



# **BSP Consulting**

# Phase One Desk-Based Study

November 2015



Development Securities (Lichfield) Limited a wholly owned subsidiary of U+I Group PLC











# **CONTENTS**

		PAGE NO
1.0	INTRODUCTION	1
2.0	SITE DESCRIPTION & HISTORY	3
3.0	GEOLOGY & ENVIRONMENTAL SETTING	11
4.0	PRELIMINARY CONCEPTUAL SITE MODEL	20
5.0	CONCLUSIONS	28

# **APPENDICES**

$\mathbf{A}$	Site Location Plan
B	<b>Annotated Site Plan</b>

- C Site Plans Showing General Site Views
- D Historical Plans
- E Landmark Envirocheck Report
- F Plates
- **G** Proposed Masterplan Options Drawings
- **H** Conditions and Limitations

#### 1.0 INTRODUCTION

# 1.1 Introduction

BSP Consulting has been appointed by the Client, Development Securities (Lichfield) Ltd a wholly owned subsidiary of U + I Group PLC, to undertake a Phase I Desk Study on a parcel of land within the city centre area of Lichfield, Staffordshire.

It is understood that previous works have been undertaken at the site by WSP Environmental Ltd, including a desk study report and initial intrusive investigation. However, there is no formal reliance on the contents of these reports and these works date from 2006/2007, therefore it is understood that an up-to-date desk study report is required to support a planning application for the sites redevelopment.

# 1.2 Project Understanding

We understand that the Client requires the completion of a Phase I Desk Study report to support a planning application for the redevelopment of the site with a mixed enduse including new retail/commercial units, bus depot, multi-storey car park and residential dwellings.

Outline Masterplan options drawings are included within Appendix G for information purposes.

The foregoing understanding has formed the basis of our assessment. Where the proposed site end-use is not consistent with our current understanding, it may be necessary to review our assessment to ensure it continues to apply.

# 1.3 Scope of Works

The scope of the Phase I Desk Study included the following:

- Review of existing reports relating to the site.
- Site walkover and conversations with current site operatives (as appropriate).
- Review of historical and contemporary Ordnance Survey publications.
- Review of the sites geology, hydrology and hydrogeology.
- Review of the sites radon status.
- Review of the sites coal mining status.
- Review of a commissioned Landmark Envirocheck Report and use of the Landmark Analysis software tool.
- Production of a preliminary Conceptual Site Model.

#### 1.4 Limitations

The conclusions and recommendations made in this report are limited to those that can be made based on the findings of the investigation. Where comments are made based on information obtained from third parties, BSP Consulting assumes that all third party information is true and correct.

No independent action has been undertaken to validate the findings of third party information, unless specifically stated.

The Phase I Desk Study undertaken herein comprises entirely of non-intrusive works and provides a strategic overview of the site from a geotechnical and environmental perspective and attempts to identify any potential abnormal issues with regards to the redevelopment proposals.

This report has been prepared in accordance with our understanding of current good practice. However, new information or legislation, or changes to good practice may necessitate revision of the report after the date of its issue.

BSP Consulting has prepared this report for the sole use and reliance of the Client, Development Securities (Lichfield) Ltd a wholly owned subsidiary of U+I Group PLC, in accordance with our standard Conditions and Limitations (a copy of which is included as Appendix H). This report may not be relied upon by any third party without the explicit written agreement of BSP Consulting.

#### 2.0 SITE DESCRIPTION & HISTORY

# 2.1 Site Description

The site comprises a parcel of land within the centre of Lichfield, and may be located centred on approximate Ordnance Survey National Grid Reference 411860E 309310N and covers an area of approximately 2.78 hectares. A Site Location Plan (Figure No. 15052/01) is included as Appendix A.

A site walkover was undertaken on 25<sup>th</sup> June 2015, in part accompanied by a representative of Lichfield District Council. We would note that some parts of the site remained inaccessible at this time and therefore the following is based upon the areas viewed and available for inspection.

The northern part of the site predominantly contained a large concrete-built multistorey car park, which we understand has undergone strengthening works in recent years. The lower storey of the car park is situated beneath the level of the adjacent Birmingham Road to the sites southeast. A redundant walkway ran around the eastern façade of the building, which terminated at a bricked up subway at the sites northeastern extent. At the farthest northerly extent of the site, a row of five commercial units fronting onto Baker's Lane were present (the outside square within Baker's Lane forms the northern site boundary). These retail units were occupied by companies including RAW Menswear and Magic Story (home and crafts store). The car park and the retail units were separated by an access roadway, which ran around the western frontage of the car park and led onto Castle Dyke to the sites northwest.

To the south of the car park a pedestrianised paved walkway was present, which ran past the housing to an electricity substation (brick-built structure) and adjacent bicycle store, a separate public conveniences building and a small newsagents kiosk, and led to the northern extent of a bus depot and off-road public car park. The bus depot was formed of two separate bus lanes, with a strip of soft landscaping present along the eastern boundary fronting onto Birmingham Road. Both the depot and car park were seemingly surfaced with macadam.

To the southwest of the car park a partially grass surfaced soft landscaping area was present, which contained a number of semi-mature to mature trees. A public footpath splits the soft landscaping in two, providing access between Castle Dyke to the west and the bus depot to the southeast, and further informal paths have been created across these areas. Further to the south of the soft landscaping, and to the northwest of the bus depot, a police station (of three-storey predominantly brick-built construction) was present.

Access into and across the police station was not available at the time of our visit, however the external areas appear to be primarily macadam surfaced, with external buildings present towards the northwestern extent of the police compound. No obvious Above-ground Storage Tanks (ASTs) or potentially contaminative features were observed based on our limited inspection of this area.

Phase I Desk Study Report

The southwestern part of the site was formed by part of the car parking area to the Lichfield District Council offices (situated adjacent to the southwest of the site), with two residential dwellings situated within the site between the car park access off Frog Lane and the police station to the north. Access into and across the dwellings was not available, however the front gardens appear to be primarily laid to lawn.

The southern part of the site (forming approximately 25% of the site area) comprised an operational car dealership and vehicle garage (Tempest Ford), which benefited from access both off Birmingham Road to the southeast and St John's Street to the southwest. The main car showroom and service centre were housed within the large centrally sited building to this area, with a further service building located in the southwest, set slightly apart from the main building. Cars were parked externally to the showroom, primarily along the frontages to Birmingham Road and St John's Street, although a further vehicle rental premises was located to the east; within the boundary of the Tempest Ford car dealership land (which we understand the entirety of which forms a tenancy to Lichfield District Council).

Within the eastern external area of the car showroom land, an approximately oval concrete scar is located between the two entrances off Birmingham Road. It is understood from anecdotal evidence from employees that this forms the remnants of a former pump island. The tanks to the pump island were anecdotally inferred to be adjacent to the southernmost Birmingham Road entrance, with these having formed Underground fuel Storage Tanks (USTs) previously decommissioned and subsequently infilled with concrete. The scars to the tanks were just visible beneath the cars stored above.

A further series of USTs, again anecdotally inferred to be decommissioned by infilling with concrete, appear to have historically been situated at the southern edge of the site. The concrete scarring to the infilling of former manhole covers was evident in this area. A small soft landscape area formed the most southerly extent of the site, within which a concrete base was observed (anecdotally inferred to comprise the base to former fuel price signage). Whilst not visible at our visit, a drainage interceptor has been identified adjacent to the southern boundary by previous site inspections undertaken by WSP.

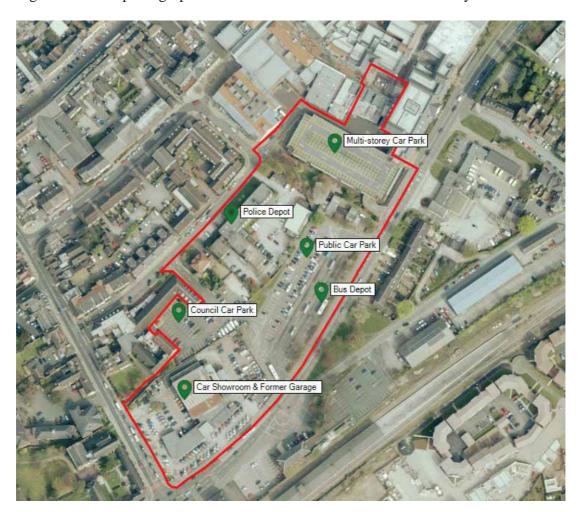
To the north of the main car showroom/garage, a relatively large yard area was situated, which we understand is utilised for both staff car parking and for the storage of vehicles undergoing maintenance and repair. Within this yard area, and adjacent to the northern face of the main building, an AST was located. The AST was housed within a brick bund. Additional ASTs (both historical and current) may have been present within the garage site.

The site is situated within a mixed setting of residential dwellings (primarily to the east and northwest) and commercial retail units to the north. Birmingham Road forms the eastern boundary of the site, with St John's Street and Frog Street forming the southern and western boundaries respectively. The Lichfield City railway station was located to the south of the site, with buildings associated with public services (including a chapel, preparatory school, nursing home etc.) present beyond St John's Street to the south.

An Annotated Site Plan (Figure No. 15052/02) is included as Appendix B of this report, which shows the main features of the site and immediate surrounds. General views of the site are included on the plan in Appendix C of this report (Figure Nos. 15052/03 to 15052/05) and on Plate Nos. 1-3 presented in Appendix F.

An aerial photograph of the site, obtained from the Landmark Analysis tool, is included in Figure 1 below, which includes annotations of the key land-uses present at the site at the time of our walkover.

Figure 1: Aerial photograph of the site labelled with annotations of key site features.



# 2.2 Site History

Available historical and contemporary Ordnance Survey publications (detailed in Appendix D) were reviewed to obtain historical information for the site.

It should be noted that the site boundary marked on the historical sheets within the Envirocheck Report appears to 'shift' on several of the maps due to scaling inaccuracies between maps of differing dates. This is a function of Envirocheck transposition algorithms.

The key findings of the historical search are summarised in Table 1.

	TABLE 1 – HISTORICAL	MAP INFORMATION		
Date	Features on Site	Features off Site		
1880s	<ul> <li>The majority of the site either comprises a part of an undeveloped field (in the southeast) or orchards (in the northwest).</li> <li>'Yeomanry House' is indicated in the southwest of the site, which comprises a large building with smaller annexes.</li> <li>A small glasshouse, possibly part of the grounds to an adjacent 'Grammar School', is labelled over a small building in the west of the site.</li> <li>A small number of residential dwellings are indicated in the north of the site.</li> <li>A number of rectangular shaped structures are indicated adjacent to the northwest boundary of the site (use is unclear).</li> </ul>	<ul> <li>The site lies towards the southeastern extent of an urbanised area, seemingly primarily residential in character.</li> <li>Industrial premises appear locally interspersed within the wider residencies, with an 'Iron &amp; Brass Foundry', 'Nail &amp; Bolt Works' and various malthouses all located within a distance of 100m from the site.</li> <li>Railway lines are indicated beyond approximately 50m of the sites southeastern boundary, with an associated station shown 100m to the sites east.</li> </ul>		
1900s	<ul> <li>The site remains essentially unchanged.</li> <li>Yeomanry House is now labelled as a 'High School'.</li> <li>Possible wells are indicated in the central-western part of the site.</li> </ul>	The surrounding area remains essentially unchanged.		
1910s	No maps available for viewing.	No maps available for viewing.		
1920s	<ul> <li>The rectangular shaped structures in the west of the site are no longer indicated, with a 'School' and an adjacent large building shown in the general location of these former features.</li> <li>No other significant changes to the wider site are evident.</li> </ul>	<ul> <li>The surrounding area remains essentially unchanged.</li> <li>'Lichfield Council Offices' are indicated in place of the former grammar school to the southwest of the site.</li> </ul>		
1930s to 1950s	The site appears to be essentially unchanged.	The surrounding area remains essentially unchanged.		
1960s	<ul> <li>Three large buildings associated with a 'Garage' are indicated in the south of the site, with a possible forecourt indicated adjacent to the sites southwestern boundary. A pump ('P') is shown in this area. A 'Tank' is also indicated off-set to the north of the garage buildings.</li> <li>The external area to a 'Depot' (shown to locally encroach into the site) is indicated in the sites southwest together with associated outbuildings, with three residential dwellings shown in the sites west (annotated as 'Holme', 'Little Croft' and 'Frogmorton House').</li> <li>Four large buildings associated with 'Lichfield C of E Secondary School (Girls &amp; Boys)' are indicated in the northwest of the site, with small structures associated with a 'Drill Hall' shown immediately to the north of the school.</li> <li>A 'Bus Station' is indicated in the central-eastern part of the site.</li> <li>The northern extent of the site appears to have been cleared (i.e. the residential dwellings are no longer shown).</li> </ul>	'Birmingham Road' has been constructed adjacent to the eastern boundary of the site, with a new row of residential dwellings constructed beyond.  The general area around the site appears relatively unchanged.		
1970s	The Garage in the south of the site appears to have been extended, with a further 'Tank' indicated off the northeastern façade of the main building.  Frogmorton House and part of the	The area to the north and northwest of the site has undergone redevelopment, with retail units indicated along the length of Baker's Lane and with a 'Public Hall' indicated to the sites northwest.		

	TABLE 1 – HISTORICAL MAP INFORMATION						
Date	Features on Site	Features off Site					
1980s	adjacent Depot building are no longer indicated, and a further small building is shown at the sites western boundary to the south of Little Croft.  • A 'Police Station' is now shown across the area formerly containing a School, and a strip of soft landscaping (containing several trees) is shown within the approximate area formerly occupied by the Drill Hall.  • A large 'Multistorey Car Park' is indicated in the north of the site.  • Retail units (part of an extended row situated along Baker's Lane) are indicated in the northern extent of the site.  • A small building containing public conveniences (labelled PC) and an electricity substation are indicated in the northeast of the site, between the bus station and multi-storey car park.  • A further small feature (possible tank) is indicated to the northeast of the garage building, although the tank in the sites southwest corner is no longer annotated.  • Some of the outbuildings associated with the adjacent former depot building are no longer shown on the site.  • A new access trackway is indicated to the south of Little Croft, replacing the former building shown in this area.  • The remaining areas of the site appear	<ul> <li>The depot adjacent to the southwest of the site has been redeveloped, and now forms part of the council offices.</li> <li>With the exception of localised development (primarily residential) the surrounding area remains essentially unchanged.</li> </ul>					
1990s	<ul> <li>relatively unchanged.</li> <li>The remaining outbuildings from the former depot are no longer indicated in the southwestern part of the site.</li> <li>The remainder of the site remains essentially unchanged.</li> <li>The retail units in the north of the site form part of the 'Three Spires Shopping Centre'.</li> </ul>	<ul> <li>With the exception of the expansion of the council offices adjacent to the sites southwest, the sites surrounding area remains essentially unchanged.</li> <li>The retail area along Baker's Lane to the north is labelled as the 'Three Spires Shopping Centre', with some of the smaller retail units to the sites northeast having been amalgamated with a larger building further to the sites north.</li> </ul>					
2006 to 2015	The site remains essentially unchanged.	The surrounding area remains essentially unchanged.					

# 2.3 Aerial Photography & Historical Map Overlays

As part of the commissioned Landmark Report, the use of the Landmark Envirocheck Analysis tool was purchased to provide site specific aerial photographic imagery, and to provide the ability to undertake limited historical map overlay manipulation. The following aerial photographic pictures show the sites northern, central and southern areas in greater detail to the aerial plan included in Section 2.1.

An aerial image of the northern area of the site, including the multi-storey car park, toilet block, newspaper kiosk, and existing retail units is provided in Figure 2 below.

Figure 2: Aerial photograph of northern site area.



An aerial image of the central part of the site, including the bus depot, off-street public car park, the police depot, existing residential dwellings and the Council car park is provided in Figure 3 below.

Figure 3: Aerial photograph of central site area.



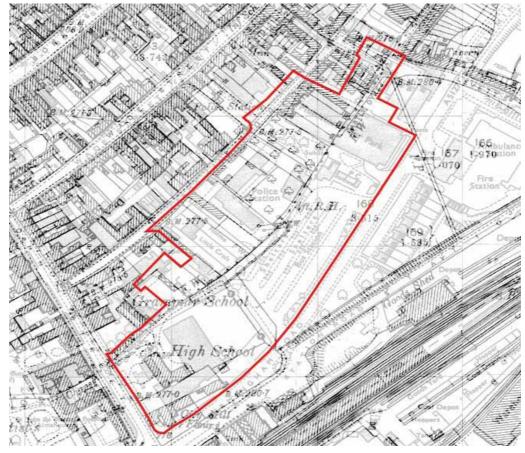
An aerial image of the southern part of the site, centred on the existing car showroom and former garage, is provided in Figure 4 below.

Figure 4: Aerial photograph of southern site area.



Based on the historical map review included in Section 2.2, selected maps have been overlaid in order to provide a visual depiction of the key issues highlighted within the historical review. Figures 5 and 6 show the key historical features identified at the site.

Figure 5: Historical map overlay of the 1902 and 1975 map sheets



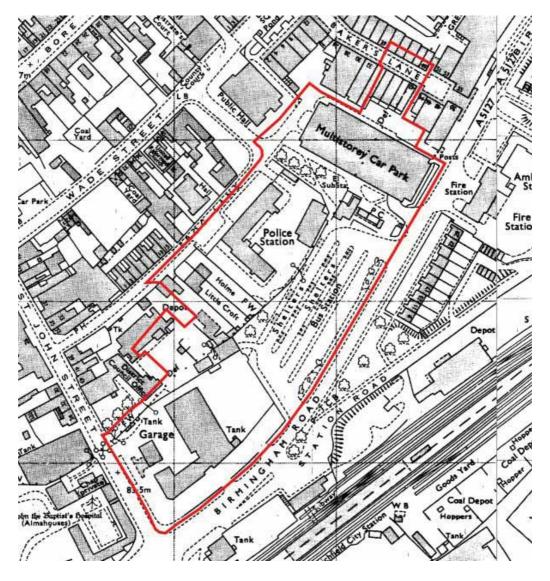


Figure 6: Snapshot of the 1975 to 1977 historical map sheet

The foregoing images show the Above-ground Storage Tanks (ASTs) present within the former garage in the southern part of the site, as well as the possible canopy to a former fuel filling area near to the sites southwestern boundary. Former buildings or structures are also locally indicated on the earlier historical plans, including the former High School and residential dwellings in the sites northern extent (seemingly removed to facilitate construction of the multi-storey car park).

#### 3.0 GEOLOGY & ENVIRONMENTAL SETTING

# 3.1 Geological References

The following geological publications were referred to:

- BGS One-Inch to One-Mile Series Sheet 154 'Lichfield', Solid & Drift Edition (1954).
- BGS publication, British Regional Geology 'Central England' Third Edition (1969).
- The Coal Authority and The Law Society publication 'Coal Mining and Brine Subsidence Claim Searches Directory and Guidance' Sixth Edition (2006).
- Environment Agency website: www.environment-agency.gov.uk.
- British Geological Survey website: www.bgs.ac.uk.

# 3.2 Geology

The geological publications indicate that the site is immediately underlain by solid geology comprising the Bromsgrove Sandstone Formation, which dates from the Triassic Period. No superficial (drift) deposits are indicated beneath the site.

The Bromsgrove Sandstone Formation is described by the BGS as typically comprising 'Sandstones, red, brown and grey, commonly pebbly or conglomeratic at the bases of beds, interbedded with red and brown siltstones and mudstones.'

#### 3.3 Faults

No faults are indicated to be present within the boundary of the site, or within the immediate vicinity of the site.

# 3.4 Man-Made Deposits

The geological publications do not show the presence of any man-made deposits (i.e. Made Ground, Worked Ground or Landscaped Ground) beneath the site or within the vicinity of the site.

However, given the legacy of development across the site as revealed by the historical map information, together with the current site setting, it is anticipated that Made Ground or disturbed ground (albeit likely to be predominantly relatively shallow) may be present across the majority of the site.

Significant thicknesses of Made Ground may locally be present associated with underground features (interceptor chambers, storage tanks, buried utilities, foundations etc.) or from previous earthworks activities. Given the presence of former residential dwellings on parts of the site, potentially infilled basements and infrastructure etc. may also locally be encountered.

# 3.5 Coal Mining

The site does not lie in an area requiring the commission of a coal mining report in accordance with The Coal Authority and The Law Society publication 'Coal Mining and Brine Subsidence Claim Searches – Directory and Guidance' Sixth Edition (2006). No specific investigation or mitigation in relation to historical coal mining issues is therefore considered to be necessary at the site.

# 3.6 Landmark Envirocheck Report

A Landmark Envirocheck Report was commissioned to assist in ascertaining the environmental setting of the site. The full Envirocheck Report is presented in Appendix E and has revealed the following relevant information. (Details are only listed where they are within 250m of the site).

# 3.6.1 Agency & Hydrological

# **Aquifer Status**

The bedrock geology underlying the site (i.e. the Bromsgrove Sandstone Formation) is classified as a Principal Aquifer.

The Environment Agency describes Principal Aquifers as '...layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer'.

# Source Protection Zone Status

The site and immediate surrounds lie within a Zone III (Total Catchment) Source Protection Zone (SPZ) as designated by the Environment Agency. An SPZ relates to the protection of groundwater used for public drinking water supply, with a Zone III designation corresponding to the total area needed to support the discharge from the protected groundwater source.

The nearest source protection borehole is located approximately 1800m to the northeast of the site, with the Zone I area being approximately 1650m from the site, and the Zone II area located approximately 1300m from the site. Further source protection boreholes are situated at distance to the sites northwest and south.

# Flood Risk Status

The site is not shown to lie in an area identified to be at risk from flooding.

# Surface Water Features

The closest surface water feature is identified 174m to the southwest of the site, which appears to correspond to the presence of a surface water pond within the grounds of Staffordshire University.

Phase I Desk Study Report

# **Local Authority Pollution Prevention and Controls**

There is one entry listed approximately 194m to the northwest of the site associated with 'Johnson Cleaners UK Ltd'. The entry is detailed as 'Permitted' and relates to dry cleaning processes.

# Pollution Incidents to Controlled Waters

A single pollution incident to Controlled Waters is identified 143m to the northwest of the site, associated with the release of hydraulic oil from a dustbin lorry. The incident occurred on Tudor Row, and the receiving water is not listed. The severity of the incident is listed as minor (category 3), and given the age since the spillage occurred (i.e. July 1997) this entry is considered not to be specifically relevant to the site.

#### 3.6.2 Waste

A scrapyard, including a waste transfer station, is indicated approximately 84m to the south of the site operated by E A Barnes & Sons Ltd at Shell Works, City Wharf, Lichfield.

The facility is variously listed under Licensed Waste Management Facilities (license identified as having been surrendered), Registered Waste Transfer Sites (license identified as having been superseded) or Registered Waste Treatment or Disposal Sites (with entries for the same facility listed 86m and 148m to the south of the site).

A variety of wastes are listed as being accepted within the facility, with an input rate described as small (greater than or equal to 10,000 and less than 25,000 tonnes per year). The most recent license is listed as January 1993, and the license status is identified as being 'operational as far as is known'.

#### 3.6.3 Hazardous Substances

There are no sites associated with hazardous substances (e.g. explosives) identified within 250m of the site.

#### 3.6.4 Geological

# Geological Hazards

No potentially significant onerous geological issues have been identified within the Landmark Envirocheck Report, which relate to the site.

# **BGS** Estimated Soil Chemistry Data Maps

The BGS has prepared estimated soil concentration maps for several metals (including Arsenic, Lead, Nickel, Chromium and Cadmium), which are extrapolated from records available for use within their assessments.

Whilst potentially useful for the inference of Natural Metal Enrichment (NME) of the natural soils in a general locale, the data should not be used to inform any detailed decisions with regards to the chemistry of a particular site as it does not allow for anthropogenic affects. Estimates of the soil chemistry at the site indicate anticipated concentrations of Arsenic of <15mg/kg, Cadmium of <1.8mg/kg, Chromium of 20-40mg/kg, Lead of <150mg/kg and Nickel of <15mg/kg.

Based on the information supplied in the Landmark Envirocheck Report, the site is indicated to be located in an area where significant NME of the underlying natural soils is not anticipated to be present. However, this is only applicable to the specific determinands listed above.

# Radon

The site does not lie within an area identified by Landmark as requiring radon protective measures.

#### **BGS** Borehole Records

The Landmark report indicates that several boreholes were historically advanced in close proximity to the site (i.e. within around 80m of the site boundaries). The majority of these relate to the Baker's Lane redevelopment to the sites north, although all of these records are listed as being commercially unavailable (i.e. there is no current access to the borehole records).

#### 3.6.5 Industrial Land Use

A single inactive contemporary trade directory entry is listed within the site, at 36 Baker's Lane, for dry cleaning services. We would note that No. 36 Baker's Lane is now occupied by RAW Menswear.

An obsolete fuel station entry is also identified within the site associated with Kennings Ltd on St John Street; this is anticipated to correspond to the former filling station located in the south of the site.

As part of the desk study we have undertaken an internet search for Kennings Ltd Lichfield, and have found the following undated photograph pertaining to this former land-use at the site (source: www.pinterest.com/pin/3987978418318).



The photograph is looking into the southwestern corner of the site from St John Street, towards the existing vehicle servicing and maintenance area. The photograph clearly shows that this area has also been historically utilised for vehicle servicing, and also reveals the presence of various fuel dispensers in the sites southwestern extent (as annotated on the photograph).

A further 62No. entries are identified within 250m of the site, of which only 18No. are listed as being active. Nearby activities (variously inactive or active) include garage services, general engineers, manufacturers and wholesalers (variously including disability equipment, electrical goods and lampshades, amongst others), tyre dealers, printers and many others.

We would note that the southern part of the site contains an operational Ford dealership (Tempest Ford), which includes a servicing and maintenance area; this appears to be incorrectly attributed by Landmark to an off-site inactive premises 9m to the sites southwest.

Phase I Desk Study Report

#### 3.6.6 Sensitive Land Use

The site is identified as being within a Nitrate Vulnerable Zone. In our experience the majority of this area of the country is defined as a Nitrate Vulnerable Zone and this classification is considered not to present a potential risk to the proposed redevelopment.

#### 3.7 Land Use Assessment

As part of the land use assessment, reference has been made to the 'Desk Reference Guide to potentially Contaminative Land Uses' produced by Mr P Syms and published jointly by the ISVA (The professional Society for Valuers and Auctioneers) in association with The Royal Institution of Chartered Surveyors (RICS) and the Chartered Institute of Environmental Health (CIEH).

We have also made reference to the Department for Environment, Food and Rural Affairs and the Environment Agency Contaminated Land Report CLR8 'Potential Contaminants for the Assessment of Land' (March 2002). This document identifies key contaminants which may potentially be present at a site as a result of a given historical land use, and whilst formally withdrawn is still considered to be a useful desk-based reference guide.

#### 3.7.1 On Site Assessment

#### Summary

The site has historically been subjected to iterative phases of development, with a former school building having been present in the south of the site since the earliest available map publications (i.e. 1880s). The site was subsequently redeveloped in the 1920s, whereby a further school building was constructed in the northwest of the site, and by the 1960s the site has been fully developed to include a bus depot, garage (fuel filling station) and residential dwellings. By the 1970s the site had established the modern layout, with the multi-storey car park and a police station replacing the former school buildings in the northwest. Made Ground may therefore be anticipated beneath parts (or all) of the site, together with any remnant building materials associated with previously demolished buildings/structures.

Presently, the site retains many of the land-uses listed above, including the bus depot, multi-storey car park and police station, with the southern part of the site utilised as a car showroom and vehicle maintenance/repair facility. A number of former USTs are known to have been present within the southern part of the site associated with the former use as a Petrol Filling Station (PFS), with the remnants of these visible on the ground by scarring of the hardstanding (albeit the exact number of USTs remains unknown, and was not confirmed by WSP in their liaison with the relevant Petroleum Licensing Officer in 2006). An historical photograph indicates that fuel pump stations were present not only along the frontage to St John's Street (as indicated by the outline to a forecourt on the historical plans) but also within the access off St John's Street; presumably utilising the tanks labelled in this general area on the historical maps.

Evidence of a further UST, located to the rear of the police station building, was highlighted by the WSP report via consultation with the Lichfield District Council Environmental Health department. This was seemingly corroborated by consultation with the Petroleum Officer in 2006, where the presence of a UST within the police station yard was confirmed; albeit it was unknown whether petrol or diesel was stored and whether the UST had been decommissioned. Upon securing access into this part of the site in the future, it is recommended that the relevant police personnel are contacted to ascertain whether they hold any further records of this feature.

Phase I Desk Study Report

An electricity substation is present in the northern part of the site, housed within a brick-built structure adjacent to the public conveniences. This appears on the historical maps in the 1970s, and therefore it must be anticipated that this feature contained Polychlorinated Biphenyls (PCBs) for at least a part of its operational life. Associated contamination of the underlying soils may therefore have resulted from this feature.

The site is indicated to be underlain by the Bromsgrove Sandstone Formation, which is classified as a Principal Aquifer by the Environment Agency, and falls within an Outer Source Protection Zone. The site is therefore located within a relatively high sensitivity area with respect to potential contamination issues to Controlled Waters.

# Land Use Classifications

Our review of the Syms document has revealed that the existing and former use of the southern part of the site falls into the Syms document classification of Garages (including sale of automotive fuel and repair of cars) and is given a hazard rank of 30 and a Medium perceived risk (Class C).

With respect to garages, the Syms document notes 'Fuels such as petrol and diesel are highly mobile and have the potential to cause widespread contamination. This may result in free product forming a migratory plume away from the site, vapour may also diffuse into the soil and advance ahead of the free product. Lighter fractions of the fuel may float on the surface of groundwater, with heavier fractions migrating downwards through the water. Contaminants are less mobile in clay soils and those with a high organic content, which will adsorb the contaminants, and they are most mobile in coarse grained sands and gravels...Other potential contaminants include, chlorinated hydrocarbons (used as degreasing solvents), heavy metals (additives in some oils and fuels) and battery acids'.

With respect to other vehicle re-fuelling operations (such as the inference of an underground tank within the police depot), the following salient comments are included within the classification of 'Transport Depots, Road Haulage, Commercial Vehicle Fuelling, Local Authority Yards and Depots' as detailed within the Syms document:

'Many sites may include fuelling and vehicle maintenance facilities...[and] historic contamination may remain on sites where these functions have been discontinued. Vehicle wash facilities are another potential source of contamination, unless waste water is disposed of via an effective petrol interceptor.

Raw materials for use in connection with vehicle operations include diesel fuel, lubricating oils, cleaning materials, brake fluids and anti-freeze. Repair and maintenance facilities will generate wastes associated with operations such as welding, soldering and respraying, which may include body filler materials (e.g. glass fibre) solvents and paints. On some older sites waste oils, which can contain heavy metals such as lead and vanadium, may have been disposed of by simply pouring them on the ground, or into underground structures...Modern disposal methods usually involve direct piping of waste oils from servicing facilities to holding tanks to await collection by specialist contractors.

Used tyres and other combustible waste may have been burned on site, leaving behind PAH contamination... Tank cleaning operations may result in ground contamination'.

The Landmark report indicates that a dry cleaners formerly operated from No. 36 Baker's Lane, which is situated in the far northern extent of the site. However, this land use is no longer operational and appears to have been replaced by RAW Menswear. The land-use of laundries and dry-cleaning is included as a specific risk category within the Syms document, although a distinction is made between the larger (potentially more contaminative) premises and those smaller operations situated on the 'High Street' (such as that formerly operating on the site). However, for general information, the following information is provided by Syms:

"...dry cleaning is a dry process of cleaning garments, which may include leathers and other 'non-textiles', through the use of organic solvents... Some sites may contain both laundry and dry-cleaning operations but today the majority of dry-cleaning operations are located in shop units in shopping areas.

The solvents in general use, for dry-cleaning, during the 20<sup>th</sup> Century have included, carbon tetrachloride (from the 1890s to the mid 20<sup>th</sup>C); trichloroethylene (from the 1920s); and, from the mid 1950s to the present day, perchloroethylene (tetrachloroethylene, tetrachloroethene). Chlorofluorocarbons (CFCs) have been used as dry-cleaning solvents (accounting for about 10% of the solvent used by the industry in 1990) but this use if being reduced in view of the effect of CFCs on atmospheric ozone depletion.

Most dry-cleaning operations are based around a cage, into which the garment are placed. The process generally comprises an initial solvent 'wash', followed by a spin to remove the solvent. The garments are then rinsed in distilled solvent, undergo a further spin and are dried in warm air... For the most part dry-cleaning machines are self-contained, fully automatic and incorporate solvent recycling... The most likely cause of contamination is the accidental spillage of solvents, although small quantities of other contaminants may accumulate in drainage systems.'

The other land-uses at the site do not specifically fall within any of the risk based classifications adopted within the Syms or CLR8 documents, although contamination may locally result due to fuel/oil spillages from vehicles utilising the bus depot, the various car parks or from any boiler houses etc. serving the various on-site premises (either currently or historically).

#### **Contamination Profile**

Based on the information obtained from the desk study and our walkover of the site, potential contamination that may be present could include:

- Metals associated with Made Ground beneath the site associated with the existing garage and former use of the site as a fuel filling station or vehicle repair/maintenance workshop (from re-spraying activities etc.).
- Polycyclic Aromatic Hydrocarbons (PAH's) derived from any ashy inclusions in the near surface soils.
- Asbestos in the ground associated with former buildings/structures.
- Oil/fuel hydrocarbons associated with vehicle servicing, storage, spillages at the former fuel filling station and leakages from the former (potentially still in-situ) USTs.
- Volatile and Semi-volatile organic compounds (VOCs/SVOCs) and solvents associated with vehicle servicing or locally in the north of the site associated with the former dry cleaning activities (considered a low risk at this stage).
- Potentially hazardous ground gases (i.e. carbon dioxide and methane) or hydrocarbon vapours associated with any significant depths of Made Ground beneath the site or from any remaining non-decommissioned USTs.
- Polychlorinated Biphenyls (PCBs) associated with the electricity substation present in the north of the site since the 1970s.

#### 3.7.2 Off Site Assessment

The historical maps have indicated a variety of possible off-site sources of contamination, including various engineering works and railway lines. However, the on-site contamination risks are primarily anticipated to represent the key risk drivers for any significant contamination present on the site.

Based on the information contained within the WSP report, a UST is present off-site within 100m of the site associated with the fire station; situated to the east of the site immediately beyond Birmingham Road. Whilst a potential point source of contamination into the underlying Principal Aquifer, given the capacity of the operator of the UST (i.e. a fire station) it would be anticipated that the feature would be well maintained and unlikely (albeit still possible) to pose a significant risk to either the underlying groundwater or nearby premises.

#### 4.0 PRELIMINARY CONCEPTUAL SITE MODEL

#### 4.1 General

The DEFRA publication 'Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance' (dated April 2012) states the following with regards to the production of a Conceptual Site Model (CSM) for a site:

'The process of risk assessment involves understanding the risks presented by land, and the associated uncertainties. In practice, this understanding is usually developed and communicated in the form of a "conceptual model". The development of a CSM is typically undertaken in an iterative process, reflecting the changes in understanding as more detailed site information becomes available.

In developing a CSM, and specifically in the context of land contamination, consideration needs to be given to three essential elements; which form the basis of any risk present. The statutory guidance sections 3.8 and 3.9 (April 2012) states the following with respect to Part 2A.

'Under Part 2A, for a relevant risk to exist there needs to be one or more contaminant-pathway-receptor [CPR] linkages — "contaminant linkage" — by which a relevant receptor might be affected by the contaminants in question. In other words, for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters. For the purposes of this guidance:

- (a) A "contaminant" is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters.
- (b) A "receptor" is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property, or controlled waters. The various types of receptors that are relevant under the Part 2A regime are explained in later sections.
- (c) A "pathway" is a route by which a receptor is or might be affected by a contaminant.

The term "contaminant linkage" means the relationship between a contaminant, a pathway and a receptor. All three elements of a contaminant linkage must exist in relation to a particular land before the land can be considered potentially to be contaminated land under Part 2A, including evidence of the actual presence of contaminants. The term "significant contaminant linkage", as used in this Guidance, means a contaminant linkage which gives rise to a level of risk sufficient to justify a piece of land being determined as contaminated land. The term "significant contaminant" means the contaminant which forms part of a significant contaminant linkage."

With respect to the presence of background levels of contaminants, section 3.21 to 3.23 states 'The Part 2A regime was introduced to help identify and deal with land which poses unacceptable levels of risk. It was not intended to apply to land with levels of contaminants in soil that are commonplace and widespread throughout England or parts of it, and for which in the very large majority of cases there is no reason to consider that there is an unacceptable risk.

Normal levels of contaminants in soil should not be considered to cause land to qualify as contaminated land, unless there is a particular reason to consider otherwise. Therefore, if it is established that land is at or close to normal levels of particular contaminants, it should usually not be considered further in relation to the Part 2A regime...

For the purpose of this Guidance, "normal" levels of contaminants in soil may result from:

- (a) The natural presence of contaminants (e.g. caused by soil formation processes and underlying geology) at levels that might reasonably be considered typical in a given area and have not been shown to pose an unacceptable risk to health or the environment.
- (b) The presence of contaminants caused by low level diffuse pollution, and common human activity other than specific industrial processes. For example, this would include diffuse pollution caused by historic use of leaded petrol and the presence of benzo(a)pyrene from vehicle exhausts, and the spreading of domestic ash in gardens at levels that might reasonably be considered typical.'

In selecting appropriate generic assessment criteria Section 3.27 of the Guidance states:

'It is common practice in contaminated land risk assessment to use "generic assessment criteria" (GACs) as screening tools in generic quantitative human health risk assessment to help assessors decide when land can be excluded from the need for further inspection and assessment, or when further work would be warranted'.

With respect to assessing contaminated land, section 4.17 of the Guidance states:

'In deciding whether or not land is contaminated land on grounds of significant possibility of significant harm to human health, the local authority should use the categorisations described in paragraphs 4.19 – 4.30 below. Categories 1 and 2 would encompass land which is capable of being determined as contaminated land on the grounds of significant possibility of harm to human health. Categories 3 and 4 would encompass land which is not capable of being determined on such grounds.'

In relation to the use of GAC values in the assessment of contaminated land, section 3.29 of the Guidance states:

'GACs relating to human health risk assessment represent cautious estimates of levels of contaminants in soil at which there is considered to be no risk to health or, at most, a minimal risk to health. With regards to such GACs:

- (a) They may be used to indicate when land is very unlikely to pose a significant possibility of significant harm to human health. This is on the basis that they are designed to estimate levels of contamination at which risks are likely to be negligible or minimal and far from posing a significant possibility of significant harm to human health.
- (b) They should not be used as direct indicators of whether a significant possibility of significant harm to human health may exist. Also, the local authority should not view the degree by which the GACs are exceeded (in itself) as being particularly relevant to this consideration, given that the degree of risk posed by land would normally depend on many factors other than simply the amount of contaminants in soil.
- (c) They should not be seen as screening levels which describe the boundary between Categories 3 and 4 in terms of Section 4 (i.e. the two Categories in which land would not be contaminated land on grounds of risk to human health). In the very large majority of cases, these SGVs/GACs describe levels of contamination from which risks should be considered to be comfortably within Category 4.
- (d) They should not be viewed as indicators of levels of contamination above which detailed risk assessment would automatically be required under Part 2A.
- (e) They should not be used as generic remediation targets under the Part 2A regime. Nor should they be used in this way under the planning system, for example in relation to ensuring that land affected by contamination does not meet the Part 2A definition of contaminated land after it has been developed.'

In undertaking a risk assessment and deriving a CSM for the purposes of the development of a site (i.e. planning and development control) reference has been made to both the Model Procedures for the Management of Land Contamination, as well as the National Planning Policy Framework (NPPF, dated March 2012). Reference has also been made to the Contaminated Land Statutory Guidance (referenced above), although this is primarily concerned with Local Government determinations of Statutory 'Contaminated Land', which is separate to planning framework requirements.

# 4.2 Contaminant [C] - Pathway [P] - Receptor [R] Considerations

The following CPR assessment has been undertaken based on the assumption that the site is to be redeveloped with a mixed end-use including new retail/commercial units, bus depot, multi-storey car park and residential dwellings. Given the variance in sensitivity between the various proposed end-users (i.e. commercial and residential) it is likely that the site will require zoning for any future chemical contamination assessment, or alternatively that the most sensitive end-use (i.e. residential with plant uptake) be adopted for initial assessment purposes.

# 4.3 Consideration of Potential Sources of Contamination [C]

Based on the findings of our works, the potential key sources of contamination at the site that would require investigation as part of any Phase II Exploratory Investigation works will include the following:

- Metals associated with Made Ground beneath the site associated with the existing garage and former use of the site as a fuel filling station or vehicle repair/maintenance workshop (from re-spraying activities etc.).
- Polycyclic Aromatic Hydrocarbons (PAH's) derived from any ashy inclusions in the near surface soils.
- Asbestos in the ground associated with former buildings/structures.
- Oil/fuel hydrocarbons associated with vehicle servicing, storage, spillages at the former fuel filling station and leakages from the former (potentially locally still insitu and operational) USTs.
- Volatile and Semi-volatile organic compounds (VOCs/SVOCs) and solvents associated with vehicle servicing or locally in the north of the site associated with the former dry cleaning activities (considered a low risk at this stage).
- Potentially hazardous ground gases (i.e. carbon dioxide and methane) or hydrocarbon vapours associated with any significant depths of Made Ground beneath the site or from any remaining non-decommissioned USTs.
- Polychlorinated Biphenyls (PCBs) associated with the electricity substation present in the north of the site since the 1970s.

The foregoing should be revisited in due course, driven by the findings of appropriate Phase II Exploratory Investigation works.

In addition, consideration has also been given to the following:

- Radon.
- Sulphate/Acid conditions (mainly for constructional reasons).

# 4.4 Consideration of Potential Pathways [P]

The potential pathways at the site are primarily:

- Direct ingestion of soil.
- Inhalation of dust and vapours.
- Direct skin contact with the ground.
- Direct contact with building materials.
- Direct ingestion of home-grown produce within proposed residential development areas.
- Vertical and lateral migration of contamination.
- Vertical and lateral migration of potentially hazardous ground gases/vapours.

# 4.5 Consideration of Potential Receptors [R]

The potential key receptors at the site are:

- The construction personnel (i.e. site workers) involved with the development of the site (typically short term (acute) exposure).
- The final end users (residents or employees typically long term (chronic) exposure and site visitors or general members of the public typically short term (acute) exposure).

- Neighbouring properties (i.e. off-site receptors).
- Controlled waters (i.e. principally underlying groundwater).
- Buildings/construction materials.

# 4.6 Summary

Our preliminary conceptual site model of possible CPR pollutant linkages, applicable to the proposed site usage and based on our current understanding, is summarised in Table 2. In providing an opinion on the possible risk attributable to the appropriate CPR linkage, we have used the following hierarchy; although it should be noted that these are preliminary and subject to confirmation by appropriate Phase II intrusive works:

Unlikely < Plausible < Likely

TABLE 2 - SUMMARY OF PRELIMINARY CPR ASSESSMENT				
Contaminant [C]	Pathway [P]	Receptor [R]	Comments	CPR Linkage Risk
Potentially contaminated soils and/or groundwater associated with the sites current and historic usage	Ingestion of soil and dermal contact Inhalation of dust and vapours	Construction Personnel	Based on the known historical and current land uses operating from the site, the risk of near surface soil contamination is considered plausible, such that nominal remedial precautions may be required for the protection of human health during the development of the site.	Likely
			The risk of significant widespread underlying soil contamination is considered to be low, at this stage. However, where fuel storage facilities are/have been locally present, the risk categorisation should be considered to be medium (for example within the garage area in the sites southwest and the police depot in the sites north). More robust remedial measures (such as tank removal works, bioremediation etc.) may therefore locally be required, dependent upon the outcome of detailed intrusive investigation works.	Plausible
			Appropriate soil testing is recommended during any Phase II intrusive works to inform the PPE requirements of construction personnel.	
	Ingestion of soil and dermal contact	End Users  (including residents, employees, visitors and general members of the public)	Based on the known historical and current land uses operating from the site, the risk of near surface soil contamination is considered plausible, such that nominal remedial precautions may be required for the protection of human health as part of the development (inclusion of remedial capping in soft landscaping/garden areas for example).	Likely

TAI	TABLE 2 - SUMMARY OF PRELIMINARY CPR ASSESSMENT				
Contaminant [C]	Pathway [P]	Receptor [R]	Comments	CPR Linkage Risk	
			The risk of significant widespread underlying soil contamination is considered to be low, at this stage. However, where fuel storage facilities are/have been locally present, the risk categorisation should be considered to be medium (for example within the garage area in the sites southwest and the police depot in the sites north). More robust remedial measures (such as tank removal works, bioremediation etc.) may therefore locally be required, dependent upon the outcome of detailed intrusive investigation works.	Plausible	
	Inhalation of dust and vapours	End Users  (including residents, employees, visitors and general members of the public)	Based on the known historical and current land uses operating from the site, the risk of near surface soil contamination is considered plausible, such that nominal remedial precautions may be required for the protection of human health as part of the development (inclusion of remedial capping in soft landscaping/garden areas for example).	Likely	
			The risk of significant widespread underlying soil contamination is considered to be low, at this stage. However, where fuel storage facilities are/have been locally present, the risk categorisation should be considered to be medium (for example within the garage area in the southwest and the police depot in the north). More robust remedial measures (such as tank removal works, bioremediation etc.) may therefore locally be required, dependent upon the outcome of detailed investigation works.	Plausible	
			The overall risk of vapour intrusion into the proposed buildings is currently considered to be low to (locally) medium. This should be assessed further by appropriate Phase II works.	Unlikely / Plausible	
			Following completion of development (as currently proposed) the generation of significant quantities of dust is considered to be low.	Unlikely	
	Vertical and lateral migration/ leaching of contamination	Neighbouring properties (off site receptors)	On-site sources of potentially mobile contamination have been identified by the Desk Study works that may impact off-site receptors (i.e. the potential localised presence of hydrocarbon impacted soils associated with the former/existing ASTs and USTs).		
			Given the permeable nature of the indicated underlying natural soils (i.e. Sandstone) the possibility of any significant hydrocarbon contamination (i.e. created through a single large		

TABLE 2 - SUMMARY OF PRELIMINARY CPR ASSESSMENT				
Contaminant [C]	Pathway [P]	Receptor [R]	Comments	CPR Linkage Risk
			volume spill/leak or by repeated smaller spills/leaks) becoming mobile is considered to be high. Given that the fuel storage features are located towards the periphery of the site, an off-site migration risk is therefore possible (albeit this will largely be dependent on the depth to, and flow direction of, the underlying groundwater - as the primary pathway for contaminant migration).	Unlikely/ Plausible
	Vertical and lateral migration/ leaching of contamination	Underlying Groundwater	The site is underlain by a Principal Aquifer, associated with the underlying Sandstone, and lies within a Zone III SPZ. The site is therefore situated within a highly sensitive locale for risks to groundwater from contamination. Previous intrusive works indicate that groundwater may be present at depths of around 5m to 10m below ground level, with an inferred flow direction towards the northeast – this should be confirmed during detailed Phase II works.  The risk of significant widespread underlying soil contamination is considered to be low, at this stage. However, where fuel storage facilities are/have been locally present, the risk categorisation should be considered to be medium (for example within the garage area in the sites southwest and the police depot in the sites north). However, it is understood that a majority of the USTs have been decommissioned by the infilling of concrete. The risk of ongoing pollution from these sources is therefore considered to be low, with any historical contamination likely to have already migrated (potentially with natural attenuation) away from the point source feature(s).  However, remedial measures may be required to demonstrate a betterment of the site condition in due course (potentially including tank or source removal works of any grossly impacted soils etc.).	Unlikely / Plausible
	Vertical and lateral migration/ leaching of contamination resulting in direct contact	Buildings and construction materials (including potable water supply pines/other	Sources of potentially mobile contamination have been locally identified by the Desk Study works (i.e. the presence of ASTs and USTs) within the site.	Plausible
	Permeation of hydrocarbons through plastic pipes	pipes/other utilities)	Phase II works should be designed to assess the risks posed by any contamination associated with these features, together with a broader assessment of the wider ground conditions beneath the site.	

TABLE 2 - SUMMARY OF PRELIMINARY CPR ASSESSMENT				
Contaminant [C]	Pathway [P]	Receptor [R]	Comments	CPR Linkage Risk
Radon (naturally occurring gas from bedrock materials)	Vertical and lateral migration	Buildings, Construction Personnel and End Users	No radon protective measures are required at the site.	Unlikely
Ground gases	Vertical and lateral migration	Buildings, Construction Personnel and End Users	The potential presence of deep Made Ground at the site may represent a source of potentially hazardous ground gases (i.e. methane and carbon dioxide). It is recommended that the risks posed by ground gases are assessed in more detail during the course of intrusive investigation works through the installation and subsequent monitoring of ground gas monitoring wells.  However, it should be noted that the	Plausible
			redevelopment proposals locally include undercroft parking. The design of these features should include suitable ventilation for exhaust fumes etc., which will equally serve to disperse any ground gases generated at the site. It is noted that BS8485 provides a point score system of 4 for the provision of basement car parking, where the design of the structure is in accordance with Building Regulations 2000 Approved Document F.	Unlikely

# **KEY**

Where text is in *Bold Italic* item is potentially present. Where normal text is used item is not present/plausible. CPR Linkage Risk Definitions:

Unlikely – A significant pollutant linkage/risk has not been identified.

**Plausible** – A significant pollutant linkage/risk has been identified that may be present at the site. Mitigation measures may be required.

**Likely** – A significant pollutant linkage should be anticipated based on our findings to date. Mitigation measures are likely to be required.

The foregoing preliminary conceptual model highlights the potential plausible pollutant linkages that may relate to the site and would therefore require addressing by appropriate Phase II Exploratory Works. The information contained within the conceptual model should be confirmed and revised upon completion of an appropriate intrusive investigation, where appropriate.

#### 5.0 CONCLUSIONS

# The following conclusions and recommendations are preliminary and subject to confirmation by an appropriate site-specific Phase II Exploratory Investigation.

# 5.1 Site Summary

- The site is situated in the centre of Lichfield and currently comprises a mixture of
  commercial activities; including a bus depot, car parking and a separate multistorey car park, retail units, an existing car dealership and vehicle maintenance
  workshops, as well as including residential dwellings, public toilets, an electricity
  substation and localised areas of soft landscaping.
- Historically the site has contained a petrol filling station and garage in the south, a
  school in the west and former residential dwellings in the north, all of which were
  either demolished or replaced to provide the existing premises operating from site.
- Various USTs (the majority seemingly decommissioned) and ASTs are/were present within the site, primarily within the former petrol filling station and garage (now occupied by Tempest Ford). A further unconfirmed UST is inferred to be present within the external yard area to the police station in the sites north.
- The site is indicated to be underlain by the Bromsgrove Sandstone Formation (typically weathering to Sand near surface), although Made Ground may be anticipated immediately below existing ground level associated with the former and existing land uses. The underlying natural soil is classified as a Principal Aquifer by the Environment Agency, and the site lies within a Zone III SPZ. The site is therefore situated within an area of relatively high sensitivity with respect to Controlled Waters (in accordance with the Environment Agency publication Groundwater protection: Principles and practice (GP3)).

# 5.2 Geotechnical Assessment

We understand that the site is to be redeveloped with a mixed end-use, incorporating retail units (including both multi-storey and low-rise units), a new car park (including undercroft parking), new residential dwellings and a new bus depot. The loading characteristics for the development are therefore likely to be highly variable and may include the requirement for significant earthworks or changes in site levels.

The site is anticipated to be underlain by a layer of Made Ground (anticipated to be generally relatively shallow but potentially deep in places), beneath which solid geology of the Bromsgrove Sandstone Formation is indicated. This typically weathers to Sand near surface, and grades into competent bedrock with depth, and is considered a suitable bearing stratum for the purposes of the proposed development.

Foundations for the development are likely to comprise a mixture of traditional strip, trench fill or pad foundations, or a piled foundation solution for more heavily loaded buildings/structures.

Lichfield City Centre, Lichfield

Prior to the design of any foundations it will be necessary to undertake a detailed scope of intrusive investigation works, in order to obtain the necessary geotechnical information on which designs can be based. Such works should include ascertaining the presence, thickness and nature of any man-made deposits (i.e. Made Ground, presence of tanks, presence of former basements etc.), together with the depth to, and strength of, the Natural Strata.

The inclusion of a series of rotary cored boreholes within the scope of works is considered to be necessary, in order to assess the strength and competency of the bedrock beneath the site (likely to be required to assist in detailed piled foundation design and to inform the design of the floor slab for the undercroft parking).

It should also be noted that a series of possible wells were historically indicated in the west of the site on the historical map publications (see Section 2.2). A watching brief should be maintained by the Contractor during any earthworks in this area, and any such features uncovered surveyed in and infilled in an appropriate manner (for example with lean-mix concrete). Foundation designs in these areas may therefore need to be revised where such features are encountered.

#### 5.3 Ground Gas Precautions

It is recommended that a programme of ground gas monitoring is undertaken at the site to assist in establishing the ground gas regime and the necessity for any specific ground gas precautions within the proposed buildings/structures.

#### 5.4 Radon

Based on the Landmark report, no radon associated precautions are required at the site.

# 5.5 Coal Mining

No coal mining precautions or associated investigation works are required at the site.

### 5.6 Water

The results of the intrusive investigation will establish the groundwater depths beneath the site, where present at shallow depths.

Previous works (by others) suggest groundwater may be present at depths of around 5m to 10m below ground levels within the site, and further localised perched water may be anticipated locally within any Made Ground soils.

# 5.7 Surface Water Drainage

Due to the indicated relatively permeable nature of the underlying natural soils (i.e. anticipated to be Sand or Sandstone) the use of soakaways may locally be feasible, subject to the findings of the intrusive investigation works and subsequent testing in general accordance with BRE 365.

Lichfield City Centre, Lichfield

However, due to the density of the proposed structures, together with the necessity for a reduced level dig to accommodate undercroft car parking areas, the applicability of soakaways may be spatially limited.

The use of soakaways may also be dependent on the presence of any significant thicknesses of Made Ground beneath the site.

Further consideration of the use of soakaways may be provided during the course of intrusive investigation works at the site, subject to the requirements of the Client.

#### 5.8 Soil Contamination Profile

The Phase I Desk Study has identified the following key contaminants that may potentially be present within the underlying soils at the site, associated with a variety of potential sources as detailed herein:

- Metals.
- Polycyclic Aromatic Hydrocarbons (PAH's).
- Asbestos.
- Oil/fuel hydrocarbons.
- Volatile and Semi-volatile organic compounds (VOCs/SVOCs) and solvents.
- Potentially hazardous ground gases (i.e. carbon dioxide and methane) or hydrocarbon vapours.
- Polychlorinated Biphenyls (PCBs).

The contaminants listed above should be included within the scope of any chemical analysis undertaken as part of a programme of exploratory investigation works at the site. Given the sensitivity of the site in relation to risks posed to underlying groundwater, the inclusion of water sampling and laboratory analysis (for the key mobile contaminants as listed above) is recommended during the course of future exploratory investigation works.

# 5.9 Asbestos Survey & Removal

We would recommend that a suitable asbestos survey is undertaken prior to demolition of the existing buildings/structures, with any encountered/identified asbestos removed off-site by suitably qualified specialists.

#### 5.10 Environmental Risk Assessment

As part of the Phase I Desk Study a qualitative assessment of potential environmental risk/development constraints has been undertaken with due consideration given to guidance issued by the Environment Agency, Department of the Environment, Food and Rural Affairs and other appropriate bodies.

The potential environmental risk has been assessed qualitatively using the source-pathway-receptor plausible pollutant linkage model introduced in the Environmental Protection Act 1990, and discussed in more detail in Section 4.

The following in-house qualitative assessment of risk has been undertaken based around the following definitions:

**Low Risk** – it is unlikely that an issue will arise at the site as a significant cost or liability for the owner or tenant of the site. Basic intrusive investigation works should be undertaken.

**Medium Risk** – it is possible that an issue will arise at the site as a significant cost or liability for the owner or tenant of the site. Appropriate intrusive investigation works should be undertaken.

**High Risk** – it is likely that an issue will arise at the site as a significant cost or liability for the owner or tenant of the site. Detailed intrusive investigation works should be undertaken.

On the basis of the Phase I Desk Study information, it is considered that the site on the whole represents a potential **Medium Risk** of significant cost or liability to the owner of the site. However, some areas of the site may be considered as Low Risk, and some (i.e. around the garage and in the locations of current/former fuel storage tanks) may be regarded as High Risk.

The majority of the recent and current site activities are considered to represent a generally low risk of ongoing contamination. Whilst contamination of the near surface soils may locally be anticipated as a result of past land-uses and operations on the site, with the contaminants detailed in Section 5.8 potentially present, any minor elevated concentrations should be able to be adequately addressed through the provision of nominal remedial precautions (i.e. remedial capping to garden areas or areas of public open space etc.).

The presence of any significant gross contamination, at concentrations requiring specific remedial treatment (i.e. in-situ or ex-situ techniques or source removal works), are currently anticipated to be localised to areas where former USTs or ASTs are/were situated.

In consideration of the USTs, we have been informed from the existing site tenants (Tempest Ford) that those known to be present within the former petrol filling station have been historically decommissioned and subsequently infilled with concrete. Any contamination around these features is therefore likely to be a legacy of historical releases rather than an ongoing point source of contamination. However, ASTs remain present on site (albeit these appear to be bunded) and the presence of an unconfirmed UST has been highlighted within the external yard area of the police station (by the Petroleum Licensing Officer during the course of previous works completed by WSP).

# 5.11 Statutory Consultation

We would recommend that a copy of this Phase I Desk Study report is issued to the Local Planning Authority for review and comment as part of the planning application process. Any comments made by the Local Authority, or their appointed consultees, should be incorporated into the Phase II Exploratory Investigation to ensure that the intrusive investigation is acceptable to all parties.

# 5.12 Phase II Exploratory Investigation Works

Phase II Exploratory Works should be sufficient to investigate the possible issues raised in the Phase I Desk Study and should be undertaken in general accordance with current industry good practice. Given the operational nature of the site and the anticipated requirement for a phased approach to the development, exploratory investigation works are likely to be undertaken in a phased manner, to include both pre- and post-demolition works, and potentially on a parcel-specific basis for each element of the development.

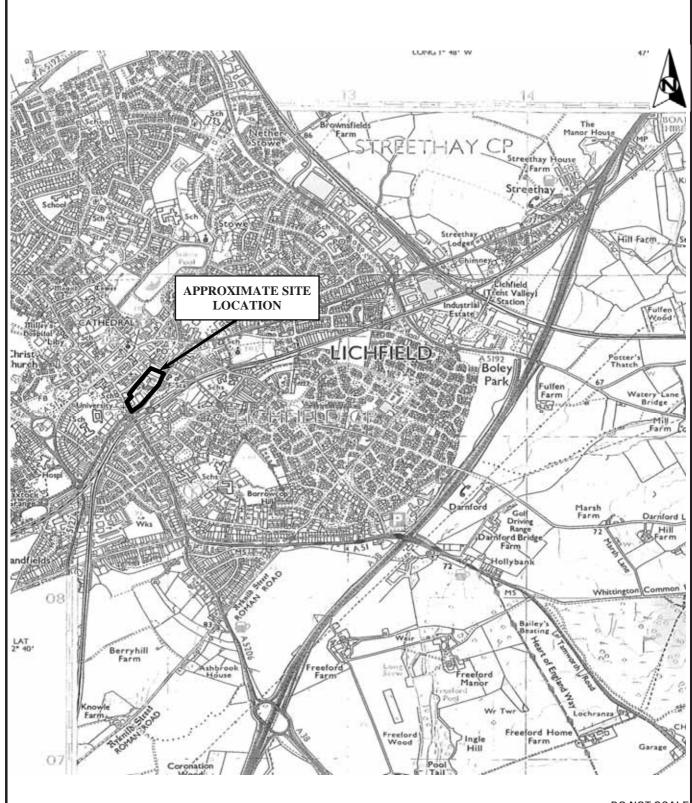
# 5.13 Closing Comment

Based on the evidence of the findings of the Phase I desk study enquiries and following the implementation of any necessary remedial measures, the site is considered likely to be suitable for the proposed mixed end-use from a geotechnical and environmental perspective.



# APPENDIX A

Site Location Plan (Figure No. 15052/01)



DO NOT SCALE

REPRODUCED FROM THE ORDNANCE SURVEY MAP WITH THE PERMISSION OF THE CONTROLLER OF HER MAJESTY'S STATIONERY OFFICE. CROWN COPYRIGHT RESERVED. LICENCE NO. AL 100041272

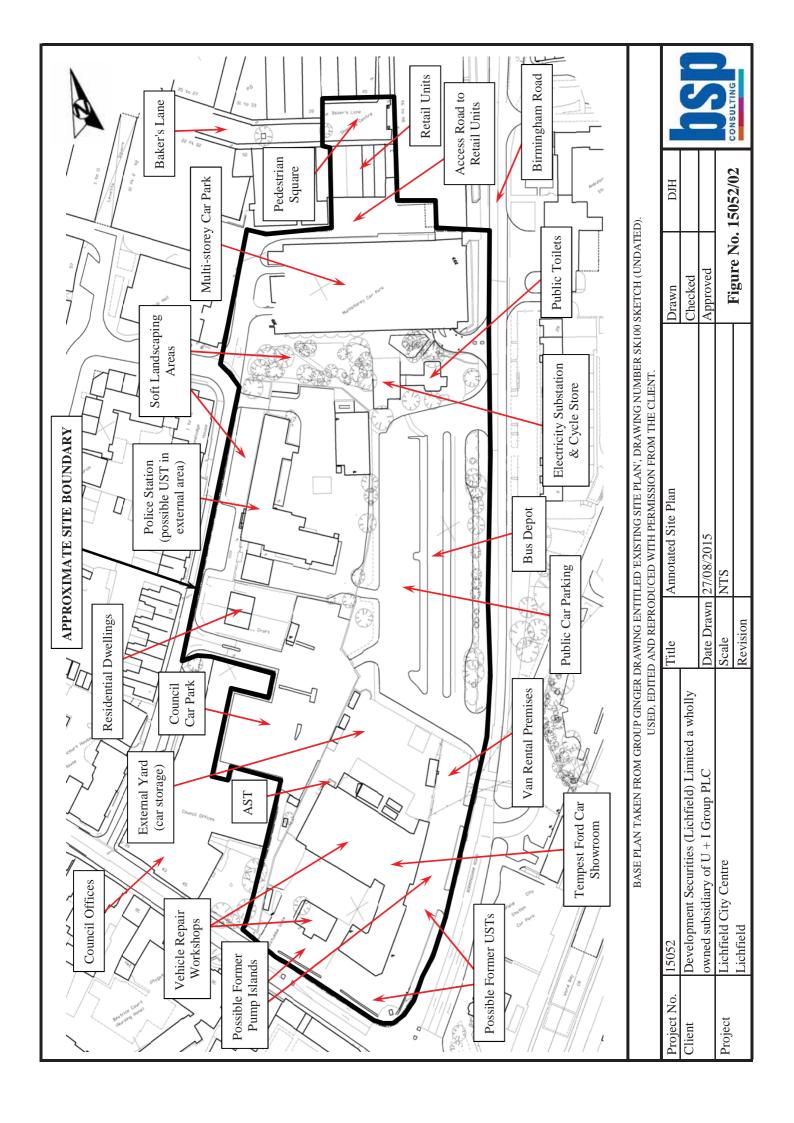
		Figure No.	15052/01
Title	Site Location Plan	Rev.	
	Lichfield	Date Drawn	27/08/2015
Project	Lichfield City Centre	Scale	NTS
Client	Development Securities (Lichfield) Limited a wholly owned subsidiary of U + I Group PLC	Checked Approved	
Project No.	15052	Drawn	DJH
Danis of Ma	15052	D	DIII





### APPENDIX B

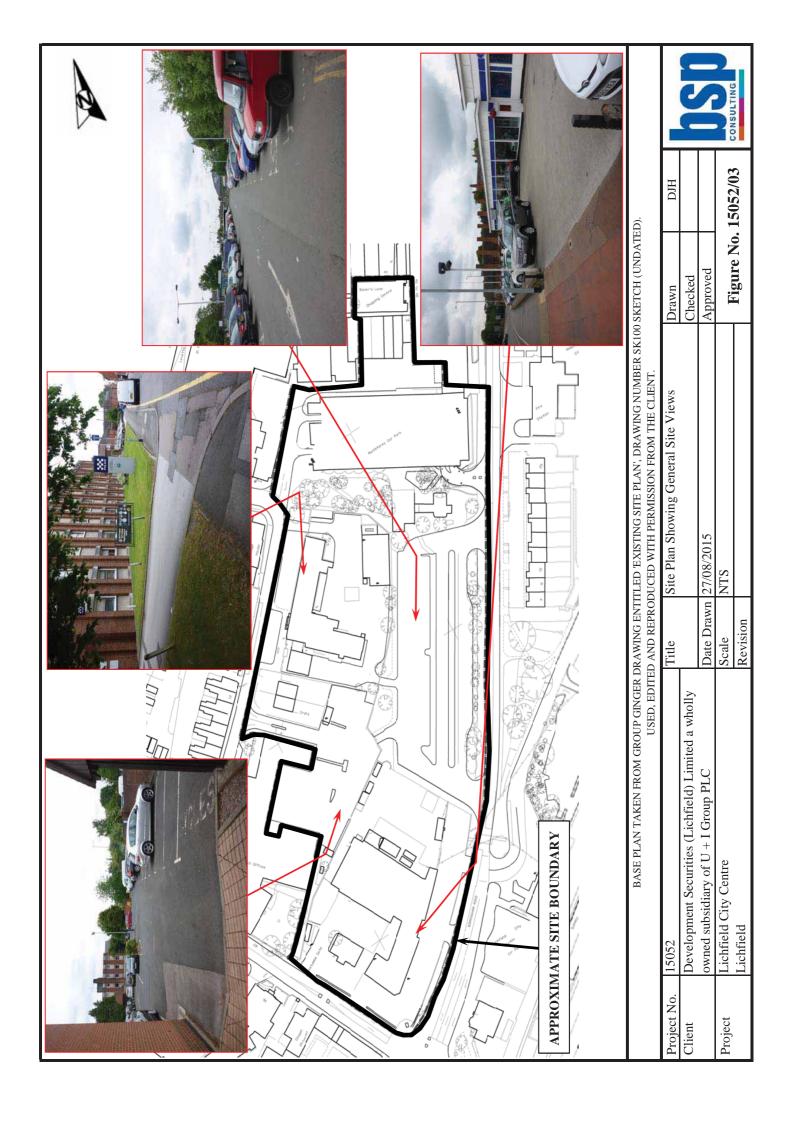
Annotated Site Plan (Figure No. 15052/02)

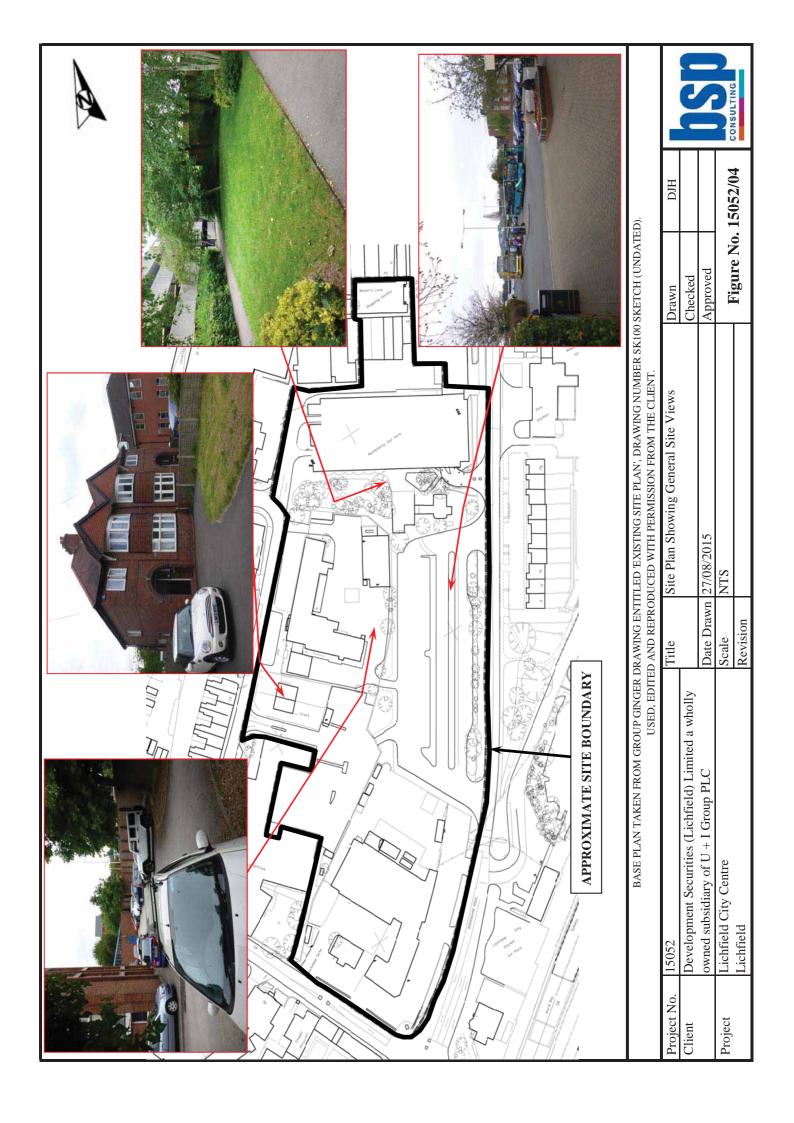


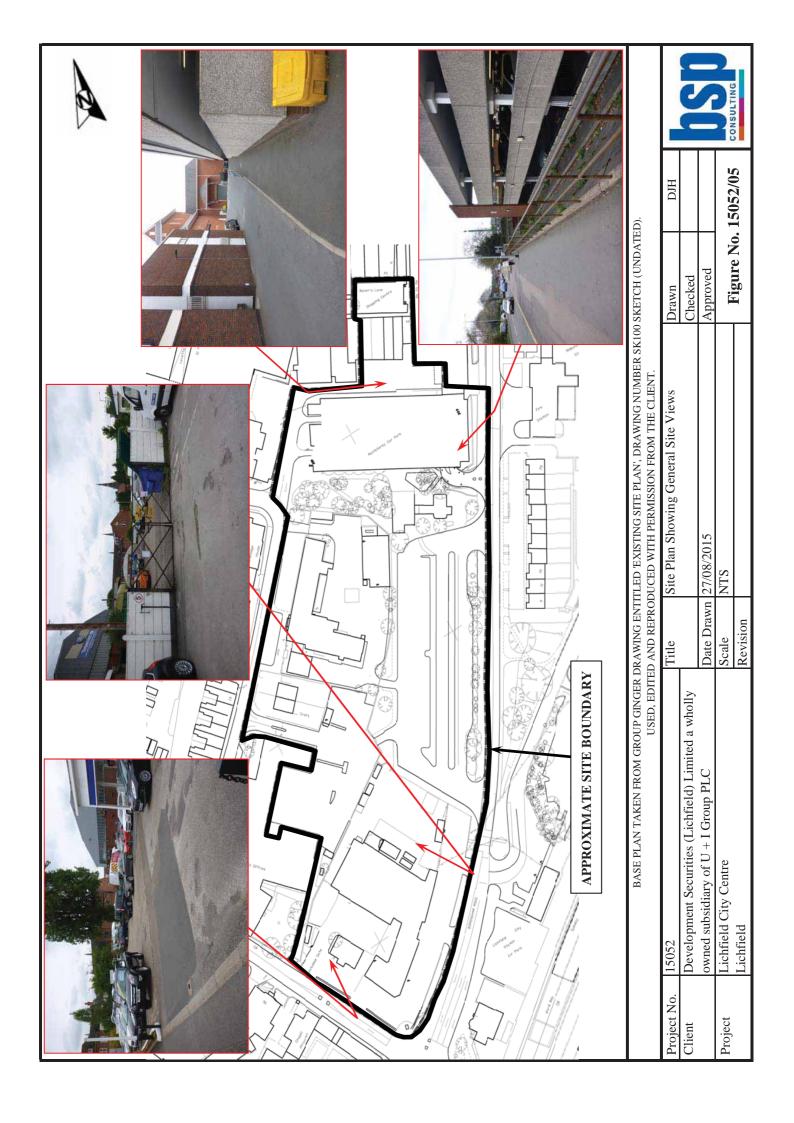


### APPENDIX C

Site Plans Showing General Site Views (Figure Nos. 15052/03 to 15052/05)







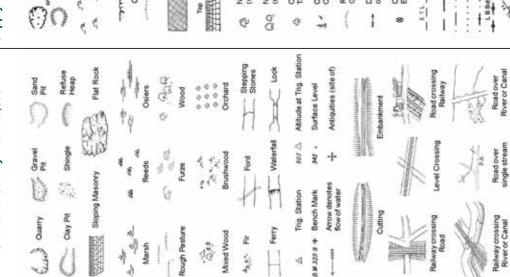


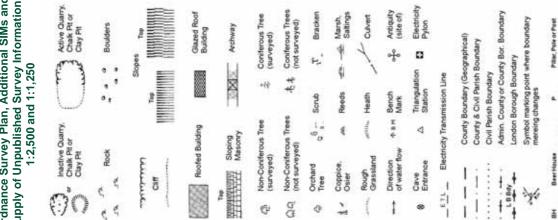
### APPENDIX D

**Historical Plans** 

# **Historical Mapping Legends**

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





Ordnance Survey Plan, Additional SIMs and Large-Scale National Grid Data 1:2,500 and Supply of Unpublished Survey Information

Historical Mapping & Photography included:

GeoDyne

1:2,500 1902 1:2,500 1923 1:2,500 1965 - 1966

1:2,500 1975 - 1977

1:2,500

Ordnance Survey Plan Ordnance Survey Plan

Additional SIMs Staffordshire Staffordshire

Mapping Type Staffordshire

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

Large-Scale National Grid Data Large-Scale National Grid Data

Additional SIMs

1990 - 1992

1:1,250 1994 1:1,250 1995 1:1,250 1995 1:1,250

Large-Scale National Grid Data Large-Scale National Grid Data Large-Scale National Grid Data Large-Scale National Grid Data

Slopes Tap		Rock (scattered)	Boulders (scattered)	Scree	Conferous Tree (surveyed)	Conferous Trees (not surveyed)	T Bracken	Satings	Culver	Antiquity (site of)	Electricity Pylon	Buildings with Building Seed	Glazed Roof Building	oundary				Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)	Pillar, Pole or Post
	8	¢	Δ	4	+10	**	Sorub	Reeds	Heath	Triangulation Station	sion Line			Civil parish/community boundary	ndary	ndary	ost/stone	nereing symb ear in oppose	a. S
				3 Boulder	Non-Coniferous Tree (surveyed)	Non-Coniferous Trees (not surveyed)	ф <sub>О</sub>	4	1	₫	Electricity Transmission Line	Bench Mark	Roofed Building	Civil parish	District boundary	County boundary	Boundary post/stone	Boundary n always app of three)	
letitodu	Citt	Rock	Boulders	Positioned Boulder	Non-Conife (surveyed)	Non-Coniferou (not surveyed)	Orchard Tree	Coppice, Osier	Rough Grassland	Direction of water flow	Electric	BH 23858m	- P	:	1	1	į		Barracka
E. C.	1	E,	1	₫	(Gi	Ġ.	0	»ii	ĺ	1	Ę	÷			1	1		2.50.	# i

N.	Avio	-A15-	A10-	ŀ
754	Α		A9	-
Ş		(5)	A8	
-S		W A	-	
SZ.	Atte	18	- 40	

Order Details	
Order Number:	68506292_1_1
Customer Ref:	35021
National Grid Reference: 411860, 309310	411860, 309310
Slice:	A
Site Area (Ha):	2.78
Search Buffer (m):	100

Public Convenience

Cemeter

Post Office

Pumping Stadon Place of Worship

Ppg Sta

309310

Site Details

Sewage Ppg Sta Sewage Pumping Station

Electricity Generating Station

Dismtd Rly El Gen Sta

hubble Convente Public House

Post Office

Boundary Post or Stone

10.00 5

Administrative County & Civil Parish Boundary

....

County Boundary (Geographical) County & Civil Parish Boundary

single stream

County Borough Boundary (England) County Burgh Boundary (Scotland)

Electricity Pole, Pillar

EIP

Signal Box or Bridge

Electricity Pillar or Post

å 18

Fire Alarm Pillar

oot Bridge Aulde Post

Police Call Box

3.P. B.S. Boundary Post or Stone

Co. Burgh Bdy Co. Bore, Bdy.

Bridle Road Foot Bridge

Electricity Pylon

Signal Post

Shiles

**Drinking Fourtain** Capstan, Crans

Signal Post or Light

Signal Box or Bridge Signal Post or Light

Tarrix or Track Wind Pump

Fountain / Orinking Ftn. Electricity Sub Station

Filter Bed

El Sub Sta Falben Gas Gov

Gas Valve Compound Gas Governer Guide Post

Syc.

Water Point, Water Tap

WIPE WIT

Variose Mie Post or Mooring Post

Telephone Call Box

Mooring Peat or Ring

M.P.M.R.

Guide Post or Board

Mile Storie Normal Tidal Limit

Hydrant or Hydraulic Level Crossing

Dough

Telephone Call Box Telephone Call Post

Tank or Track

Trough

WdPp

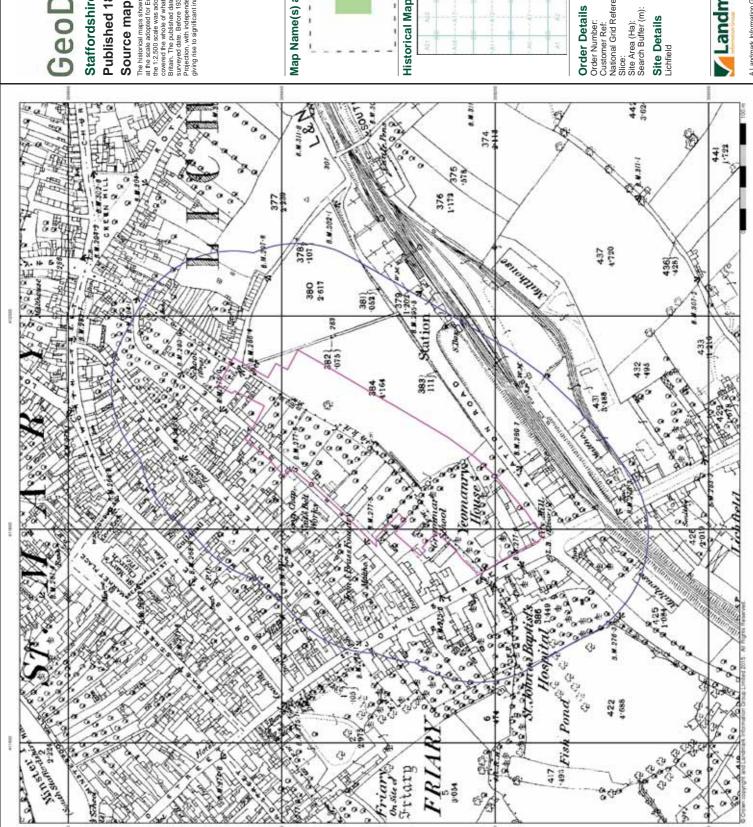


Works (building orares) Wr.Pt. Wr.T. Water Point, Water Tap.

Mile Post or Mile Storie

Tel: Fax: Web:

A Landmark Information Group Service v47.0 10-Jun-2015 Page 1 of 16

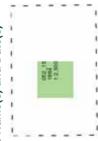


### Staffordshire

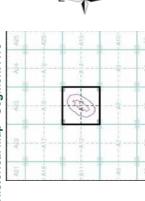
### Source map scale - 1:2,500 Published 1884

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Sobland, in the 1844 in 12,500 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 clint some years alter than the

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

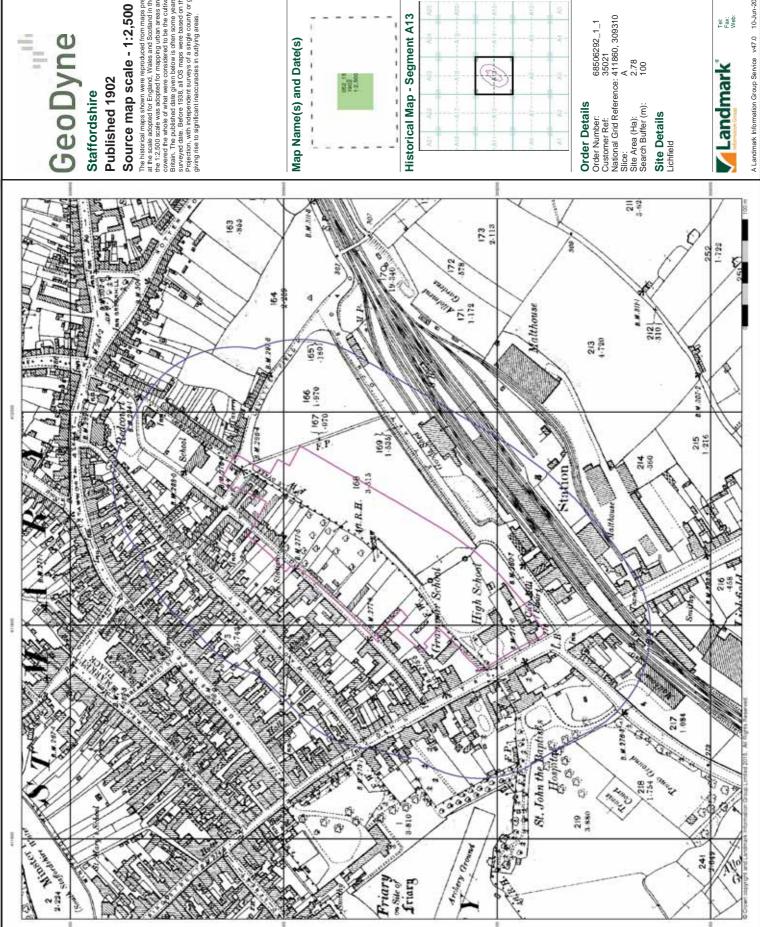


## Historical Map - Segment A13



Order Details
Order Number: 68506292\_1\_1
Customer Ref: 35021
National Grid Reference: 411860, 309310





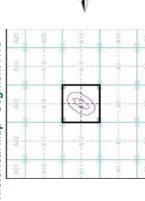
### Published 1902

The historical maps shown were reproduced from maps predominantly held the first scale adopted for England, Wales and Scotland in the 140f. S. In 1854, the 12.500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultimate 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 polycidor, with independent surveyer of as alloge county or group of counties, giving itse to significant inaccuraces in outlying areas.

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

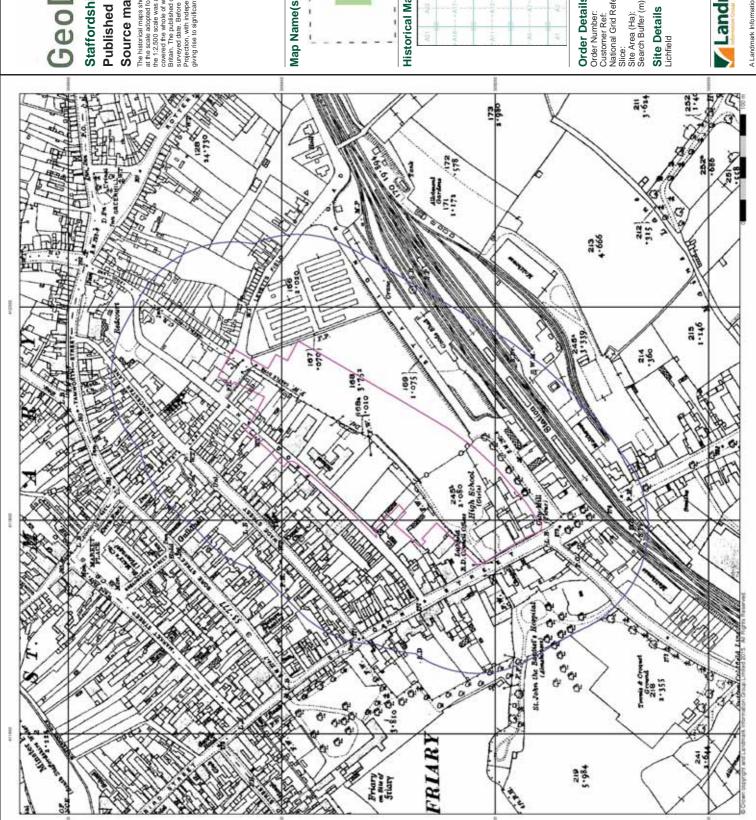


## Historical Map - Segment A13





Page 3 of 16



### Staffordshire

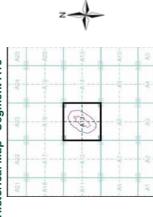
### Source map scale - 1:2,500 Published 1923

The historical maps shown were reproduced from maps predominantly held the first scale adopted for England, Wales and Scotland in the 140f. S. In 1854, the 12.500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultimate 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 polycidor, with independent surveyer of as alloge county or group of counties, giving itse to significant inaccuraces in outlying areas.

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



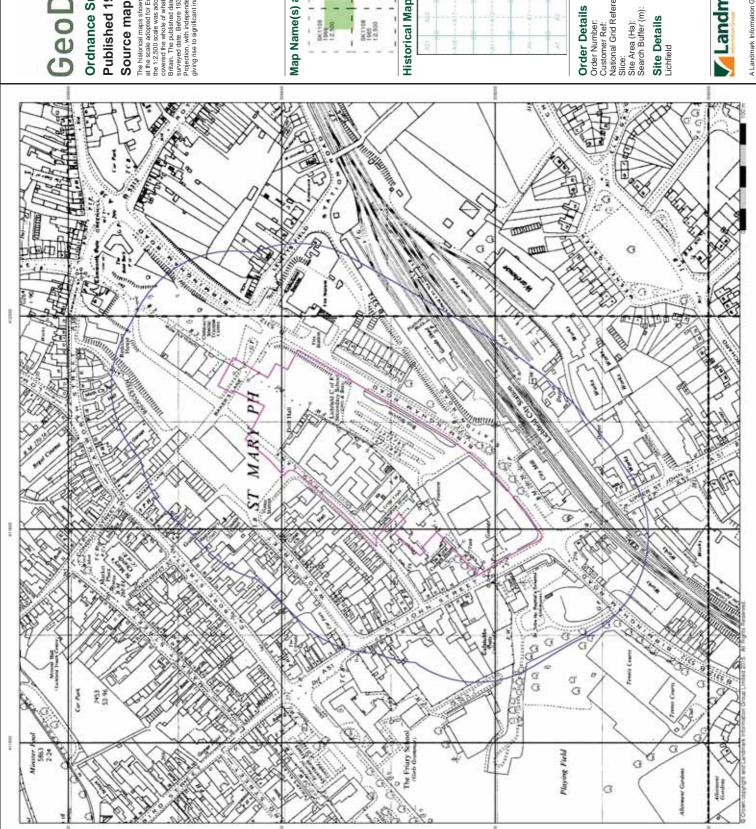
## Historical Map - Segment A13



Order Details
Order Number: 68506292\_1\_1
Customer Ref: 35021
National Grid Reference: 411860, 309310 Slice: Site Area (Ha): Search Buffer (m):



A Landmark Information Group Service v47.0 10-Jun-2015 Page 4 of 16

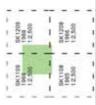


### Ordnance Survey Plan Published 1965 - 1966

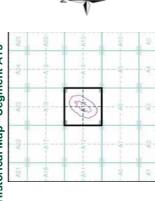
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held the free scale adopted for England, Vales and Scotland in the 1840's. In 1854, the 12,500 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 admirin. The published date prom below is client some years alter than the surveyed date. Before 1939, all OS maps were based on the Cassini.

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

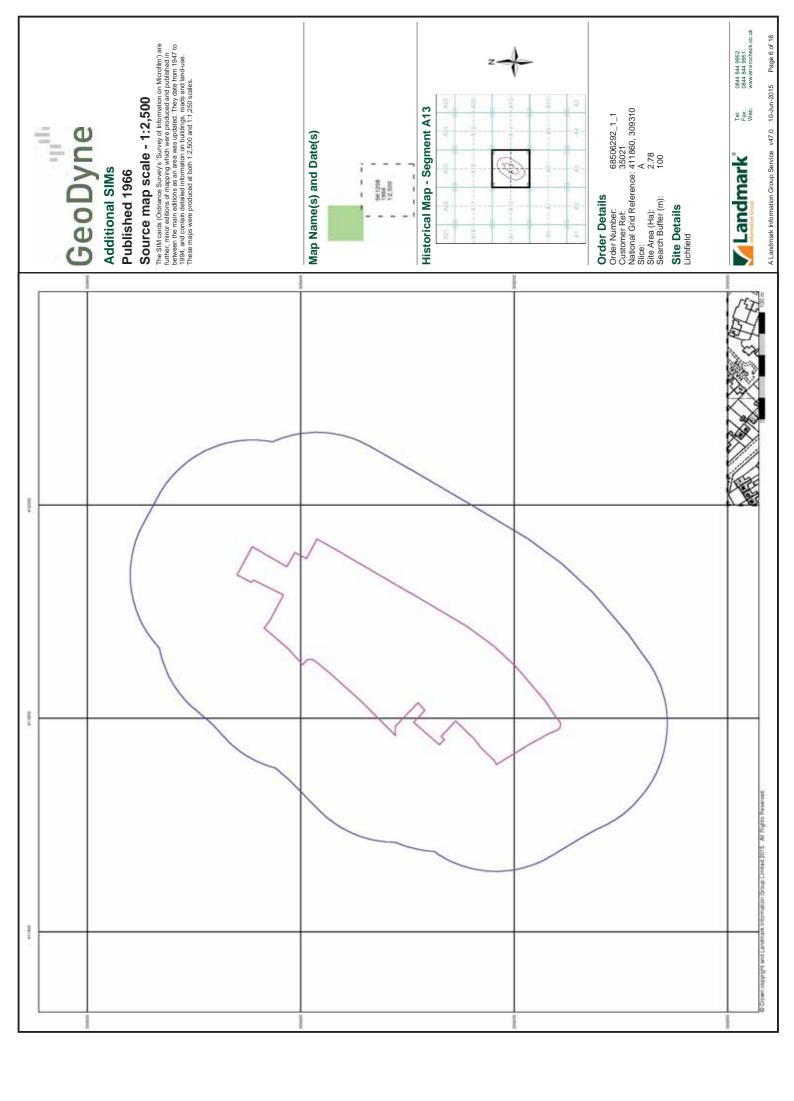


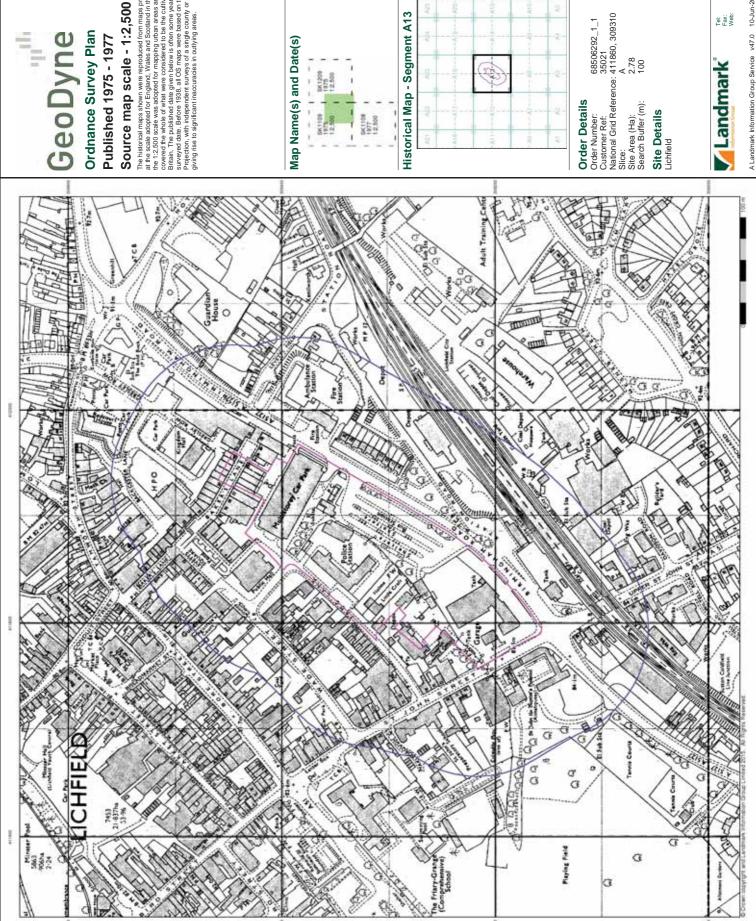
## Historical Map - Segment A13



Order Details
Order Number: 68506292\_1\_1
Customer Ref: 35021
National Grid Reference: 411860, 309310

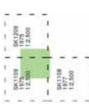




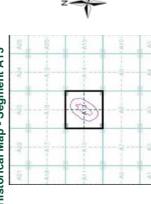


**Ordnance Survey Plan** Published 1975 - 1977 The historical maps shown were reproduced from maps predominantly held the first scale adopted for England, Wales and Scotland in the 140f. S. In 1854, the 12.500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultimate 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 polycidor, with independent surveyer of as alloge county or group of counties, giving itse to significant inaccuraces in outlying areas.

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



## Historical Map - Segment A13

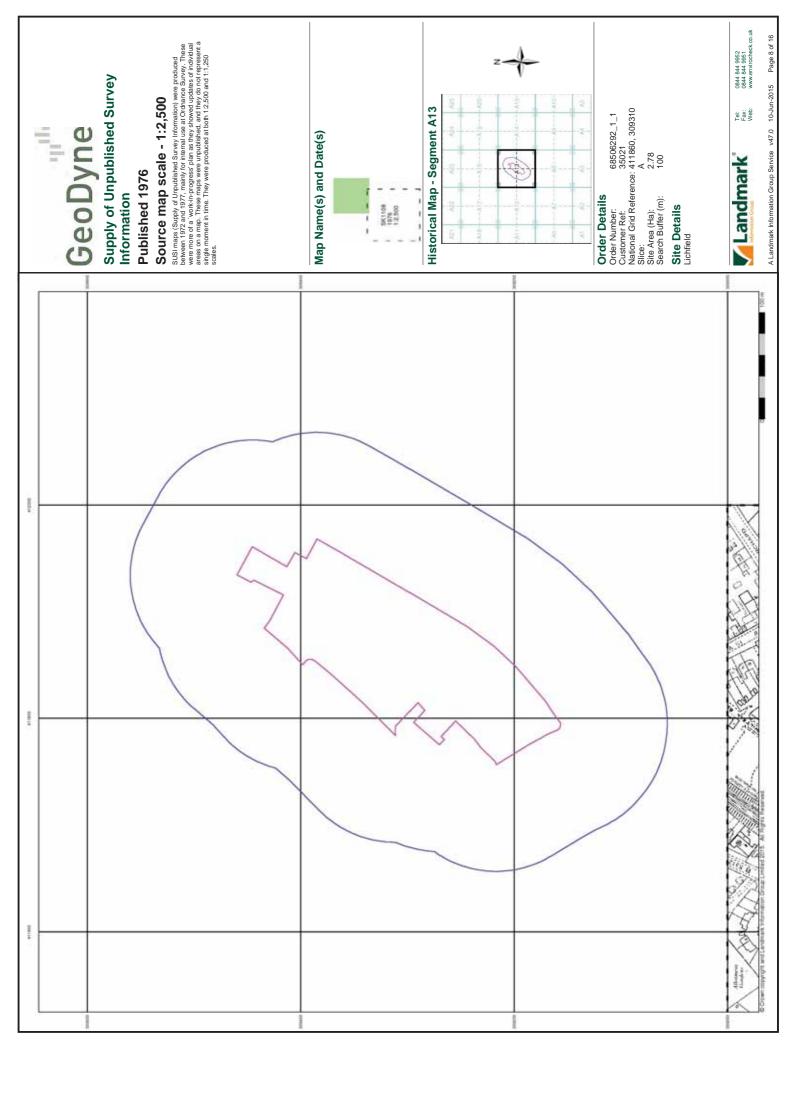


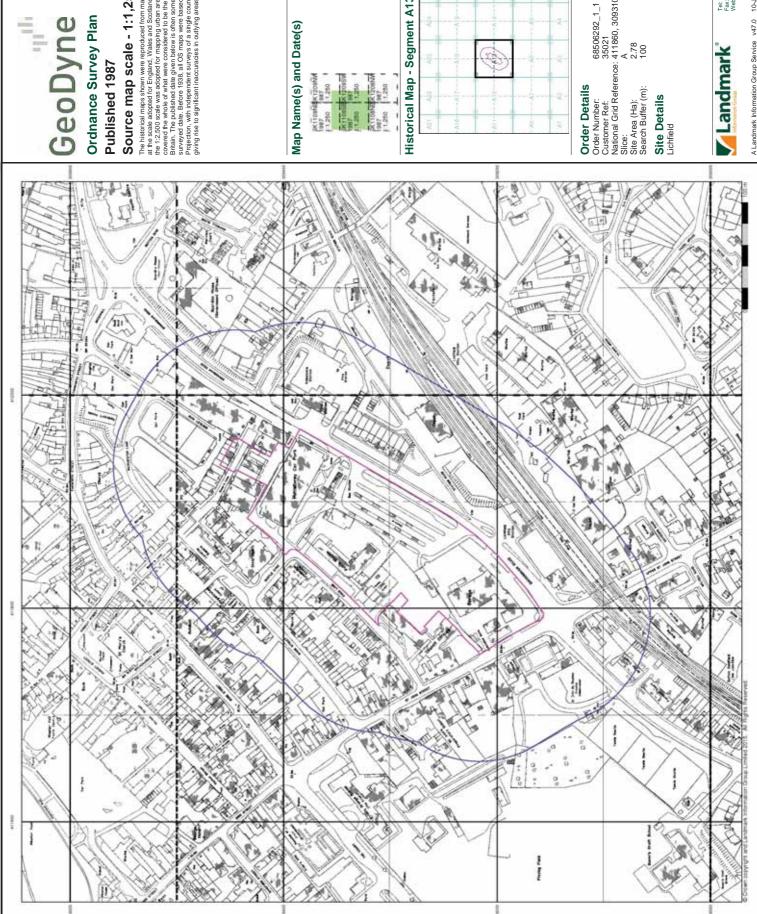
Order Details
Order Number: 68506292\_1\_1
Customer Ref: 35021
National Grid Reference: 411860, 309310 Slice: Site Area (Ha): Search Buffer (m):





Page 7 of 16





Ordnance Survey Plan Published 1987

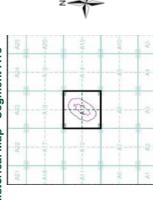
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held the first scale adopted for England, Wales and Scotland in the 140f. S. In 1854, the 12.500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultimate 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 polycidor, with independent surveyer of as alloge county or group of counties, giving itse to significant inaccuraces in outlying areas.

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



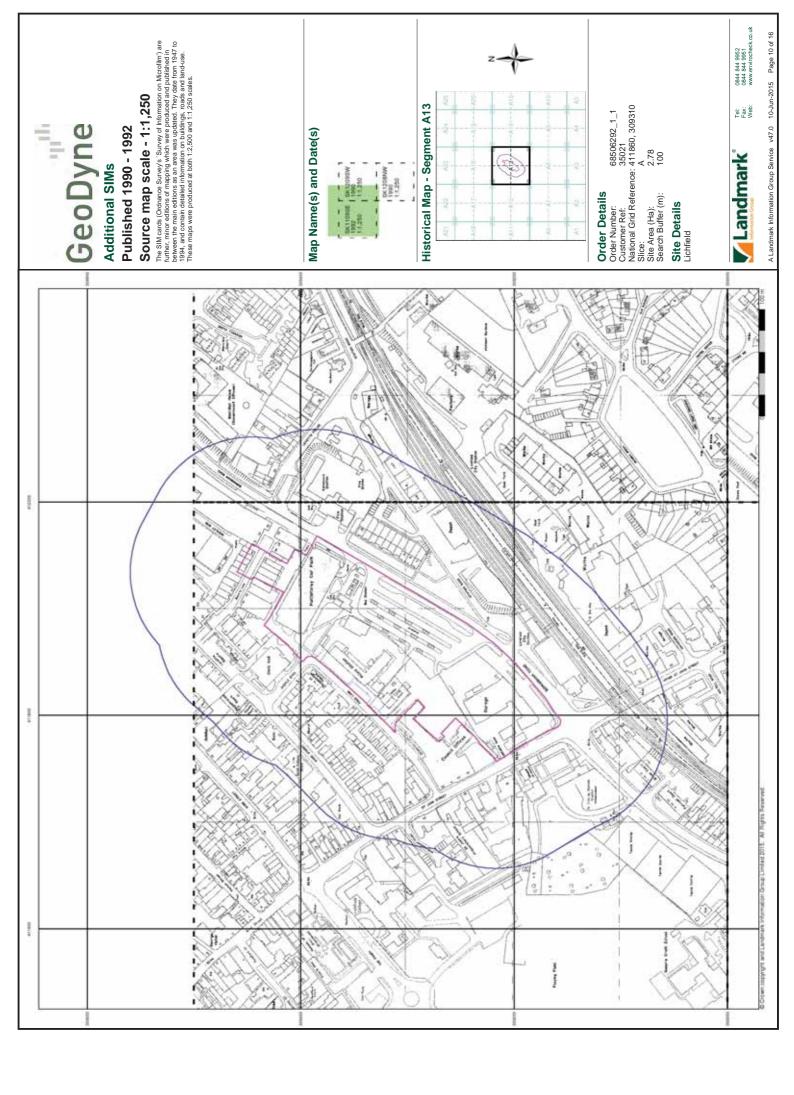
## Historical Map - Segment A13

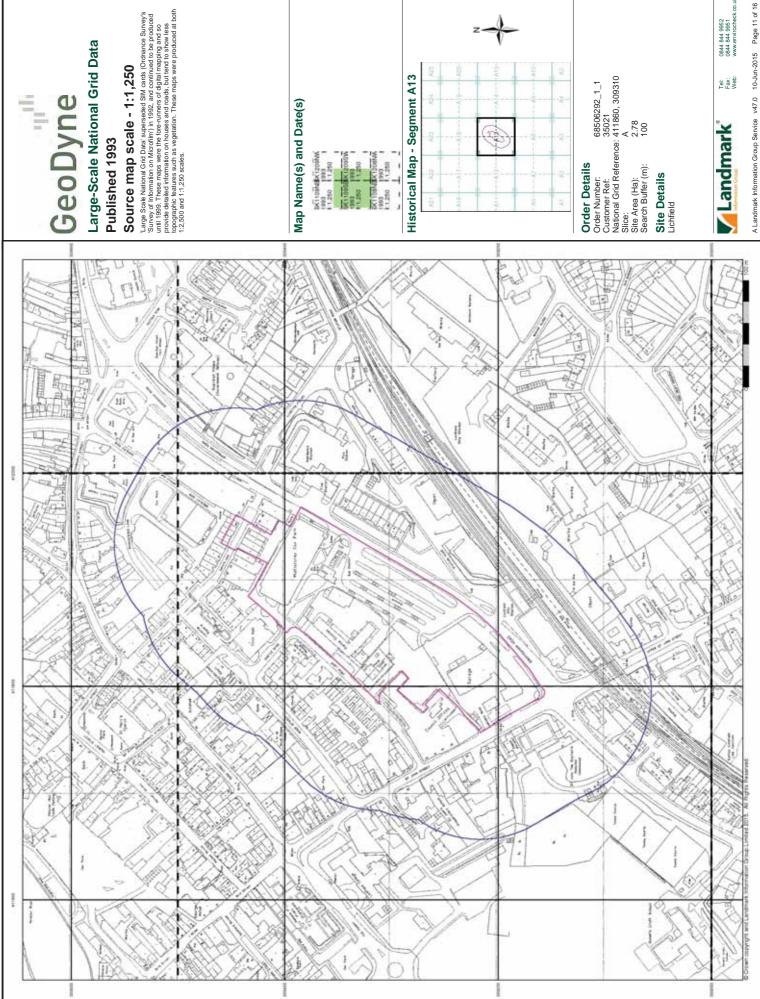


Order Details
Order Number: 68506292\_1\_1
Customer Ref: 35021
National Grid Reference: 411860, 309310



A Landmark Information Group Service v47.0 10-Jun-2015 Page 9 of 16



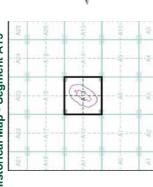


### Large-Scale National Grid Data Published 1993

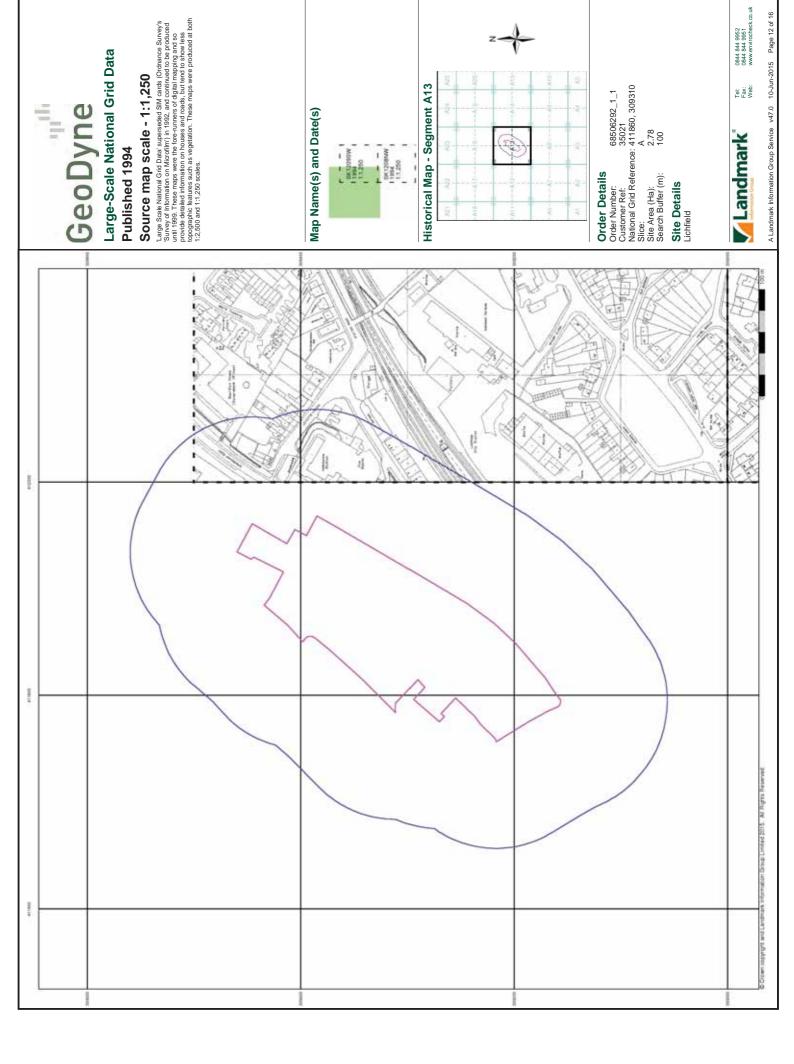
## Source map scale - 1:1,250

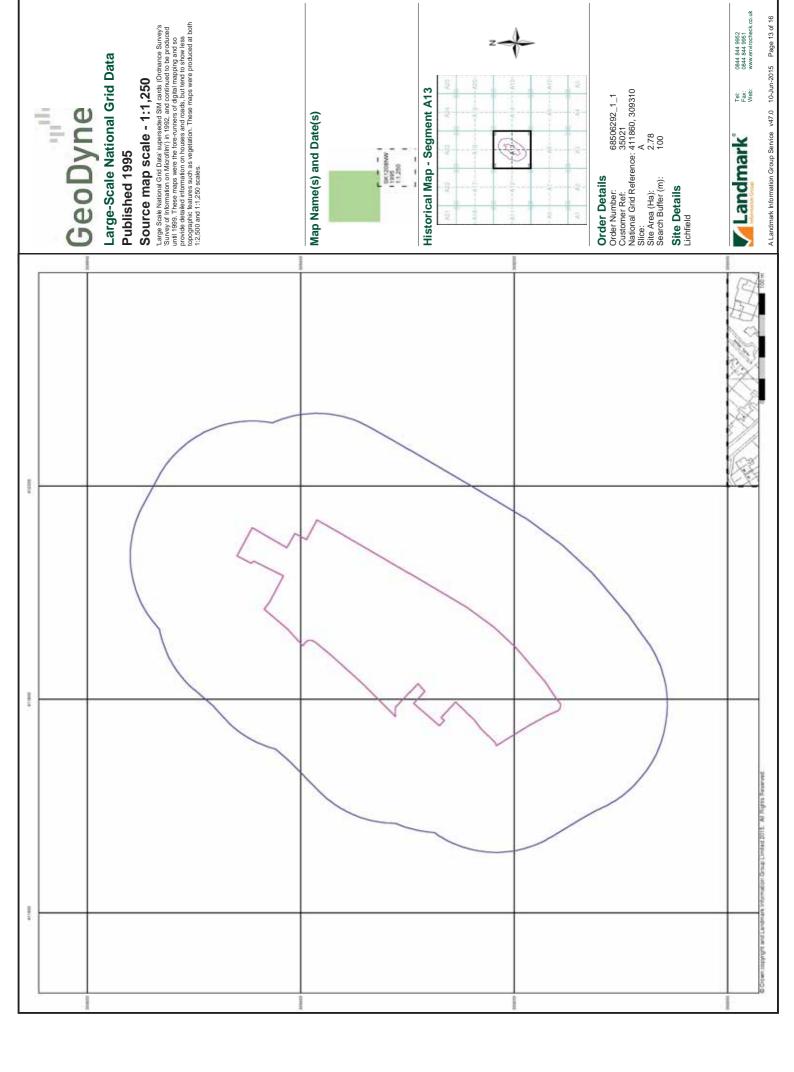
Large Scale National Grid Data's superseded SIM cards. (Ordnance Survey's Verwards on on Michaelm') in 1925, and continued to be produced until 1999. These maps were the fore-turners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic learners such as vegetation. These maps were produced at both 12,500 and 11,250 scales.

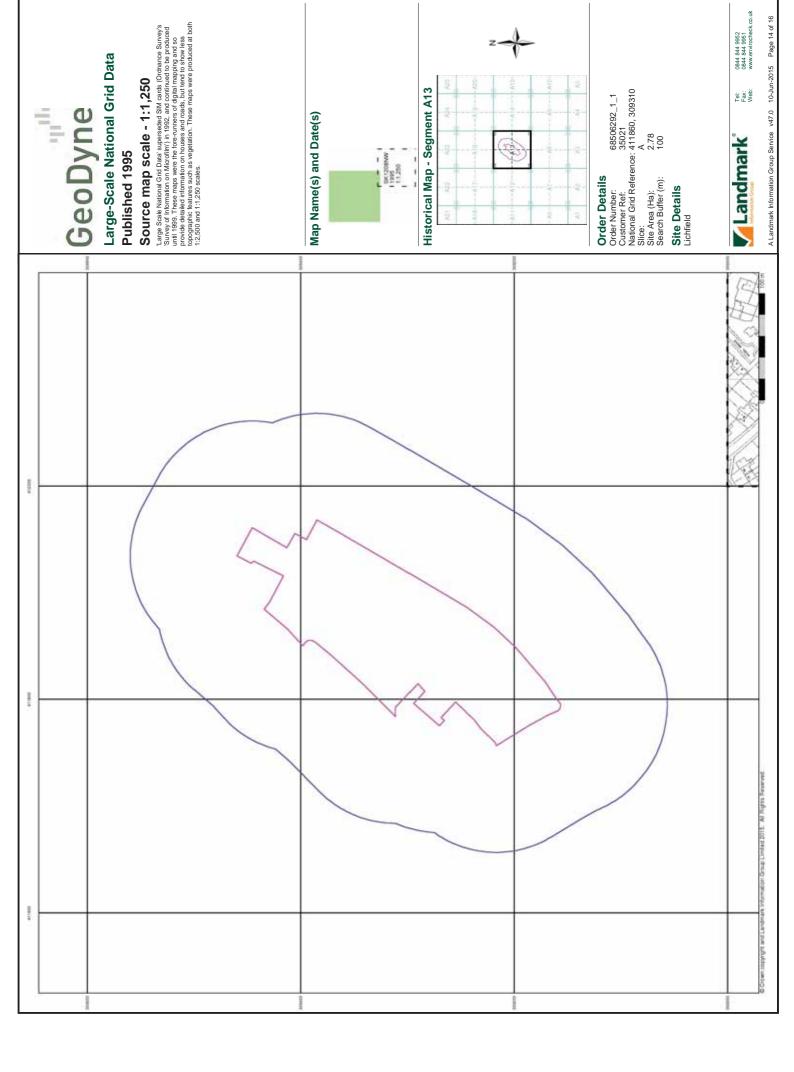


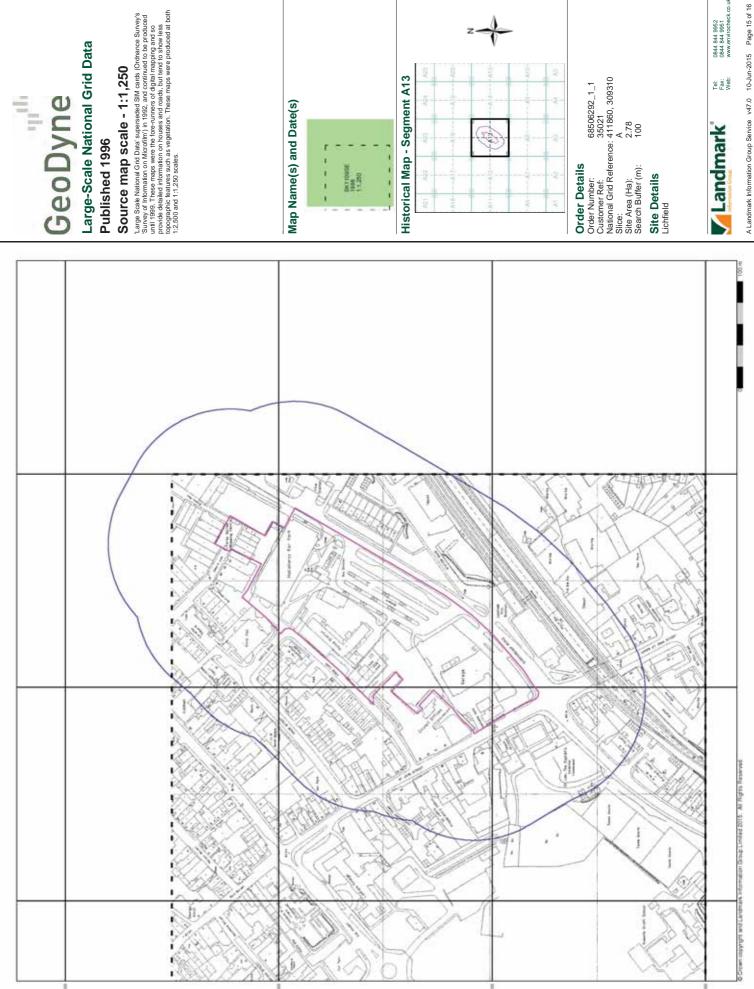












## Large-Scale National Grid Data

## Published 1996

Source map scale - 1:1,250

Large Scale National Glid Data superseded SIM cards (Ordnance Survey's Verwey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-tumers of digital mapping and so provide detailed information on houses and reads, but tend to show less tropographic learness such as vegetation. These maps were produced at both 12,500 and 11,250 scales.

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

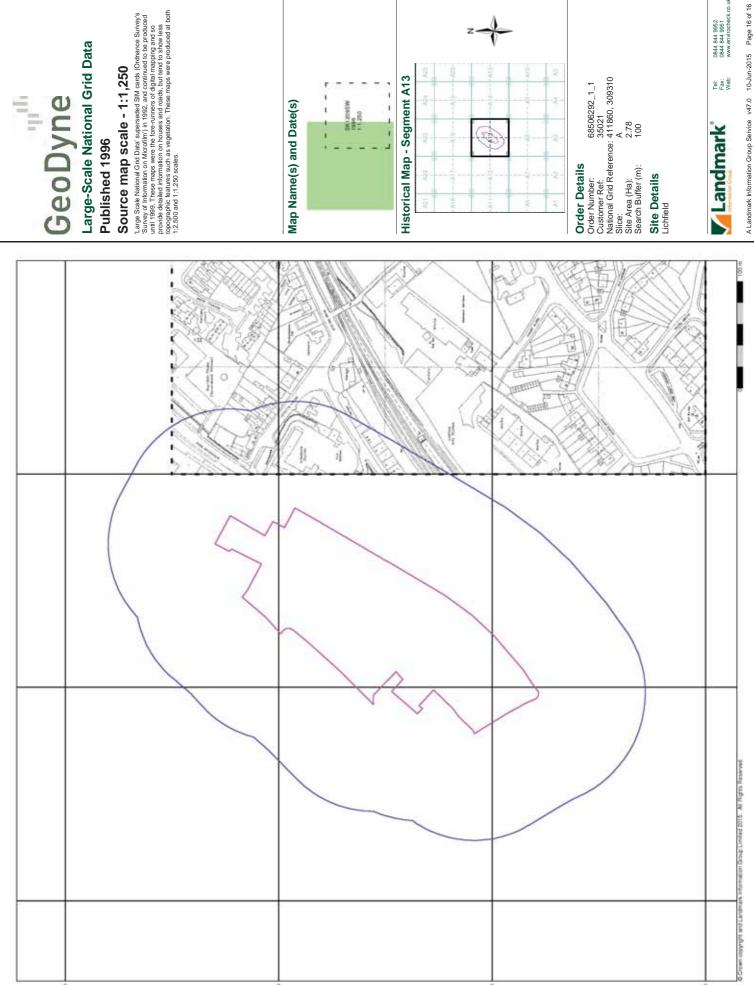


## Historical Map - Segment A13



Order Details
Order Number: 68506292\_1\_1
Customer Ref: 35021
National Grid Reference: 411860, 309310
Slice: 2.78
Search Buffer (m): 100



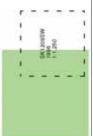


### Large-Scale National Grid Data Published 1996

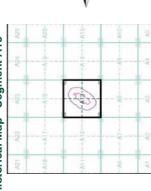
## Source map scale - 1:1,250

Large Scale National Grid Data's superseded SIM cards. (Ordnance Survey's Verwards on on Michaelm') in 1925, and continued to be produced until 1999. These maps were the fore-turners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic learners such as vegetation. These maps were produced at both 12,500 and 11,250 scales.

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



## Historical Map - Segment A13



Order Details
Order Number: 68506292\_1\_1
Customer Ref: 35021
National Grid Reference: 411860, 309310
Slice: A
Site Area (Ha): 2.78
Search Buffer (m): 100



# **Historical Mapping Legends**

Ordnance Survey County Series 1:10,560

Marsh

Reeds

Oslers

Mixed Wood

Brushwood

Deciduous

..... Orchard

Shingle

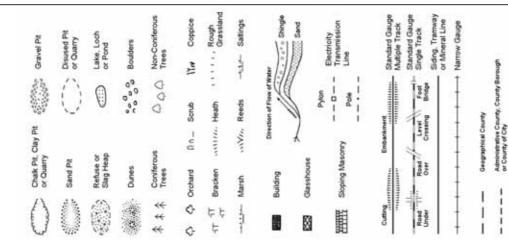
Quarry

Pits et

Sand

Gravel

Ordnance Survey Plan 1:10,000



Trigonometrical Station

Arrow denotes flow of water

+

Bench Mark

Rough Pasture

Furze

Well, Spring, Boundary Post

Pump, Guide Post, Signal Post Site of Antiquities

Surface Level

### Electricity transmission line (with poles) Marsh, Salt Marsh or Reeds Pylon, flare stack vater (springs) Non-coniferous Narrow gauge railway Refuse tip or slag heap Civil, parish or Triangulation Single track railway **Juderground** Constituency Flow arrows Boulders (scattered) community (scattered) Top of cliff Conferous Coppice or Osiers Mean low boundary Sand Pit Heath detail Mud S. 1 G Metropoltan, London Borough boundary Point feature (e.g. Guide Post or Mile Stone) Conferous ± trees (scattered) trees (scattered) County boundary - - Overhead detail Area of wooded vegetation Mean high water (springs) Bench mark (where shown) District, Unitary, Non-conferous General detail (England only) Water feature Telephone line (where shown Multi-track " Rough Grassland Gravel Pit Boulders Orchard railway South Sand Rock 0 BA CELSON THIRD . 0

### GeoDyne

1:10,000 Raster Mapping

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Staffordshire	1:10,560	1883	က
Staffordshire	1:10,560	1:10,560 1902 - 1903	4
Staffordshire	1:10,560	1924	2
Staffordshire	1:10,560	1938	9
Ordnance Survey Plan	1:10,000	1955	7
Ordnance Survey Plan	1:10,000   1967	1967	8
Ordnance Survey Plan	1:10,000	1:10,000   1970 - 1973	6
Ordnance Survey Plan	1:10,000	1976 - 1979	10
Birmingham	1:25,000	1977	11
Ordnance Survey Plan	1:10,000   1990	1990	12
10K Raster Mapping	1:10,000	2006	13
VectorMap Local	1:10,000	2015	4

	V V	(23)	5 5 54 4 75	
5	- V	100	10	+ +
	A 9 A20			A1B-

Order Details	
Order Number:	68506292_1_1
Customer Ref:	35021
National Grid Reference: 411860, 309310	411860, 309310
Slice:	A
Site Area (Ha):	2.78
Search Buffer (m):	250
Site Details	
Lichfield	

7

e.

S

or lighting tower

Glasshouse

Site of (antiquity) General Building

Spring Telephone Call Box Telephone Call Post Well

Fourtain Guide Post Mile Post

Rural District Boundary

Co. Burgh Bay RD Boy

Co. Bore. Bdy.

Civil Parish Boundary

7 E 8 8 2 7 ≥

Post Office Public Convenience Public House Signal Box

Club House Fire Engine Station Foot Bridge

Police Station

Pol Sta

Boundary Post or Stone

Administrative County & Civil Parish Boundary

County Boundary (Geographical)

County & Civil Parish Boundary

1

County Borough Boundary (England) County Burgh Boundary (Scotland)

Civil Parish Shows alternately when

Municipal Berough, Urban or Rural District, Burgh or District Council Borough, Burgh or County Constituency Steam only when and coloridant with other board

Level Crossing

Road Road

Road over Stream

Road over River or Canal

Road over

Stream

Railway over River

Road over Railway

虚明

Raised Road Unferced

Sunken Road

Femined

Minor Roads

Fenced

Main Roads

Instrumental

1

Sketched

Important Building





A Landmark Information Group Service v47.0 10-Jun-2015 Page 1 of 14

# Russian Military Mapping Legends

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

1:25,000 mapping

Key to Numbers on Mapping

# GeoDyne

Historical Mapping & Photography included:

-	Mapping Type	Scale	Date	Pg
	Staffordshire	1:10,560	1883	3
	Staffordshire	1:10,560	1902 - 1903	4
	Staffordshire	1:10,560	1924	2
	Staffordshire	1:10,560	1938	9
	Ordnance Survey Plan	1:10,000	1955	7
	Ordnance Survey Plan	1:10,000	1967	8
	Ordnance Survey Plan	1:10,000	1970 - 1973	6
	Ordnance Survey Plan	1:10,000	1976 - 1979	10
	Birmingham	1:25,000	1977	11
	Ordnance Survey Plan	1:10,000	1990	12
	10K Raster Mapping	1:10,000	2006	13
	VectorMap Local	1:10,000	2015	4
-				

### Russian Map - Slice A

VS1				
+	-10	- SZ	2	1
A1G-	A 7.	Ali	V B	A20
-			-	
4114	- 1	The state of		A
+	Ļ		F	-
AG	4	40	VI	Ato
N IV	5	- 2	-4	5

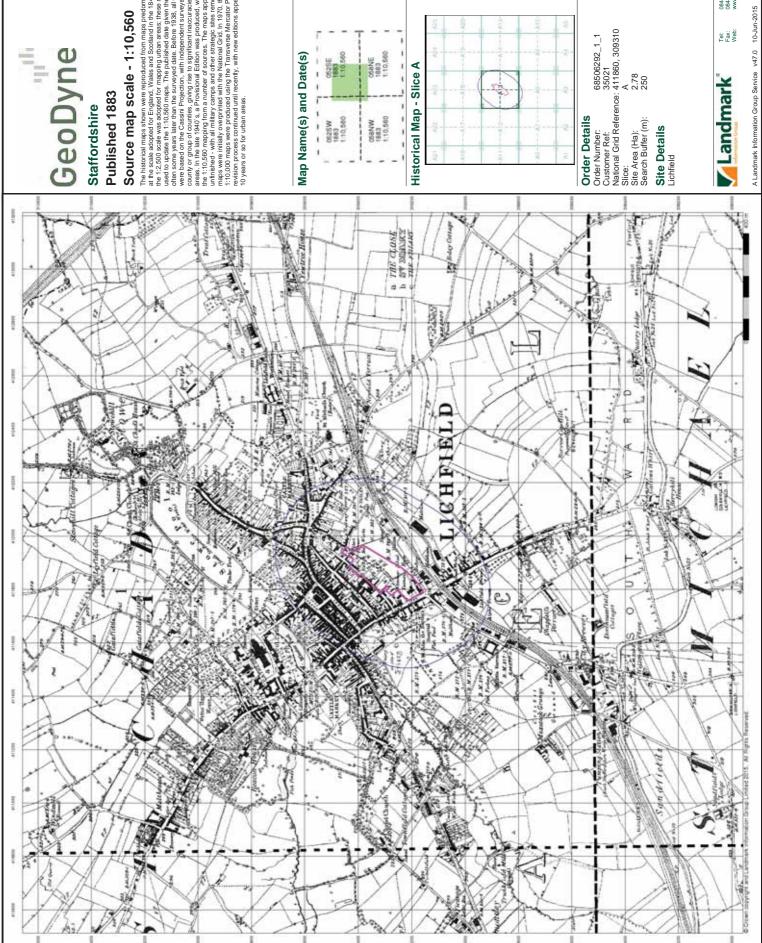
	68506292_1_1	35021	: 411860, 309310	A	2.78	250
Order Details	Order Number:	Customer Ref:	National Grid Reference: 411860, 309310	Slice:	Site Area (Ha):	Search Buffer (m):

Site Details Lichfield

Landmark

A Landmark Information Group Service v47.0 10-Jun-2015 Page 2 of 14 Tel: Fax: Web:

a. Not drawn to scale	scale b. Drawn to acal				a. Not draw	. Not drawn to scale	b. Drawm to scale			
Gow	Government and Administrative Buildings	٠	Military and Industrial Buildings	spinis	7	Govern	Government and Administrative Buildings	•	Military Industr	Miltary and Industrial Buildings
Milita	Miltary and Communication Areas	0	Subway Entrance	ance	-	Millary and Communic	Military and Communication Areas	නි	Subwa	Subway Entrance
4.0	Freproof Building	E	Prominent Fireproof Building	reproof	d	Party Der Buldings	Party Demolished Buildings	2000	Demol	Demoished Buildings
ž	Non-freproof Building	= []	Non-freproof Building (non-dwelling)	f Building g)		Bull-Up Area Fireproof Bull Predominant	Bult-Up Area with Fireproof Buildings Predominant		Bull-Up Area Non-Fireproo Predominant	Bull-Up Area with Non-Freproof Buildings Predominant
1	Factory, mill, and flour mill.	<b>1</b>		Factory, mil.	- <b>1</b>	Individua	Individual Fireproof Building	1	Promine Building	Prominent Industrial Building
a		2 4	e wethou	without chimneys	O	Individual	ndvidual Owelling. Freproof	D.	Ruins	Ruins of an Individual Dwelling
MOYO S	Power Station, drawn to scale	1	8	Hydroelectric Power Station	J		4 0 mm	E CHIA	ď.	v seem.
.7	Radio Station, drawn to scale	7		Telephone Station, drawn to scale	Factoryor Mill Chimney		Factory or Mill with Chimney	Factory or Mill without Chimney	rMil	Mine or Open Pit Mine
500		1	<b>1</b> 10	Open-pit Salt Mine	Operating Shaftor Mine		Non-Operating Shaft or Mine	Saft Mine	700 ,	A Tailings Pile
4		am Argues		ampun en	27-00		()	0-		•
000		Â	=	۹ <b>اااا</b>	æ		Stone Quarry	Gas Pump or Service Station	p or	Fuel Storage or Natural Gas Tank
ă i	Oil Deposit or Well	it or Well	ō	Oil Seepage	-		×	×		- 646
0	0 00	· ·	•	o Max	Oil or Natural Gas Derrick		Small Hydroelectric Power Station	Power Station	nog	Transformer
Tallings Pile	Fuel Storage Tanks	ge Tanks	Natura	Natural Gas Tank	(					
120	16(g o	0 + 2.0		+12 🛆 678	Cemetery		Buriel Mound	Triangulation Point	Point	Triangulation
Bench Mark	Drill Hole	Mound		on Burial Mound			(Name or and or a	E X		į,
rie 🖪 pass	20		Cff. Tuesd	1	Bench Mark		Bench Mark	Telegraph	4	Telephone
	nsamp ick Rationd	- + 4	Mark Double-track (Cut) Railroad and Station Building	yw. Ples ck (Culvert) n Building	Badin Station		(monumented)	Office Airfield		Station Station
COCHE E		KARN & ES	General	Septem # 4 23				Seaplane Base	Berre	
Conferens Forest		Deciduous Forest	Mix	Mixed Forest	ag.	Fil Ka	Kas Peet Plantings			Which of Road
		٠			]	egraphTelephan Main Highway	100	Highway under Construction		Steep Grade Improved Dirt Road (former truck road)
Limits	Citrus Orchard Wet	Wet Ground		Vegetation	Small	5	Small Pipe Iridge COL (Culvert) Tumed	ă	smande	Dismantled Railroad
0'99	Numbers for spot elevations, depth soundings, contour lines, etc.	ations, dept	h soundings.		Doub	Ne-track inst Class	Double-track Railroad with First Class Station	Rathos	ed Unde	Railroad Under Construction
0.2	Velocity of the current, width of river bed, depth of river	width of rive	r bed, depth	ofriver		C	121	-		Wister Gauge
<b>新</b> 申 <b>至</b> 中	Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the dameter of trees.	hand capac he river bot	ty of bridges, tom; height of	depth of forest and	Shore	}	River or Ditch with	Direction	Man and	Direction and velocity parts and discussion (1931)
ssian A	Russian Alphabet (Forretennice and phonetic interpretation of map text)	neud bue as	etic interpretati	an of map best)	Embanement	E S	Embankment	1		Water Level Mark
(V) #	3 3 (2)	II n (P)	1	(H)	A SER A	7	Nater Reservoiror	Corper C		Sohath with calus
B 6 (B)	N E	P P (R)		III III (SH)	Man		Rain Wister Pit.	Buude		action with valid
(0)		TT (E)		(manne)	1		2			= 347.1
A (D)	M M (M)	y (d)			Reavy (Index)	dex)	and Value	Half Confour	X > .	Spot Elevation Value
ë (YO)		X X (KH)		33 (E)						
				H WA OF IA						

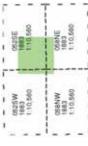


### Staffordshire

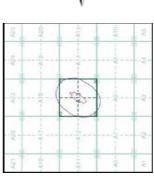
### Published 1883

county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's a Porvisional Edition was produced, which updated the 1:10,500 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 Mercado. Projection. The The historical maps shown were reproduced from maps predominantly held at the scale adopted for England. Wates and Scotland in the 1840's. In 1884 the 13.2500 scale was adopted for mapping utban areas, these maps were used to update the 110.560 maps. The published date given therefore is effect some years later than that so uneyed date. Before 18.38, all OS maps were based on the Cassain Pojection, with independent surveys of a single

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



### Historical Map - Slice A



 Order Details
 68506292\_1\_1

 Order Number:
 35021

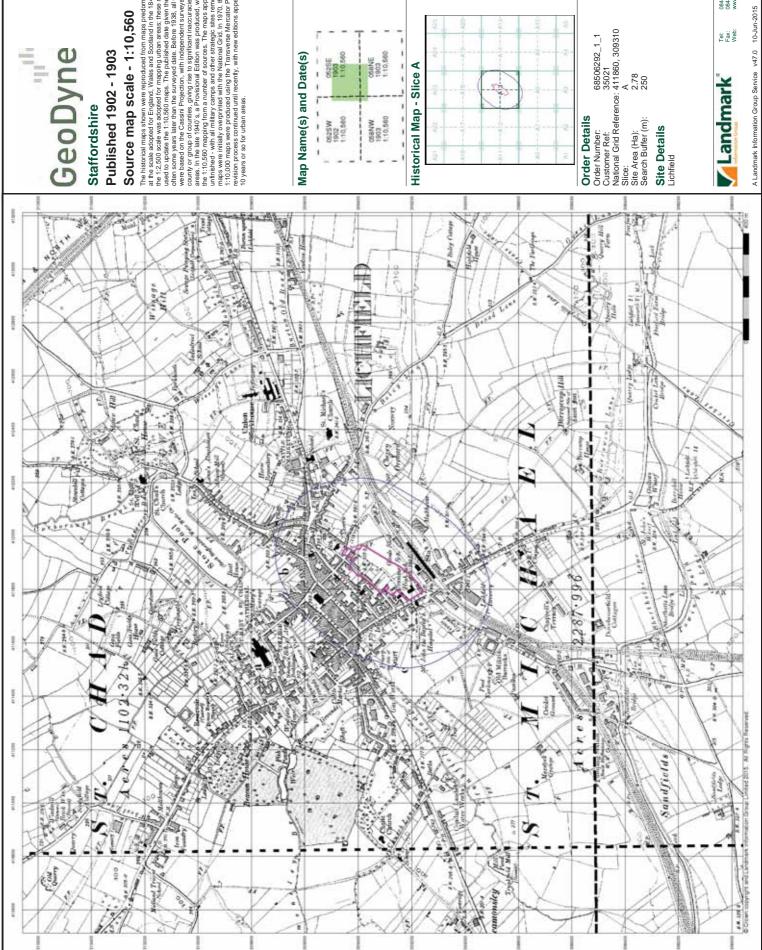
 Customer Ref:
 35021

 National Grid Reference:
 411860, 309310

 Slice:
 278

 Search Buffer (m):
 250

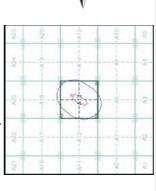


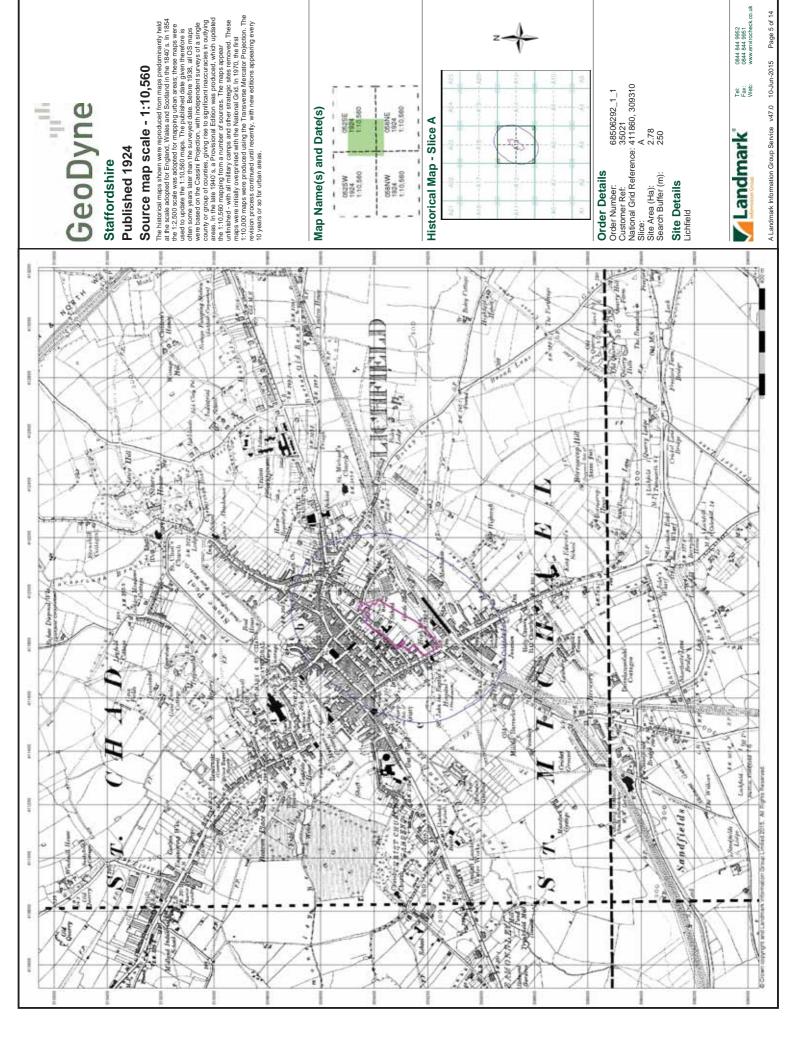


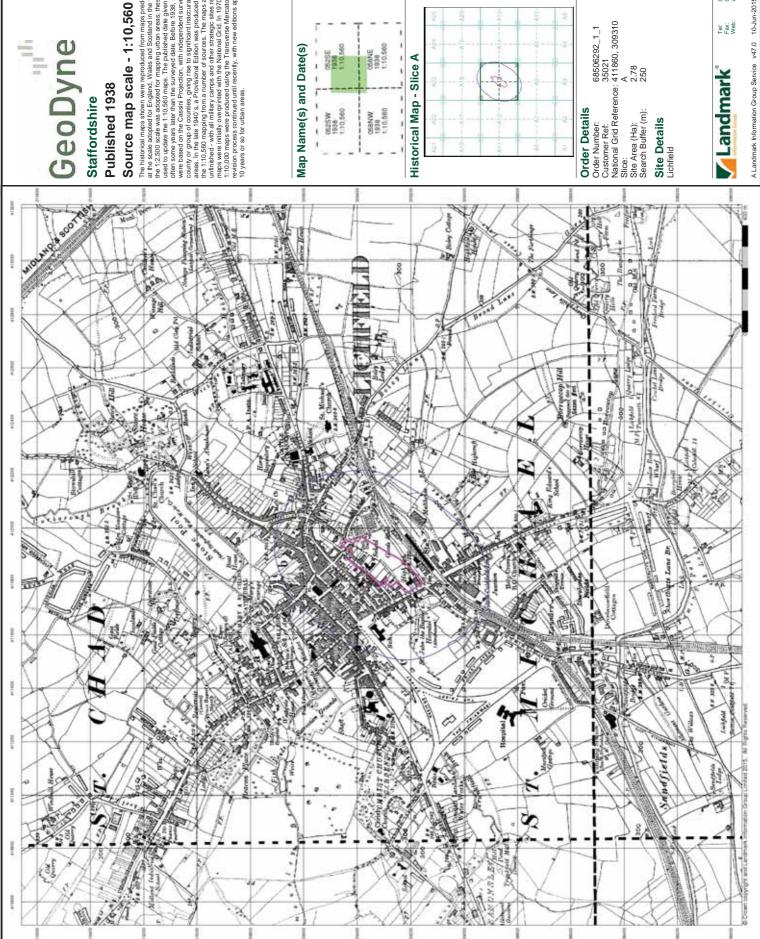
Published 1902 - 1903

county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's a Porvisional Edition was produced, which updated the 1:10,500 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 Mercado. Projection. The The historical maps shown were reproduced from maps predominantly held are scale adopted for England. Wales and Scotland in the 1640's. In 1854 the 12.500 scale was adopted for mapping uthan areas; these maps were used to update the 110.560 maps. The published date given therefore is effect some years attait than the surveyed date. Before 1838, all OS maps were based on the Casarin Pojection, with independent surveys of a single









### Staffordshire

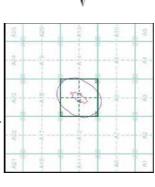
### Published 1938

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 1:10,500 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially centrined with the National Gircl. In 1970, the lift strates are suppressed and other strategic sites of the second and a site of the second or strategic sites of the second or strategic sites of the second or second second or The historical maps shown were reproduced from maps predominantly held at the scale adopted for England. Wates and Scotland in the 1840's. In 1884 the 13.2500 scale was adopted for mapping utban areas, these maps were used to update the 110.560 maps. The published date given therefore is effect some years later than that so uneyed date. Before 18.38, all OS maps were based on the Cassain Pojection, with independent surveys of a single

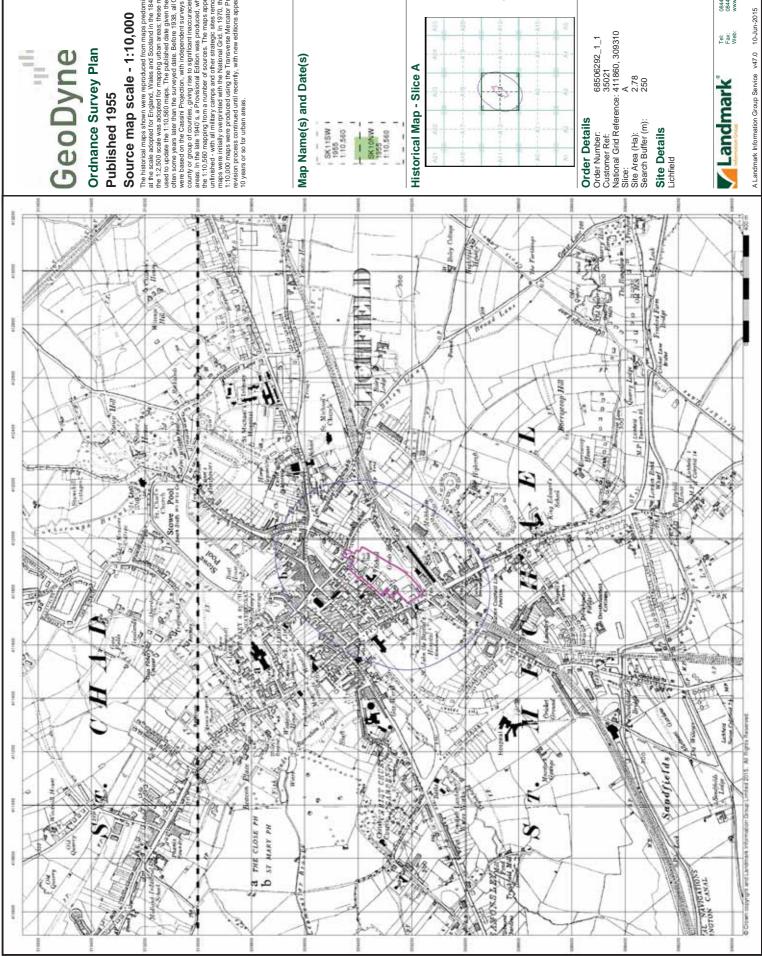
### Map Name(s) and Date(s)



### Historical Map - Slice A



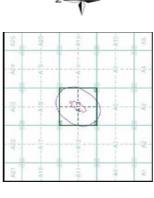


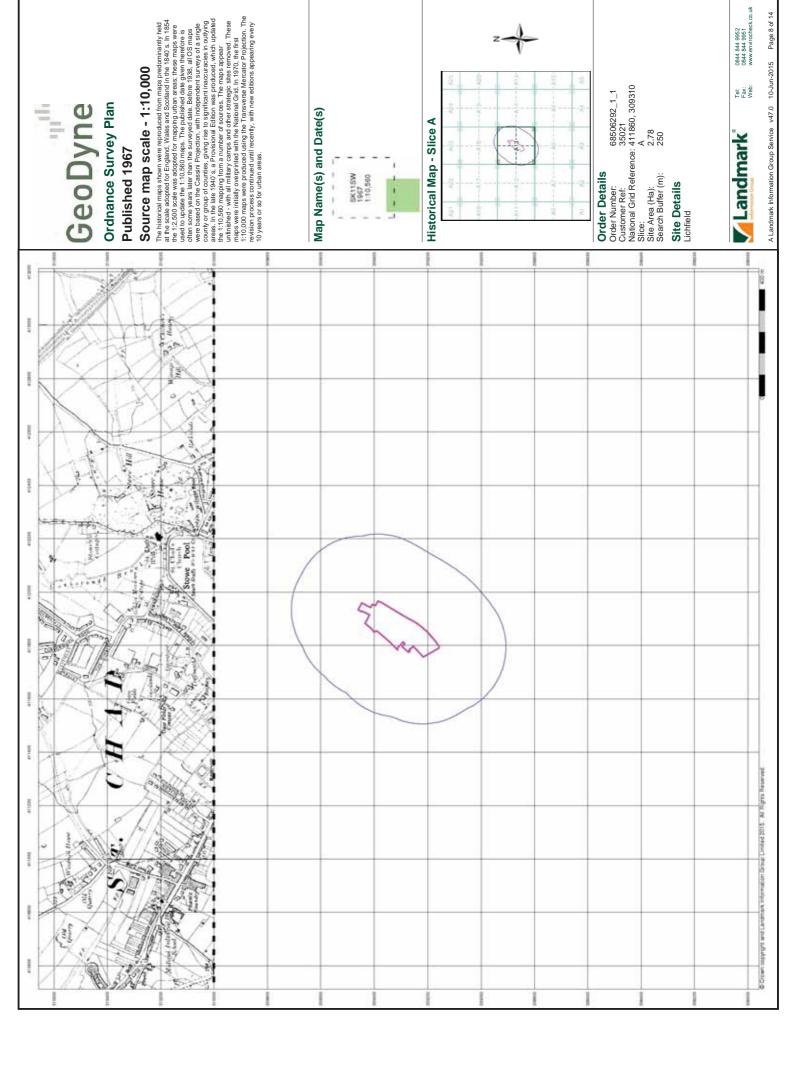


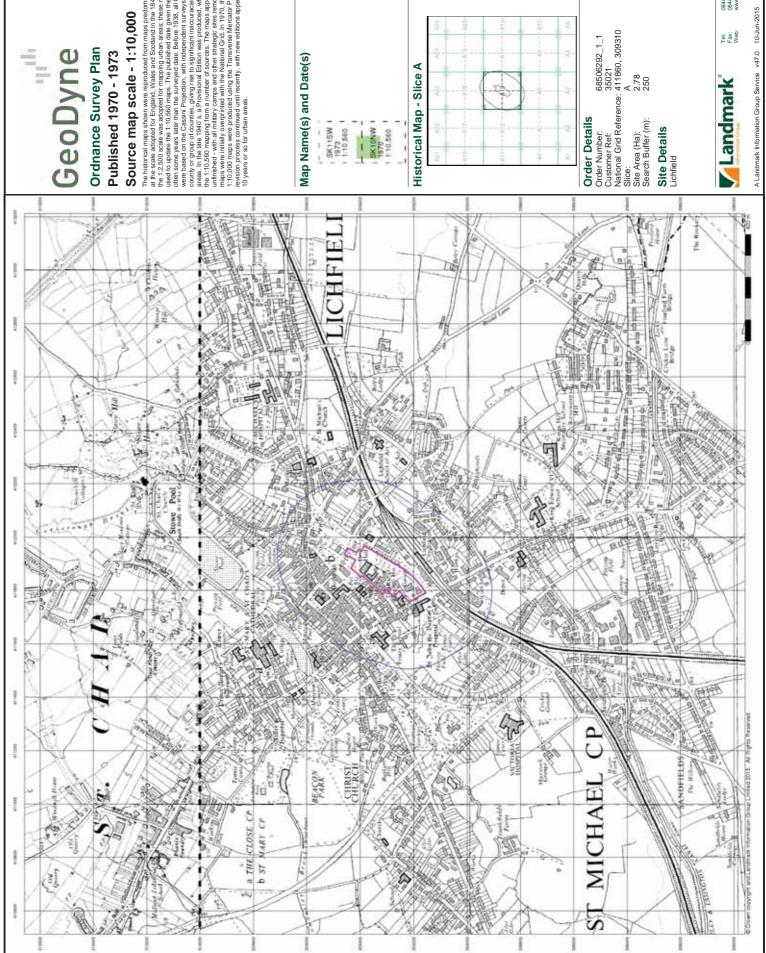
## **Ordnance Survey Plan**

## Source map scale - 1:10,000

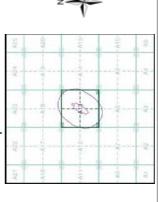
county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's a Porvisional Edition was produced, which updated the 1:10,500 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercado. Projection. The The historical maps shown were reproduced from maps predominantly held at the scale adopted for England. Wates and Scotland in the 1840's. In 1884 the 13.2500 scale was adopted for mapping utban areas, these maps were used to update the 110.560 maps. The published date given therefore is effect some years later than that so uneyed date. Before 18.3, all OS maps were based on the Cassain Pojection, with independent surveys of a single

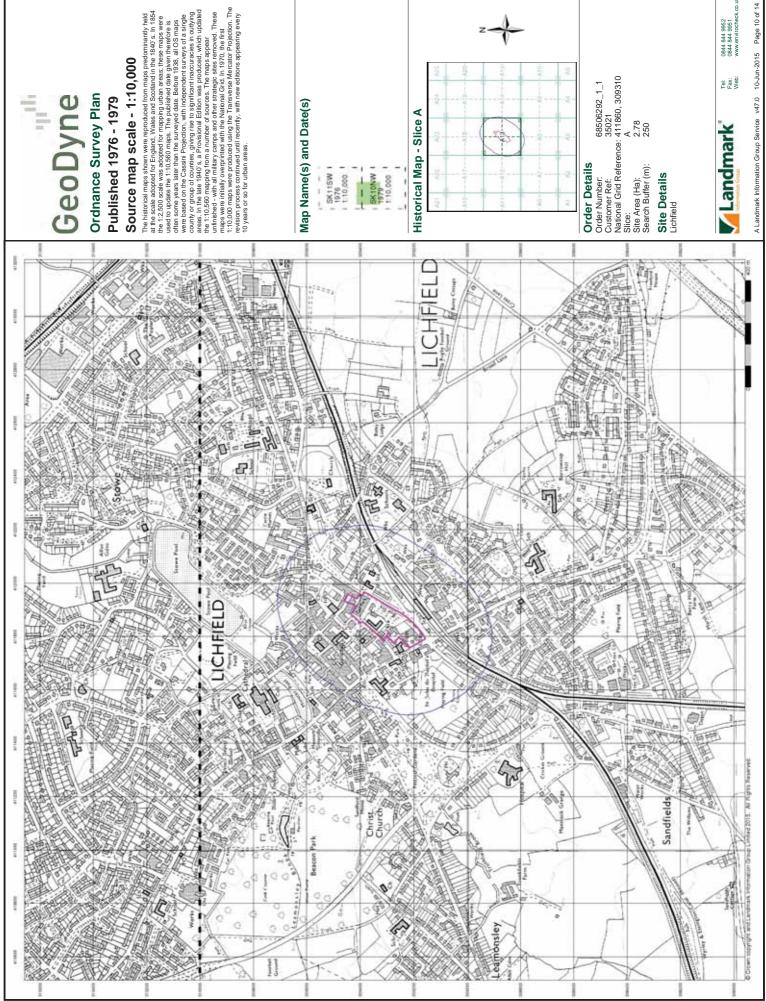






**Ordnance Survey Plan** Published 1970 - 1973 The historical maps shown were reproduced from maps predominantly held at the scale adopted for England. Wales and Scotland in the 1840's. In 1854 the 12,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years faller than the surveyed date. Before 1838, all OS maps often some years faller than the surveyed date. Before 1838, all OS maps

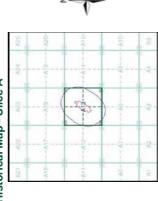




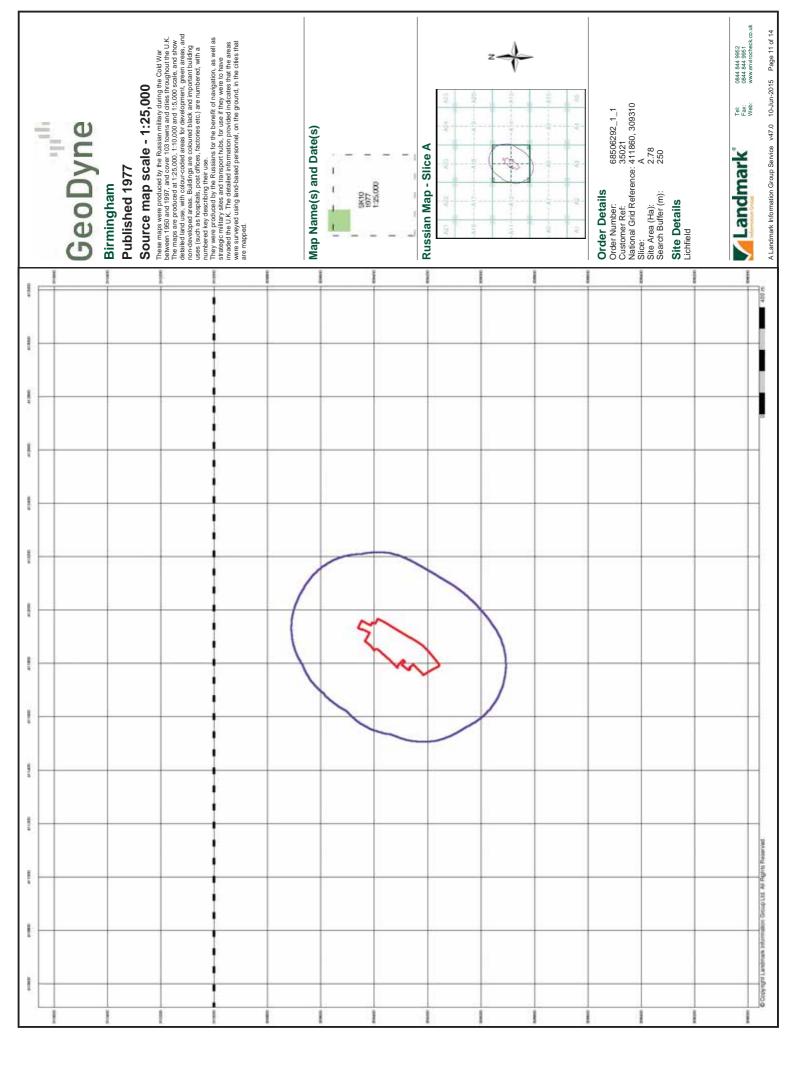
**Ordnance Survey Plan** Published 1976 - 1979

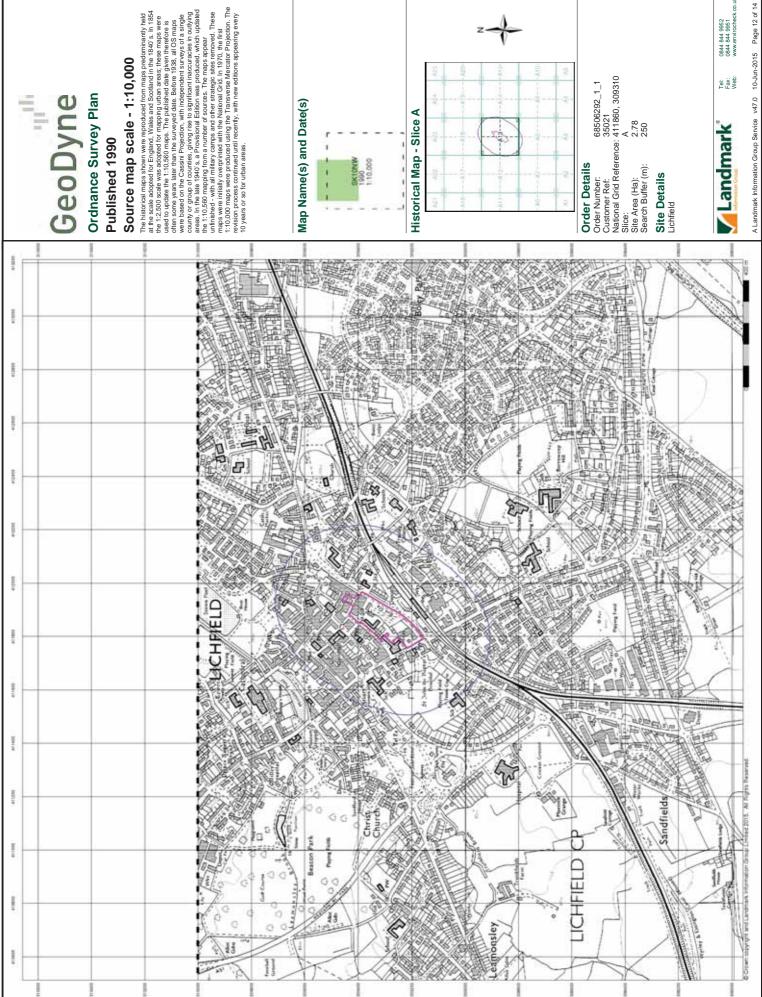
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly hat the scale adopted for England, Wales and Scotland in the 1840's. In 1 the 12,50° scale was advolved for mapping ubnan areas, these maps we used to update the 1:10,50° maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS map



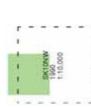


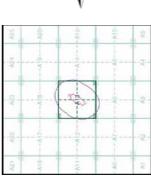


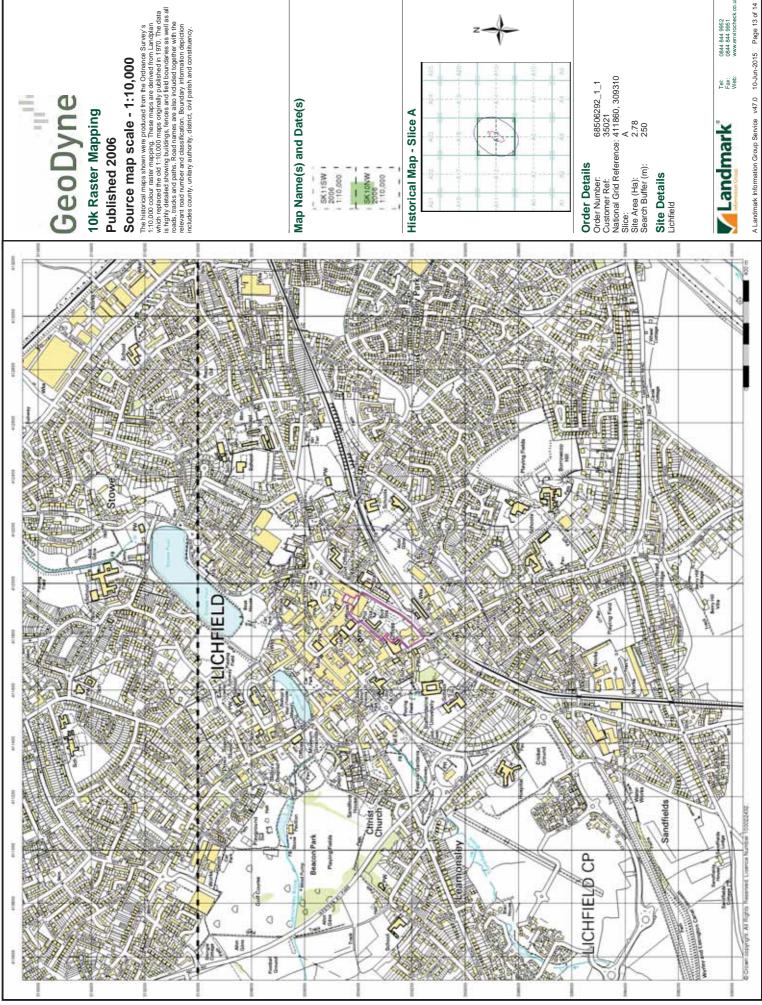


Ordnance Survey Plan Published 1990

The historical maps shown were reproduced from maps predominantly he at the scale adopted for England, Wales and Scotland in the 1840's. In 11 the 12.500 scale was adopted for mapping urban areas; these maps were used to update the 11,10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps often some years later than the surveyed date.



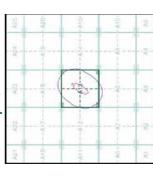




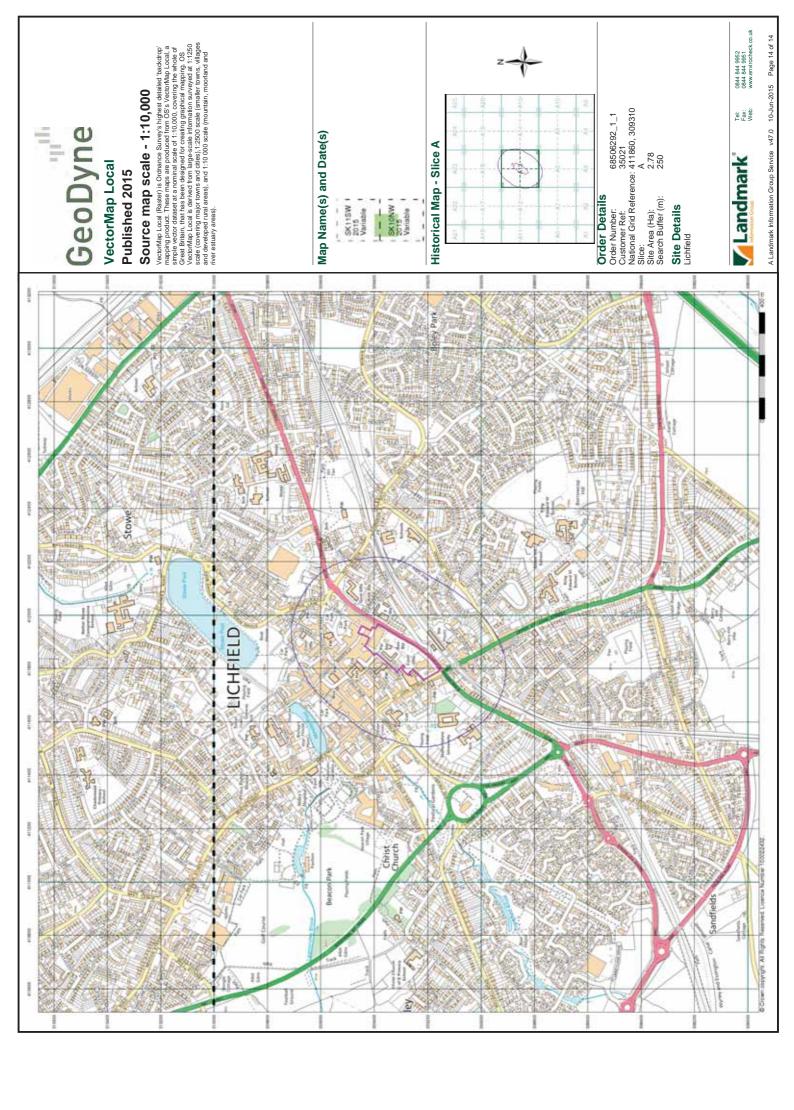
### 10k Raster Mapping

Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance: 1:10,000 colour raster mapping. These maps are derived from which replaced the old 1:10,000 maps originally published in 1: within replaced showing buildings, fences and field boundaric is highly detailed showing buildings, fences and field boundaric roads, tracks and paths. Road names are also included togeth.









#### APPENDIX E

Landmark Envirocheck Report



### **Envirocheck® Report:**

#### **Datasheet**

#### **Order Details:**

**Order Number:** 

68506292\_1\_1

**Customer Reference:** 

35021

**National Grid Reference:** 

411860, 309310

Slice:

Α

Site Area (Ha):

2.78

Search Buffer (m):

250

#### **Site Details:**

Lichfield

#### **Client Details:**

Mr R Spencer GeoDyne Ltd The Granary Church Lane Thrumpton NG11 0AX

#### **Prepared For:**

BSP Consulting 12 Oxford Street Nottingham NG1 5BG







Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	2
Hazardous Substances	-
Geological	4
Industrial Land Use	6
Sensitive Land Use	12
Data Currency	13
Data Suppliers	17
Useful Contacts	18

#### 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 the attached 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 2015. 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.

#### **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.

#### **Ove Arup Copyright Notice**

The Data provided in this report 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 information and data supplied in the product are 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.

#### Peter Brett Associates Copyright Notice

The cavity data presented has been extracted from the PBA enhanced version of the original DEFRA national cavity databases. PBA/DEFRA 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 PBA. In no event shall PBA/DEFRA 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.

#### Report Version v49.0



# **Summary**

Data Type	Page Number	On Site	0 to 250m (*up to 500m)
Agency & Hydrological			
Contaminated Land Register Entries and Notices			
Discharge Consents			
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		1
Local Authority Pollution Prevention and Control Enforcements			
Nearest Surface Water Feature	pg 1		Yes
Pollution Incidents to Controlled Waters	pg 1		1
Prosecutions Relating to Authorised Processes			
Prosecutions Relating to Controlled Waters			
Registered Radioactive Substances			
River Quality			
River Quality Biology Sampling Points			
River Quality Chemistry Sampling Points			
Substantiated Pollution Incident Register			
Water Abstractions			
Water Industry Act Referrals			
Groundwater Vulnerability	pg 1	Yes	n/a
Bedrock Aquifer Designations	pg 1	Yes	n/a
Superficial Aquifer Designations			n/a
Source Protection Zones	pg 1	1	
Extreme Flooding from Rivers or Sea without Defences			
Flooding from Rivers or Sea without Defences			
Areas Benefiting from Flood Defences			
Flood Water Storage Areas			
Flood Defences			
Detailed River Network Lines			
Detailed River Network Offline Drainage			





Data Type	Page Number	On Site	0 to 250m (*up to 500m)
Waste			
BGS Recorded Landfill Sites			
Historical Landfill Sites			
Integrated Pollution Control Registered Waste Sites			
Licensed Waste Management Facilities (Landfill Boundaries)			
Licensed Waste Management Facilities (Locations)	pg 2		1
Local Authority Recorded Landfill Sites			
Registered Landfill Sites			
Registered Waste Transfer Sites	pg 2		1
Registered Waste Treatment or Disposal Sites	pg 3		2
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 4	Yes	n/a
BGS Estimated Soil Chemistry	pg 4	Yes	Yes
BGS Recorded Mineral Sites			
BGS Urban Soil Chemistry			
BGS Urban Soil Chemistry Averages			
Brine Compensation Area			n/a
Coal Mining Affected Areas			n/a
Mining Instability			n/a
Man-Made Mining Cavities			
Natural Cavities			
Non Coal Mining Areas of Great Britain			
Potential for Collapsible Ground Stability Hazards	pg 5	Yes	
Potential for Compressible Ground Stability Hazards	pg 5		Yes
Potential for Ground Dissolution Stability Hazards			
Potential for Landslide Ground Stability Hazards	pg 5	Yes	
Potential for Running Sand Ground Stability Hazards	pg 5		Yes
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 5		Yes
Radon Potential - Radon Affected Areas			n/a
Radon Potential - Radon Protection Measures			n/a



# **Summary**

Data Type	Page Number	On Site	0 to 250m (*up to 500m)
Industrial Land Use			
Contemporary Trade Directory Entries	pg 6	1	62
Fuel Station Entries	pg 11	1	
Sensitive Land Use			
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	pg 12	1	
Ramsar Sites			
Sites of Special Scientific Interest			
Special Areas of Conservation			
Special Protection Areas			



# **Agency & Hydrological**

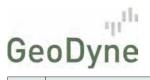
Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	Local Authority Pollution Prevention and Controls  Name: Johnson Cleaners Uk Ltd Location: 18 Market Street, Lichfiedl, Ws13 6lh Authority: Lichfield District Council, Environmental Health Department Permit Reference: PPC86/A/07 Dated: 29th October 2007 Process Type: Local Authority Pollution Prevention and Control Description: PG6/46 Dry cleaning Status: Permitted Positional Accuracy: Manually positioned to the address or location	A13NW (NW)	194	2	411677 309485
	Nearest Surface Water Feature	A13SW (SW)	174	-	411586 309187
2	Pollution Incidents to Controlled Waters  Property Type: Road (Road Traffic Accident) Location: Tudor Row, Wade Street, LICHFIELD Authority: Environment Agency, Midlands Region Oils - Other Oil Note: Dustbin Lorry Lost All Its Hydraulic Oil; Amenity Effected Incident Date: 18th July 1997 Incident Reference: Catchment Area: Receiving Water: Cause of Incident: Incident Severity: Positional Accuracy: Located by supplier to within 100m	A13NW (NW)	143	3	411750 309500
	Groundwater Vulnerability  Soil Classification: Soils of High Leaching Potential (U) - Soil information for resto workings and urban areas is based on fewer observations than worst case vulnerability classification (H) assumed, until prove Map Sheet: Sheet 22 South Staffordshire & East Shropshire Scale: 1:100,000	elsewhere. A (NE)	0	3	411863 309311
	Drift Deposits None				
	Bedrock Aquifer Designations Aquifer Designation: Principal Aquifer	A13NE (NE)	0	4	411863 309311
	Superficial Aquifer Designations  No Data Available				
3	Source Protection Zones	A13NE (NE)	0	3	411863 309311
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
	Detailed River Network Lines None				
	Detailed River Network Offline Drainage None				





Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
4	Licensed Waste Ma Licence Number: Location: Operator Name: Operator Location: Authority: Site Category: Licence Status: Issued: Last Modified: Expires: Suspended: Revoked: Surrendered: IPPC Reference:	A2328 City Wharf, St Johns Street, Lichfield, Staffordshire, WS13 6PB E A Barnes & Sons Not Supplied Environment Agency - Midlands Region, Central Area Household, Commercial And Industrial Transfer Stations Surrendered 22nd January 1993 Not Supplied	A13SE (S)	84	3	411917 309149
	Positional Accuracy:  Local Authority Lan	Located by supplier to within 10m  dfill Coverage				
	Name:	Staffordshire County Council - Has supplied landfill data		0	8	411863 309311
	Local Authority Lan	dfill Coverage				
	Name:	Lichfield District Council - Landfill data has been supplied by another authority		0	5	411863 309311
	Registered Waste T	ransfer Sites				
5	Licence Holder: Licence Reference: Site Location: Operator Location: Authority: Site Category: Max Input Rate: Waste Source Restrictions: Licence Status: Dated: Preceded By Licence: Superseded By	E A Barnes & Sons Ltd 8/C/93/0484 (B65) Shell Works, City Wharf, St Johns Street, Lichfield, Staffordshire Kenilworth, Station Road, LICHFIELD, Staffordshire, WS13 6HZ Environment Agency - Midlands Region, Upper Trent Area Transfer Small (Equal to or greater than 10,000 and less than 25,000 tonnes per year) Some restriction on source of waste  Record supersededSuperseded 1st January 1993 Not Given  8/C/93/0484 (B65)	A13SE (S)	86	3	411920 309150
	Licence:	Located by supplier to within 100m Not Supplied Commercial Waste Construction And Demolition Wastes Excavation Materials Inert Waste Non-Putrescible Household Waste Clinical - As In Wmp 25 Drums/Similar - Empty Or Full Liquid/Sludge Wastes Notifiable Wastes Putrescible Wastes Special Wastes Waste N.O.S.				





Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Registered Waste T	reatment or Disposal Sites				
6	Licence Holder: Licence Reference: Site Location: Operator Location: Authority: Site Category: Max Input Rate: Waste Source Restrictions: Licence Status: Dated: Preceded By Licence: Superseded By Licence:	E A Barnes & Sons Ltd	A13SE (S)	86	3	411920 309150
		Sludge Wastes Spec.Waste (Epa'90:S62/1996 Regs)N.O.S				
	Registered Waste T	reatment or Disposal Sites				
7	Licence Holder: Licence Reference: Site Location:  Operator Location: Authority: Site Category: Max Input Rate:  Waste Source Restrictions: Licence Status: Dated: Preceded By Licence: Superseded By Licence:	E A Barnes & Sons Ltd 8/L/91/0388 (SDL B10 Shell Works, City Station Wharf, St John Street, LICHFIELD, Staffordshire, WS14 9DZ As Site Address Environment Agency - Midlands Region, Upper Trent Area Scrapyard Medium (Equal to or greater than 25,000 and less than 75,000 tonnes per year) No known restriction on source of waste  Licence lapsed/cancelled/defunct/not applicable/surrenderedCancelled 1st November 1991 Not Given  Manually positioned to the road within the address or location Not Supplied Max.Storage Staffs Cat. Bii 'Scrap Metal' Vehicle Batteries Max.Stor Elemental Sodium/Potassium Metal In Fine Powder Form Notif. Waste -Except Batt.Acid/Petrol Percussive/Explosive Waste Special Waste -Except Batt.Acid/Petrol Waste Cont. Pcbs Waste Cont.Flam.Solvent -Exc.Petrol	A13SE (S)	148	3	411900 309050





Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid	d Geology				
	Description:	Triassic Rocks (Undifferentiated)	A13NE (NE)	0	4	411863 309311
	BGS Estimated Soil Source: Soil Sample Type: Arsenic Concentration: Cadmium Concentration: Chromium Concentration: Lead Concentration: Nickel Concentration:	British Geological Survey, National Geoscience Information Service Rural Soil <15 mg/kg <1.8 mg/kg 20 - 40 mg/kg	A13NE (NE)	0	4	411863 309311
	BGS Estimated Soil	Chemistry				
	Source: Soil Sample Type: Arsenic Concentration: Cadmium Concentration: Chromium Concentration: Lead Concentration: Nickel Concentration:	British Geological Survey, National Geoscience Information Service Rural Soil <15 mg/kg <1.8 mg/kg 20 - 40 mg/kg	A13NE (E)	32	4	412000 309311
	BGS Estimated Soil	Chemistry				
	Source: Soil Sample Type: Arsenic Concentration: Cadmium Concentration: Chromium Concentration: Lead Concentration: Nickel Concentration:	British Geological Survey, National Geoscience Information Service Rural Soil <15 mg/kg <1.8 mg/kg 20 - 40 mg/kg <150 mg/kg <15 mg/kg	A13SE (S)	157	4	411863 309000
	BGS Estimated Soil	Chemistry				
	Source: Soil Sample Type: Arsenic Concentration: Cadmium Concentration: Chromium Concentration: Lead Concentration: Nickel Concentration:	British Geological Survey, National Geoscience Information Service Rural Soil <15 mg/kg <1.8 mg/kg 40 - 60 mg/kg	A13NW (W)	204	4	411602 309401
	BGS Estimated Soil	Chemistry				
	Source: Soil Sample Type: Arsenic Concentration: Cadmium Concentration: Chromium Concentration: Lead Concentration: Nickel Concentration:	British Geological Survey, National Geoscience Information Service Rural Soil <15 mg/kg <1.8 mg/kg 20 - 40 mg/kg	A13SE (SE)	250	4	412000 309000
	BGS Measured Urba	an Soil Chemistry				
	No data available					
	BGS Urban Soil Che No data available	emistry Averages				
	Coal Mining Affecte	d Areas				
	_	not be affected by coal mining				
	Non Coal Mining Ar	eas of Great Britain				



# Geological

Vlap ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Collap	sible Ground Stability Hazards				
	Hazard Potential: Source:	Very Low British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	4	411863 309311
	Potential for Collap	sible Ground Stability Hazards				
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13NW (W)	204	4	411602 309401
	Potential for Comp	ressible Ground Stability Hazards				
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	4	411863 309311
	Potential for Comp	ressible Ground Stability Hazards				
	Hazard Potential: Source:	Moderate British Geological Survey, National Geoscience Information Service	A13NW (W)	204	4	41160 30940
	Potential for Groun	d Dissolution Stability Hazards				
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	4	41186 30931
	Potential for Lands	lide Ground Stability Hazards				
	Hazard Potential: Source:	Very Low British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	4	41186 30931
	Potential for Runni	ng Sand Ground Stability Hazards				
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	4	41186 30931
	Potential for Runni	ng Sand Ground Stability Hazards				
	Hazard Potential: Source:	Low British Geological Survey, National Geoscience Information Service	A13NW (W)	204	4	41160 30940
	Potential for Shrink	ring or Swelling Clay Ground Stability Hazards				
	Hazard Potential: Source:	No Hazard British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	4	41186 30931
	Potential for Shrink	ring or Swelling Clay Ground Stability Hazards				
	Hazard Potential: Source:	Very Low British Geological Survey, National Geoscience Information Service	A13NW (W)	204	4	41160 30940
	Radon Potential - Radon Protection Measures					
	Protection Measure: Source:	No radon protective measures are necessary in the construction of new dwellings or extensions  British Geological Survey, National Geoscience Information Service	A13NE (NE)	0	4	41186 30931
		<u> </u>				
	Affected Area:	Radon Affected Areas  The property is in a lower probability radon area, as less than 1% of homes are above the action level	A13NE (NE)	0	4	41186 30931



Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
8	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries Sketchley Retail Ltd 36, Bakers Lane, Lichfield, Staffordshire, WS13 6NG Dry Cleaners Inactive Automatically positioned to the address	A13NE (NE)	0	-	411927 309430
9	Contemporary Trad Name: Location: Classification: Status:	**	A13SW (SW)	9	-	411773 309174
10	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries Shopmobility Castle Dyke, Lichfield, Staffordshire, WS13 6HR Disability Equipment - Manufacturers & Suppliers Inactive Automatically positioned to the address	A13NW (N)	32	-	411841 309432
11	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries Fireworks (Lichfield) Ltd 4, Tudor Row, Wade Street, Lichfield, Staffordshire, WS13 6HH Fireplaces & Mantelpieces Inactive Automatically positioned to the address	A13NW (NW)	65	-	411799 309437
11	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries  No Mas Vello 1 Tudor Row,Wade St, Lichfield, Staffordshire, WS13 6HH Electrolysis Active Manually positioned to the address or location	A13NW (NW)	66	-	411793 309430
11	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries Copy Quick 9, Tudor Row, Wade Street, Lichfield, Staffordshire, WS13 6HH Copying & Duplicating Services Inactive Automatically positioned to the address	A13NW (NW)	100	-	411781 309470
12	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries Lichfield Sony Centre Galleria 16, Bakers Lane, Lichfield, Staffordshire, WS13 6NF Electrical Goods Sales, Manufacturers & Wholesalers Inactive Automatically positioned to the address	A13NW (N)	67	-	411842 309486
12	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries  Max Spielmann 7, Bakers Lane, Lichfield, Staffordshire, WS13 6NF Photographic Processors Inactive  Automatically positioned to the address	A13NW (N)	93	-	411854 309521
12	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries  Sony Centre Bakers La, Lichfield, Staffordshire, WS13 6NG Electrical Goods Sales, Manufacturers & Wholesalers Inactive Manually positioned to the road within the address or location	A13NW (N)	104	-	411838 309526
13	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries P J S Autos Auto Care Centre, Station Road, Lichfield, Staffordshire, WS13 6HX Garage Services Active Automatically positioned to the address	A13SE (SE)	70	-	411974 309257
13	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries Fma Process Engineering Ltd 1, Three Spires House, Station Road, Lichfield, Staffordshire, WS13 6HX Engineers - General Active Automatically positioned to the address	A13SE (E)	81	-	412005 309287
14	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries C & G Mowers (Horticultural Engineers) Unit 4c Willtell Works, Upper St. John Street, Lichfield, Staffs, WS14 9DX Lawnmowers & Garden Machinery - Sales & Service Inactive Manually positioned to the road within the address or location	A13SW (S)	99	-	411829 309064



Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Contemporary Trad	e Directory Entries				
14	Name: Location:	C & G Mowers Unit 4c Willtell Works, Upper St. John Street, Lichfield, Staffordshire, WS14 9DX	A13SW (S)	108	-	411834 309056
	Classification: Status: Positional Accuracy:	Horticultural Equipment Maintenance & Repair  Active  Manually positioned to the road within the address or location				
	Contemporary Trad	**				
15	Name: Location: Classification: Status:	M & I 13a St John Street, Lichfield, Staffordshire, WS13 6NU Domestic Appliances - Servicing, Repairs & Parts Inactive Manually positioned within the geographical locality	A13NW (W)	101	-	411690 309346
	Contemporary Trad					
15	Name: Location: Classification: Status:	Disable Aids (Cannock) Ltd Friary Court, 13a, St. John Street, Lichfield, Staffordshire, WS13 6NU Disability Equipment - Manufacturers & Suppliers Inactive Automatically positioned to the address	A13NW (W)	109	-	411685 309355
	Contemporary Trad					
15	Name: Location: Classification: Status:	M & I Domestic Appliances Ltd 13, St. John Street, Lichfield, Staffordshire, WS13 6NU Domestic Appliances - Servicing, Repairs & Parts Active Automatically positioned to the address	A13NW (W)	113	-	411682 309359
	Contemporary Trad	e Directory Entries				
15	Name: Location: Classification: Status:	Celsius Solutions Ltd 13, St. John Street, Lichfield, Staffordshire, WS13 6NU Air Conditioning Equipment & Systems Inactive	A13NW (W)	113	-	411682 309359
	Contemporary Trad	Automatically positioned to the address				
16	Name: Location: Classification: Status:	Mr Tyre Ltd Station Road, Lichfield, Staffordshire, WS13 6HX Garage Services Active	A13NE (E)	101	-	412053 309330
	-	Automatically positioned to the address				
16	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	M R Tyres Station Road, Lichfield, Staffordshire, WS13 6HX Tyre Dealers Inactive Automatically positioned to the address	A13NE (E)	101	-	412053 309330
	Contemporary Trad					
17	Name: Location: Classification: Status: Positional Accuracy:	The House Of Minster 26, Tamworth Street, Lichfield, Staffordshire, WS13 6JJ Cosmetic Manufacturers Active Automatically positioned to the address	A13NE (N)	120	-	411899 309574
	Contemporary Trad	e Directory Entries				
17	Name: Location: Classification: Status: Positional Accuracy:	B R Hawkins 28, Tamworth Street, Lichfield, Staffordshire, WS13 6JJ Furriers Inactive Automatically positioned to the address	A13NE (N)	126	-	411902 309581
	Contemporary Trad					
17	Name: Location: Classification: Status: Positional Accuracy:	Matthews Print 19, Tamworth Street, Lichfield, Staffordshire, WS13 6JP Printers Inactive Automatically positioned to the address	A13NE (N)	151	-	411870 309595
	Contemporary Trad	* '				
17	Name: Location: Classification: Status:	Bulpitts Lampshades Ltd 29, Tamworth Street, Lichfield, Staffordshire, WS13 6JP Lampshade Manufacturers & Distributors Inactive Automatically positioned to the address	A13NE (N)	153	-	411903 309609



Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Contemporary Trad	le Directory Entries				
18	Name: Location:	English Rose Pvcu Unit 4B, Wiltell Road Industrial Estate, Wiltell Road, Lichfield, Staffordshire, WS14 9ET	A13SW (S)	128	-	411788 309030
	Classification: Status: Positional Accuracy:	Cladding Suppliers & Installers Inactive Automatically positioned to the address				
	Contemporary Trad					
18	Name: Location: Classification: Status:	C & M Sales Unit 6, Wiltell Road Industrial Estate, Wiltell Road, Lichfield, Staffordshire, WS14 9ET Car Dealers Inactive	A13SW (S)	147	-	411779 309011
	-	Automatically positioned to the address				
19	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	T J Print 8, Bore Street, Lichfield, Staffordshire, WS13 6LL Printers Inactive Manually positioned to the address or location	A13NW (NW)	140	-	411684 309409
	Contemporary Trad					
20	Name: Location: Classification: Status:	Sensible Transport Solutions Ltd 45, Birmingham Road, Lichfield, Staffordshire, WS13 6PG Commercial Vehicle Dealers Active Automatically positioned to the address	A13SW (SW)	150	-	411707 309034
	Contemporary Trad	le Directory Entries				
21	Name: Location: Classification:	Andy Chapman Mesnes Green Industrial Estate, Mesnes Green, Lichfield, Staffordshire, WS14 9AB Classic Car Specialists	A13SE (SE)	154	-	412022 309171
	Status: Positional Accuracy:	Inactive Automatically positioned to the address				
	Contemporary Trad	le Directory Entries				
21	Name: Location: Classification: <b>Status:</b> Positional Accuracy:	Virgin Windows & Conservatory Ltd Mesnes Industrial Park, Cherry Orchard, Lichfield, Staffordshire, WS14 9AB Window Frame Manufacturers Inactive Manually positioned within the geographical locality	A13SE (SE)	154	-	412007 309150
	Contemporary Trad					
21	Name: Location: Classification: Status:	D & R Motors Mesnes Green, Lichfield, Staffordshire, WS14 9AB Garage Services Inactive Automatically positioned to the address	A13SE (SE)	156	-	412028 309178
	Contemporary Trad	**				
21	Name: Location: Classification: Status:	Euroeast Mesnes Green Industrial Estate, Mesnes Green, Lichfield, Staffordshire, WS14 9AB Garage Services Inactive	A13SE (SE)	170	-	412042 309176
		Automatically positioned to the address				
22	Contemporary Trad Name: Location:	Lichfield Electronics 3, The Corn Exchange, Conduit Street, Lichfield, Staffordshire, WS13 6JU	A13NW (N)	155	-	411798 309562
	Classification: Status: Positional Accuracy:	Electronic Component Manufacturers & Distributors Inactive Automatically positioned to the address				
	Contemporary Trad					
22	Name: Location: Classification: <b>Status:</b> Positional Accuracy:	Supasnaps 4, The Corn Exchange, Conduit Street, Lichfield, Staffordshire, WS13 6JU Photographic Processors Inactive Automatically positioned to the address	A13NW (N)	158	-	411795 309563
	Contemporary Trad	e Directory Entries				
22	Name: Location: Classification: <b>Status:</b>	Jordan 7, The Corn Exchange, Conduit Street, Lichfield, Staffordshire, WS13 6JU Antiques - Repairing & Restoring Inactive Automatically positioned to the address	A13NW (N)	169	-	411786 309570



Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
22	Location: Classification: Status:	Directory Entries Currys Digital 20, Conduit Street, Lichfield, Staffordshire, WS13 6JR Electrical Goods Sales, Manufacturers & Wholesalers Inactive Automatically positioned to the address	A13NW (N)	197	-	411786 309604
22	Location: Classification: Status:	B Directory Entries Gasworks 2-4, Dam Street, Lichfield, Staffordshire, WS13 6AA Clothing Accessory Manufacturers Inactive Automatically positioned to the address	A13NW (N)	221	-	411769 309622
22	Location: Classification: Status:	E Directory Entries Cartridge World 2-4, Dam Street, Lichfield, Staffordshire, WS13 6AA Printers Inactive Automatically positioned to the address	A13NW (N)	221	-	411769 309622
23	Location: Classification: Status:	E Directory Entries  Heat & Air Management Ltd Old Coach House, 67a, Upper St. John Street, Lichfield, Staffordshire, WS14 9DT  Air Conditioning & Refrigeration Contractors Inactive  Automatically positioned to the address	A13SE (S)	161	-	411877 309019
23	Location: Classification: Status:	Pirectory Entries Process Burner Systems Ltd Old Davidson House, Upper St. John Street, Lichfield, Staffordshire, WS14 9DU Manufacturers Inactive Manually positioned to the address or location	A13SE (S)	161	-	411877 309019
23	Location: Classification: Status:	E Directory Entries St John Street Garage Upper St. John St, Lichfield, Staffordshire, WS14 9DT Garage Services Active Manually positioned to the road within the address or location	A13SE (S)	175	-	411864 308996
23	Location: Classification: Status:	E Directory Entries Espace Europe Ltd Espace House, 71a, Upper St. John Street, Lichfield, Staffordshire, WS14 9DT Freight Forwarders Active Automatically positioned to the address	A13SE (S)	180	-	411913 309020
24	Location: Classification: Status:	e Directory Entries J R M Plastics Ltd 10 Lombard St, Lichfield, Staffordshire, WS13 6DP Plastic Products - Manufacturers Inactive Manually positioned to the address or location	A13NE (N)	169	-	411960 309626
24	Location: Classification: Status:	Directory Entries  D Mccarthy Bros (Lichfield) Ltd  12a, Lombard Street, Lichfield, Staffordshire, WS13 6DR  Asphalt & Coated Macadam Laying Contractors  Inactive  Automatically positioned to the address	A13NE (N)	185	-	411957 309643
25	Location: Classification: Status:	Directory Entries  Magic By Candle Light  9, Breadmarket Street, Lichfield, Staffordshire, WS13 6LG  Candle Manufacturers & Suppliers  Active  Manually positioned to the address or location	A13NW (NW)	181	-	411732 309534
25	Location: Classification: Status:	Directory Entries  Dartmouth Global Trading Co Ltd  Exchange House, 33, Market Street, Lichfield, Staffordshire, WS13 6LA Scrap Metal Merchants Inactive  Automatically positioned to the address	A13NW (NW)	211	-	411705 309551



Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
26	Contemporary Trade Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries Just Popples 11, Greenhill, Lichfield, Staffordshire, WS13 6DY Garden Ornament Manufacturers Inactive Automatically positioned to the address	A13NE (NE)	185	-	412074 309591
27	Contemporary Trade Name: Location: Classification: Status:	71	A13SW (SW)	190	-	411592 309123
27	Positional Accuracy:  Contemporary Trade Name: Location:  Classification: Status:	Automatically positioned to the address  e Directory Entries  Maximus Handling Systems Ltd  Unit 16, Lichfield Business Village, The Friary, Lichfield, Staffordshire, WS13  6QG  Materials Handling Equipment  Active	A13SW (SW)	190	-	411592 309123
28	Contemporary Trade Name: Location: Classification: Status:	Automatically positioned to the address  e Directory Entries  Mobi Recycle Blackberry Av, Lichfield, Staffordshire, WS14 9GS Reclaiming - Waste Products Inactive Manually positioned to the road within the address or location	A13SE (E)	191	-	412112 309252
28	Contemporary Trade Name: Location: Classification: Status:	••	A13SE (E)	198	-	412102 309221
29	Contemporary Trade Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries  Klick Photopoint  18, Market Street, Lichfield, Staffordshire, WS13 6LH Photographic Processors Inactive  Manually positioned to the address or location	A13NW (NW)	194	-	411677 309485
29	Contemporary Trade Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries  Johnson Cleaners (Uk) Ltd  18, Market Street, Lichfield, Staffordshire, WS13 6LH Dry Cleaners  Active  Automatically positioned to the address	A13NW (NW)	195	-	411677 309485
29	Contemporary Trade Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries  Motor Vehicle Dismantlers Association Charrington House, 17a, Market Street, Lichfield, Staffordshire, WS13 6JX Car Breakers & Dismantlers Inactive Automatically positioned to the address	A13NW (NW)	228	-	411651 309508
29	Contemporary Trade Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries  Complete Home Solutions Ltd  17, Market Street, Lichfield, Staffordshire, WS13 6JX Fascias and Soffits  Active  Manually positioned to the address or location	A13NW (NW)	228	-	411651 309508
30	Contemporary Trade Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries  Mark One 6a, Bird Street, Lichfield, Staffordshire, WS13 6PR Commercial Cleaning Services Inactive Manually positioned to the address or location	A13NW (NW)	204	-	411622 309435
30	Contemporary Trade Name: Location: Classification: Status: Positional Accuracy:	e Directory Entries  All 4 Fun 2, Market Street, Lichfield, Staffordshire, WS13 6LH T-Shirts Inactive  Manually positioned to the address or location	A13NW (NW)	206	-	411624 309441



Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
30	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	le Directory Entries  Beau Beauty 11, Bird Street, Lichfield, WS13 6PW Car Paint & Lacquer Manufacturers & Suppliers Active Automatically positioned to the address	A13NW (NW)	228	-	411592 309434
31	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	le Directory Entries  Netzsch Mastermix Ltd 23, Lombard Street, Lichfield, Staffordshire, WS13 6DP Engineers - General Active Automatically positioned to the address	A18SE (N)	211	-	411943 309670
31	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	le Directory Entries  Tuke & Bell Ltd  1, Cross Keys, Lichfield, Staffordshire, WS13 6DN Sewage Disposal - Equipment & Service Inactive  Automatically positioned to the address	A18SE (N)	236	-	411949 309695
32	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	le Directory Entries Lichfield Electrolysis Clinic 81a, Upper St. John Street, LICHFIELD, Staffordshire, WS14 9DT Electrolysis Active Automatically positioned to the address	A8NE (S)	213	-	411891 308966
33	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	le Directory Entries Lichfield Safe Centre Ltd 1-5, Church Street, Lichfield, Staffordshire, WS13 6DZ Safes & Vaults - Suppliers & Installers Active Automatically positioned to the address	A13NE (NE)	229	-	412134 309594
33	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	le Directory Entries Lichfield Conservatories & Windows 1-5, Church Street, Lichfield, Staffordshire, WS13 6DZ Window Frames - Sales & Service Inactive Manually positioned to the address or location	A13NE (NE)	229	-	412134 309594
33	Contemporary Trad Name: Location: Classification: Status: Positional Accuracy:	le Directory Entries Lichfield Safe Centre 1-5, Church Street, Lichfield, Staffordshire, WS13 6DZ Safes & Vaults - Suppliers & Installers Inactive Automatically positioned to the address	A13NE (NE)	232	-	412138 309594
34	Fuel Station Entries Name: Location: Brand: Premises Type: Status: Positional Accuracy:	Kennings Ltd St John Street, LICHFIELD, Staffordshire, WS13 6PB Obsolete Not Applicable Obsolete Manually positioned to the address or location	A13SW (SW)	0	-	411816 309212



### **Sensitive Land Use**

Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Nitrate Vulnerab	le Zones				
35	Name: Description: Source:	Not Supplied Surface Water Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	A13NE (NE)	0	7	411863 309311

Order Number: 68506292\_1\_1 Date: 10-Jun-2015 rpr\_ec\_datasheet v49.0 A Landmark Information Group Service Page 12 of 18



Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices		
Lichfield District Council - Pollution Control	April 2014	Annual Rolling Update
Discharge Consents		
Environment Agency - Midlands Region	April 2015	Quarterly
Enforcement and Prohibition Notices		
Environment Agency - Midlands Region	March 2013	As notified
Integrated Pollution Controls		
Environment Agency - Midlands Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control		
Environment Agency - Midlands Region	April 2015	Quarterly
Local Authority Integrated Pollution Prevention And Control		
Lichfield District Council - Environmental Health Department	March 2014	Annual Rolling Update
Local Authority Pollution Prevention and Controls		
Lichfield District Council - Environmental Health Department	March 2014	Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements		
Lichfield District Council - Environmental Health Department	March 2014	Annual Rolling Update
Nearest Surface Water Feature		
Ordnance Survey	July 2012	Quarterly
Pollution Incidents to Controlled Waters		
Environment Agency - Midlands Region	December 1999	Not Applicable
Prosecutions Relating to Authorised Processes		
Environment Agency - Midlands Region	March 2013	As notified
Prosecutions Relating to Controlled Waters		
Environment Agency - Midlands Region	March 2013	As notified
River Quality		
Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points		
Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points		
Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register	·	
Environment Agency - Midlands Region - Central Area	April 2015	Quarterly
Environment Agency - Midlands Region - Upper Trent Area	April 2015	Quarterly
Water Abstractions	·	
Environment Agency - Midlands Region	April 2015	Quarterly
Water Industry Act Referrals		
Environment Agency - Midlands Region	April 2015	Quarterly
Groundwater Vulnerability	7.52010	
Environment Agency - Head Office	April 2015	Not Applicable
	7,0111 2010	1 TOC / Epinoabio
Drift Deposits Environment Agency - Head Office	January 1999	Not Applicable
	January 1999	140t Applicable
Bedrock Aquifer Designations British Geological Survey - National Geoscience Information Service	October 2012	As notified
,	October 2012	AS HOUNED
Superficial Aquifer Designations	lonus=: 0045	۸ م ممدنات عا
British Geological Survey - National Geoscience Information Service	January 2015	As notified
Source Protection Zones	A " 221=	
Environment Agency - Head Office	April 2015	Quarterly
Extreme Flooding from Rivers or Sea without Defences		_
Environment Agency - Head Office	May 2015	Quarterly
Flooding from Rivers or Sea without Defences		
Environment Agency - Head Office	May 2015	Quarterly



Agency & Hydrological	Version	Update Cycle
Areas Benefiting from Flood Defences		
Environment Agency - Head Office	May 2015	Quarterly
Flood Water Storage Areas		
Environment Agency - Head Office	May 2015	Quarterly
Flood Defences		
Environment Agency - Head Office	May 2015	Quarterly
Detailed River Network Lines		
Environment Agency - Head Office	March 2012	Annually
Detailed River Network Offline Drainage		
Environment Agency - Head Office	March 2012	Annually
Waste	Version	Update Cycle
BGS Recorded Landfill Sites		
British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Historical Landfill Sites		
Environment Agency - Midlands Region - Central Area	February 2015	Quarterly
Environment Agency - Midlands Region - Upper Trent Area	February 2015	Quarterly
ntegrated Pollution Control Registered Waste Sites		
Environment Agency - Midlands Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries)		
Environment Agency - Midlands Region - Central Area	August 2014	Quarterly
Environment Agency - Midlands Region - Upper Trent Area	August 2014	Quarterly
icensed Waste Management Facilities (Locations)		
Environment Agency - Midlands Region - Central Area	April 2015	Quarterly
Environment Agency - Midlands Region - Upper Trent Area	April 2015	Quarterly
ocal Authority Landfill Coverage		
Lichfield District Council	May 2000	Not Applicable
Staffordshire County Council - Waste Management	May 2000	Not Applicable
ocal Authority Recorded Landfill Sites		
Lichfield District Council	May 2000	Not Applicable
Staffordshire County Council - Waste Management	May 2000	Not Applicable
Registered Landfill Sites		
Environment Agency - Midlands Region - Upper Trent Area	March 2003	Not Applicable
Registered Waste Transfer Sites		
Environment Agency - Midlands Region - Upper Trent Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites		1
Environment Agency - Midlands Region - Upper Trent Area	March 2003	Not Applicable
Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH)  Health and Safety Executive	January 2015	Bi-Annually
	Janualy 2015	Di-Attitually
Explosive Sites	Ootob = 2004.4	D: Approalle
Health and Safety Executive	October 2014	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS) Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements		
ichfield District Council - Planning Department	September 2014	Annual Rolling Updat
Staffordshire County Council	September 2014	Annual Rolling Updat
Planning Hazardous Substance Consents		
	Comtombon 204.4	Annual Palling Under
ichfield District Council - Planning Department	September 2014	Annual Rolling Updat



Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology		
British Geological Survey - National Geoscience Information Service	January 2009	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	January 2010	Annually
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	May 2015	Bi-Annually
Brine Compensation Area Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Mining Report Service	March 2014	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	July 2014	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified
Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	May 2015	Quarterly
Fuel Station Entries Catalist Ltd - Experian	May 2015	Quarterly



Sensitive Land Use	Version	Update Cycle
Areas of Adopted Green Belt		
Lichfield District Council	May 2015	As notified
Areas of Unadopted Green Belt		
Lichfield District Council	May 2015	As notified
Areas of Outstanding Natural Beauty		
Natural England	February 2015	Bi-Annually
Environmentally Sensitive Areas		
Natural England	August 2014	Annually
Forest Parks		
Forestry Commission	April 1997	Not Applicable
Local Nature Reserves		
Natural England	April 2015	Bi-Annually
Marine Nature Reserves		
Natural England	July 2013	Bi-Annually
National Nature Reserves		
Natural England	March 2015	Bi-Annually
National Parks		
Natural England	February 2015	Bi-Annually
Nitrate Sensitive Areas		
Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	February 2012	Not Applicable
Nitrate Vulnerable Zones		
Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	July 2014	Annually
Ramsar Sites		
Natural England	March 2014	Bi-Annually
Sites of Special Scientific Interest		
Natural England	April 2015	Bi-Annually
Special Areas of Conservation		
Natural England	March 2014	Bi-Annually
Special Protection Areas		
Natural England	April 2015	Bi-Annually





A selection of organisations who provide data within this report

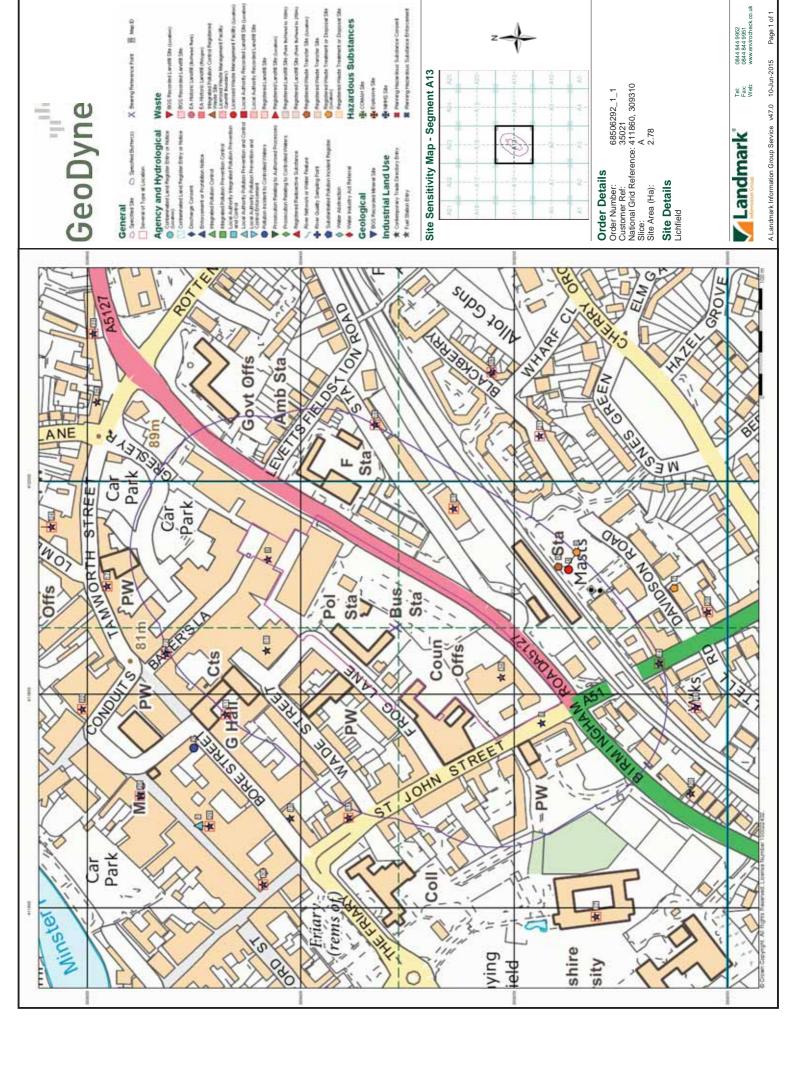
Data Supplier	Data Supplier Logo
Ordnance Survey	Ordnance Survey*
Environment Agency	Environment
Scottish Environment Protection Agency	S E PAPE Seatish Environment Protection Agency
The Coal Authority	COAL AUTHORITY
British Geological Survey	British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
Centre for Ecology and Hydrology	Centre for Ecology & Hydrology NATURAL ENVIRONMENT RESEARCH COUNCIL
Natural Resources Wales	Cyfoeth Naturiol Cyrrou Matural Resources Wolfer
Scottish Natural Heritage	SCOTTISH NATURAGE WAR
Natural England	NATURAL ENGLAND
Public Health England	Public Health England
Ove Arup	ARUP
Peter Brett Associates	peterbrett

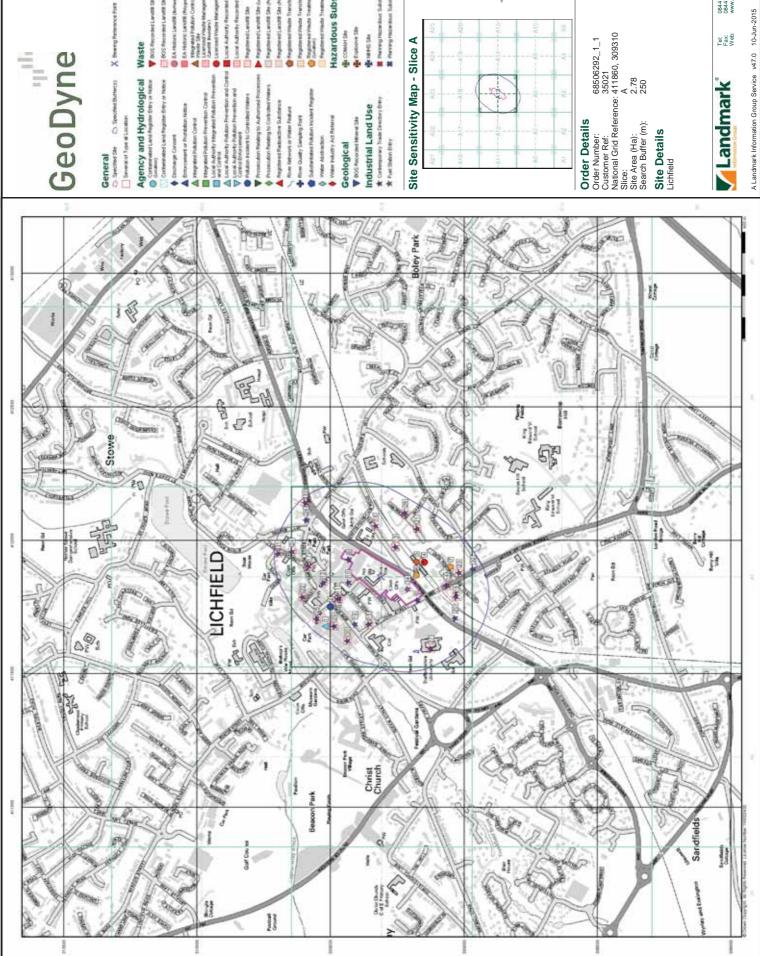


#### **Useful Contacts**

Contact	Name and Address	Contact Details
2	Lichfield District Council - Environmental Health Department	Telephone: 01543 308000 Fax: 01543 308712 Website: www.lichfielddc.gov.uk
	District Council House, Frog Lane, Lichfield, Staffordshire, WS13 6YY	j
3	Environment Agency - National Customer Contact Centre (NCCC)	Telephone: 08708 506 506 Email: enquiries@environment-agency.gov.uk
	PO Box 544, Templeborough, Rotherham, S60 1BY	
4	British Geological Survey - Enquiry Service  British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
5	Lichfield District Council District Council House, Frog Lane, Lichfield, Staffordshire, WS13 6YZ	Telephone: 01543 414000 Fax: 01543 250673 Website: www.lichfielddc.gov.uk
6	Natural England Suite D, Unex House, Bourges Boulevard, Peterborough, Cambridgeshire, PE1 1NG	Telephone: 0845 600 3078 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
7	Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)  Government Buildings, Otley Road, Lawnswood, Leeds, West Yorkshire, LS16 5QT	Telephone: 0113 2613333 Fax: 0113 230 0879
8	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
-	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

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

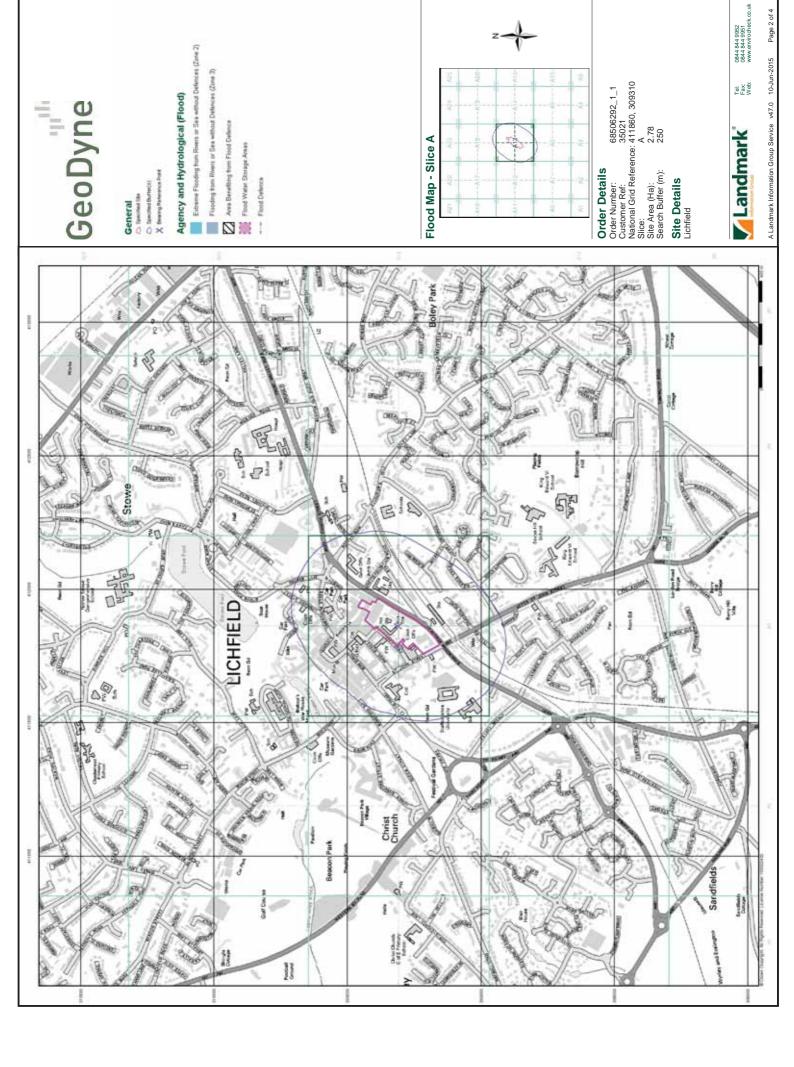


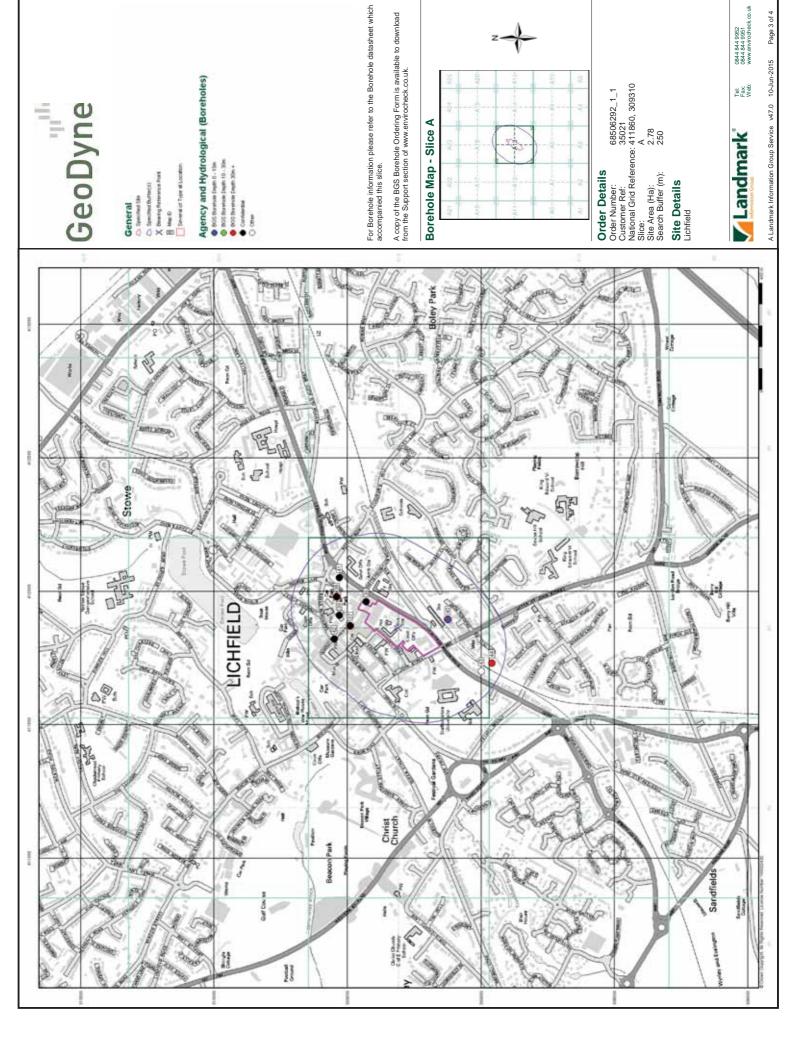


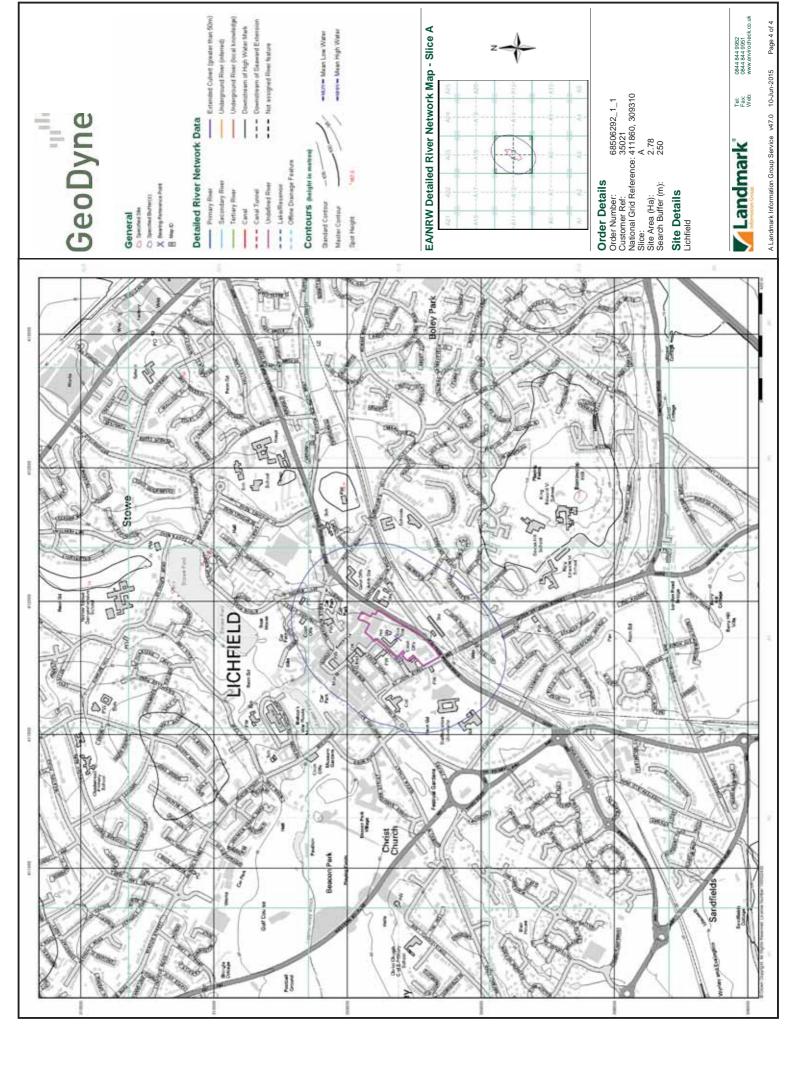
Hazardous Substances

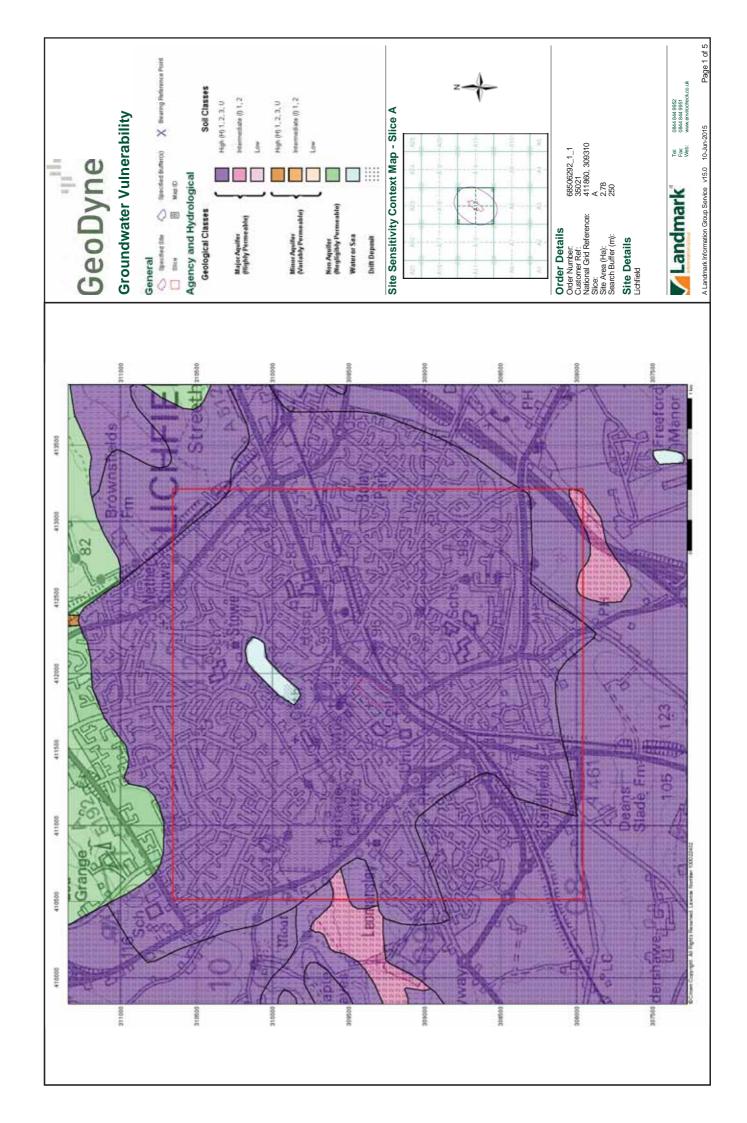


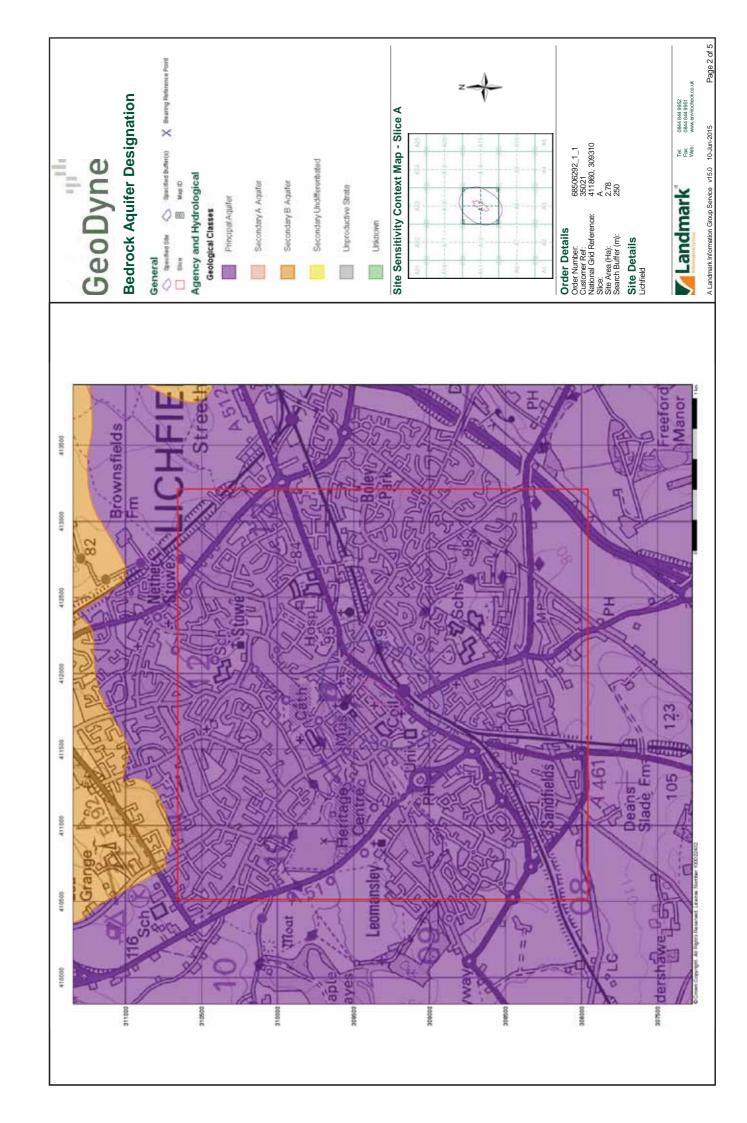
Page 1 of 4

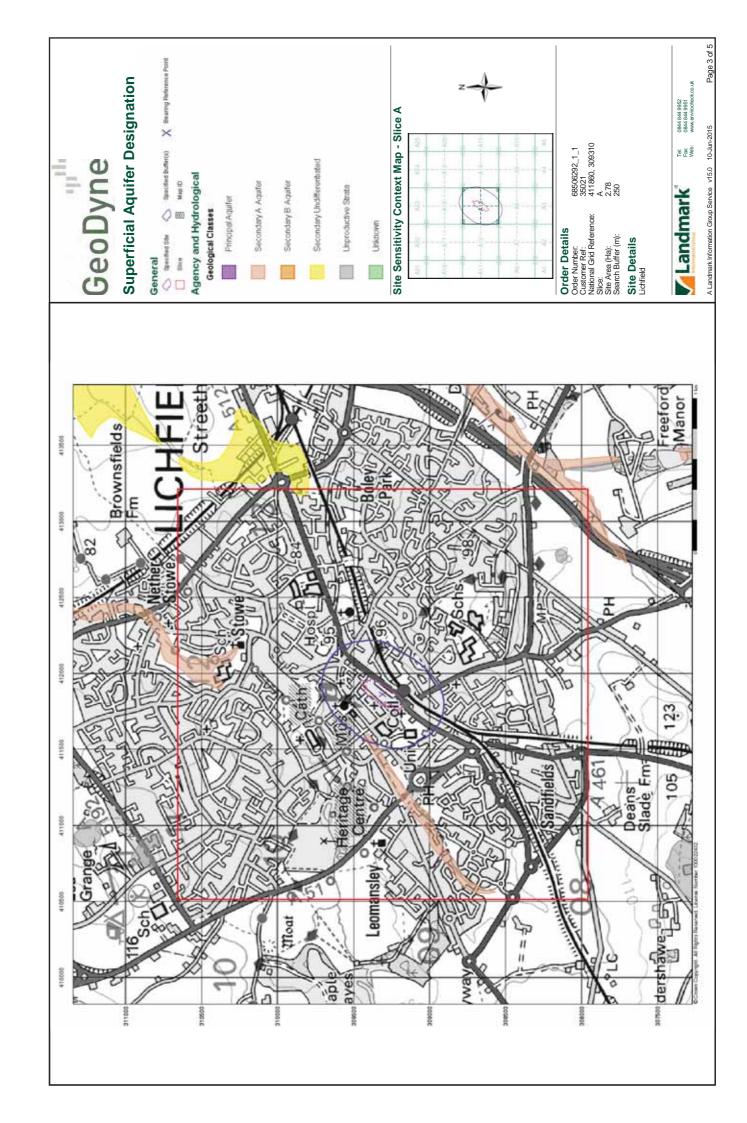


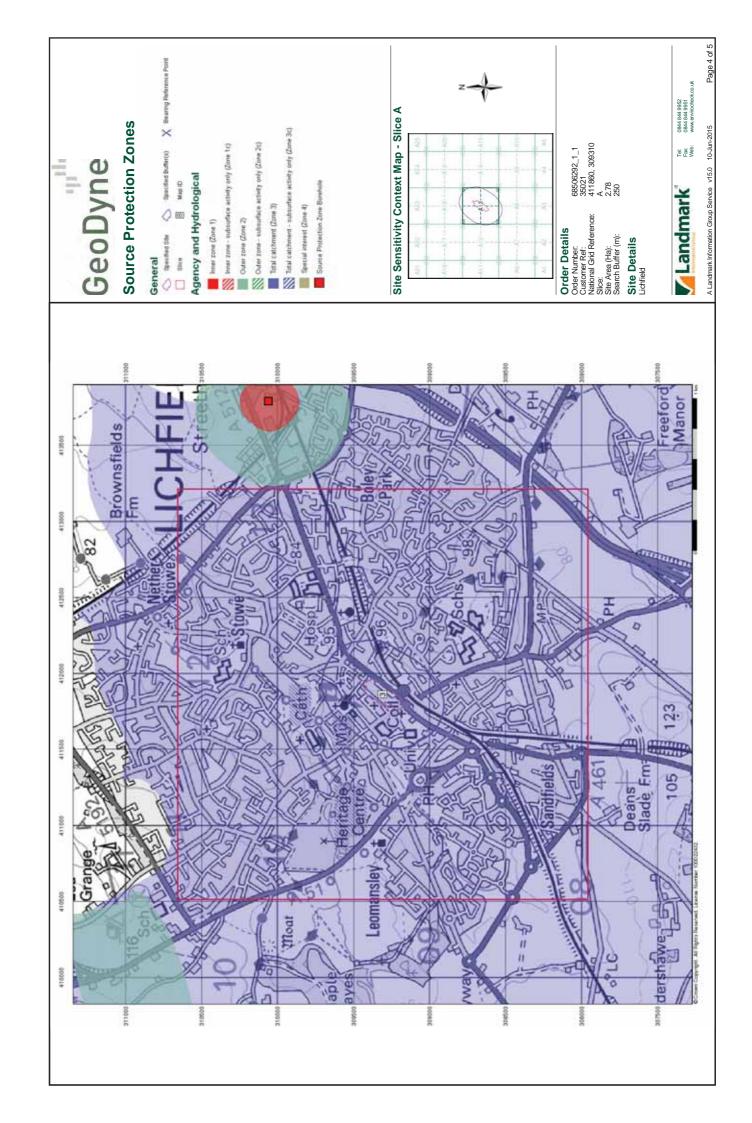


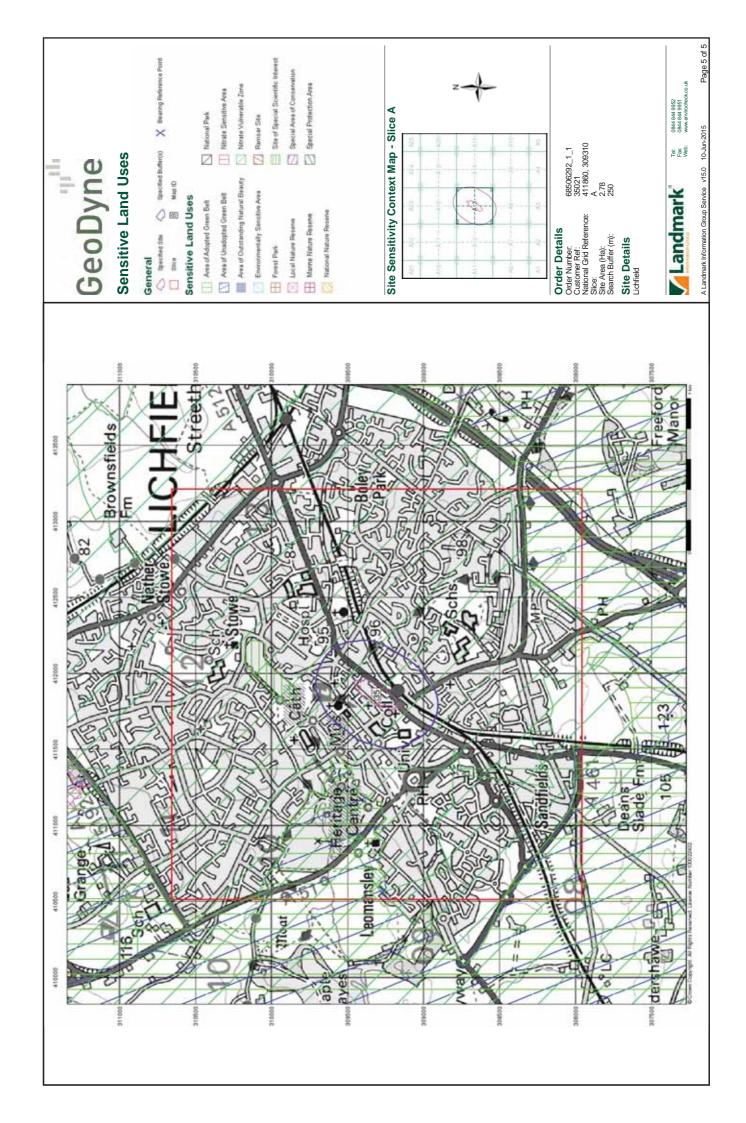


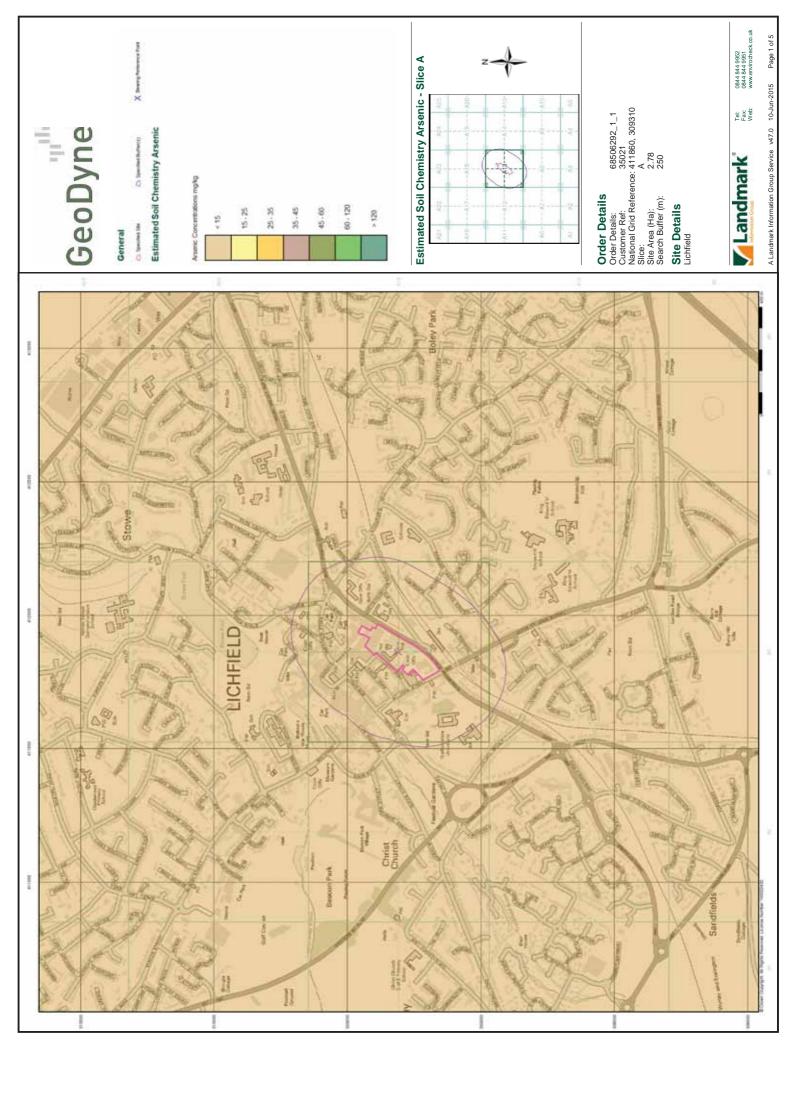


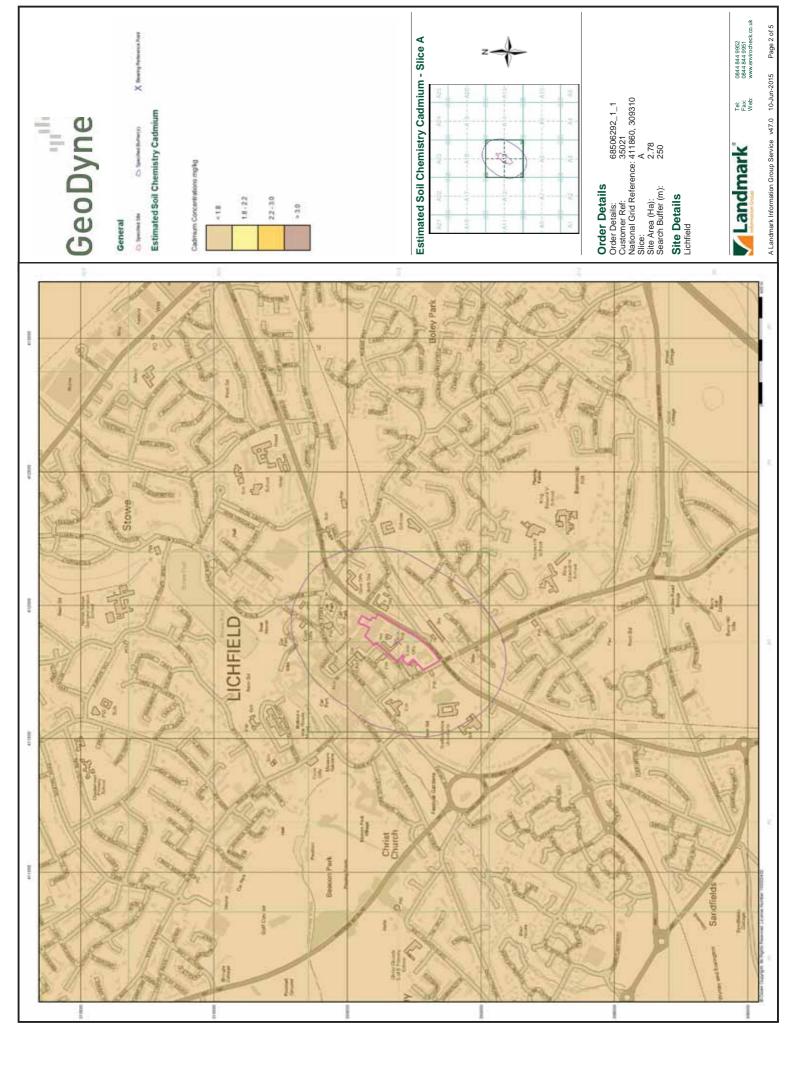


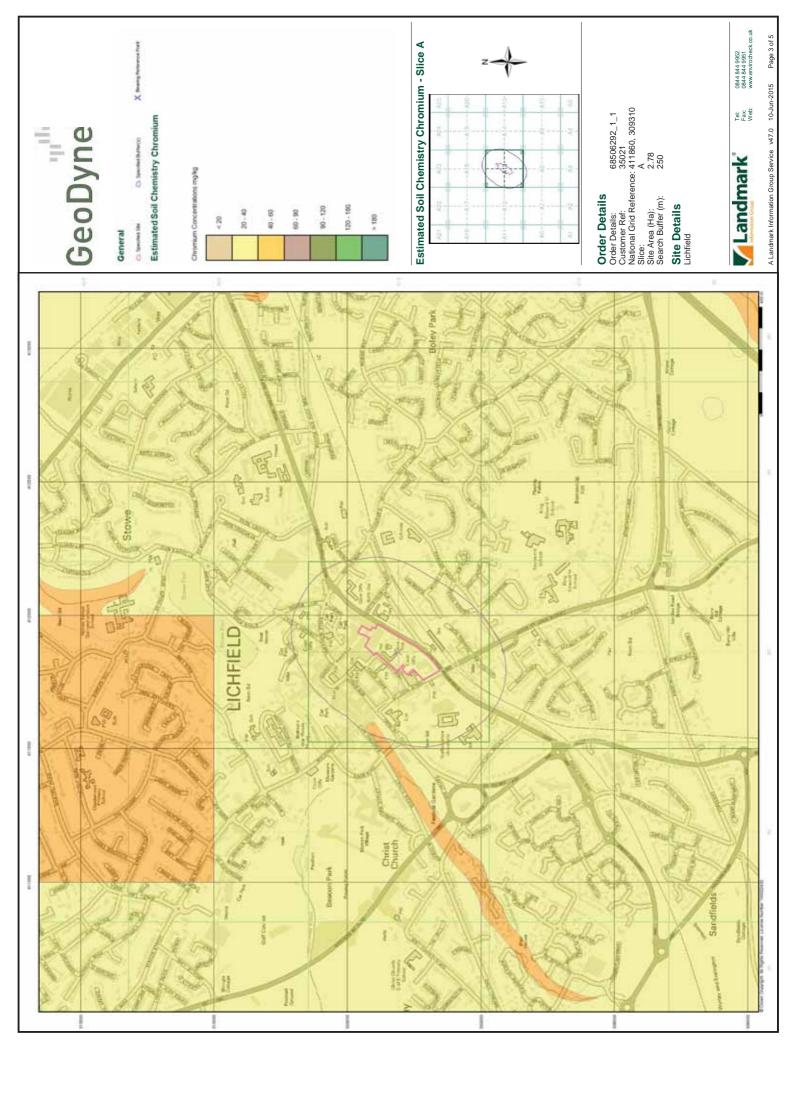


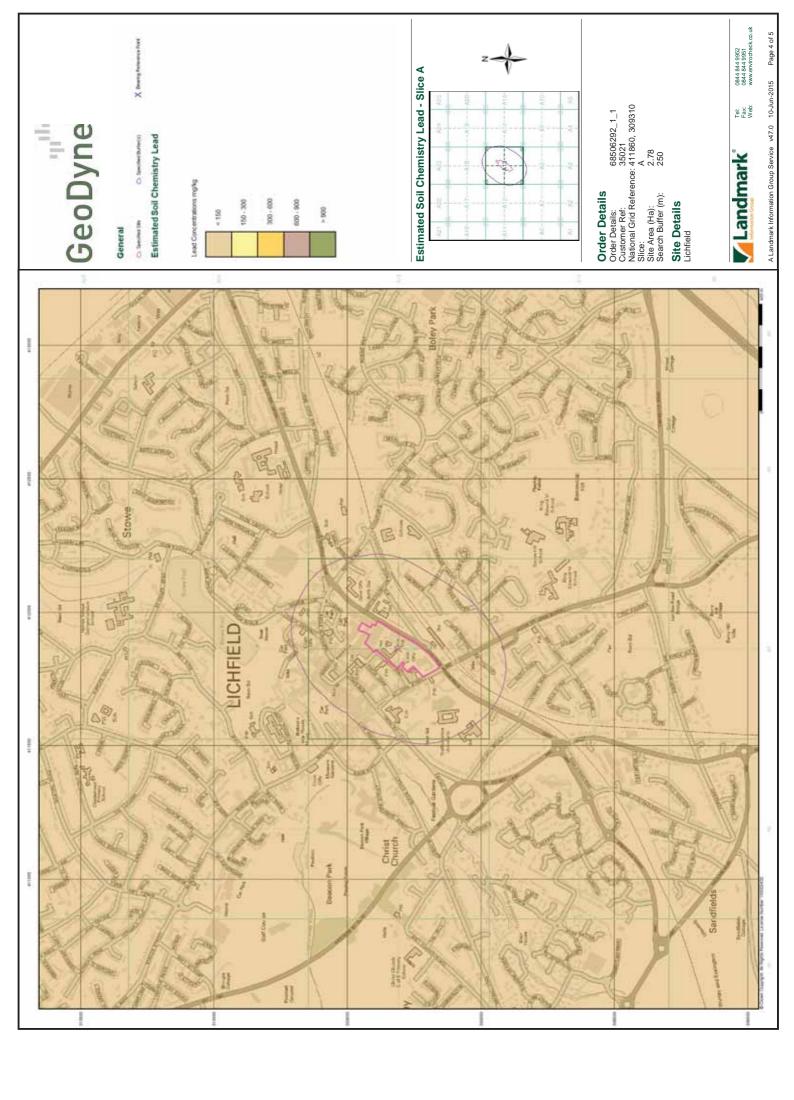


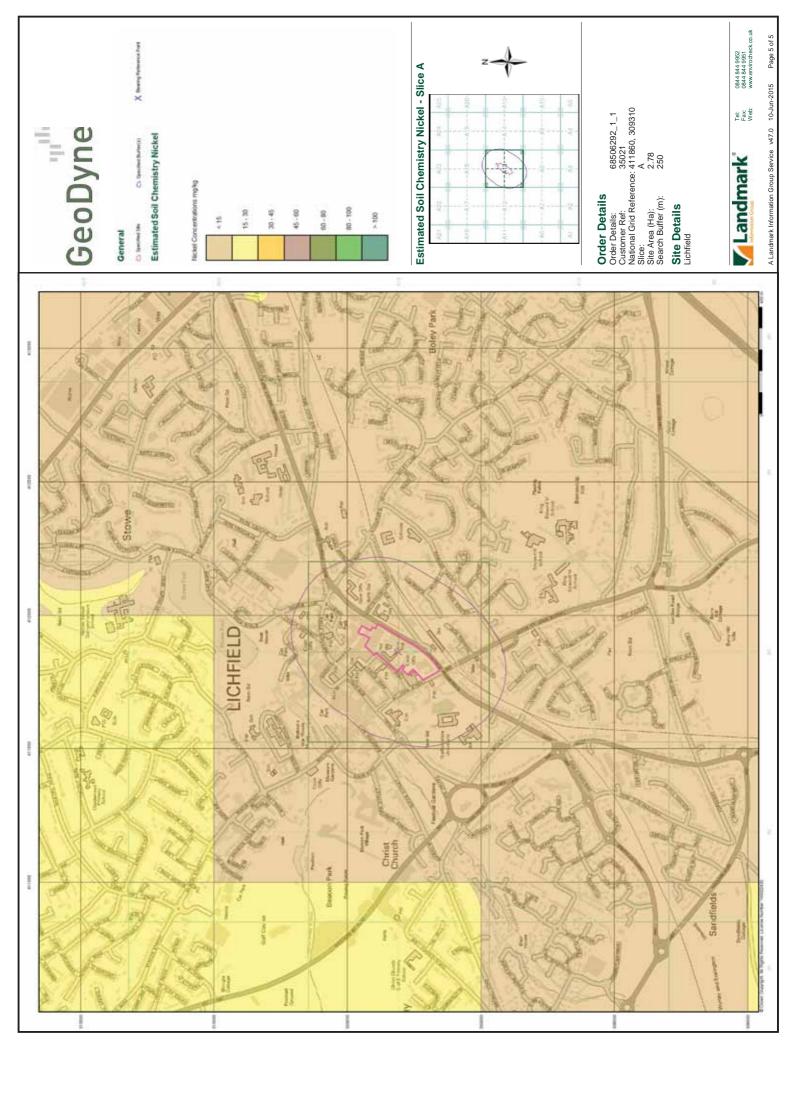














## **Envirocheck® Report:**

# **BGS Boreholes Datasheet**

#### **Order Details:**

**Order Number:** 

68506292\_1\_1

**Customer Reference:** 

35021

**National Grid Reference:** 

411860, 309310

Slice:

Α

Site Area (Ha):

2.78

Borehole Search Buffer (m):

250

#### **Site Details:**

Lichfield

#### **Client Details:**

Mr R Spencer GeoDyne Ltd The Granary Church Lane Thrumpton NG11 0AX

### **Prepared For:**

BSP Consulting 12 Oxford Street Nottingham NG1 5BG





## **BGS Boreholes Summary**

Data Type	Page Number	On Site	0 to 250m
BGS Boreholes	pg 1	None	15

#### 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 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 the attached 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 2015. 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 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.

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

Report Version v49.0



## **BGS** Boreholes Detail

Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
36	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw183 Not Supplied Bakers Lane Redevelopment Lichfield 11 Not Available	A13NE (NE)	8	4	411960 309430
37	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw182 Not Supplied Bakers Lane Redevelopment Lichfield 10 Not Available	A13NE (N)	22	4	411910 309460
37	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw175 Not Supplied Bakers Lane Redevelopment Lichfield 2 Not Available	A13NE (N)	58	4	411870 309490
38	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw181 Not Supplied Bakers Lane Redevelopment Lichfield 9 Not Available	A13NE (NE)	39	4	411960 309490
38	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw179 Not Supplied Bakers Lane Redevelopment Lichfield 6 Not Available	A13NE (NE)	71	4	411970 309520
38	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw178 Not Supplied Bakers Lane Redevelopment Lichfield 5 Not Available	A13NE (NE)	85	4	411960 309540
39	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw177 Not Supplied Bakers Lane Redevelopment Lichfield 4 Not Available	A13NE (N)	75	4	411910 309530
40	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw382 1.2 Telecommunications Tower Sta 0061 Lichfield Tp1 http://scans.bgs.ac.uk/sobi_scans/boreholes/18810750/	A13SE (S)	83	4	411894 309129
40	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw381 2 Telecommunications Tower Sta 0061 Lichfield 1 http://scans.bgs.ac.uk/sobi_scans/boreholes/18810749/	A13SE (S)	86	4	411894 309125
40	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw383 1.85 Telecommunications Tower Sta 0061 Lichfield 2 http://scans.bgs.ac.uk/sobi_scans/boreholes/18810751/	A13SE (S)	89	4	411893 309120
40	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw384 .99 Telecommunications Tower Sta 0061 Lichfield Tp2 http://scans.bgs.ac.uk/sobi_scans/boreholes/18810752/	A13SE (S)	90	4	411893 309119
41	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw180 Not Supplied Bakers Lane Redevelopment Lichfield 7 Not Available	A13NE (NE)	124	4	412050 309530



## **BGS Boreholes Detail**

Map ID		Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
42	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole	Sk10nw176 Not Supplied Bakers Lane Redevelopment Lichfield 3 Not Available	A13NW (N)	133	4	411820 309550
43	Scan:  BGS Boreholes  BGS Reference:	Sk10nw99	A13SW	183	4	411700
	Drilled Length (m): Borehole Name: Link to Borehole Scan:	Not Supplied Wiltell Works Lichfield Not Available	(SW)			309000
44	BGS Boreholes BGS Reference: Drilled Length (m): Borehole Name: Link to Borehole Scan:	Sk10nw2 54.25 Lichfield Brewery Lichfield http://scans.bgs.ac.uk/sobi_scans/boreholes/193813/	A8NW (S)	207	4	411730 308960



## **Data Currency and Contact Details**

BGS Boreholes	Version	Update Cycle
BGS Boreholes		
British Geological Survey - National Geoscience Information Service	April 2015	Quarterly

Con	tact Details	Contact Logo	
4	British Geological Survey - Enquiry Service  British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG  Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk	British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL	
-	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	LANDMARK Information Group	



## APPENDIX F

**Plates** 



Photographs of electricity substation in northeastern part of site

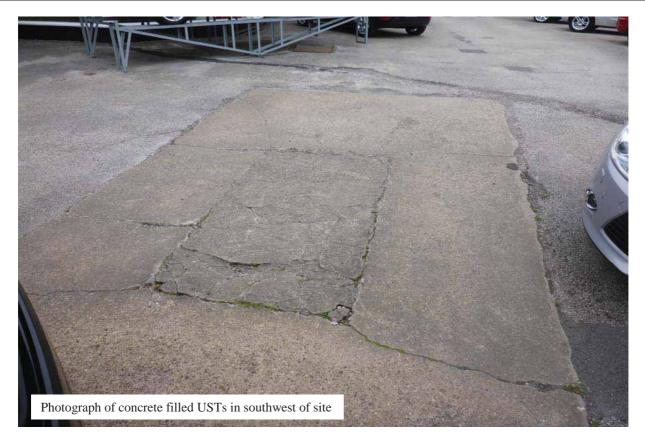






Project No.	15052	Drawn	DJH
Client	Development Securities (Lichfield) Limited a	Checked	
	wholly owned subsidiary of U + I Group PLC	Approved	
Project	Lichfield City Centre	Scale	NTS
	Lichfield	Date Drawn	27.08.15
Title	Photographs of possible former UST features	Rev.	
		Plate No.	2





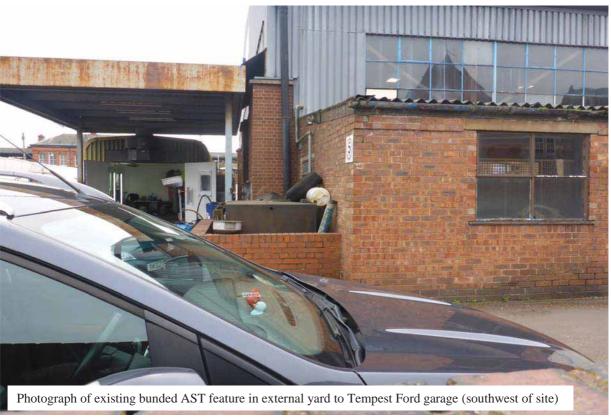


		Plate No.	3
Title	Photographs of fuel storage features	Rev.	
	Lichfield	Date Drawn	27.08.15
Project	Lichfield City Centre	Scale	NTS
	wholly owned subsidiary of U + I Group PLC	Approved	
Client	Development Securities (Lichfield) Limited a	Checked	
Project No.	15052	Drawn	DJH

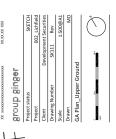


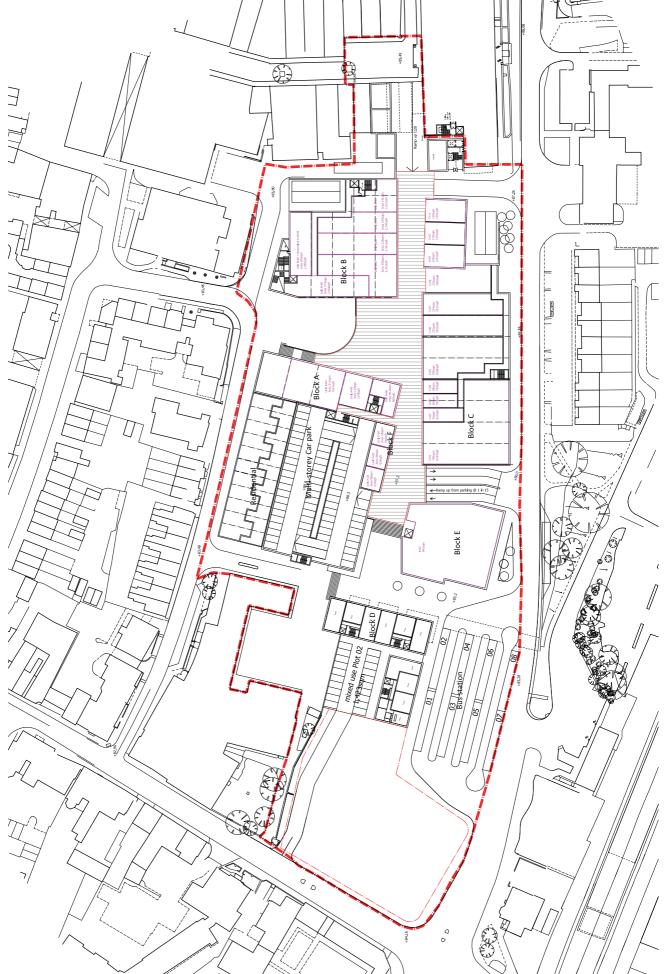


## APPENDIX G

**Proposed Masterplan Options Drawings** 











## APPENDIX H

**Conditions & Limitations** 

## **Standard Conditions & Limitations For Ground Investigation Works**

# OS CONSULTING

12 Oxford Street Nottingham NG1 5BG T: 0115 840 2227 F: 0115 840 2228 info@bsp-consulting.co.uk www.bsp-consulting.co.uk



#### **Phase I Desk Studies**

- 1. Works undertaken to provide the basis of the Phase I Desk Study report comprise a review of information available from a number of sources/parties (potentially also including the Client) together with a walk over of the site (where applicable and included within the quotation). The opinions given in the Phase I Desk Study are based on the information available from third parties/sources that has been obtained within the available timeframe. BSP Consulting assumes all third party information to be true and correct and therefore cannot accept liability for the accuracy of such information supplied.
- Should additional information become available that may affect the comments and opinions made within the Phase I Desk Study, BSP Consulting reserves the right to review such information and make modifications to comments/opinions as appropriate.
- 3. It should be borne in mind that a Phase I Desk Study collates available information to generate a conceptual model of the site. The actual geotechnical and environmental considerations can only be fully quantified by intrusive investigation works to confirm the accuracy of the conceptual site model.

#### **Phase II Intrusive Investigations**

- 1. Our quotation assumes that access to the site will be arranged by others at no cost to ourselves.
- We have assumed that free access is available throughout to the entire site and that works can be undertaken during a single mobilisation.
   Where restricted access is encountered, or where additional unscheduled mobilisations are required, additional costs may be incurred to the client.
- 3. We have assumed that all available information relating to buried services will be supplied by the Client at no cost to ourselves. No responsibility will be accepted for damage to underground services that have not been brought to our prior attention by the Client.
- 4. All excavations will be backfilled with compacted arisings upon completion, with any excess arisings left proud of ground levels. Excess arisings will not be removed from the site unless specifically requested by the Client. Where we are requested to remove excess arisings, all associated costs will be passed to the Client.
- 5. We will attempt to leave the site in a clean and tidy state, however, it must be understood that some disturbance of the site is unavoidable during intrusive works.
- 6. Exploratory holes are positioned approximately on site by BSP Consulting. Should the client require precise locations of all exploratory points, additional fees will be incurred. It must be borne in mind that backfilled trial pits can create 'soft spots', therefore, should the Client wish to designate 'no dig' zones, for example under the footprint of proposed structures, these must be brought to our attention prior to commencement of works.
- 7. Groundwater observations relate to conditions encountered at the time of investigation. It must be understood that groundwater levels may vary as a result of recent climatic conditions or seasonal variation.
- 8. Trial pits and boreholes examine only a small proportion of the total site area. No liability can be accepted for conditions not revealed in exploratory holes, particularly between positions. All extrapolations of available data are given in good faith.

#### Payment

- 1 Payment terms are strictly 28 days from the invoice date.
- 2 Prior to commencement of works, we require receipt of formal written instruction from the Client accepting full financial responsibility for the work
- 3 Receipt of instruction to commence work shall be taken as acceptance and compliance of the foregoing conditions.

#### Liability

1 BSP Consulting offer £5,000,000 Professional Indemnity Insurance (in aggregate over the year). This shall be the limit of our liability for works undertaken. No individual liability shall be implied to, or accepted by, any employee for works undertaken for and on behalf of BSP Consulting.

Managing Director: Eur Ing David Sumner BSc(Hons) MSc CEng FICE MIHT

Directors: Clive Roddick BSc(Hons) CEng MICE Mark Rayers BSc(Hons) MCIT MIHT CMILT Jef Todd EngTech TMICE Carl J Hilton MSc BSc(Hons) CEng MIStructE MAPM

Associate Directors: Jason Davenport BEng(Hons) MIHT Tony Goddard BEng(Hons) CEng MICE

Associates: Paul Whittingham BEng(Hons) CEng MIStructE Paul Epiphick BSc(Hons) CEng MICE

Consultant: Martin Breakwell BSc(Hons) CEng MICE









Ы