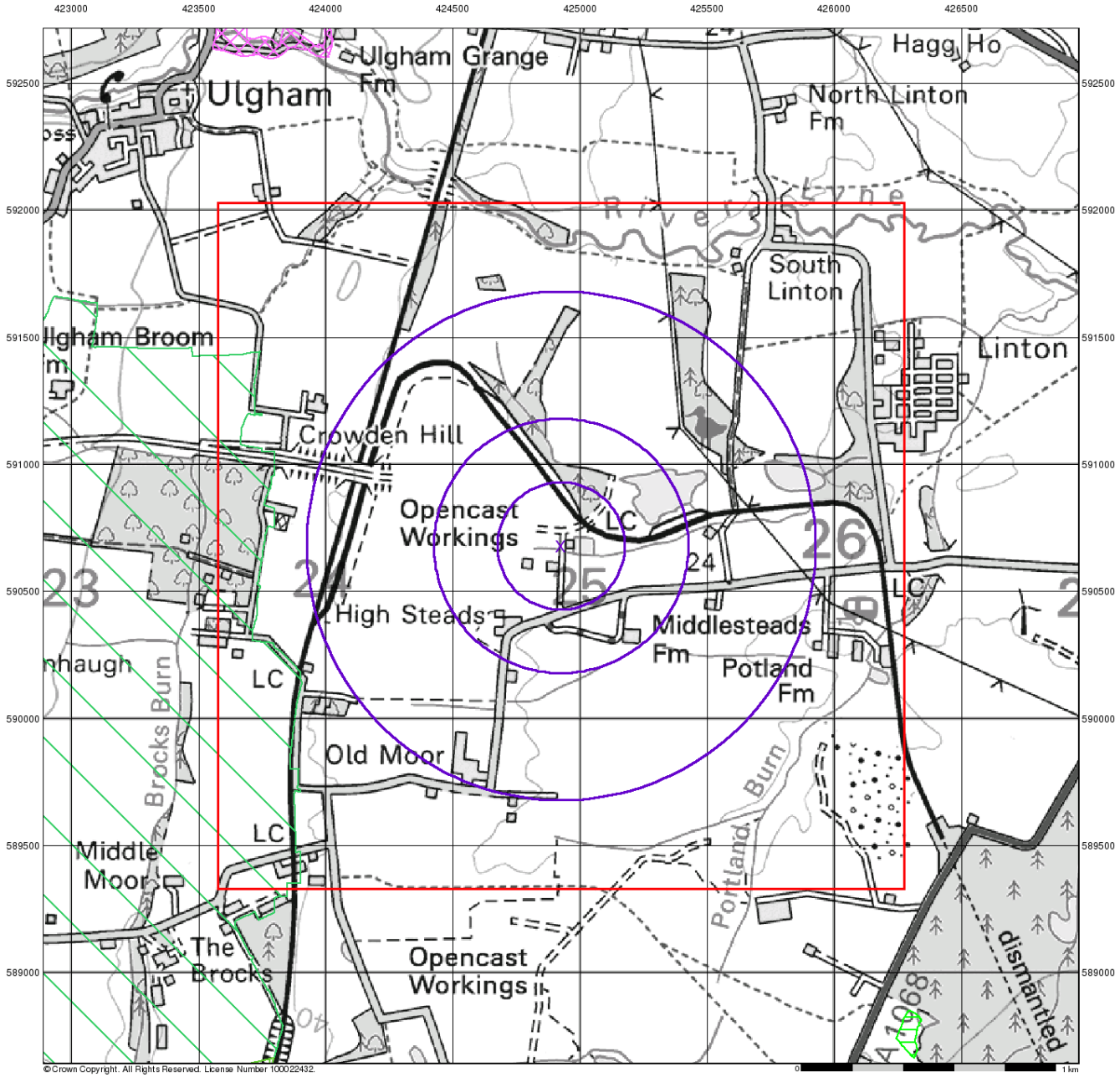
Order Details

Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

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



Envirocheck®

LANDMARK INFORMATION GROUP®

Sensitive Land Uses

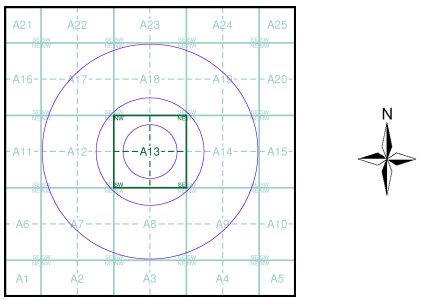
General

Specified Site | Specified Buffer(s) | Bearing Reference Point
Slice | Map ID

Sensitive Land Uses

- Ancient Woodland
- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- World Heritage Sites

Site Sensitivity Context Map - Slice A



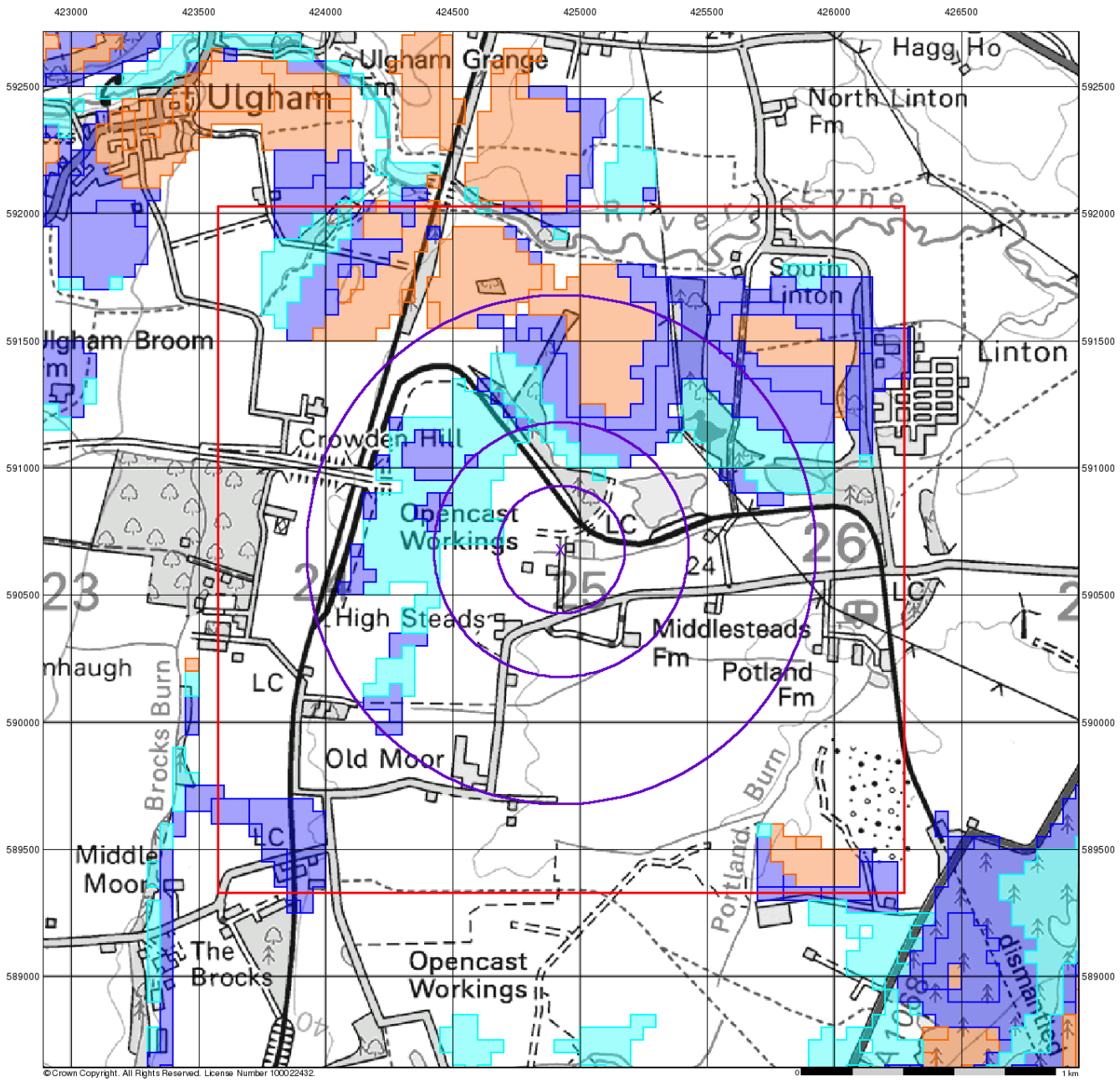
Order Details

Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

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



Envirocheck®

LANDMARK INFORMATION GROUP®

BGS Flood GFS Data

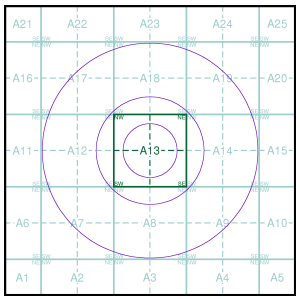
General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Slice

Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Site Sensitivity Context Map - Slice A



Order Details

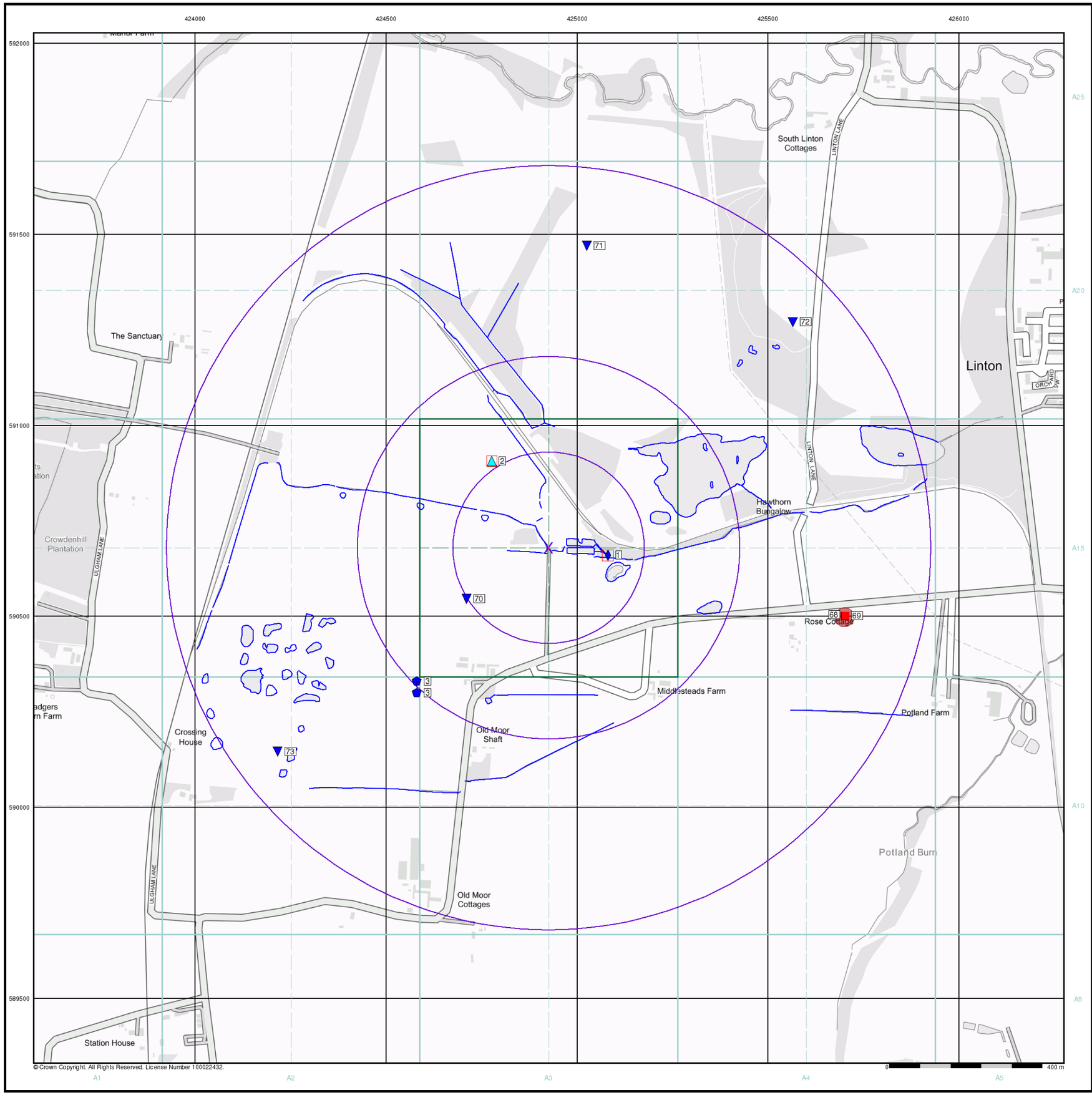
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown Copyright. All Rights Reserved. License Number 100022432.

Envirocheck®

LANDMARK INFORMATION GROUP®

General

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

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
- 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

Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

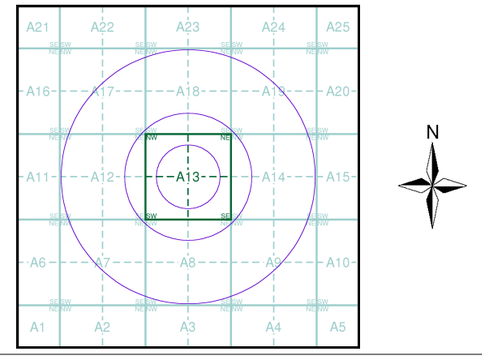
Waste

- 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
- 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

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Site Sensitivity Map - Slice A



Order Details

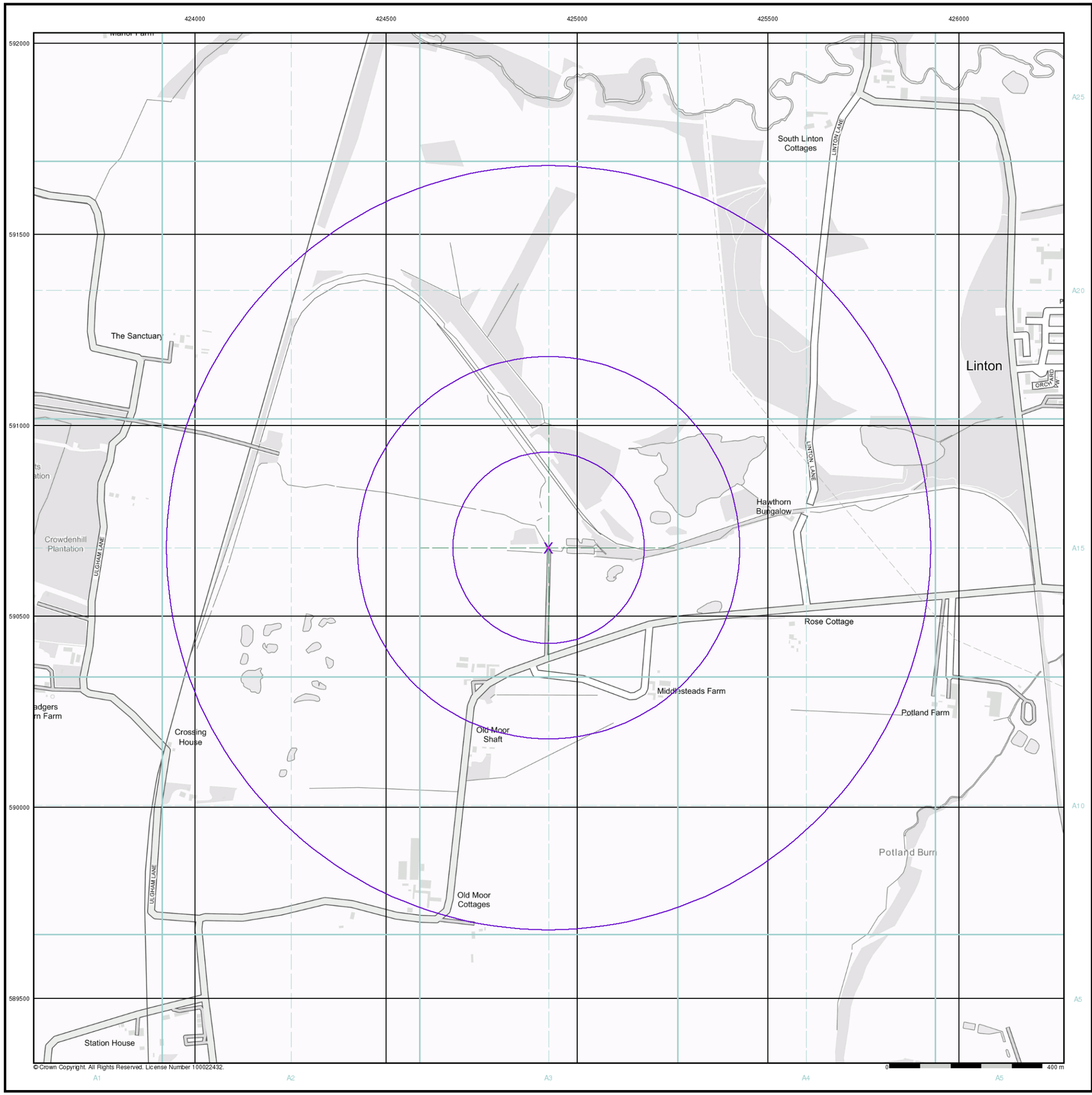
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



Envirocheck®

LANDMARK INFORMATION GROUP®

Industrial Land Use Map

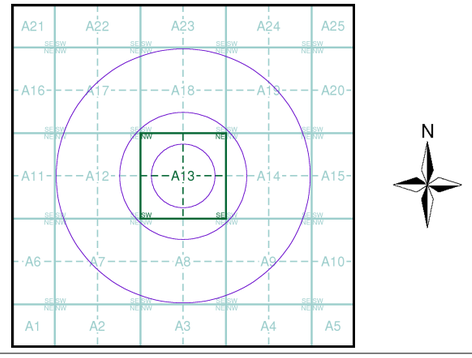
General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Slice
Map ID

Industrial Land Use

Contemporary Trade Directory Entry
Fuel Station Entry
Gas Pipeline
Underground Electrical Cables

Industrial Land Use Map - Slice A



Order Details

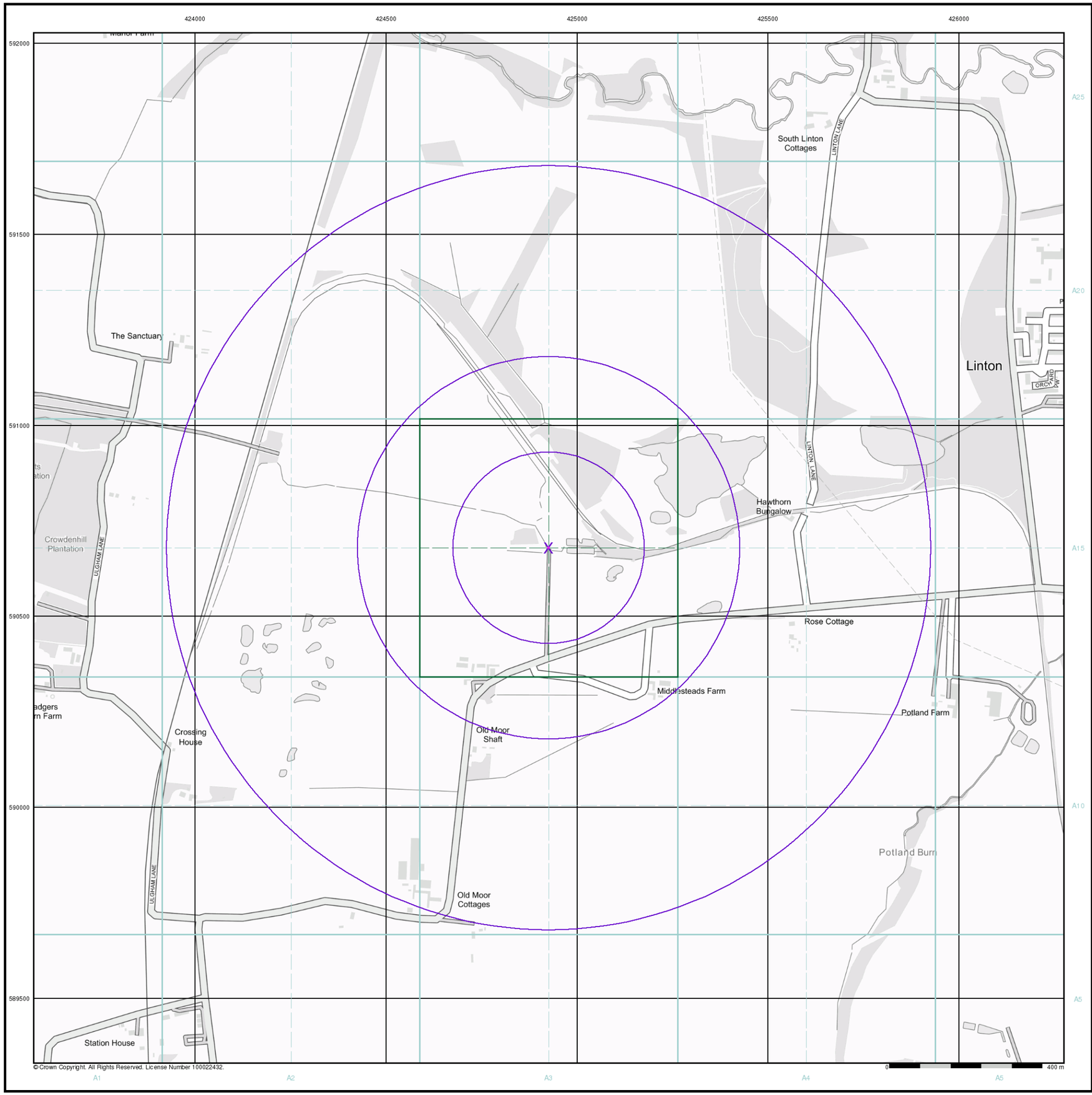
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown Copyright. All Rights Reserved. License Number 100022432.

Envirocheck®

LANDMARK INFORMATION GROUP®

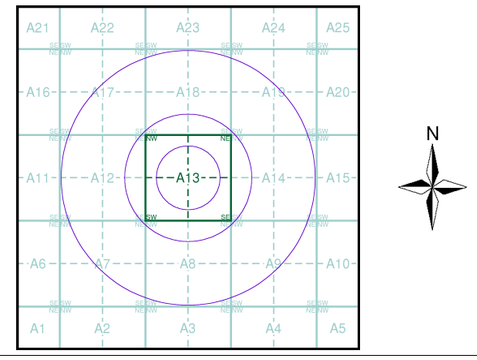
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A



Order Details

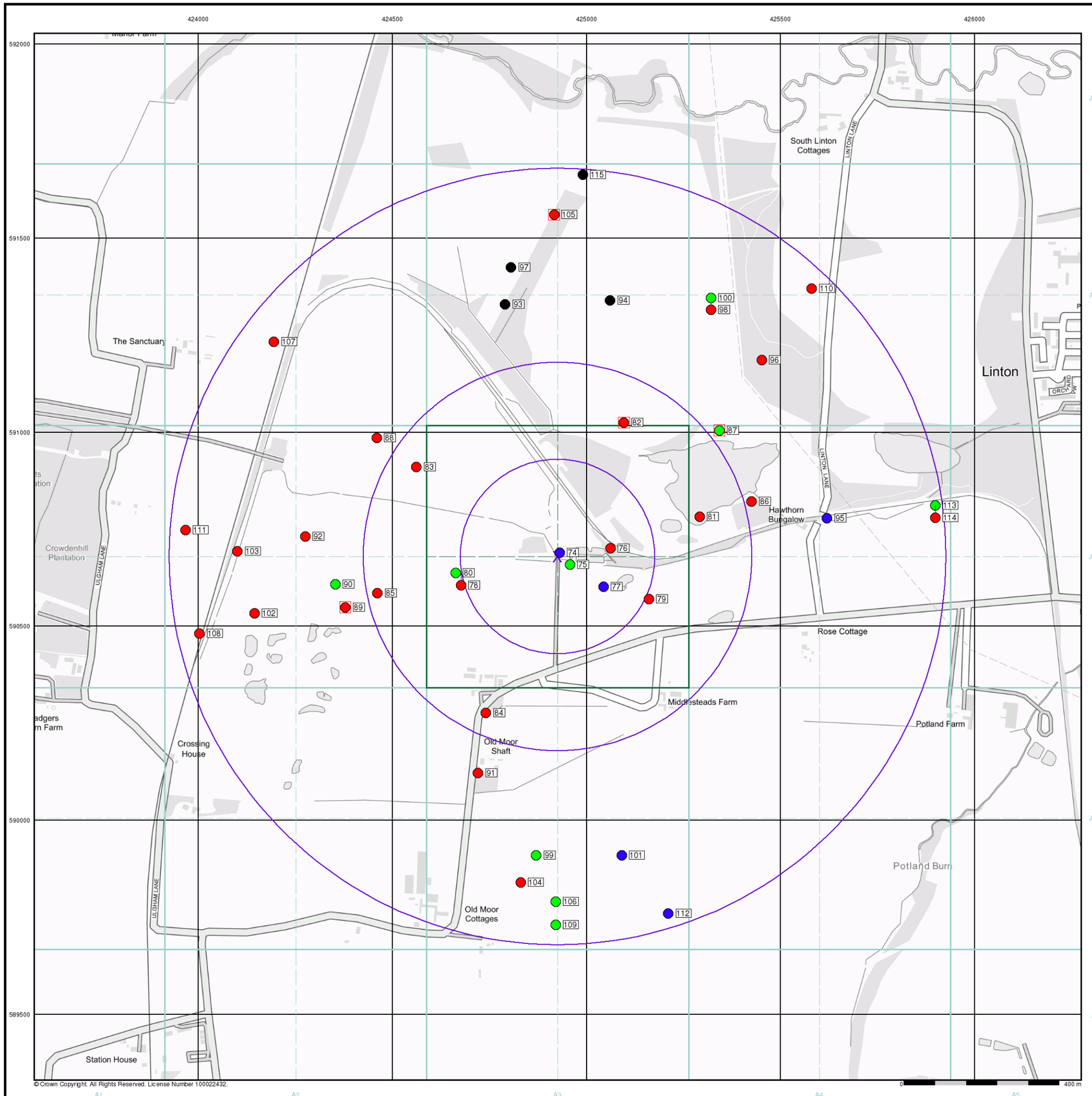
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



© Crown Copyright. All Rights Reserved. License Number 100022432.

Envirocheck®

LANDMARK INFORMATION GROUP®

General

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

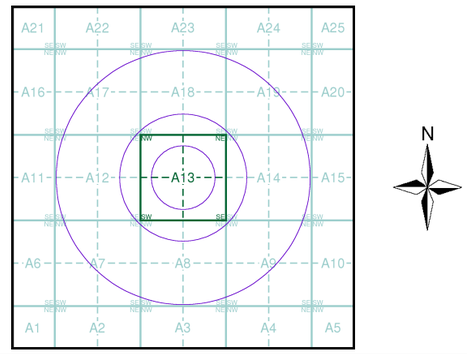
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



Order Details

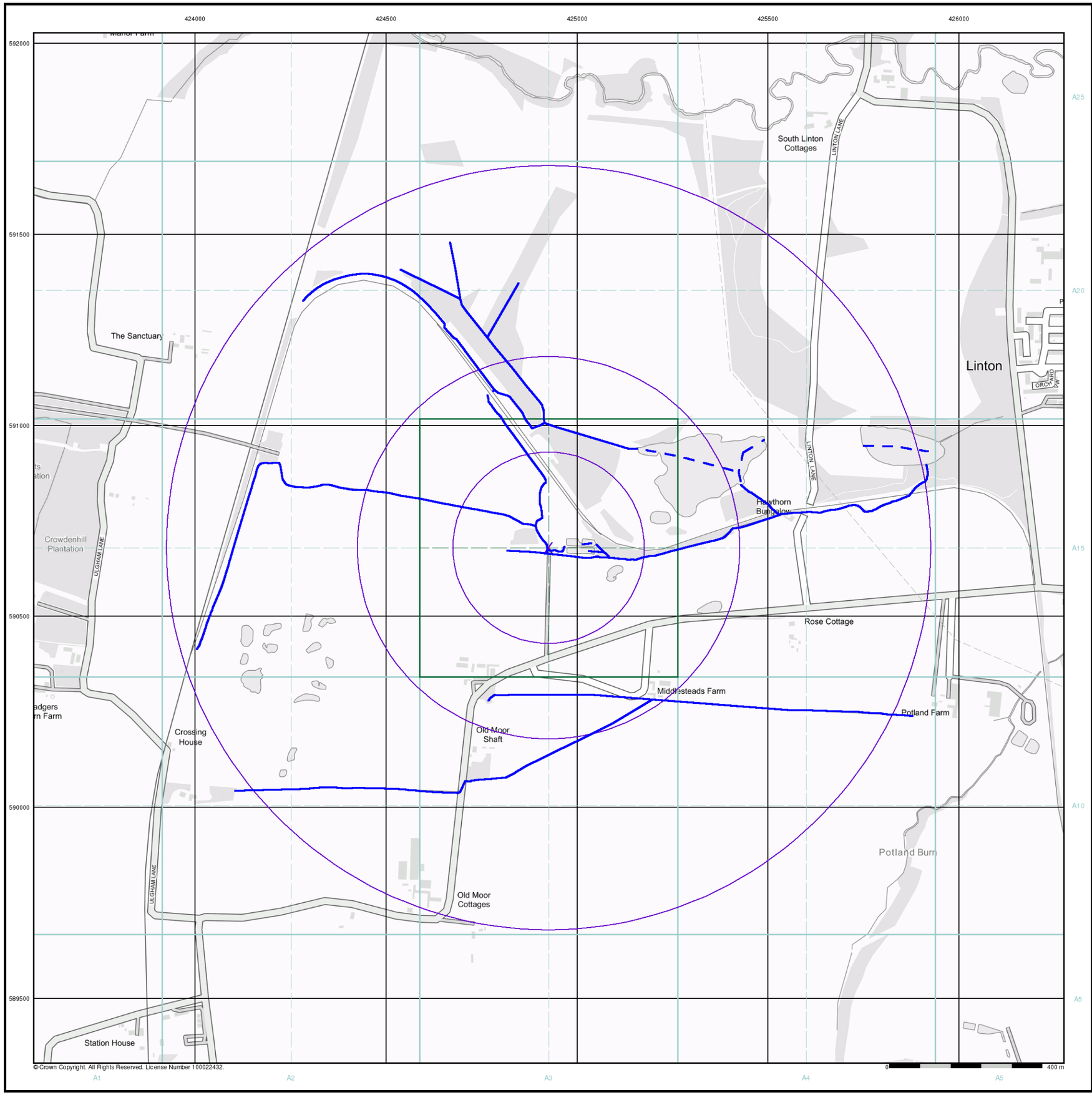
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark INFORMATION GROUP

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



Envirocheck®

LANDMARK INFORMATION GROUP®

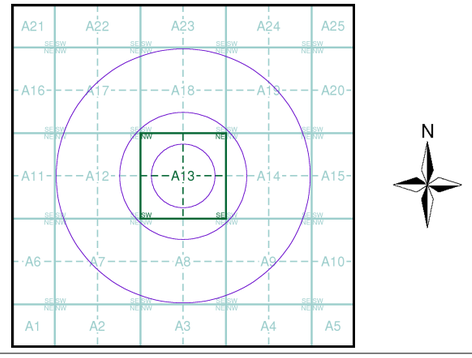
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

OS Water Network Data

- Canal
- Reservoir
- Foreshore
- Marsh
- Tidal River
- Inland River
- Drain
- Other
- Lake
- Transfer
- Lock Or Flight Of Locks
- Sea

OS Water Network Map - Slice A



Order Details

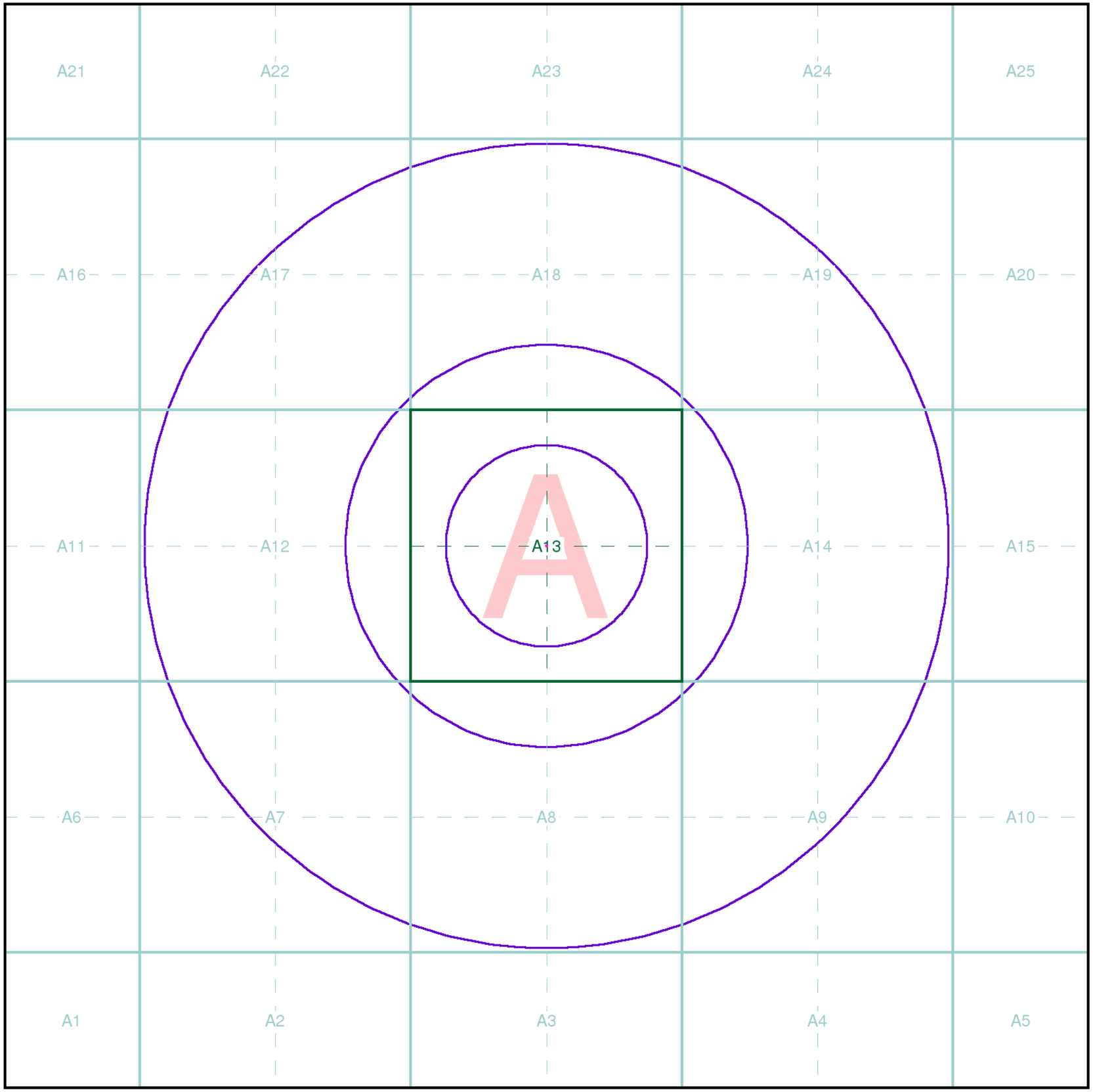
Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Landmark® INFORMATION GROUP

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



Envirocheck®

LANDMARK INFORMATION GROUP®

Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:

Map data

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Environment Agency

NATURAL ENGLAND

Envirocheck reports are compiled from 136 different sources of data.

Prepared For

N B Clark Morpeth Ltd.,
Unit 20B,
Coopies Haugh Lane,
Coopies Lane Industrial Estate,
MORPETH,
Northumberland, NE61 6JN.

Client Details

Dr D A Blythe, DAB Geotechnics Ltd.,
Ellington, MORPETH, Northumberland, NE61 5ES

Order Details

Order Number:	300463013_1_1
Customer Ref:	22010
National Grid Reference:	424930, 590680
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

Site at 424550, 591100

Full Terms and Conditions can be found on the following link:
http://www.landmarkinfo.co.uk/Terms/Show/515

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

APPENDIX C

Chemical Analysis Certificates

2531

ANALYTICAL TEST REPORT

Contract no: 118389

Contract name: Butterwell D.P.

Client reference: 22010

Clients name: Olive Consulting

Clients address: 3 Tweed Avenue
Ellington, Morpeth
Northumberland
NE61 5ES

Samples received: 27 January 2023

Analysis started: 27 January 2023

Analysis completed: 06 February 2023

Report issued: 06 February 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing

Approved by:

Will Fardon

Technical Director

Unit 6 Parkhead, Greencroft Industrial Park, Stanley, County Durham, DH9 7YB
Tel 01207 528578 Email customerservices@chemtech-env.co.uk
Vat Reg No. 772 5703 18 Registered in England number 4284013

Chemtech Environmental Limited

GROUNDWATERS

Lab number			118389-1	118389-2	118389-3	118389-4	118389-5
Sample id			Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Depth (m)			-	-	-	-	-
Date sampled			26/01/2023	26/01/2023	26/01/2023	26/01/2023	26/01/2023
Time sampled			15:00	14:45	14:30	14:15	15:20
Test	**Method**	**Units**					
Antimony (total)	CE218	µg/l Sb	0.3	0.5	0.4	0.4	0.4
Arsenic (total)	CE218	µg/l As	0.62	0.85	0.74	0.75	0.64
Boron (total)	CE218	µg/l B	30	27	26	25	33
Cadmium (total)	CE218	µg/l Cd	<0.07	0.10	<0.07	<0.07	<0.07
Calcium (total)	CE218	mg/l Ca	1142	1283	913	909	1181
Chromium (total)	CE218	µg/l Cr	1.3	1.4	2.1	2.1	1.6
Copper (total)	CE218	µg/l Cu	2.4	3.6	3.3	2.9	2.7
Iron (total)	CE218	µg/l Fe	350	512	1834	2072	145
Lead (total)	CE218	µg/l Pb	3.6	5.8	4.5	4.6	3.3
Magnesium (total)	CE218	mg/l Mg	288	287	219	221	284
Manganese (total)	CE218	µg/l Mn	12.0	10.7	12.9	12.4	3.8
Mercury (total)	CE218	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (total)	CE218	µg/l Ni	1.5	2.0	2.3	2.2	1.7
Potassium (total)	CE218	mg/l K	24.7	26.8	26.9	26.5	25.1
Sodium (total)	CE218	mg/l Na	254	524	227	222	389
Zinc (total)	CE218	µg/l Zn	12	11	13	12	4
Hardness (by calculation)	CE121	mg/l $CaCO_3$	3429	2959	2542	2415	3388
pH	CE213 [U]	units	8.0	8.1	8.1	8.1	8.3
Electrical conductivity	CE214 [U]	µS/cm	686	608	536	519	746
Chloride	CE049 [U]	mg/l Cl	39	36	27	26	45
Nitrate	CE049 [U]	mg/l NO_3	<0.3	<0.3	<0.3	<0.3	<0.3
Sulphate	CE049 [U]	mg/l SO_4	111	98	84	78	109
Alkalinity (settled)	CE035 [U]	mg/l $CaCO_3$	186	162	148	144	216
Suspended solids	CE038 [U]	mg/l	8.5	18	35	29	35.5
Chemical Oxygen Demand (total)	CE037	mg/l O_2	18	19	29	27	41
Dissolved Oxygen	CE040	mg/l O_2	10.7	10.8	10.9	11.1	12.7

Chemtech Environmental Limited

METHOD DETAILS

METHOD	GROUNDWATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE218	Antimony (total)	Acid digestion, ICP-MS		0.1	µg/l Sb
CE218	Arsenic (total)	Acid digestion, ICP-MS		0.06	µg/l As
CE218	Boron (total)	Acid digestion, ICP-MS		8	µg/l B
CE218	Cadmium (total)	Acid digestion, ICP-MS		0.07	µg/l Cd
CE218	Calcium (total)	Acid digestion, ICP-MS		0.04	mg/l Ca
CE218	Chromium (total)	Acid digestion, ICP-MS		0.2	µg/l Cr
CE218	Copper (total)	Acid digestion, ICP-MS		0.4	µg/l Cu
CE218	Iron (total)	Acid digestion, ICP-MS		3	µg/l Fe
CE218	Lead (total)	Acid digestion, ICP-MS		0.2	µg/l Pb
CE218	Magnesium (total)	Acid digestion, ICP-MS		0.01	mg/l Mg
CE218	Manganese (total)	Acid digestion, ICP-MS		0.4	µg/l Mn
CE218	Mercury (total)	Acid digestion, ICP-MS		0.008	µg/l Hg
CE218	Nickel (total)	Acid digestion, ICP-MS		0.5	µg/l Ni
CE218	Potassium (total)	Acid digestion, ICP-MS		0.03	mg/l K
CE218	Sodium (total)	Acid digestion, ICP-MS		0.6	mg/l Na
CE218	Zinc (total)	Acid digestion, ICP-MS		1	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE214	Electrical conductivity	Conductivity Meter	U	10	µS/cm
CE049	Chloride	Ion Chromatography	U	0.5	mg/l Cl
CE049	Nitrate	Ion Chromatography	U	0.2	mg/l NO_3
CE049	Sulphate	Ion Chromatography	U	1.7	mg/l SO_4
CE035	Alkalinity (settled)	Titrimetry	U	2	mg/l $CaCO_3$
CE038	Suspended solids	Gravimetry	U	2	mg/l
CE037	Chemical Oxygen Demand (total)	Colorimetry		10	mg/l O_2
CE040	Dissolved Oxygen	DO meter		1	mg/l O_2

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
118389-1	Sample 1	-	Y	Dissolved Oxygen (EHT)
118389-2	Sample 2	-	Y	Dissolved Oxygen (EHT)
118389-3	Sample 3	-	Y	Dissolved Oxygen (EHT)
118389-4	Sample 4	-	Y	Dissolved Oxygen (EHT)
118389-5	Sample 5	-	Y	Dissolved Oxygen (EHT)

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

2531

ANALYTICAL TEST REPORT

Contract no: 120556

Contract name: Butterwell D.P.

Client reference: 22010

Clients name: Olive Consulting

Clients address: 19 Main Street
Ponteland
Newcastle upon Tyne
NE20 9NH

Samples received: 17 March 2023

Analysis started: 17 March 2023

Analysis completed: 29 March 2023

Report issued: 29 March 2023

Key

U	UKAS accredited test
M	MCERTS & UKAS accredited test
$	Test carried out by an approved subcontractor
I/S	Insufficient sample to carry out test
N/S	Sample not suitable for testing
NAD	No Asbestos Detected

Approved by:

Abbie Neasham-Bourn
Senior Reporting Administrator

Chemtech Environmental Limited

GROUNDWATERS

Lab number			120556-1	120556-2	120556-3	120556-4	120556-5
Sample id			Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Depth (m)			-	-	-	-	-
Date sampled			16/03/2023	16/03/2023	16/03/2023	16/03/2023	16/03/2023
Time sampled			12:26	12:36	12:48	12:45	12:40
Test	**Method**	**Units**					
Antimony (dissolved)	CE128 U	µg/l Sb	0.3	0.3	0.4	0.3	0.5
Arsenic (dissolved)	CE128 U	µg/l As	0.51	0.57	0.67	0.51	0.46
Boron (dissolved)	CE128 U	µg/l B	33	24	54	39	54
Cadmium (dissolved)	CE128 U	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07
Calcium (dissolved)	CE128 U	mg/l Ca	84.36	81.84	115.80	81.37	75.45
Chromium (dissolved)	CE128 U	µg/l Cr	<0.2	<0.2	0.2	<0.2	<0.2
Copper (dissolved)	CE128 U	µg/l Cu	2.2	2.5	2.7	1.9	2.3
Iron (dissolved)	CE128 U	µg/l Fe	37.2	26.0	35.0	27.3	9.2
Lead (dissolved)	CE128 U	µg/l Pb	<0.2	<0.2	<0.2	<0.2	<0.2
Magnesium (dissolved)	CE128 U	mg/l Mg	23.63	23.25	31.74	20.34	17.68
Manganese (dissolved)	CE128 U	µg/l Mn	10.3	5.9	14.3	8.3	20.3
Mercury (dissolved)	CE128 U	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 U	µg/l Ni	1.3	1.6	1.7	1.3	1.5
Potassium (dissolved)	CE128 U	mg/l K	4.21	4.31	5.69	3.81	3.07
Sodium (dissolved)	CE128 U	mg/l Na	15.9	19.0	22.6	17.2	20.7
Zinc (dissolved)	CE128 U	µg/l Zn	1	<1	<1	<1	2
pH	CE213 U	units	8.2	8.2	8.3	8.3	8.4
Electrical conductivity	CE214 U	µS/cm	612	589	626	595	567
Chloride	CE049 U	mg/l Cl	43	43	45	47	31
Nitrate	CE049 U	mg/l NO_3	13	5.2	14	21	0.6
Sulphate	CE049 U	mg/l SO_4	114	109	107	81	66
Alkalinity (settled)	CE035 U	mg/l $CaCO_3$	138	128	134	140	190
Suspended solids	CE038 U	mg/l	11	35	15	25	12
Chemical Oxygen Demand (total)	CE037	mg/l O_2	19	22	19	12	18
Dissolved Organic Carbon	CE247	mg/l C	39	35	38	37	50

Chemtech Environmental Limited

METHOD DETAILS

METHOD	GROUNDWATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE128	Antimony (dissolved)	ICP-MS	U	0.1	µg/l Sb
CE128	Arsenic (dissolved)	ICP-MS	U	0.06	µg/l As
CE128	Boron (dissolved)	ICP-MS	U	8	µg/l B
CE128	Cadmium (dissolved)	ICP-MS	U	0.07	µg/l Cd
CE128	Calcium (dissolved)	ICP-MS	U	0.04	mg/l Ca
CE128	Chromium (dissolved)	ICP-MS	U	0.2	µg/l Cr
CE128	Copper (dissolved)	ICP-MS	U	0.4	µg/l Cu
CE128	Iron (dissolved)	ICP-MS	U	3	µg/l Fe
CE128	Lead (dissolved)	ICP-MS	U	0.2	µg/l Pb
CE128	Magnesium (dissolved)	ICP-MS	U	0.01	mg/l Mg
CE128	Manganese (dissolved)	ICP-MS	U	0.4	µg/l Mn
CE128	Mercury (dissolved)	ICP-MS	U	0.008	µg/l Hg
CE128	Nickel (dissolved)	ICP-MS	U	0.5	µg/l Ni
CE128	Potassium (dissolved)	ICP-MS	U	0.03	mg/l K
CE128	Sodium (dissolved)	ICP-MS	U	0.6	mg/l Na
CE128	Zinc (dissolved)	ICP-MS	U	1	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE214	Electrical conductivity	Conductivity Meter	U	10	µS/cm
CE049	Chloride	Ion Chromatography	U	0.5	mg/l Cl
CE049	Nitrate	Ion Chromatography	U	0.2	mg/l NO_3
CE049	Sulphate	Ion Chromatography	U	1.7	mg/l SO_4
CE035	Alkalinity (settled)	Titrimetry	U	2	mg/l $CaCO_3$
CE038	Suspended solids	Gravimetry	U	2	mg/l
CE037	Chemical Oxygen Demand (total)	Colorimetry		10	mg/l O_2
CE247	Dissolved Organic Carbon	Filtration, Combustion TOC analyser		5	mg/l C

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments
Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.
For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.
Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
120556-1	Sample 1	-	N	
120556-2	Sample 2	-	N	
120556-3	Sample 3	-	N	
120556-4	Sample 4	-	N	
120556-5	Sample 5	-	N	

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 4 weeks from initial receipt unless otherwise instructed.

www.osecology.co.uk

Ecological Appraisal

Land at Linton

August 2022

Olive Compliance



Client	Olive Compliance
Project Name	Land at Linton
Project Number	22066
Report Type	Ecological Appraisal
Version	V1 (DRAFT)

	Name	**Position**	**Date**
Report Originator	Mandy Rackham	Senior Ecologist	August 2022
Reviewed	James Streets	Director	

This report is issued to the Client for the purpose stated in the Agreement between the Client and OS Ecology Ltd, under which this work was undertaken. The report may only be used for this aforementioned purpose and copyright remains with OS Ecology Ltd. The report is only intended for the Client and must not be relied upon or reproduced by anyone other than the Client without the express written agreement of OS Ecology Ltd. The use of this report by unauthorised persons is at their own risk. OS Ecology Ltd accepts no duty of care to any such party.

OS Ecology Ltd has exercised due care and attention in the preparation of this report. Unless specifically stated, there has been no independent verification of information provided by others. No other warranty, express or implied, is made in relation to the content of this report and OS Ecology Ltd accepts no liability for any loss or damage resulting from errors, omissions or misrepresentations of others.

The findings of the report and subsequent assessment and opinions of OS Ecology Ltd are based entirely on the facts and circumstances at the time the work was undertaken. OS Ecology Ltd have produced this report in line with best practice guidance and following the principles and requirements of British Standard BS42020. The report has been provided taking due regard of the provisions of the CIEEM Code of Professional Conduct. It must be noted that the none of the information provided within this report constitutes legal opinion.

Where required to do so by law or regulatory authority, OS Ecology Ltd may disclose any information obtained from the Client to a third party. Should OS Ecology Ltd become aware that the Client has breached or is likely to breach legislation relating to wildlife or the environment, OS Ecology Ltd will be entitled to disclose such information to the relevant authority, including the relevant governmental body or the police.

Contents

Summary 5

1. Introduction 8

Site Location 8
Site Description 8
Objectives of the Study 8
Development Proposals 8

2. Methodology 9

Scope of Study 9
Planning Policy 9
Desk Study 9
Field Survey 10
Habitats/Protected Species 10
Limitations to Survey 10
Assessment Methodology 10

3. Results 12

Desk Study 12
General Land Use 12
Designated Sites 12
Priority Habitats 13
Ancient Woodland 13
European Protected Species Licensing 13
Data Search 14
Local Records Centre 14
Field Survey 15
Habitats 15
Target Notes 18
Protected Species 18

4. Site Assessment 20

Assessment of Survey Findings 20
Habitats 20
Bats 20
Birds 20
Great Crested Newts 20
Badger 21
Priority Butterfly Species 21
Water Vole 21
Other Protected Species 21
Designated Sites 22

5. Impact Assessment 23

6. Recommendations 24

Further Survey 24

Appendix 1 – Bat Suitability and Survey Effort 25

Appendix 2 – Policy and Legislation 27

Appendix 3 - Receptor Valuation 35

Appendix 4 – Figures..... 37

Tables

Table 2.2: Survey Conditions..... 10
Table 3.1: Designated Sites Within 2km..... 12
Table 3.2: Granted Natural England European Protected Species Licences within 2km..... 13
Table 3.3: Records from LRC Data Search..... 14
Table 3.4: Habitat Descriptions..... 15
Table 3.5: Target Notes..... 18

Summary

OS Ecology Ltd were commissioned by Olive Compliance in March 2022 to undertake an Ecological Appraisal of land at Linton, Northumberland. It is proposed to submit a waste licence application in relation to the site.

Summary Table	
Habitat Assessment	Habitats within the site comprise a mixture of grassland, ephemeral areas, dense scrub, standing water and hard standing. Several ditches are present within the eastern section of the site and scattered scrub is present throughout. Wall cotoneaster listed as an invasive species on schedule 9 of the Wildlife and Countryside Act 1981 has been recorded on site. Habitats on site are considered to be of parish value however further botanical survey will be required during the peak botanical period in order to confirm this.
Bats	There are no structures present within the site or trees with suitable roosting features as such roosting bats are considered likely to be absent from the site. The grassland, scrub, standing water and open mosaic habitats within the site have the potential to provide suitable foraging and commuting opportunities for bat species. The site is well connected to higher quality habitat within the immediate surroundings. The site is considered to be of low suitability to bat species and further survey is required in order to confirm the overall value of the site to bat species.
Birds	The site provides opportunities for both foraging and nesting bird species, with grassland, scrub and open mosaic habitats all providing suitable habitats. Several pairs of lapwing as well as skylark were recorded within the western section of the site. The large area of open mosaic habitat offers suitable breeding habitat for ground nesting bird species with good sightlines. Further survey of the site is required in order to confirm the overall value of the site to bird species.
Great Crested Newts	Several areas of standing water and ditches are present within the site. Waterbodies present within the western section of the site are considered likely to be ephemeral in nature however other waterbodies and ditches have the potential to hold water throughout the breeding season. There are also several waterbodies outwith the site boundary but within 500m of the site. Great crested newts are known to be present within the local area and a mitigation licence for this species has previously been granted for work at the proposed development site. Scrub, grassland and open mosaic habitats within the site have the potential to support this species during its terrestrial phase.

	A mitigation licence for this species remains in place for the site and further details on outstanding requirements will be required in order to confirm additional survey requirements.
Badger	No setts or other field signs of this species were recorded within the site during the survey. Habitats present within the site are considered to be suboptimal for sett creation however habitats within the local area are considered suitable of supporting this species. Should badger be present within the local area there is potential that this species will forage within the site on occasion. Overall the site is considered to be of low value to this species.
Priority Butterfly Species	The survey was undertaken outside of the survey period for priority species such as dingy skipper. However grassland and open mosaic habitats have the potential to support priority species and larval food source plants have been recorded within the site. Further survey is required in order to further assess the potential for the site to support priority butterfly species.
Water Vole	The waterbodies within the eastern section of the site and ditches have the potential to support this species however no field signs of water vole were recorded during the survey. Large areas of vegetation had been removed from ditches and the eastern waterbodies prior to the survey. Further survey is required in order to further assess the potential for this species to be present.
Other Protected Species	There is potential for the priority species brown hare, common toad and hedgehog to be present within the site on occasion. The site is considered to be of local value to these species if present. Due to the nature of the site and the habitats present additional protected or notable species are considered likely to be absent.
Designated Sites	The site lies within an identified SSSI Impact Risk Zone relating to designated sites in the wider area. The following impact risk triggers are identified: • Landfill, including inert landfill, non-hazardous landfill and hazardous landfill. • Any discharge of water or liquid waste of more than 20m^3/day to ground (ie to seep away) or to surface water, such as a beck or stream.
Impact Assessment	The following initial impact assessment is based on survey completed to date, further survey and detailed site design is necessary to allow a full impact assessment to be completed: • Loss of habitats of up to Parish value. • Loss of or degradation to bat foraging habitats and commuting routes through habitat removal or additional lighting. • Loss of bird nesting or foraging habitat.

	• Harm or disturbance to bird species should site works be undertaken during the nesting bird season (March to August inclusive) • Loss of or degradation to great crested newt breeding and or terrestrial habitat during site works. • Harm or disturbance to great crested newts and other amphibian species should they be present on site at the time of works. • Risk of harm or entrapment to badger and other small mammal should they be present on site during works. • Loss of priority butterfly habitat should these species be present on site. • Loss of water vole habitat should waterbodies and ditches be affected by the proposals. • Harm or disturbance to water vole should they be present on site during works.
Recommendations	Based on the nature of the site the following survey work is required in order to complete a detailed avoidance, mitigation and compensation scheme: • In line with Bat Conservation Trust Good Survey Guidelines season bat transects of the site should be undertaken in order to confirm the value of the site to bat species. In addition a period of 5 nights remote monitoring should be undertaken following each transect survey. • Four breeding bird surveys should be undertaken in order to confirm the value of the site to bird species. • Additional information regarding the existing great crested newt mitigation licence for the site is required in order to confirm potential survey works for this species. • A total of four butterfly surveys should be undertaken in order to further assess the potential for priority butterfly species to be present. • Checking surveys for badger and water vole should be undertaken.

This report is not suitable to support a planning submission. Further survey/detailed site design is required to complete the assessment, allowing a detailed impact assessment and design of an appropriate mitigation/compensation scheme.

1. Introduction

Site Location

1.1 The site is located to the west of Linton at an approximate central grid reference of NZ 24944 90736. The site location is illustrated within figure 1 in the appendices.

Site Description

1.2 The site is approximately 2.6 ha in size and comprises grassland, hard standing, scrub, waterbodies and areas of mosaic habitat.

Objectives of the Study

1.3 The objectives of this report are:

- To identify and describe any potential ecological receptors that may be present on site or within an identified zone of influence.
- To identify and assess whether proposals may impact on the identified receptors.
- To identify potential mitigation, compensation or enhancement measures if required.
- To identify and detail further surveys if required.

Development Proposals

1.4 The proposed works will include the submission of a waste licence application for the site.

2. Methodology

Scope of Study

2.1 The site was surveyed to identify whether the following were present for legislative and planning purposes:

- Habitats of Conservation Value
- Priority Habitats
- Protected and Priority Species

2.2 A summary of relevant legislation is provided within Appendix 2.

2.3 The ecological characteristics of the site were reviewed to identify the scope of the assessment, with the zone of influence determined through professional judgement.

2.4 The survey area comprised the "site" defined within figure 2 (Appendix 4). The desktop study included a data search covering the site and a 2km buffer zone while habitats within the local area were reviewed via aerial imagery.

2.5 Access permitting, all potential bat roosting sites within the survey area were assessed. Guidance regarding the assessment of the suitability of sites for use by bats is provided within Appendix 1.

Planning Policy

2.6 Planning policy relevant to this site, specifically the National Planning Policy Framework and the Northumberland Local Plan, can be found within Appendix 2.

Desk Study

2.7 Desk study was undertaken to assess the nature of the surrounding habitats and included:

- Assessment of aerial imagery and Ordnance Survey mapping.
- A search of the MAGIC website[1] for statutorily designated sites for nature conservation, habitat listed within the Priority Habitat Inventory or the Ancient Woodland Inventory and European protected species licensing records within 2km of the survey area.
- A data search request submitted to the Local Record Centre.

[1] Multi Agency Geographic Information for the Countryside (www.magic.gov.uk)

Field Survey

Habitats/Protected Species

2.8 The site was subject to a walk over, during which habitats were assessed in line with the habitat classifications detailed within the UK Habitat Classification User Manual[2].

2.9 Classification have been used as defined within the User Manual.

2.10 During the survey the site was checked for evidence of protected species and habitats were assessed for their potential to support such species.

2.11 Survey was undertaken by Mandy Rackham MCIEEM, an experienced surveyor who holds protected species licences for a range of species including bats and great crested newts.

2.12 The following equipment was utilised during survey:

- 10x25 binoculars.
- Digital camera.
- Garmin Handheld GPS unit.

2.13 The survey was undertaken on the 23rd March 2022 in the following weather conditions:

Table 2.1: Survey Conditions

Date	Temperature	Cloud Cover	Precipitation	Wind Conditions
23.03.2022	14°C	<5%	None	WF2

Limitations to Survey

2.14 Survey was undertaken outside the core botanical survey period (April to September) when some species will not be apparent, and a full assessment of the habitats cannot be completed.

Assessment Methodology

2.15 Guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM) is utilised to provide habitat valuations.

2.16 The level of value of specific ecological receptors is assigned using a geographic frame of reference. For, example international value being most important (SACs, SPAs and pSPAs), then national (SSSIs), regional, county (LWS), district (LNR), local and lastly, within the immediate zone of influence of the site only (low).

[2] Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). The UK Habitat Classification User Manual Version 1.1 at http://www.ukhab.org/

2.17 In terms of species, for example breeding birds, should the population within the site constitute greater than 1% of the geographic population, it would be considered significant at that level. In addition, presence of designated sites, scarce species and or quality[3]/diversity of habitats are used to guide that valuation

2.18 Assessment methods for bats have been undertaken with reference to Wray et al. (2007)[4], which correlates with the geographic frame of reference. Within which they define the relative rarity of each species based on the known distribution[5] at the time and the value of the roost type, assuming that roosts such as feeding perches are of lower value that maternity roosts or sites that have a high level of fidelity.

2.19 Examples of ecological receptors at various levels of value are provided within Appendix 3.

[3] Quality can be subjective and vary in different geographic areas. Reasoned professional judgement is therefore used to inform the assessment.
[4] Wray et al (2007) Valuing Bats in Ecological Impact Assessment. In Practice. Based on a presentation at the Mammal Society – Specific Issues with Bats
[5] It should be noted that there are regular changes to our understanding of distribution as further studies are undertaken.

3. Results

Desk Study

General Land Use

3.1 A review of aerial imagery and Ordnance Survey mapping highlighted that the general land use in the surrounding area is dominated agricultural land with both arable and permanent pasture.

3.2 The site and land to the north west has, from a review of historic aerial imagery, previously been an open case site, with restoration and removal of much of the infrastructure from 2015 onwards.

Designated Sites

3.3 A search of the Multi Agency Geographic Information for the Countryside Website[6] indicated that the following designated sites for nature conservation lie within 2km of the site.

Table 3.1: Designated Sites Within 2km			
Designation	**Site Name**	**Reason for Designation**	**Distance from Survey Area (Closest point)**
Special Area of Conservation	None within 2km		
Special Protection Area	None within 2km		
National Nature Reserve	None within 2km		
Site of Special Scientific Interest	None within 2km		
SSSI Impact Risk Zone (IRZ) The site lies within an identified SSSI Impact Risk Zone relating to designated sites in the wider area. The following impact risk triggers are identified: • Landfill, including inert landfill, non-hazardous landfill and hazardous landfill. • Any discharge of water or liquid waste of more than 20m^3/day to ground (ie to seep away) or to surface water, such as a beck or stream.			
Local Nature Reserve	Ulgam Meadow	-	1.9km to the north west

[6] Multi Agency Geographic Information for the Countryside (MAGIC) www.magic.gov.uk (Accessed March 2022)

Priority Habitats

3.4 A search of the MAGIC website identified areas of habitat within 2km of the site identified within the Priority Habitat Inventory as the following habitat types:

- Deciduous Woodland

3.5 An area identified as deciduous woodland extends into the site boundary from the north west, however from a review of aerial imagery dating back to 2002, no woodland is or has been present on site.

Ancient Woodland

3.6 The MAGIC website identified no areas of woodland listed within the Ancient Woodland Inventory within 2km of the site.

European Protected Species Licensing

3.7 The MAGIC website identified the following granted Natura England European Protected Species licenses within 2km of the site[7].

Table 3.2: Granted Natural England European Protected Species Licences within 2km

Licence Reference	Species	Licensed Work	License Period
2016-21449-EPS-MIT	Great crested newt	Damage and destruction of a resting place	2016-2018
2016-21449-EPS-MIT-2	Great crested newt	Damage and destruction of a resting place	2018-2028
2016-21449-EPS-MIT-2	Great crested newt	Unknown	2020-2028
2020-48732-EPS-MIT	Great crested newt	Unknown	2020-2022
EPSM2011-3163	Great crested newt	Destruction of a resting place	2011-2014
EPSM2009-1095	Great crested newt	Destruction of a resting place	2011-2015

[7] The dataset is noted as having been last updated in January 2022.

Data Search

Local Records Centre

3.8 The following table summarises the data search results from ERIC NE. Records were provided for all protected and notable species within 2km of the site, of which key species are listed. The full data search can be provided on request.

Table 3.3: Records from LRC Data Search

Taxon	Species	No. of Records within Search Area	Records of Particular Note
Amphibians	Common Frog	7	633
	Common Toad	16	633
Mammals (excluding bats)	Brown Hare	1	-
	Eurasian Badger	2	1792
	Eurasian Red Squirrel	60	78
	European Otter	4	392
	European Water Vole	2	1540
	West European Hedgehog	4	485
Bats	Brown Long-eared Bat	1	1696
	Common Pipistrelle	7	655
	Daubenton's Bat	1	1443
	Nathusius' Pipistrelle	2	659
	Noctule Bat	3	1444
	Pipistrelle Bat species	1	1600
	Soprano Pipistrelle	4	655
	Unidentified Bat	2	-
	Whiskered/Brandt's Bat	2	-
Butterflies	Dingy Skipper	1	2051
	Small Heath	1	-
	Wall	40	259
Birds	A total of 807 records of 123 species of bird were recorded within 2km of the site.		
Reptiles	Common Lizard	11	1521

3.9 The records centre identified no Local Wildlife Sites (LWS) within 2km of the site.

Field Survey

Habitats

Table 3.4: Habitat Descriptions
Overview of habitats Habitats within the site comprise a mixture of grassland, ephemeral areas, dense scrub, standing water and hard standing. Several ditches are present within the eastern section of the site and scattered scrub is present throughout. The habitats within the site are illustrated within Figure 3.

Habitat Description	**Habitat Category**
Grassland Small blocks and strips of neutral grassland are present within the eastern section of the site. The western section of the site is dominated by a large field which has a thin soil substrate which has been sown with grassland species. Bare ground is present throughout this developing grassland and occasional scattered scrub is present in places. Areas of standing water, considered likely to be ephemeral in nature are present throughout the grassland habitats.	*Primary Code* g3c – Other Neutral Grassland
Species List Species present include crested dog stail (*Cynosurus cristatus*), creeping bent (*Agrostis stolonifera*), cocksfoot (*Dactylis glomerata*), tufted hair grass (*Deschampsia cespitosa*), meadow foxtail (*Alopecurus pratensis*), timothy (*Phleum pratense*), hard rush (*Juncus inflexus*), daisy (*Bellis perennis*), white clover (*Trifolium repens*), meadow buttercup (*Ranunculus acris*), common mouse ear (*Cerastium fontanum),* ribwort plantain (*Plantago lanceolata*), spear thistle (*Cirsium vulgare*), broad leaf dock (*Rumex obtusifolius*), common knapweed (*Centaurea nigra*), selfheal (*Prunella vulgaris*), gorse (*Ulex europaeus*), creeping thistle (*Cirsium arvense*), red clover (*Trifolium pratense*), cat's ear (*Hypochaeris* sp.), coltsfoot (*Tussilago farfara)* and common nettle (*Urtica dioica*).	*Secondary Code* 10 – Scattered Scrub 14 – Scattered Rushes 119 – Seasonally Wet 191 - Ditch
Schedule 9/Undesirable species present (Y/N): Y	Further Survey Needed (Y/N): Y







Open Mosaic Habitat Areas of the site are dominated by bare ground with ephemeral species present. Areas of the western section where buildings have been removed previously and	*Primary Code* u1a – Open Mosaic Habitats on

edges of concrete are also dominated by a mix of bare ground, ephemeral vegetation and occasional scrub species. Small areas of standing water are present in places with ditches also present.	Previously Developed Land
Species List Species present include crested dogstail (*Cynosurus cristatus*), creeping bent (*Agrostis stolonifera*), cocksfoot (*Dactylis glomerata*), tufted hair grass (*Deschampsia cespitosa*), hard rush (*Juncus inflexus*), soft rush (*Juncus effusus*), ribwort plantain (*Plantago lanceolata*), spear thistle (*Cirsium vulgare*), broad leaf dock (*Rumex obtusifolius*), gorse (*Ulex europaeus*), cats ear (*Hypochaeris* sp.), coltsfoot (*Tussilago farfara*), dandelion (*Taraxacum* sp.), birds foot trefoil (*Lotus corniculatus*), creeping buttercup (*Ranunculus repens*), ragwort (*Senecio jacobaea*), creeping cinquefoil (*Potentilla reptans*), weld (*Reseda luteola*), wall cotoneaster (*Cotoneaster horizontalis*), wild carrot (*Daucus carota*), yarrow (*Achillea millefolium*), hawthorn (*Crataegus monogyna*), willow (*Salix* sp.), woodrush (*Luzula* sp.) wild mignonette (*Reseda lutea*), rosebay willowherb (*Chamaenerion angustifolium*) and occasional reedmace (*Typha latifolia*).	*Secondary Code* 17 – Ruderal / Ephemeral 119 – Seasonally Wet
Schedule 9/Undesirable species present (Y/N): Y	Further Survey Needed (Y/N): Y





Scrub Blocks of dense scrub are present within the eastern section of the site around waterbodies. In addition scattered scrub is present throughout the site.	*Primary Code* h3h – Mixed Scrub
Species List Scrub species within the site include alder (*Alnus glutinosa*), gorse, bramble (*Rubus fruticosus*), wall cotoneaster, hawthorn, willow (Salix sp), pine and dogrose (*Rosa canina*). Recent scrub management was noted within the eastern section of the site evidence of scrub removal around the ponds and ditches.	*Secondary Code* 47 – Native 76 – Recently Managed
Schedule 9/Undesirable species present (Y/N): Y	Further Survey Needed (Y/N):N





Standing Water There are a number of waterbodies and ditches present within the site which were holding water at the time of the survey. Waterbodies present within the easter section of	*Primary Code* r1 – Standing Open Water and Canals

the site are likely to hold water throughout the year whilst several waterbodies located within the western section of the site are considered to be more ephemeral in nature.	
Species List Ephemeral waterbodies had no defined edges at the time of the survey and lacked aquatic vegetation. The large waterbodies within the eastern section of the site and ditches were noted to include marginal species such as reedmace, tufted hair grass and hard rush however large areas of vegetation had been cleared at the time of the surveys. Further details are provided within the Target Note table below.	*Secondary Code* 19 – Ponds 119 – Seasonally Wet 191 - Ditch





Hard Standing Large areas of concrete are present within the eastern section of the site forming access roads as well as former parking areas and locations of former structures.	*Primary Code* u1b – Developed Land Sealed Surface





Target Notes

Table 3.5: Target Notes	
Target Note 1 There are several large areas of standing water present within the western section of the site. Smaller areas of standing water are present in the eastern section of the site. These areas of water are considered likely to be ephemeral in nature.	
Target Note 2 A number of ditches are present within the eastern section of the site which were noted to have undergone recent management. Several of the ditches were holding water at the time of the survey.	
Target Note 3 There are two large water bodies present within the far eastern section of the site. Both area likely to hold water year round and vegetation removal / management had been undertaken prior to the survey.	

Protected Species

Bats

3.10 There are no structures present within the site. Concrete blocks which area present within the site are well sealed with some shallow cracks considered unsuitable for roosting bats. There are no trees present within the site boundary suitable of supporting roosting bats.

3.11 Grassland, scrub, open mosaic habitats and the waterbodies present within the site have the potential to provide suitable foraging opportunities to bat species and the site is well connected to higher quality habitat within the immediate surrounding.

Birds

3.12 The scrub habitats have the potential to provide suitable foraging and nesting opportunities to a small number of passerines.

3.13 The large field within the western section of the site has the potential to support ground nesting bird species. Skylark and several pairs of lapwing were recorded within this area during the survey.

Great Crested Newts

3.14 There are several waterbodies present within the site boundary. Although waterbodies within the western section of the site are considered likely to be ephemeral in nature, ditches and waterbodies within the eastern section of the site are considered likely to hold water throughout the breeding season.

3.15 Consultation with Ordnance Survey Maps and aerial photography identified several additional waterbodies within 500m of the site.

3.16 Grassland, scrub and open mosaic habitats present within the site have the potential to support this species during its terrestrial phase.

Badger

3.17 No field signs attributable to badger were recorded within the site and habitats suitable of supporting sett creation are limited. There is potential for badger to forage within the site utilising grassland and open mosaic habitats.

Priority Butterfly Species

3.18 Survey was undertaken outside of the survey period for priority butterfly species such as dingy skipper however grassland and the open mosaic habitats within the site have the potential to support such species with larval food source plants recorded on site.

Water Vole

3.19 No evidence of this species was recorded on site during the survey however the waterbodies within the eastern section of the site have the potential to provide suitable habitat for this species.

Other protected species

3.20 There is potential for priority species such as brown hare, common toad and hedgehog to all be present within the site.

3.21 Due to the nature of the site and the habitats present additional protected or notable species are considered likely to be absent.

4. Site Assessment

Assessment of Survey Findings

Habitats

4.1 Habitats on site comprise a mixture of grassland, scrub, open mosaic habitat, hard standing and standing water.

4.2 Habitats on site are considered to be of parish value however further botanical survey will be required during the peak botanical period in order to confirm this.

4.3 Wall cotoneaster listed as an invasive species on schedule 9 of the Wildlife and Countryside Act 1981 has been recorded on site.

Bats

4.4 There are no structures present within the site or trees with suitable roosting features as such roosting bats are considered likely to be absent from the site.

4.5 The grassland, scrub, standing water and open mosaic habitats within the site have the potential to provide suitable foraging and commuting opportunities for bat species. The site is well connected to higher quality habitat within the immediate surroundings.

4.6 The site is considered to be of low suitability to bat species and further survey is required in order to confirm the overall value of the site to bat species.

Birds

4.7 The site provides opportunities for both foraging and nesting bird species, with grassland, scrub and open mosaic habitats all providing suitable habitats.

4.8 Several pairs of lapwing as well as skylark were recorded within the western section of the site. The large area of open mosaic habitat offers suitable breeding habitat for ground nesting bird species with good sightlines.

4.9 Further survey of the site is required in order to confirm the overall value of the site to bird species.

Great Crested Newts

4.10 Several areas of standing water and ditches are present within the site. Waterbodies present within the western section of the site are considered likely to be ephemeral in nature however other waterbodies and ditches have the potential to hold water throughout the breeding season.

4.11 There are also several waterbodies outwith the site boundary but within 500m of the site. Great crested newts are known to be present within the local area and a mitigation

licence for this species has previously been granted for work at the proposed development site.

4.12 Scrub, grassland and open mosaic habitats within the site have the potential to support this species during its terrestrial phase.

4.13 A mitigation licence for this species remains in place for the site and further details on outstanding requirements will be required in order to confirm additional survey requirements.

Badger

4.14 No setts or other field signs of this species were recorded within the site during the survey. Habitats present within the site are considered to be suboptimal for sett creation however habitats within the local area are considered suitable of supporting this species.

4.15 Should badger be present within the local area there is potential that this species will forage within the site on occasion. Overall the site is considered to be of low value to this species.

Priority Butterfly Species

4.16 The survey was undertaken outside of the survey period for priority species such as dingy skipper. However grassland and open mosaic habitats have the potential to support priority species and larval food source plants have been recorded within the site.

4.17 Further survey is required in order to further assess the potential for the site to support priority butterfly species.

Water Vole

4.18 The waterbodies within the eastern section of the site and ditches have the potential to support this species however no field signs of water vole were recorded during the survey.

4.19 Large areas of vegetation had been removed from ditches and the eastern waterbodies prior to the survey. Further survey is required in order to further assess the potential for this species to be present.

Other Protected Species

4.20 There is potential for the priority species brown hare, common toad and hedgehog to be present within the site on occasion. The site is considered to be of local value to these species if present.

4.21 Due to the nature of the site and the habitats present additional protected or notable species are considered likely to be absent.

Designated Sites

4.22 The site lies within an identified SSSI Impact Risk Zone relating to designated sites in the wider area. The following impact risk triggers are identified:

- Landfill, including inert landfill, non-hazardous landfill and hazardous landfill.
- Any discharge of water or liquid waste of more than 20m^3/day to ground (i.e. to seep away) or to surface water, such as a beck or stream.

5. Impact Assessment

5.1 The following impact assessment is based on the survey work to date and the understanding that the Client wishes to undertake the following:

- Submission of a waste licence application.

5.2 As a result of the assessment completed and the nature of the proposed works, the likely impacts, without appropriate avoidance measures, mitigation and/or compensation scheme, are anticipated to be:

- Loss of habitats of up to Parish value.
- Loss of or degradation to bat foraging habitats and commuting routes through habitat removal or additional lighting.
- Loss of bird nesting or foraging habitat.
- Harm or disturbance to bird species should site works be undertaken during the nesting bird season (March to August inclusive)
- Loss of or degradation to great crested newt breeding and or terrestrial habitat during site works.
- Harm or disturbance to great crested newts and other amphibian species should they be present on site at the time of works.
- Risk of harm or entrapment to badger and other small mammal should they be present on site during works.
- Loss of priority butterfly habitat should these species be present on site.
- Loss of water vole habitat should waterbodies and ditches be affected by the proposals.
- Harm or disturbance to water vole should they be present on site during works.

5.3 Further survey and detailed site design is required to complete a detailed impact assessment.

6. Recommendations

Further Survey

6.1 Based on the nature of the site the following survey work is required in order to complete a detailed avoidance, mitigation and compensation scheme:

- In line with Bat Conservation Trust Good Survey Guidelines season bat transects of the site should be undertaken in order to confirm the value of the site to bat species. In addition a period of 5 nights remote monitoring should be undertaken following each transect survey.
- Four breeding bird surveys should be undertaken in order to confirm the value of the site to bird species.
- Additional information regarding the existing great crested newt mitigation licence for the site is required in order to confirm potential survey works for this species.
- A total of four butterfly surveys should be undertaken in order to further assess the potential for priority butterfly species to be present.
- Checking surveys for badger and water vole should be undertaken.

Appendix 1 – Bat Suitability and Survey Effort

Classifications of suitability are based on those provided within the Bat Conservation Trust Good Practice Survey Guidelines[8], with the table below taken from page 35 of the guidelines (table 4.1).

Guidelines for Assessing the Potential Suitability of Proposed Development Sites for Bats (based on the presence of habitat features within the landscape, to be applied using professional judgement)		
Suitability	**Description**	
	Roosting Habitats	**Commuting and foraging habitats**
Negligible	Negligible habitat features on site, likely to be used by roosting bats	Negligible habitat features on site, likely to be used by commuting and foraging bats
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[a] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e unlikely to be suitable for maternity or hibernation[b]. A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential[c].	Habitat that could be used by small numbers of commuting bats such as gappy hedgerow or unvegetated stream, but isolated, i.e not very well connected to the surrounding landscape by other habitat. Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions[a] and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions[a] and surrounding habitat	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree lined watercourse and grazed parkland. Site is close to and connected to known roosts.
a. For example in terms of temperature, humidity, height above ground level, light levels or levels of disturbance. *b. Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten et al., 2015). This phenomenon requires some research in the UK but ecologists should be aware of potential for larger numbers of this species to be present during the autumn and winter in larger buildings in highly urbanised environments.* *c. The system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015)*		

[8] Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

The classification of the suitability relates to the level of further survey recommended.

Survey Effort and Timing Depending on Suitability of the Structure or Tree (Tables 7.1-7.3 in the BCT Guidelines			
	Low roost suitability	**Moderate roost suitability**	**High roost suitability**
Survey Effort	One survey visit One dusk emergence or dawn re-entry survey	Two separate visits One dusk emergence and a separate dawn re-entry survey	Three separate visits At least one dusk emergence and a separate dawn re-entry survey. The third can be either dusk or dawn.
Timings	May-August (structures) No further survey (trees)	May to September. At least one must be in the optimum period (May to August)	May to September. two must be in the optimum period (May to August)
If bats are recorded	If bats emerge from or enter a building during surveys, the survey schedule will be adjusted to increase the survey effort so that enough information can be collected to characterise the roost and provide data should a Natural England Licence be required.		

Appendix 2 – Policy and Legislation

Planning Policy

National Planning Policy Framework (NPPF)[9]

The revised National Planning Policy Framework sets out the government's planning policies for England and how these are expected to be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. Planning law requires that applications for planning permission be determined in accordance with the development plan. The key paragraphs from the relating to the natural environment are detailed below.

Ecologically Relevant Paragraphs of the NPPF	
Paragraph	**Statement**
8	Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives): a) an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure; b) a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and c) an environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy
174	Planning policies and decisions should contribute to and enhance the natural and local environment by: a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland; c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate; d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures; e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate

[9] National Planning Policy Framework July 2021 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf)

Ecologically Relevant Paragraphs of the NPPF	
Paragraph	**Statement**
175	Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries
179	To protect and enhance biodiversity and geodiversity, plans should: a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.
180	When determining planning applications, local planning authorities should apply the following principles: a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest; c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons63 and a suitable compensation strategy exists; and d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.
181	The following should be given the same protection as habitats sites: a) potential Special Protection Areas and possible Special Areas of Conservation; b) listed or proposed Ramsar sites64; and c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites
182	The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

Local Planning Policy

The following table details the ecologically relevant policies of the local plan relevant to this site.

Ecologically Relevant Policies of the Northumberland Local Plan[10]	
Policy No.	**Policy**
Policy ENV 1	**Approaches to assessing the impact of development on the natural, historic and built environment (Strategic Policy)** 1. The character and significance of Northumberland's distinctive and valued natural, historic and built environments, will be conserved, protected and enhanced by: a. Giving appropriate weight to the statutory purposes and special qualities of the hierarchy of international, national and local designated and non-designated nature and historic conservation assets or sites and their settings, as follows: i. Greatest weight will be given to international and national designations, in accordance with the obligations set out in relevant legislation and advice; ii. Following this, those of regional and local importance; b. Protecting Northumberland's most important landscapes and applying a character-based approach to, as appropriate, manage, protect or plan landscape across the whole County. 2. In applying part (a) above, recognising that: a. Assets or sites with a lower designation or non-designated, can still be irreplaceable, may be nationally important and/or have qualitative attributes that warrant giving these the appropriate protection in-situ; b. Development and associated activity outwith designations can have indirect impacts on the designated assets or sites; 3. An ecosystem approach will be taken that demonstrates an understanding of the significance and sensitivity of the natural resource. Such an approach should result in a neutral impact on, or net benefit for those ecosystems and the ecosystem services that they provide.
Policy ENV 2	**Biodiversity and geodiversity** 1. Development proposals affecting biodiversity and geodiversity will minimise their impact and net gains for biodiversity will be secured by: a. Avoiding significant harm through location and/ or design. Where significant harm cannot be avoided, applicants will be required to demonstrate that adverse impacts will be adequately mitigated or, as a last resort compensated for; b. Securing net biodiversity gains and/or wider ecological enhancements through new development. 2. Where sites are designated for their biodiversity or geodiversity, planning decisions will reflect the hierarchical approach set out in Policy ENV 1. 3. In the case of Local Wildlife and Geological Sites and Local Nature Reserves: a. development clearly outweigh the harm to the nature conservation value of the site. b. Where permission can be granted in accordance with (3)(a) above, planning conditions or obligations will be used to protect the site's remaining nature conservation interest and to provide appropriate compensatory measures for the harm caused. 4. The Council expects the ecosystem approach to be applied in development through: a. The conservation, restoration , enhancement, creation and/or (where appropriate) the re-creation of priority habitats and the habitats of priority species; b. The protection and enhancement of all ecological networks and links to promote migration, dispersal and genetic exchange, including the South East Northumberland Wildlife Network, as shown on the Policies Map, including its linkages with Newcastle and North Tyneside;

[10] Northumberland Local Plan, Publication Draft Plan (Regulation 19), January 2019, Northumberland County Council

Ecologically Relevant Policies of the Northumberland Local Plan[10]	
Policy No.	**Policy**
	c. Measures that will buffer or extend existing sites of ecological value, support the development of the Border Uplands Nature Improvement Area and Northumberland Coalfield Nature Improvement Area or contribute to national or local biodiversity objectives; d. Minimising any adverse effects on habitats and species caused by the wider impacts of development and its associated activities including: i. Disturbance; or ii. The inadvertent introduction of non-native species: or iii. Reductions in water quality; or iv. Other forms of pollution that would adversely affect wildlife; The above to be achieved through precautionary measures including appropriate buffer zones and developer contributions to the Coastal Mitigation Service within zones shown on the Policies Map; e. Maximising opportunities to incorporate biodiversity in and around development through additional built-in or planted features; and f. Securing the continued management of those ecological features created, restored or enhanced as a result of development. 5. Harm to geological conservation interests will be prevented and, where appropriate, opportunities for public access to those features will be provided.

Government Circular ODPM 06/2005 Biodiversity and Geological Conservation[11] (England only)

This Circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England.

Part IV - Conservation of Species protected by Law details that the presence of a protected species is a material consideration when considering a development proposal that may result in harm to the species or its habitat and that planning authorities must have regard to species protected under the Habitat Regulations.
It goes on to say that: *it is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted.*

Natural Environment and Rural Communities (NERC) Act 2006[12] [13]

Section 40 – To conserve biodiversity

[11]ODPM Circular 06/2005 Office of the Deputy Prime Minister Eland House, Bressenden Place, London SWIE 5DU Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System
[12] https://www.legislation.gov.uk/ukpga/2006/16/section/40
[13] https://www.legislation.gov.uk/ukpga/2006/16/section/41

This section puts a duty on public authorities to conserve biodiversity when undertaking its duties and functions.

Section 41 – Biodiversity list and Action

Requires the Secretary of State *to publish a list of the living organisms and types of habitat which in the Secretary of State's opinion are of principal importance for the purpose of conserving biodiversity*. They must also *take such steps as appear to the Secretary of State to be reasonably practicable to further the conservation of the living organisms and types of habitat included in any list published under this section or promote the taking by others of such steps*.

The 2007 lists were superseded by the UK Post-2010 Biodiversity Framework.

UK Priority Habitats (excl. marine habitats)[14]	
UK BAP Broad Habitat	**UK BAP Priority Habitat**
Rivers and Streams	• Rivers
Standing Open Waters and Canals	• Oligotrophic and Dystrophic Lakes • Eutrophic Standing Waters • Ponds • Aquifer Fed Naturally Fluctuating Water Bodies • Mesotrophic Lakes
Arable and Horticultural	• Arable Field Margins
Boundary and Linear Features	• Hedgerows
Broadleaved, Mixed and Yew Woodland	• Traditional Orchards • Upland Mixed Ashwoods • Wood-Pasture and Parkland • Wet Woodland • Upland Oakwood • Lowland Mixed Deciduous Woodland • Lowland Beech and Yew Woodland • Upland Birchwoods
Coniferous Woodland	• Native Pine Woodlands
Acid Grassland	• Lowland Dry Acid Grassland
Calcareous Grassland	• Lowland Calcareous Grassland • Upland Calcareous Grassland
Neutral Grassland	• Lowland Meadows • Upland Hay Meadows
Improved Grassland	• Coastal and Floodplain Grazing Marsh
Dwarf Shrub Heath	• Lowland Heathland • Upland Heathland
Fen, Marsh and Swamp	• Upland Flushes, Fens and Swamps • Purple Moor Grass and Rush Pastures • Lowland Fens • Reedbeds
Bogs	• Lowland Raised Bog • Blanket Bog

[14] http://jncc.defra.gov.uk/page-5706

UK Priority Habitats (excl. marine habitats)[14]	
UK BAP Broad Habitat	**UK BAP Priority Habitat**
Montane Habitats	• Mountain Heaths and Willow Scrub
Inland Rock	• Inland Rock Outcrop and Scree Habitats • Calaminarian Grasslands • Open Mosaic Habitats on Previously Developed Land • Limestone Pavements
Supralittoral Rock	• Maritime Cliff and Slopes
Supralittoral Sediment	• Coastal Vegetated Shingle • Machair • Coastal Sand Dunes

Protected Species Legislation

European Protected Species

European Protected Species (EPS) are species of plants and animals (other than birds) protected by law throughout the European Union. They are listed in Annexes II and IV of the European Habitats Directive and receive full protection under The Conservation of Species and Habitats Regulations 2017 (as amended). This make it an offence to:

- deliberately capture, injure or kill any European Protected Species (EPS)
- deliberately disturb any European Protected Species (EPS);
- damage or destroy a breeding site or place of rest or shelter used by any European Protected Species (EPS).

The Wildlife and Countryside Act 1981 (as amended) adds further protection by making it an offence to intentionally or recklessly[15] disturb an EPS while it is occupying a structure or place which it uses for shelter or protection, or to obstruct access to any structure or place the species uses for shelter or protection.

European Protected Species Relevant to the UK			
Animals		**Plants**	
All bat species	Great Crested Newt	Yellow marsh saxifrage	Creeping marshwort
Large blue butterfly	Otter	Shore dock	Slender naiad
Wild cat	Smooth snake	Killarney fern	Fen Orchid
Dolphins, porpoises and whales (all species)	Sturgeon fish	Early gentian	Floating-leaved water plantain
Dormouse	Natterjack toad	Lady's slipper	
Sand lizard	Pool Frog		
Fisher's Estuarine Moth	Snail, Lesser Whirlpool Ram's-horn		

[15] Under the Countryside and Rights of Way Act 2000 (CROW Act) extended the protection to cover reckless damage or disturbance

European Protected Species Relevant to the UK		
Animals		**Plants**
Marine turtles		

Other Protected Species

Other Protected Species Legislation		
Species	**Legislation**	**Level of Protection**
Water vole	Wildlife and Countryside Act 1981 (as amended) Wild Mammals (Protection) Act 1996	The species is listed on Schedule 5 of the Wildlife and Countryside Act (1981) makes the following actions offences: • intentionally killing, injuring, or taking water vole • intentionally or recklessly damaging, destroying or obstructing access to any structure or place used for shelter or protection • disturbing water vole whilst they are using any structure or place used for shelter or protection Under the Wild Mammals (Protection) Act, water vole are protected from unnecessary suffering by a number of methods.
Birds	Wildlife and Countryside Act 1981 (as amended)	Under the Wildlife and Countryside Act (1981) it is an offence if any person: • intentionally kills, injures or takes any wild bird • intentionally takes, damages or destroys the nest of any wild bird whilst that nest is in use of being built; • intentionally takes, damages or destroys eggs of any wild bird; Wild birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) are protected from: • intentional or reckless disturbance whilst it is building a nest or is in, on or near a nest containing eggs or young; • disturbance of dependent young
Badger	Protection of Badgers Act 1992 Wild Mammals (Protection) Act 1996	The Protection of Badgers Act (1992) makes it an offence to wilfully or attempt to: • kill or injure a badger • possesses a dead badger or any part of, or anything derived from a dead badger; • digs for badgers; • damages a badger sett or any part of it; • destroys a badger sett • obstructs access to, or any entrance of, a badger sett; • causes a dog to enter a badger sett; • disturbs a badger whilst it is occupying a badger sett. Under the Wild Mammals (Protection) Act, badgers are protected from unnecessary suffering by a number of methods.
Slow-worm Adder Grass Snake	Wildlife and Countryside Act 1981 (as amended)	Under the Wildlife and Countryside Act (1981) it is an offence if any person: • intentionally kill or injures these slow-worms, adders, grass snakes or common lizards

Other Protected Species Legislation		
Species	**Legislation**	**Level of Protection**
Common Lizard		• sells, offers or exposes for sale, or has in his possession or transports for the purpose of sale, any live or dead slow-worm, adder, grass snake or common lizard or any part of, or anything derived from, such an animal

Appendix 3 - Receptor Valuation

The importance of ecological features is considered within a defined geographic context, examples of which are provided within the table below. The valuation of features is a complex process and, in many cases, requires the application of expert judgement. Valuation considers a range of factors including statutory designations, national biodiversity lists, biodiversity action plan lists and lists of declining, rare or legally protected species. Other factors to be considered include the 'naturalness' of habitats, the functional importance of features and whether habitats are irreplaceable.

Examples of Importance of Ecological Features (Geographic Context)[16]			
Importance	**Designated Site**	**Habitat**	**Species**
International and European	Special Protection Area/Proposed Special Protection Area Special Area of Conservation/Proposed Special Area of Conservation Ramsar Site	A significant area of a Priority Habitat listed on Annex 1 of the Habitats Directive or a smaller area of such habitat that is thought to be functionally linked to a significant area of such habitat	An area that is functionally important to a species listed on Annexes II, IV or V of the Habitats Directive or Annex I of the Birds Directive which is present in internationally significant numbers (>1% of the biogeographic population)
National	Site of Special Scientific Interest	A significant area of a Priority Habitat listed as a habitat of principal importance under Section 41 of the Natural Environment and Rural Communities Act 2006 or a smaller area of such habitat that is thought to be functionally linked to a significant area of such habitat	An area that is functionally important to a species listed as a species of principal importance under Section 41 of the Natural Environment and Rural Communities Act 2006, which is present in nationally significant numbers (>1% of the national population)
Regional	-	An area of a Priority Habitat listed as a habitat of principal importance under Section 41 of the Natural Environment and Rural Communities Act 2006 which is not significant enough in extent to be considered of national importance but is considered to be of greater than metropolitan or county value.	An area that is functionally important to a species which is present in regionally significant numbers (>1% of the regional population
Metropolitan area or County	Local Wildlife Site designated at a metropolitan area or county level	A significant area of a Priority Habitat listed within the relevant local Biodiversity Action Plan or a smaller area	An area that is functionally important to a species listed as a Priority Species within the relevant local Biodiversity

[16] Based on information provided within Guidelines for Ecological Impact Assessment in the UK and Ireland (2018) CIEEM

Examples of Importance of Ecological Features (Geographic Context)[16]			
Importance	**Designated Site**	**Habitat**	**Species**
Local (District/ Borough of Parish)	Local Wildlife Site designated at a district or borough level	of such habitat that is thought to be functionally linked to a significant area of such habitat	Action Plan, which is present in significant numbers within the geographic context.
Low	-	Habitats that are unexceptional in a local context and do not meet the above criteria.	Species populations that are unexceptional in a local context and do not meet the above criteria.

Appendix 4 – Figures



Key

Site Boundary

Secondary Codes
10 - Scattered Scrub
47 - Native
111 - Road

North

Figure No: 1
Figure Name: Site Location
Project Name: Land at Linton
Project Ref. No: 22066
Date: July 2022
Author: MR

0 500 1,000 m



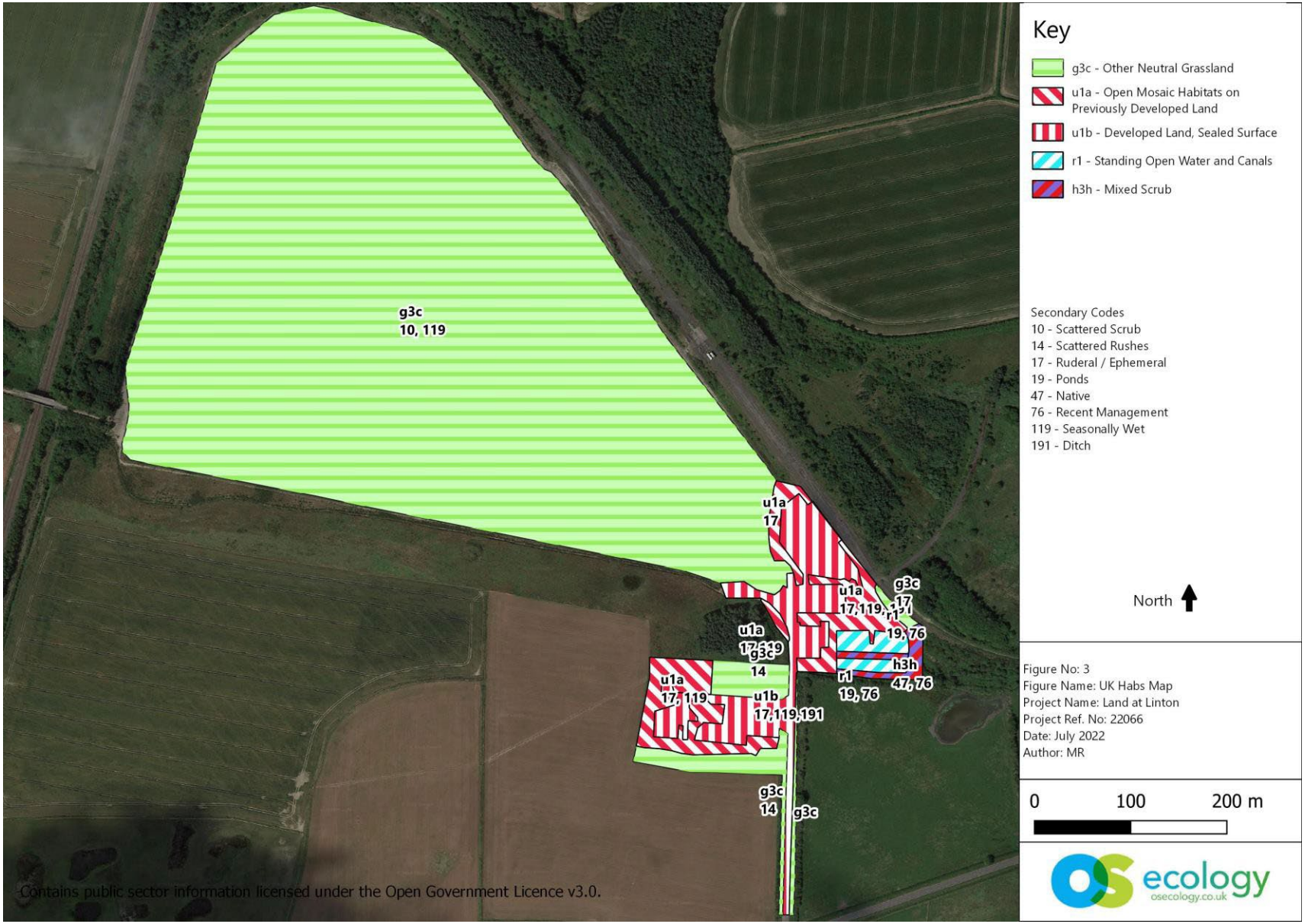
Key

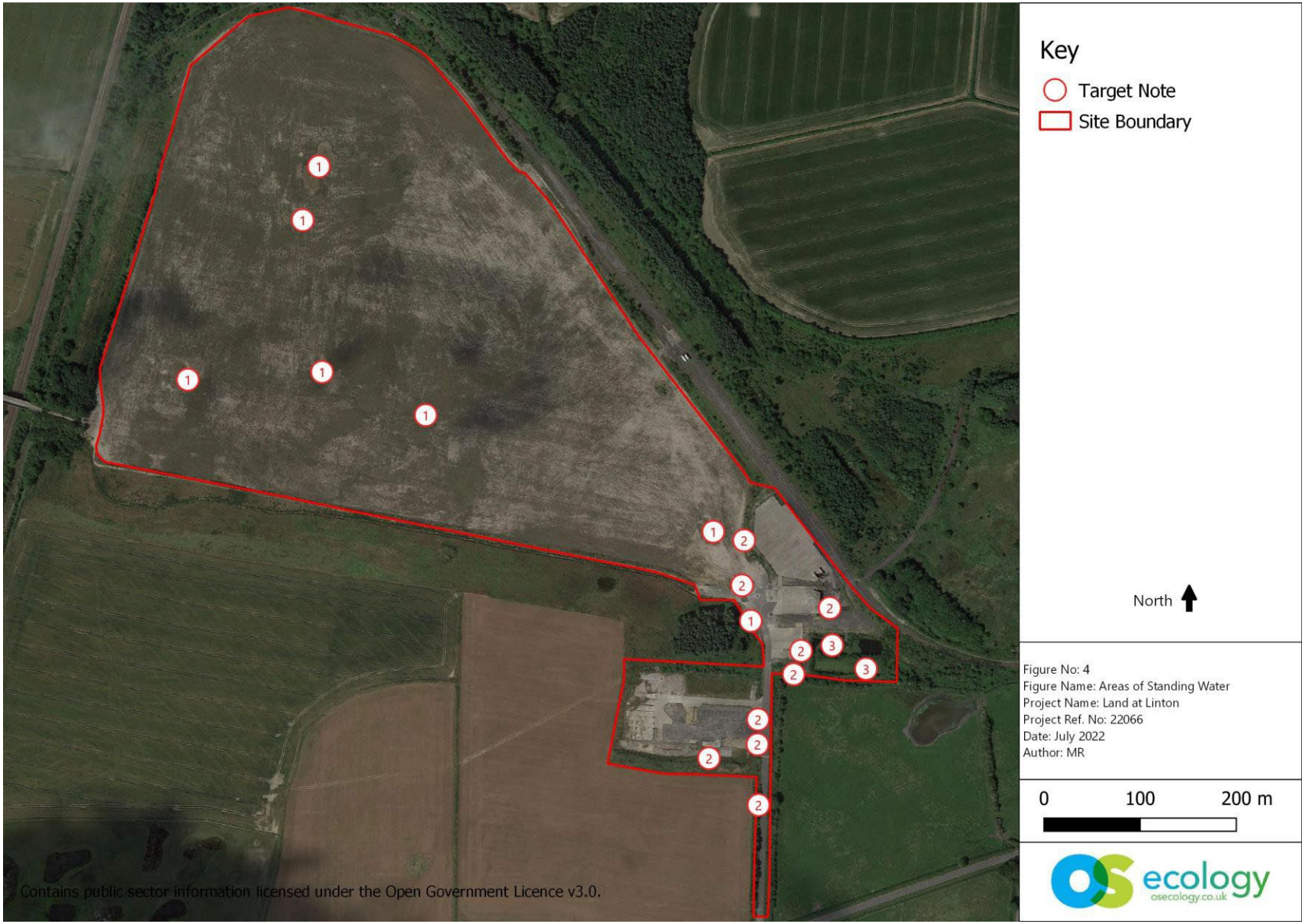
Site Boundary

North

Figure No: 2
Figure Name: Site and Setting
Project Name: Land at Linton
Project Ref. No: 22066
Date: July 2022
Author: MR

0 100 200 m


g3c
10, 119
u1a
17
u1a
17,119
g3c
17
r1
19, 76
u1a
17,119
g3c
14
h3h
47, 76
r1
19, 76
u1a
17, 119
u1b
17,119,191
g3c
14
g3c
Contains public sector information licensed under the Open Government Licence v3.0.
Key
g3c - Other Neutral Grassland
u1a - Open Mosaic Habitats on Previously Developed Land
u1b - Developed Land, Sealed Surface
r1 - Standing Open Water and Canals
h3h - Mixed Scrub
Secondary Codes
10 - Scattered Scrub
14 - Scattered Rushes
17 - Ruderal / Ephemeral
19 - Ponds
47 - Native
76 - Recent Management
119 - Seasonally Wet
191 - Ditch
North
Figure No: 3
Figure Name: UK Habs Map
Project Name: Land at Linton
Project Ref. No: 22066
Date: July 2022
Author: MR
0
100
200 m
ecology
osecology.co.uk


Key
Target Note
Site Boundary
North
Figure No: 4
Figure Name: Areas of Standing Water
Project Name: Land at Linton
Project Ref. No: 22066
Date: July 2022
Author: MR
0
100
200 m
Contains public sector information licensed under the Open Government Licence v3.0.