Contaminated Land
Air Quality
Environmental Audit

SMITH GRANT Environmental Consultancy LLP

Partnership No: OC 300776

PROPOSED BATTERY STORAGE FACILITY, NEWBURN HAUGH, NEWCASTLE-UPON-TYNE

STAGE 1 GEO-ENVIRONMENTAL ASSESSMENT

For: Axis P.E.D & Balance Power Projects

July 2023

R3127-R01-v4

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Stage 1 Geo-Environmental Assessment

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Signed for Smith Grant LLP

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BATTERY STORAGE FACILITY, NEWBURN HAUGH

STAGE 1 GEO-ENVIRONMENTAL ASSESSMENT

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1. Introduction

1.1. General

1.1.1. Balance Power Projects (BPP) originally proposed to submit a planning application to Newcastle City Council (NCC) for the construction of a battery storage facility on a parcel of land within Newburn Haugh Industrial Estate, off Lemington Road, Newcastle-Upon-Tyne.

1.1.2. Axis P.E.D. acting on behalf of BP, instructed Smith Grant LLP (SGP) to undertake a Stage 1 Geo-Environmental Assessment for the proposed development and to provide a report to support the planning application. The assessment has been undertaken to determine any potential constraints with regard to ground conditions and contamination that may impact the proposed future use of the site.

1.1.3. The Proposed Development comprises of 28 containerised battery and inverter units, 14 transformers, storage, welfare and control room housed in modular units and private substation with transformers, a DNO room, and a 132kV substation. An access road extending from Northumberland Road to the north. A copy of the site boundary with proposed access road is provided in Drawing 062_PL _NE15 8SG_NEWBURN_HAUGH_PROPOSED_1-1250_REV F with the proposed site layout shown in Drawing 062_PL_NE15 8SG_NEWBURN HAUGH_PROPOSED PLAN_1-500_REV F.

1.2. Scope of Objectives of the Report

1.2.1. This following report describes the Stage 1 Geo-Environmental Assessment undertaken by SGP in accordance with the brief agreed with the client. The assessment has been prepared with reference to the Planning Practice Guidance provided in relation to land affected by contamination[1] land stability[2].under the National Planning Policy Framework (NPPF)[3].

1.2.2. The assessment comprised a review of third-party information on the environmental setting of the site and the site's previous and current uses with respect to potential risks to the environment or human health, and a site inspection. This report contains a qualitative risk assessment, and where appropriate makes recommendations for further investigation and remedial actions appropriate to the proposed future use of the site.

1.2.3. SGP is an environmental consultancy specialising in the risk assessment and remediation of contaminated and derelict land. The report reviewer, Dan Wayland, Partner, is a Member of the Chartered Institute of Water and Environmental Management (CIWEM), an Associate Member of the Chartered Institute of Waste Management (AssocMCIWM) and a Chartered Water and Environmental Manager (C.WEM).

[1] Planning Practice Guidance (PPG): Land Affected by Contamination, issued 12 June 2014, last updated 22 July 2019, www.gov.uk
[2] Planning Practice Guidance (PPG): Land Stability, issued 6 March 2014, last updated 22 July 2019, www.gov.uk

2. Planning and Legislative Context

2.1. National Planning Policy and Guidance

2.1.1. The **National Planning Policy Framework 2021** (NPPF)[3] sets out the Government's planning policies for England and how these are expected to be applied. The Framework provides some general guidance to local authorities on taking land condition into account in planning policies and decisions. Paragraph 174 of the Framework states:

'Planning policies and decisions should contribute to and enhance the natural and local environment by […]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of ***soil,*** *air,* ***water*** *or noise pollution or* ***land instability****. Development should, wherever possible, help to improve local environmental conditions such as air and water quality; and,*

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

2.1.2. The Framework further states in paragraph 183 in relation to Ground Conditions and Pollution that:

'Planning policies and decisions should ensure that:

a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation measures including land remediation (as well as potential impacts on the natural environment arising from that remediation);

b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and,

c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.

2.1.3. Further guidance is provided in the **Planning Practice Guidance on Land Affected by Contamination**[1] which provides guiding principles on how planning can deal with land affected by contamination. The guidance sets out when contamination may be present, the role of planning when dealing with land which may be contaminated, what a contamination risk assessment may contain and how to determine unacceptable risk. The guidance states that where there is a reason to believe contamination could be an issue, proportionate but sufficient

[3] National Planning Policy Framework (NPPF), issued 27 March 2012, last updated 20 July 2021

site investigation information should be prepared by a competent person to determine the existing or otherwise of contamination.

2.1.4. Further guidance is also provided in the **Planning Practice Guidance on Land Stability**[2] which provides guiding principles on how planning can deal with land stability. The effects of land instability may result in landslides, subsidence or ground heave. Failing to deal with this issue could cause harm to human health, local property and associated infrastructure, and the wider environment. They occur in different circumstances for different reasons and vary in their predictability and in their effect on development. The guidance sets out steps to be taken when land stability is suspected to be an issue for a planning application, what a land stability risk assessment should be contained and measures to be taken to mitigate the risk of subsidence. The guidance also sets out the role of the Coal Authority in the planning system to prevent land instability.

2.2. Local Planning Policy and Guidance

2.2.1. Newcastle City Council (NCC) adopted Part 1 of the Local plan: Planning for the Future *'Core Strategy and Urban Core Plan for Gateshead and Newcastle upon Tyne'* in 2015. The plan sets out the Council's overall spatial vision, strategic policies, urban core policies, sub areas and site-specific policies as well as delivery and monitoring to 2030. More recently, NCC adopted Part 2 of the Local Plan: Development and Allocations Plan in 2020. This plan sets out in greater detail the policies included within the Core Strategy and Urban Core Plan. Including policies related to economic prosperity, housing, minerals and waste, transport and accessibility, infrastructure, people, and place.

2.2.2. A specific policy under the Local Plan relates to contaminated land, this is as follows.

- *Policy DM24[4] - Environmental and Health Impacts of Development*
  1. *Proposals will be required to demonstrate that there is no unacceptable adverse environmental and health impacts (including cumulative impacts) from the development. To achieve this development must assess and mitigate the following environmental and health impacts:*
     - *i. air quality and the opportunities to improve air quality;*
     - ii. *noise, vibration and overheating arising from the development;*
     - iii. ***known or suspected land contamination or instability which would place existing or future occupants and users at risk;***
     - iv. *light pollution levels from artificial light on amenity and biodiversity;*
     - v. *odours which would have an impact on amenity; and*
     - vi. *hazardous installations, ensuring they do not place existing or future occupants and users at risk.*

[4] Newcastle City Council Local Plan (Part two) Development and Allocations adopted June 2020.

In addition,

- *Policy CS14[5] - Wellbeing and Health*
  The wellbeing and health of communities will be maintained and improved by:
  1. Requiring development to contribute to creating an age friendly, healthy and equitable living environment through:
  i. Creating an inclusive built and natural environment,
  ii. Promoting and facilitating active and healthy lifestyles,
  iii. ***Preventing negative impacts on residential amenity and wider public safety from noise, ground instability, ground and water contamination, vibration, and air quality,***
  iv. Providing good access for all to health and social care facilities, and
  v. Promoting access for all to green spaces, sports facilities, play and recreation opportunities.

2.3. Legislation

2.3.1. Land contamination can harm human health, groundwaters, surface waters, soils, ecosystems and property. As such it is controlled, either directly or indirectly, through a range of legislation, including, but not limited to:

- Part IIA of the Environmental Protection Act 1990: establishes a system for identifying and remediating statutorily defined 'contaminated land'; and focuses on addressing contaminated land that meets the specific legal definition and cannot be dealt with via other means, including planning;

- Water Environment Regulations 2017: replaces previous legislation and outlines duties of regulators in relation to characterisation and classification of water bodies, environmental permitting, abstraction and impoundment of water;

- Building Standards (Scotland) Regulations 1990: require suitable precautions are taken to avoid risks to health and safety caused by contaminants in ground to be covered by buildings and associated ground;

- Environmental Permitting Regulations: impose provisions to prevent ground and water contamination from operations requiring an Environmental Permit to operate; and implement controls for operations relating to the treatment or handling of contaminated soils.

2.3.2. Similarly, when dealing with land that may be unstable, the planning system works alongside a number of other regimes including Building Regulations and the Coal Authority's responsibility for public safety risks arising from past coal mining activities.

[5] Newcastle City Council Local Plan (Part one) Planning for the future, adopted March 2015.

2.4. National Best Practice and Guidance

2.4.1. The Environment Agency (EA) **Land Contamination: Risk Management Guidance**[6] provides an overarching framework for the assessment and investigation of land contamination. It replaces the previous Contaminated Land Report 11: Model Procedures for the Management of Contaminated Land 2004.

2.4.2. It is designed to be used in a range of regulatory and management contexts such as voluntary remediation, planning, assessing liabilities or under the Part 2A contaminated land regime. The guidance sets out a phased approach to the assessment of land contamination and specifies requirements for reports produced as part of the process, including Preliminary Risk Assessments (PRAs) and Generic and Detailed Quantitative Risk Assessments (GQRAs and DQRAs).

2.4.3. The EA Guidance is supported by, and cross-refers to, an extensive range of additional statutory and non-statutory guidance relating to aspects such as site investigations, protection of groundwater, understanding and managing asbestos, definition of waste and the specific investigation and assessment procedures under Part IIA. Where necessary, such guidance is referred to in the following report.

[6] Land Contamination: Risk Management, issued 8th October 2020, last updated 19th April 2021, www.gov.uk

3. Scope of Assessment and Sources of Information

3.1. Scope of Assessment

3.1.1. In undertaking this assessment SGP carried out the following activities:

- site visit to view the existing site and its setting.
- review of comprehensive historical mapping information.
- review of comprehensive environmental setting information (geology, hydrology, hydrogeology, industrial land uses, mineral excavation / extraction, landfilling / waste management activities).
- review of information relating to potential unexploded ordnance (UXO).
- review of development proposals.
- development of preliminary conceptual site model (CSM) with regards to ground contamination; and,
- provision of recommendations for further investigations and mitigation, where deemed necessary.

3.1.2. The information has been used to determine i) the potential for any ground contamination to be present on or near the site due to historical and current land uses and ii) the potential for any such contamination to pose a constraint to the proposed use of the site and / or impact the surrounding environment. The information has been used to inform the risk assessment and determine any further work and/or investigations that may be required to identify any remedial requirements to ensure the site is suitable for the proposed development with regards to ground contamination.

3.1.3. Information has also been obtained on general expected ground conditions at the site and stability / physical ground conditions where these may constrain the planned development are included where relevant. However, formal recommendations with regards to geotechnical considerations are not included.

3.1.4. Similarly, structural building, asbestos or ecological surveys have not been carried out, although reference is made to relevant information and SGP observations were deemed relevant and applicable.

3.2. Sources of Information

3.2.1. The baseline data has been obtained through a desk top study and site visit. No additional survey or field work has been undertaken as part of this assessment.

3.2.2. The principal sources of information consulted in the preparation of this report include:

Table 3.1: Information Sources

Date and reference	Author and source	Purpose and information content
Topography, geology, hydrogeology and hydrology		
http://mapapps.bgs.ac.uk [Accessed November 2022]	British Geological Survey.	distribution of geological units at surface including drift and artificial deposits, faults and mineral outcrops, borehole logs.
https://www.ordnancesurvey.co.uk/osmaps/ [Accessed November 2022]	Ordnance Survey (OS), Explorer Map, 1: 10,000	general mapping information including structures, boundaries, ground features, water features etc.
http://www.ukradon.org [Accessed March 2023]	Public Health England	mapping defining radon affected areas in England & Wales.
Historical data		
Satellite imagery	Various	recent historical features
Envirocheck Report Historical Mapping 302614758_1_1; October 2022 (provided in Appendix C)	Envirocheck: Landmark Information Group	historical mapping at 1:2,500, 1: 10,000 and 1: 10,560 scales from 1888 onwards.
Information Review		
Envirocheck Report Datasheet 302614758_1_1; October 2022 (provided in Appendix C)	Envirocheck: Landmark Information Group	hydrological, waste, hazardous substances, geological, land uses, and natural stability hazards based on historical data and geological records.
BRE 211	Public Health England	guidance for the installation of radon protection measures.
https://magic.defra.gov.uk/MagicMap [Accessed November 2022]	Defra	web-based interactive map containing information on nature conservation areas, aquifer designations, source protection and nitrate vulnerable zones.
www.zeticauxo.com (provided in Appendix D)	Zetica	unexploded bomb risk mapping.
NCC – SGP (ref: 11.11.22_RE Requesting Contaminated Land Search- Newburn Haugh Industrial Estate)	Newcastle City Council	Contaminated Land Search form submitted to Newcastle City Council Public Safety and Regulation department.
Consultants Coal Mining Report 51003315206001; October 2022 (Provided in Appendix E)	Coal Authority	Coal Mining Report purchased from the Coal Authority detailing past, present, and future coal mining regarding the site.
Coal Mining Risk Assessment by NKC Geotech Ltd (ref: 2223, March 2023)	NKC Geotech Ltd	Report of risks from historical coal mining inclusive of Coal Authority Report

3.3. Site Inspection & Investigations

3.3.1. An inspection of the Site and the immediate surrounding area was undertaken by M Jones, Consultant, on 24th November 2022.

3.3.2. A photographic record of salient features is provided in Appendix B.

3.3.3. Local Authority Consultation

3.3.4. SGP submitted a Contaminated Land Search request to Newcastle City Council on 10.11.22 regarding the previous site location plan. The response has been partially reproduced below; a full copy of the response is provided in Appendix G:

The council notes that the following using historic maps, local knowledge, and Departmental records. All distances given are approximations. The available information is outlined below:

1856 OS Map 1:2500
The site is occupied by Lemington Staiths on the bank of the River Tyne, which runs adjacent the site to the east. Railway lines/sidings are also shown on site servicing the staiths. The majority of land to the S and W appears agricultural. The majority of land to the N is industrial, making up Lemington Glass Works and TyneIron Works, with the addition of what appears to be a row of allotment gardens between the site and the glass works (within the blue line boundary on the submitted location plan). Coke ovens are shown 250 m N and 220 m NE. Limekilns are shown 250 m NE.

1898 Map 1:2500
The site is still shown as occupied by Lemington Staiths on the bank of the River Tyne, including railway lines/sidings. The land to the S and the W still appears tobe agricultural. The land to the N remains occupied by Lemington Glass Works and Tyne Iron Works, however the iron works is now shown as disused. The coke ovens and limekilns are no longer shown.

1921 OS Map 1:2500
The site and the surrounding area appear as previously described, with the only apparent exception being the addition of an "Electric Power Station" shown 110m NE of the site, occupying part of the site of the former Tyne Iron Works.

1936 OS Map 1:2500
Again, the site and surrounding area appear largely as previously described. The land which appeared to be allotment gardens is now labelled as allotment gardens. I would suspect the allotment gardens to have received FBA from the glass works and former iron works as a soil-improver, however as far as I am aware this has not been confirmed.

1950's Maps

The staiths are no longer shown on site, but some of the railway lines remain. Areas of cut and fill are indicated on site. Refuse heaps are shown 15 m N of the site adjacent the allotments, and on the site of the glass works 150 m N. Tanks are shown on the site of the glass works 130 m N and 150 m N, along with an electricity sub-station 150 m N. The former power station to the NE is now shown as a warehouse with a chimney.

1945-1950 Aerial Images

The aerial images show a view similar to that described for the 1950's map above. The chimney at the glass works and warehouse can be seen to be substantially large, approximately the same size as the remaining chimney which is c.115 ft.1960/70/80'sThe site is shown as vacant. Further development of the area has taken place. A "Works" is now located adjacent the site to the S, with tanks (50 m SW, 60 m SW) and an electricity sub-station (75 m W) on the works site. A graphite works is located 250 m S. A caravan park is located adjacent the site to the W. To the N, the glass works (with tanks and sub-station) and the warehouse remain. Significant in-filling of the former channel of the River Tyne immediately to the E of the site has taken place. NCC Shape Files The former channel of the River Tyne to the E of the site is recorded as landfill. There is also additional landfill on the site of the former graphite works, 170 m

BGS Maps

The drift geology for the site and most of the area to the W, S and E is recorded as alluvium. The in-filled river channel is recorded as made ground. The drift geology N of the site is recorded as till (diamicton). The solid geology is recorded as the Pennines Lower Coal Measures formation, consisting of interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part.

Notes

The site has not been identified for inspection under Newcastle City Council Contaminated Land Inspection Strategy. If proposals were brought forward for development, any planning approval would require an intrusive site investigation and risk assessment.

3.4. Previous Investigations

3.4.1. SGP has obtained a previous Phase 1 Geo-Environmental Study produced by WSP in August 2019 (ref. 70052051) on behalf of Homes England. The report forms appendix G1 of Chapter G (Ground Conditions and Contamination) from an Environmental Statement.

3.4.2. The report does not cover the Site but refers to land to the west which was historically occupied by Stella North Power Station and a graphite works. The site is split into multiple plots within the report with the closest plot to the site being Plot 10, located approximately 200m to the west.

3.4.3. The report refers that the former power station and graphite works was demolished in the early 2000's and that remedial works were undertaken to a commercial / residential land use standard.

3.4.4. The report refers to a ground investigation carried out by Ove Arup and Partners in 1994 and 1998 and that a reclamation strategy was developed by WSP based on the site investigation data. A copy of the reclamation strategy has not been seen but is understood to have included lime neutralization of acid fill, recycling of silicon carbide and graphite waste, ex-situ treatment of minor pockets of mineral oil impacts soils, screening and stockpiling of demolition material containing excavation, excavation and re-compaction of made ground fill above the water table and grouting of shallow mineworkings underneath development plots.

3.4.5. The reclamation works were carried out between 1999-2001 by Taylor Woodrow and validated by WSP.

3.4.6. A summary of expected ground conditions based on the previous site investigation is presented within the report for each of the plots, the ground conditions associated with Plot 10 which is closest to the Site is as follows:

- Made ground expected to 1.5m bgl including demolition rubble, graphite spoil, clinker, ash, coal and cohesive demolition fill
- Alluvium to 13.5m bgl
- Glaciofluvial deposits to 17.0-22.0m bgl
- Glacial Till to 20-27.0m bg
- Bedrock >38.1m bgl

3.4.7. WSP identified that asbestos, petroleum hydrocarbons, polyaromatic hydrocarbons, and heavy metals as potential contaminants of concern in the placed fill within Plot 10.

4. Site Location and Development Proposals

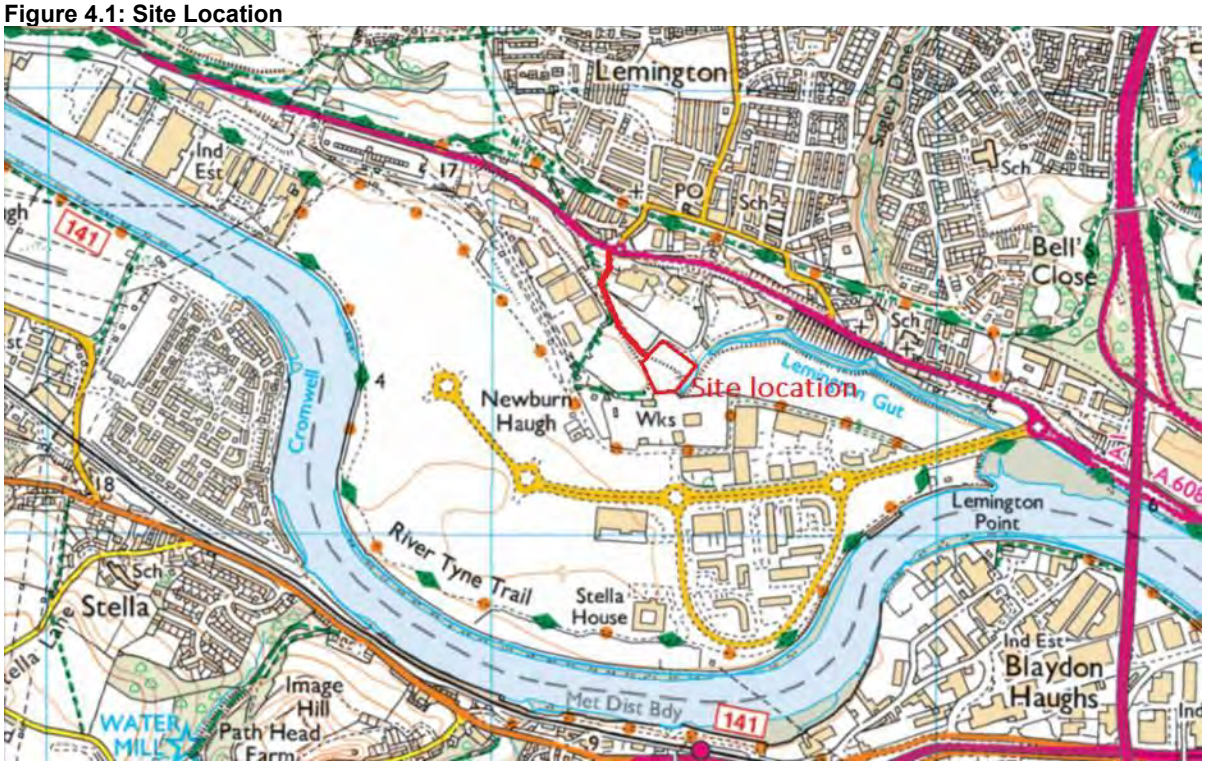
4.1. Site Details and Location

4.1.1. The Site is located on the outskirts of Lemington, lying approximately 0.3km to the south of the town centre, as shown below in Figure 4.1.

Table 4.1: Site Details

Address	Land off Lemington Road, Lemington, Newcastle-upon-Tyne
National Grid Reference	418392, 564364
Local Authority	Newcastle-upon-Tyne
Site Areas	Approximately 1ha
Current Use of Sites	Timber Merchant
Proposed Use	Battery storage facility

Figure 4.1: Site Location



4.2. Proposed Development

4.2.1. The Proposed Development comprises of 28 containerised battery and inverter units, 14 transformers, storage, welfare and control room housed in modular units and private substation with transformers, a DNO room, and a 132kV substation. An access road extending from Northumberland Road to the north. A copy of the site boundary with proposed access road is provided in Drawing 062_PL _NE15 8SG_NEWBURN_HAUGH_PROPOSED_1-1250_REV F with the proposed site layout shown in Drawing 062_PL_NE15 8SG_NEWBURN HAUGH_PROPOSED PLAN_1-500_REV F.

5. Development History and Current Status

5.1. Historical Development

5.1.1. A summary of significant features, developments and land uses shown on historical Ordnance Survey maps is provided in Table 5.1 below. Copies of selected maps are provided in Drawings D01-D06.

5.1.2. Only key features of interest are summarised below; for full details reference should be made to the complete set of historical mapping, as provided by Envirocheck (provided in Appendix C). Where key features have been observed their distance to the closest part of the respective proposed development is made.

Table 5.1: Summary of Development History

Map	Site	Surrounds *(all distances are approximate)*
1856-1857 1:2,500	No mapping available.	Incomplete mapping available. There is a fishing hut 86m east of the site. Located on the River Tyne. Shingle and rough marshland are located to the east / south-east of the site surrounding the river channel.
1859 1: 2,500 *See Drawing D01*	The site is occupied by 2 large industrial buildings, related to the Lemington coal Staiths works, and 1 public house (Doctor Syntax) located on the site. Several smaller buildings of unknown use are also shown. Railway sidings are present in the south of the site, connecting to the large buildings before continuing northwest along the proposed access road. The sidings are part of the Wallbottle Wagonway which once served the Duke Pit, Branch, and the Mineral Railway.	One of the large buildings associated with Lemington Staiths on site extends to the south. Further south of the Staiths buildings is a property named 'Holland', located 57m from the site boundary. The Lemington Glass Works and associated buildings are located approximately 53m north of the site. Close to a public house, namely the Forge Hamma mapped 92m north-east of the site. A row of terraced houses 'Low Row' are located 22m north of the site. Further north from the Lemington Glass Works is a second row of terraced houses, 'High Row', mapped 170m from site. Additionally, there is a collection of buildings northwest of the site, 106m, 11m from the proposed access road. The Tyne Iron Works is located 145m north-east of the site, the works includes associated buildings, limekilns, and gravel pit.

		Lemington Lane Farm is located 375m from the site's proposed access road and a further 345m north of the site boundary. West of the Farm is Lemington Quarry, 460m north of the site. Residential properties (Low Row) extend the length of the proposed access road, at the further point measuring 13m from the site boundary. The remaining surrounding land predominantly to the south and west of the site is characterised as open fields. The rough pasture and grasslands are flood plains of the River Tyne. The Tyne meanders within 1m of the site's easterly boundary before moving further south towards Dents Meadow. At the most southerly point the river is located 450m from the site boundary.
1861 *1:2, 500*	*No mapping available.*	*No mapping available.*
1862 1:10, 560	*No available mapping.*	*Incomplete mapping available.*
1864 *1:10,560*	No significant change to site.	No significant changes.
1895 1:2,500	*No available mapping.*	*No available mapping.*
1897 1:2,500	It is unclear but the two large industrial buildings appear too no longer be present. Railway sidings dissect the site, across the south easterly boundary line, leading to the Lemington coal staiths building located 7m south of the boundary.	Developing infrastructure north of the site, including several rows of terraced houses constructed approximately 295m north of the site, as well as secondary infrastructure such as the Infant school (217m N) and the Station House Public House (290m N). The Tyne Iron Works is now mapped as disused.
1898 1:2,500	No significant change to site.	No significant change to site.
1898 1:10,560	No significant change to site.	No significant change to site.
1899 1:10,560	No significant change to site.	No significant change to surrounds.

1920 *1:2,500* *See Drawing D02*	The number of railway sidings encroaching the site has increased. An embankment has been mapped largely through the middle of the site. In the north corner of the site boundary extending north-westerly adjacent to the proposed access road boundary there are several (approx.12) allotments mapped.	There is an Electric Power Station mapped 94m north-east of the site along the embankment of the River Tyne. Largely increased volume of terraced housing to the north of the site, 20m north of the access road and approximately 250m north / north-west of the site boundary.
1921 1:10,560	No significant change to site.	No significant to surrounds.
1936 *1:2,500*	Two public footpaths encroach the site both entering on the north easterly boundary. The Public House (Doctor Syntax) is no longer present on site. A mound or stockpile is present in the east adjacent to where a footbridge has been constructed over the Lemington Gutter onto Lemington Point	There is a cricket ground and accompanying pavilion building located 16m southwest of the site. There are five allotments to the south of the site, encroaching on the southern boundary. Located adjacent to Holland House. Newburnhall Farm is located north-west of the site within 40m of the proposed access road.
1938 *1:10,560*	No significant change to site.	No significant to surrounds.
1945 Aerial imagery	The public footpaths can be seen crossing the site. The site appears to be covered with grass with Staith house in the centre/southwest. The area of the old pub appears to be exposed dirt with some heaps or stockpiles.	The public footbridge can be seen crossing the river to the southeast of the site and the area to the southwest, across the railway line
1950-1952 1:1,250	The stockpiles noted in the aerial imagery from 1945 have been mapped as refuse heaps in the north / centre of the site, adjacent to the allotments. There is also a tunnel mapped in the south of the site appearing to travel under the railway sidings. One building (Staith House) remains in the centre of site potentially a relic of the Lemington Staiths now mapped as disused.	The footbridge over the Tyne to Lemington Point is now mapped as disused. Lemington Point is now an entirely wooded area approximately, 70m east of the site.
1952 1:10,000	No significant change to site.	The terraced houses of Low Row and High Row are no longer mapped.
1957 1:10,000	No significant change to site.	No significant change to surrounds.

1959-1971 1:2,500 *See Drawing D03*	The railway sidings which extend across the proposed access road and into the site are no longer mapped.	Two ponds and two settling ponds are located south of the site within 22m. Extended gravel pit is located 2m west of the site, lying in the place of the old railway sidings. A pond extending the length of the eastern boundary is mapped. Two further ponds and two settling ponds are mapped to the south, the closest being approximately 22m from the site boundary. Significant industrial development has taken place within the area of Newburn Haugh to the west/southwest with a works located 545m to the west of the Site. Electricity pylons and overhead lines extend from the works which is also served by railway sidings. It is understood this works relates to the former Stella North Power Station. The railway line extends to a second works 250m to the south, this may relate to the former graphite works. Four large circular structures (possible cooling towers) are mapped within a third works along the bank of Tyne approximately 520m to the west.
1959-1969 1:2,500	*No mapping available.*	*Incomplete mapping available*.
1967 1:1,10,000	No significant changes to site.	Reclamation works appear to have taken place to partially infill Lemington Gutter to the immediate southeast
1974-1978 1:10,000	No significant changes to site.	No significant changes to surrounds.

1981 1:1,250	An embankment is mapped through the centre of the site extending north, possibly associated with a large stockpile present on the site. No other structures or features are mapped as being present on the site The proposed access road forms part of a road or track which serves the adjacent caravan works and small unspecified works to the west.	A caravan park is located to the immediate west of the site within 15m, on the former cricket ground area. Allotments to the north and south are no longer mapped. Incomplete mapping north / north-west of the site.
1983-1989 1,10,000 *See Drawing D04*	No significant changes to site.	No significant change to surrounds.
1993 1:1,250 *See Drawing D05*	The embankment is no longer mapped; however, a possible stockpile is present in the north of the site.	A large industrial building mapped as a works is mapped 20m to the north. This forms part of further industrial / commercial premises within Newburn Haugh Industrial estate which extends to the northwest. Land to the immediate south is mapped as a works with several buildings, tanks and a substation present. A spoil heap is also mapped to the south; however, its extent is not shown.
2000 1:10,000 & Aerial Photo	No significant changes to site.	Riverside Way minor road (55m W) is mapped, leading to both the caravan park and the works south of the site. Railway sidings within the surrounding land are mapped as dismantled. The North Stella Power Station to the west with a large circular structure (assumed to relate to part of the power station) and Graphite works to the south are no longer mapped.
2001 Aerial imagery	The site is vacant with grass/exposed soils visible.	The reclamation works of the power station undertaken by WSP and Taylor Woodrow in 2001 can be seen to the south/southwest

2002 Aerial imagery	The site is vacant with more grass visible.	The reclamation works to the south appear to be complete with new road infrastructure development south / south-east of the site including the construction of 3 roundabouts on Kingfisher Boulevard, across the former spoil heap (approximately 160m south). Some large industrial buildings have also been constructed as part of this road development to the south. Reclamation works appear to be continuing to the southwest with different levels visible where excavations have taken place.
2003 1:10,000	No significant changes to site.	No significant changes to surrounds.
2005 Aerial imagery	No significant changes to site.	Increased building infrastructure located 63m immediately south of the site off Kingfisher Boulevard within area of former Graphite works. The reclamation works to the west / southwest appear to be complete with vacant land left and covered with grass.
2006 1:10,000	No significant changes to site.	Further expansion of Kingfisher Boulevard with 2 more roundabouts located 205m west of the site.
2009 1:10,000	No significant changes to site.	No significant changes to surrounds.
2011 Aerial imagery	No significant changes to site.	No significant changes to surrounds.
2012 Aerial imagery	No significant changes to site.	No significant changes to surrounds.
2013 1:10,000	No significant changes to site.	The Newburn Haugh business Parks develops further, located 53m east of the site.
2015 Aerial imagery	No significant changes to site.	No significant changes to surrounds.
2016 1:10,000	No significant changes to site.	No significant change to surrounds.
2017 Aerial imagery	No significant changes to site.	No significant changes to surrounds.
2018 Aerial imagery	No significant changes to site.	No significant changes to surrounds.
2019 Aerial imagery	No significant changes to site.	No significant changes to surrounds.
2020 Aerial imagery	No significant changes to site.	No significant changes to surrounds.
2021 Aerial imagery	No significant changes to site.	No significant changes to surrounds.

2022 1:10,000 & Aerial Imagery	No significant changes to the site. Remains vacant. Aerial imagery shows a track along the proposed access road and through the southern part of the site into the neighbouring industrial site to the immediate south. The site appears to be largely vegetated.	Newburn Haugh Industrial estate largely surrounds the site. Units to the immediate north are mapped as 'Glass works Business Units'. Land associated with the former power station and serving railway sidings remains vacant except for the recent road infrastructure.

Note: Dates refer to dates provided on OS mapping; actual dates may differ

5.2. Present Land Condition

5.2.1. A summary of existing significant features, recent activities and land uses shown on contemporaneous aerial photography, site inspections and anecdotal evidence is provided in Table 5.2 below.

Table 5.2: Present Land Condition

Site Description	The Site currently is an undeveloped open grass/shrub land located between commercial/ industrial premises. There is a minor track road located along the westerly boundary of the site.
Access	Access to the Site is via road, on the Riversdale Way via the A6085 Lemington Road.
Boundaries	The site boundaries consist of open vacant land to the north, a soil bund with a steep bank onto trees east / southeast, a metal fence onto an adjacent industrial works to the south, and a timber yard (Prudhoe Timber) to the west. A large pond was noted along the east / southeast boundary on mapping but only a very small amount of standing water was observed off the northeast corner.
Services / Wayleaves	Service plans have not been obtained as part of this study, but no indicators of underground services were noted during the walkover.
Rights of Way	No rights of way cross the site.
Structures	A small square of bricks embedded into the ground was present in the centre of the site (possible relict flooring or foundation) and a small wooden structure that the timber yard was using as a cover for woodwork was present in the west. by the site entrance. No other structures were observed during the site walkover.
Surfaces / Vegetation	The Site comprises of vacant land with scrub. Mature trees were noted along the east boundary. Made ground consisting of bricks, stone, ash, and coal fragments were observed across the site surface. In the south of the site a black ashy made ground was observed at the site surface. There was evidence of small bonfires in the northeast of the site. No invasive species were noted; however, a formal ecological survey has not been undertaken as part of this assessment.
Contamination Sources	Made ground was observed across the site. Bricks and stone fragments were visible at the site surface during the site walkover and patches of black ashy made ground (consistent with boiler ash) were noted in the south of the site.. Discarded car components and a discarded truck and car was noted along the southern boundary.

5.3. Historical Development Summary

5.3.1. The earliest available mapping (1859-1921) shows the Site to have been occupied by a public house (Doctor Syntax), 2 industrial premises and railway sidings (Wallbottle Wagonway and the Mineral Railway) serving the Lemington Coal Staiths. Despite minor changes such as the mapping including a public footpath in 1887, the site remained largely unchanged. In 1920, the gardens encroaching the site to the north-west are mapped as allotments adjacent to a row of terraced houses (Low Row) located 17m north. Between 1920-1936 the number of railway sidings entering and exiting the site decreased. From 1950 the site was the location of a refuse / slag heap located in the north / centre of the site. Within the same year a tunnel, was mapped entering the site in the south travelling under the remaining railway sidings. One building remains in the centre of the site, Staith house. By approximately 1981-1984 available mapping indicates the site's remaining infrastructure had been demolished, and the removal of spoil heaps and railway sidings had been completed. An embankment from previous activity remains on site. The site has been vacant since approximately 1981 to present day (2022).

5.3.2. According to available mapping the immediate surrounding land has served as mixed use including commercial / industrial premises, residential housing, grass / shrub land, and a major watercourse: the River Tyne. One of the most notable changes to the surroundings of the site is the alignment of the Tyne's River channel. According to available mapping in 1898 the Tyne's large meander was reclaimed to straighten the channel forming the Lemington Gut and form Lemington Point. Further reclamation works occurred in 1967 when further infilling of Lemington Gut took place, eventually resulting in only a limited watercourse remaining.

5.3.3. The wider surrounding land was used largely for industrial workings, from earliest mapping the Lemington Glass Works and Iron Works dominated land to the north and north/ east of the site. The Lemington Staiths (1859-1950) related infrastructure including railway sidings, buildings and track roads became the footprint for future development further south of the site on the banks on the River Tyne.

5.3.4. Significant development to the west and south occurred between 1957 and 1971 when the North Stella Power Station was constructed 500m to the west and Graphite works 325m to the south. The spoil heap associated with the graphite works extended to within 40m of the site's southern boundary although the extent of the heap is not clearly defined. Both the power station and graphite works were demolished in 1999-2000 according to the observed mapping / reporting and by 2001 remedial / reclamation works were underway to prepare the site for commercial / industrial redevelopment.

Figure 3.1. Satellite Imagery of site

Red line shows approximate site boundary: for accurate boundary refer to plans in Appendix A

5.4. Adequacy of Information

5.4.1. Whilst there are some gaps in the historical map coverage it is considered that the available mapping provides adequate coverage of the Site and immediate surroundings to inform the assessment of potential ground conditions and contamination status of the Site.

6. Site Characterisation

6.1. The physical setting of the Site has been derived from the review of information detailed in Section 2. Key details are summarised below; for full details reference should be made to the supporting information provided in Appendix C.

Table 6.1: Environmental Setting

Setting and Topography	The Site is located approximately 0.3km to the south of Lemington Town and lies within a predominately industrial area. The Site is currently located at an elevation of approximately 5m as show by Ordnance Datum on contemporary mapping.
Geology / Ground Conditions	BGS, historical OS mapping and site observations indicate the potential ground conditions to be: Made ground: BGS mapping does not report the presence of made ground although made ground deposits are mapped to the east and are assumed to relate to reclamation works of Lemington Gut. Given the history of the site, particularly during the period where a refuse heap was mapped on the site, then made ground of an unknown depth and composition is anticipated to be present. During the site walkover, ashy made ground soils were exposed at the site surface. Superficial Deposits: The site is underlain by Alluvium deposits of silt, sand, clay, and gravel. Bedrock: BGS mapping shows the Site to be underlain by bedrock of Pennine Lower Coal Measures Formation and South Wales Lower Coal Measure Formation (Undifferentiated) – Interbedded grey Mudstone, Siltstone and Sandstone. Faults: - BGS mapping maps the closest fault 0.56km to the northwest. The Coal Authority Report mapping shows 1 outcrop fault crossing the site from the northwest to the south. BGS Records BGS boreholes records there are no boreholes located within the site boundary, but 39 are located with 250m of the site. However, only 9 of these are available for public viewing. The closest 5 have been summarised below: NZ16SE209/107 In the northwest of the site, this borehole was drilled in 1860 to a depth of 12.5m. Topsoil was measured to 1m, sandy clay to 2.5, and then alternating layers of strong silts and sands and gravels to the base at 12.5m.

	NZ16SE265/1 Located in the southeast of the site. Named 'Lemington Point Tic Group 23', it was drilled to a depth of 22.38m in 1915. 'Surface mud' measured to 1.6m, sand and gravel to 13.9m, and then alternating layers of grey shale/loam shale and sandstone to the base at 22.38m. NZ16SE265/3 Located in the east of the site. Also named 'Lemington Point Tic Group 23', it was drilled to a depth of 23.8m in 1915. 'Rubbish' measured to 3.9m, sand and gravel to 10.6m, and then alternating layers of grey shale/loam shale and sandstone to the base at 23.8m. NZ16SE209/106 (50m NE) Part of the 'Bores At Newburn Haugh' collection of boreholes, it was drilled to a depth of 6.12m, prior to 1965. It recorded alternating layers of silt and sands and gravel at 4m, overlaying clayey shale to the base at 6.12m. NZ16SE265/2 (70m SE) Also named 'Lemington Point Tic Group 23', it was drilled to a depth of 23.16m in 1915. Sand and gravel measured to 10.6m, and then alternating layers of grey shale/loam shale and sandstone to the base at 23.16m.
Natural Ground Stability	The Site is in an area where risks from landslide, running sand, and collapsible ground, and shrinking and swelling clay, are very low. The risk of compressible ground is recorded as moderate-low.
Hydrology / Drainage	The nearest mapped surface watercourse is a tributary/former channel of the River Tyne located within 35m to the north. This watercourse is part of the Water Framework Directive Management Catchments (England). The Site is open grassland and drainage will be predominantly through shallow infiltration to the close tributary for the River Tyne. The site is located within Sediment Issues Priority zone. The Envirocheck report states that the site is not at risk of surface water flooding from 30–1000-year flood extent. The site does however fall into the category for being potentially susceptible to BGS groundwater flooding.
Hydrogeology / Groundwater	The aquifer designations of the underlying geological units are: Superficial Deposits: South of the site: Secondary aquifer A North of the site: Secondary Aquifer Undifferentiated Groundwater vulnerability: medium Bedrock:

	Secondary aquifer A The Site is not located in any Source Protection Zone. The combined groundwater vulnerability is classed as medium. There are no groundwater abstractions within 1km of the site.
Excavation / Mining	The site is located within an area of historical coal mining activity, the last recorded mining took place in 1907. No mining activity took place on the site. SGP has obtained a Consultants Coal Mining Report by the Coal Authority and a copy of this is present in Appendix E. In summary the report findings the following: • The past underground mining activity within the surroundings of the site included 3 mines. Coal has been mined at a depth of between 43-64m. The last known working date is recorded as 1907. • There are no probable unrecorded shallow workings • There are no mine entries within 100m of the site boundary • There are no Coal Authority managed tips within 500m of the site boundary • There are no site investigations, remediated sites or damage notice or claim from coal mining subsidence within 50m of the site boundary A Coal Mining Risk Assessment (ref. 2223) has been undertaken by mining specialist NKC Geotech. A copy of the report is provided in Appendix F, and a summary of the findings are present below: • There is a possible risk to the stability of the site from unrecorded historical shallow coal mining in the Tilley Coal and Busty Coal • The report concluded that *'an intrusive investigation of 6 holes to 30m depth, taken down in all cases to a minimum of 15m below rockhead, will be required to determine whether there are unrecorded shallow workings in the Tilley Coal and the Top Busty Coal'.* • Reporting that any remedial stabilisation works for shallow mineworking's could be limited for areas with proposed permanent structures i.e. the substation. • There are currently no recorded mine shafts requiring investigation.
Landfill / Waste Disposal	The available information shows there is one historical landfill located within the site boundary and extending beyond towards the northwest / northeast. This is referred to as Lemington Gut and was first input in 1980 until 1987. Wastes included inert and industrial waste. Information from the EA confirms that biodegradable/putrescible waste and poisonous, noxious or polluting wastes were all prohibited. This historical landfill relates to the period when an embankment was observed in historical mapping and may relate to the placement of material. Historical mapping from 1950 maps the presence of refuse heaps in the northwest of the site.

	Three additional historical landfills are mapped within 500m of the site: • Newburn Hauugh Landfill (~20m south). Operational between 1979 and 1991 and received inert and industrial waste. • Anglo Great Lakes No.1 (~110m south). Operational between 1990 and 1992 and received inert and industrial waste. • Stella North (~160m southwest). Operational from 1956, unknown end date. Received industrial waste. Potentially infilled land (water) is mapped 56m to the southeast of the site.
Neighbouring Land use / Nearby Contaminative Activities	There are commercial properties and depots part of the Newburn Haugh Industrial Estate. Neighbouring land to the east is lowland grassland bordered by the extended river tributary for the River Tyne located further east. The site is located south of the town of Lemington, with predominantly dense residential and commercial properties. The Riverside Way minor road leads from the A6085 to the south-west corner of the site. There are 19 Active Contemporary Trade Directory Entries within 250m of the site, those within proximity include: - Can AM Chains (150m SE): Chain Manufacturers and Distributors - Vet Direct Services Ltd (148m SE): Veterinary Pharmacies - Enginetech Ltd (85m N): Fuel Injection Services - Apollo Mac Ltd (120m N): Cleaning Materials and Equipment - All Away (120m N): Waste Disposal Services - Stanegate Stoves Ltd (130m NW): Heating equipment – Sales and Service - Sewage Pumping Station (180m W): Waste Storage, Processing and Disposol. Two Pollution Incidents to Controlled Waters have been reported within 250m: - 160m SE: Category 3 – Minor Incident – Significant Incident (October 1995). Miscellaneous – Inert Suspended Soils. - 175m NE – Category 2 – Significant Incident (November 1990). Farm – Pig Yard wash into Freshwater Stream/River. Additionally, the former Glass Works land has been highlighted under Planning Hazardous Substance Consents according to the Envirocheck report due to the storage of arsenic trioxide, arsenious (III) acids and salts which were held in greater than or equal to 1 tonne.
Radon	The Site lies within an area of Lower probability radon area (less than 1% of homes are estimated to be at or above the Action level).
UXO Risk	The UXO risk map identifies the Site as located within an area of Low Risk. A copy of the UXO risk map is provided in Appendix D.
Nature Conservation	No areas of the Site, or surrounding land within 500m, have been identified as

	statutory designated nature conservation sites. The land to the immediate east of the site is within the Priority Habitat Inventory – Lowland Meadow. No invasive weeds, such as Japanese Knotweed or Himalayan Balsam were observed during the site visit, although a formal survey has not been undertaken by SGP and not all parts of the site were inspected.

7. Preliminary Conceptual Site Model

7.1. Methodology

7.1.1. Information from the desk study has been used to identify the likely source-pathway-target relationships that may exist at the Site during and following the proposed development. Principal factors that may determine potential sources of contaminants at the site, receptor vulnerability and potential pathways have been identified and each assessed in turn to derive a Conceptual Site Model (CSM).

7.2. On-Site Sources

7.2.1. The earliest available mapping (1859-1921) shows the Site to have been occupied by a public house (Doctor Syntax), 2 industrial premises and railway sidings (associated with Wallbottle Wagonway and the Mineral Railway) serving the Lemington Coal Staiths. By 1920 an embankment was mapped through the middle of the site which may suggest the placement of soils. Mapping from 1950-52 maps the presence of refuse heaps in the north / centre of the site although it is uncertain whether refuse was deposited, or it has been incorrectly mapped for the placement of spoil or similar materials as possible shown in the earlier mapping. Envirocheck information refers to a historical landfill on the site although the dates of operation were between 1980 and 1987, during this period an embankment is shown on the historical mapping, presumably relating to the placement of fill materials. Wastes are understood to have included inert and industrial wastes but that degradable/putrescible wastes were banned. The landfill was named as Lemington Gut, which also refers to the watercourse to the immediate northeast which was originally part of the River Tyne. It is possible that the wastes are either associated with dredging from Lemington Gut during reclamation works or surplus fill materials that were brought on to undertake filling / reclamation works of Lemington Gut.

7.2.2. Mapping from 1950-52 maps the presence of refuse heaps in the north of the site, although it is uncertain whether refuse was deposited, or if it has been incorrectly mapped for the placement of spoil or similar materials is shown in the earlier mapping. Envirocheck information refers to a historical landfill on the site although the dates of operation were between 1980 and 1987, during this period an embankment to the southeast is shown on the historical mapping, presumably relating to the placement of fill materials. Wastes are understood to have included inert and industrial wastes but that degradable/putrescible wastes were banned. The landfill was named as Lemington Gut, which also refers to the watercourse to the immediate northeast which was originally part of the River Tyne. It is possible that the wastes are either associated with dredging from Lemington Gut during reclamation works or surplus fill materials that were brought on to undertake filling / reclamation works of Lemington Gut.

7.2.3. Made ground is not mapped as being present by the BGS, however the historical presence of the public house, terraced housing, the refuse heap and the landfill would suggest made ground

is present. It was observed during the site walkover that exposed ashy soils were present along the southeast boundary and further southeast. The surface of the timber yard was placed aggregate. The depth of such made ground soils / fills are uncertain, however deeper deposits may be present to the southeast associated with an area of infilled water according to Envirocheck information. Made ground soils, particularly those which are made up of ash, clinker and slag can contain elevated concentrations of heavy metals and PAHs. Given the apparent placement of soils / fills of unknown provenance then there is also potential for other contaminants including hydrocarbons and asbestos to be present.

7.2.4. The Coal Mining Risk Assessment has identified that there is potential risk to the stability of the site form unrecorded historic shallow coal mining activity in the Tilley and Top Busty Coal. The presence of shallow mineworkings is uncertain and can only be confirmed once the recommended mining investigation has been undertaken. If present, shallow mineworkings can be a source of mine gas.

7.2.5. Deep deposits of made ground (if present) can also serve as a source of ground gas (methane and carbon dioxide). The provenance and composition of soil / fills placed is also uncertain and the refuse heap has been historically mapped on site, extending further north. Given the date of the mapping of the refuse heap (1950-1952) the presence of domestic refuse is unlikely as this was not widely landfilled until the 1960's.

7.2.6. The Site lies within an area of Lower probability radon area (less than 1% of homes are estimated to be at or above the Action level).

7.3. Off-Site Sources

7.3.1. From the earliest mapping (1859-1897) the surrounding land has been predominantly industrial in use. There were several large-scale industries operating within the surrounding land including, the Glass Works, Tyne Iron Works, and the Lemington Staithes (associated with major railway constructions and buildings on site). Mapping from 1920 shows construction of an electric power station within 100m of the site to the northeast, by 1959-1971 significant industrial development had taken place with ponds and settling ponds mapped to the south within 22m of the site boundary, a gravel pit to the west within 2m of the site and the construction of Stella North Power Station approximately 545m to the west and a graphite works with large spoil heap 250m to the south.

7.3.2. It is understood that the demolition of the power station occurred in stages, first the cooling towers were demolished (1992) and then the power station in 1997. During the same period the Graphite Works (Anglo Great Lakes Graphite Plant) was also demolished with both sites later undergoing remedial / reclamation works to prepare the sites for commercial land use. The presence of significant mobile contaminants (with the exception to ground gas) which could

migrate onto the site are therefore considered unlikely to be present given the remedial works which are understood to have taken place.

7.3.3. Deep deposits of made ground are anticipated to be present within the surrounding area, particularly associated with land to the south around the former graphite works and power station to the west. Depending on the depth and composition of such materials these could also serve as an off-site ground gas source. Several off-site historical landfills have been identified within the Envirocheck Report, all are referred to as received inert or industrial wastes. Most likely associated with the ash and carbon by-products from the former power station and graphite works.

7.3.4. The potential for on-site migration of contaminants is anticipated to be limited to the generation of ground gases from off-site shallow mine workings and/or deep deposits of made ground.

7.4. Potential Receptors

7.4.1. The use of the Site is for industrial use and would comprise of a series of containers housing 28 battery and inverter units with 14 transformers, storage, welfare and control room housed in modular units and a 132kV substation.

7.4.2. The Site is to be fully covered with compacted granular cover with all structures and enclosed areas to comprise modular units. Other than the installation of an underground water tank, it is assumed that there will be no below ground structures and that foundations will be limited to the area of the substation only. Some utility services may be laid within shallow trenches.

7.4.3. The proposed use of the Site would be considered as low sensitivity for a commercial / industrial use with respect to human health.

7.4.4. The principle vulnerable receptors with respect to potential exposure to any soil contamination that may be present for the proposed use will be:

- construction workers who may be exposed to contaminants during preparatory and construction / refurbishment works;
- future site users and site visitors;
- future maintenance workers;
- neighbouring site users;
- Surface watercourse

7.5. Human Health Risk Assessment

7.5.1. The potential for significant contamination to be present that may pose an acute risk to construction workers during the development is considered low / moderate, although currently

unknown, particularly during any excavation works where existing soils are disturbed and if appropriate mitigation / occupational hygiene measures are not implemented and maintained.

7.5.2. In addition, the generation of contaminated dust and / or track-out during the construction period may impact neighbouring facilities and users.

7.5.3. The Site will be fully covered by hardstanding or aggregate cover which would break the exposure pathway of ingestion and direct contact to any shallow soil contamination, reducing the long-term risk to future site users.

7.5.4. The potential for the accumulation of ground / mine gases are identified either through migration from deep made ground fill or shallow mineworkings (both potentially on and off-site). It is understood that under current development proposals that all enclosed spaces such as the battery and inverter units will be housed in modular units, similar to shipping containers. Similarly, welfare, storage and control rooms will be housed in modular portacabin units. These units reside on steel frames or legs and are raised above ground level, their design forming a natural ventilation void space between the floor of the unit and ground level. The potential for the accumulation of ground or mine gas within such encloses spaces is therefore considered to be low.

7.5.5. It is assumed that most services such as cable routes connecting the battery storage units to inverters / transformers and the substation will be via above ground cables / pipes. Utilities, however, will be installed below ground level, such service ducts could serve as potential pathways for ground / mine gas.

7.5.6. The long-term risks to future site users are therefore considered low / moderate based on the likely contaminants present and the development proposals.

7.6. Property Risk Assessment

7.6.1. Elevated concentrations of sulphates / sulphur materials could be present within the fills which can produce aggressive conditions in concrete. The uses of appropriate sulphate resistant concrete may be required subject to confirmation of requirements through site investigation.

7.6.2. The potential for chemical attack on construction materials (polymers) by possible localised soil contaminants is considered to be low but chemical testing during site investigation should be undertaken to confirm the presence / absence of contaminants which could permeate water supply pipes.

7.7. Controlled Waters Risk Assessment

7.7.1. The Site is in an area of low/moderate sensitivity as far as Groundwater is considered with the superficial deposits in the north and underlying bedrock supporting a Secondary A Aquifer. The Site is not located within a Groundwater Protection Zone and there are no groundwater

abstractions within 1km. Groundwater is anticipated to be influenced tidally although shallow perched groundwater may be present within any granular fills.

7.7.2. The presence of mobile contaminants with the potential to impact the underlying aquifers is low and is likely to be limited to the leaching of made ground soils, however leaching rates are likely to reduce following construction with site-wide cover of hardstanding / gravel. In any case the impact from leaching of made ground site soils is considered to be negligible compared to that of the wider surrounds.

7.7.3. A pond is present 8m to the southeast and a river (Lemington Gut) which flows into the River Tyne is located 78m to the east. The risk from the surface run-off of silts is low but not negligible and are anticipated to be limited to during construction works.

7.8. Preliminary Conceptual Site Model (CSM)

7.8.1. The preliminary CSM has been derived for the site using the information described above, describing the potential contamination sources, pathways and receptors and is summarised below in Table 5.1:

Table 7.1: Preliminary Conceptual Site Model

Receptor	Source / Contaminant	Pathway / Exposure	Pollutant Linkage (in absence of mitigation)	Further Works
1. humans – construction workers / future maintenance workers	metals / metalloids / asbestos / PAHs hydrocarbons	dermal contact / ingestion / inhalation – short term exposure	**Low likelihood** – Made ground is present across the site, based on site observations. The depth and composition of made ground soils is uncertain but is likely to consist of ashy soils as observed at the site surface. A refuse heap was historically mapped as extending onto the site as well as a historical landfill, it is considered likely both are associated with inert fills, however investigation works are required to confirm this.	Site investigation to confirm ground conditions including made ground chemistry and contamination status.
2. humans – future site visitors / workers	metals / metalloids / asbestos / PAHs / heavy hydrocarbons	dermal contact / ingestion / inhalation	**Unlikely** – Made ground is anticipated to be present across the site, however the proposed widespread cover of hardstanding / gravel is sufficient to break the pollutant-receptor linkage with contaminants unlikely to pose a long-term risk.	Site investigation required to confirm sources, however widespread cover of hardstanding will prevent direct exposure of contaminants to future site workers/visitors.
	ground gas (methane, carbon dioxide)	accumulation within voids, confined spaces and service runs to toxic concentrations	**Likely** – Potential for shallow mineworkings both on and off-site and potential for deep made ground deposits on and off-site associated with historical landfill however it is considered unlikely that degradable and putrescible wastes are absent.	Designer to confirm that all enclosed structures will be within modular units which sit on legs/frames above ground level. If this cannot be provided or development plans change to include permanent structures a ground gas monitoring programme will be required.
	radon gas from natural ground		**Very Unlikely** – <1% of homes are estimated to be at or above the Action level.	No action required.
	VOC vapours from soil / groundwater sources		**Unlikely** – No sources of vapour contamination identified on or off-site.	No action required.

Receptor	Source / Contaminant	Pathway / Exposure	Pollutant Linkage (in absence of mitigation)	Further Works
3. humans – adjacent site users	metals / metalloids / asbestos / PAHs / hydrocarbons	windblown / dermal contact / ingestion / inhalation	**Low Likelihood –** Made ground is anticipated to be present across the site and is assumed to consist of ashy fills based on site observations, however clarification of this is required. The depths and chemistry of such fill material is uncertain, however exposure to adjacent site users during the construction stage where dust generation is likely may occur. The long-term (post-development) risk is considered negligible due to the site-wide physical barrier provided by the proposed hardstanding / granular cover.	Site investigation to confirm ground conditions including made ground chemistry and contamination status. Dust suppression techniques to be employed during construction works to limit dust generation.
4. property / services	ground gas (methane)	accumulation within voids, confined spaces and service runs to flammable concentrations	**Likely** – Potential for shallow mineworkings both on and off-site and deep made ground deposits on and off-site. Construction works include only limited excavations during the placement of the concrete slab and service trenches	Site investigation to confirm ground conditions including made ground chemistry and contamination status. Gas meters should be used as standard precautionary procedures before entering any excavations.
	pH, sulphate	chemical attack of buried concrete and plastic materials	**Likely** – there is potential for high sulphate / pyritic conditions to be presence if made ground containing inclusions of ash, clinker and slag are present	Site investigation to include pH, soluble sulphate, total sulphate and total sulphur.

Receptor	Source / Contaminant	Pathway / Exposure	Pollutant Linkage (in absence of mitigation)	Further Works
4. vegetation / landscaping	leachable metals / metalloids may be present within made ground / natural soils	plant uptake	**Low Likelihood** – Aerial imagery suggests site vegetation is in a healthy state. The southeast of the site is characterised as improved grass/shrubland. The site walkover highlighted industrial wate materials present to the southeast and gravel heaps. Made ground soils which may contain elevated heavy metal concentrations could be present. Despite this, the proposed commercial design of the site includes widespread gravel cover with no landscaped areas proposed.	No Action Required
5. ecosystems / protected species & habitats n/a – no ecosystems / protected habitats in immediate vicinity				
6. surface waters (Lemington Gut / Rive Tyne and Pond)	leachable metals / metalloids / PAHs / hydrocarbons	migration via shallow groundwater / surface water run-off.	**Unlikely** – No mobile contaminants identified other than the potential for leaching of made ground soils which will reduce following construction with site-wide hardstanding / granular cover. Leaching of site soils considered to be negligible compared to that of the wider surrounds.	No Action Required
	Silts		**Low Likelihood –** Potential during preparatory / construction works prior to the placement of hardstanding / granular cover that silts could be generated and result in surface run-off	Temporary bunds along eastern and northern boundary to reduce the potential for silt runoff during construction works

Receptor	Source / Contaminant	Pathway / Exposure	Pollutant Linkage (in absence of mitigation)	Further Works
7. groundwater – Secondary Aquifer A Groundwater vulnerability: Low / Medium Pennine Middle Coal Measures - Secondary aquifer A (Bedrock)	leachable metals / metalloids / PAHs / hydrocarbons	migration via saturated zone	**Unlikely** – The leaching of made ground soils will be significantly reduced under current development proposals for site-wide hardstanding / granular cover. The leaching of the made ground soils on the site negligible compared to that of the wider surrounding area.	No Action Required

7.9. Other Considerations

Ground Stability – Natural Hazards

7.9.1. The Site is in an area where risks from landslide, running sand, and collapsible ground, and shrinking and swelling clay, are very low; and no hazard from compressible ground or ground dissolution is recorded.

Ground Stability – Man-Made Hazards

7.9.2. Historical mapping from 1949-1952 shows the presence of a tunnel in the southern part of the site. The tunnel extended beneath an embankment and railway sidings, by 1981 it is no longer shown. It is uncertain whether the tunnel remains or whether it was demolished or infilled. If present, there is potential it could result in some ground instability depending on its integrity.

Coal Mining Risk Assessment

7.9.3. A CMRA was completed by NKC Geotech in 2022 (ref. 2222) following review from the Coal Authority Report (see Appendix E). The CMRA identified mining activity of two seams located below the site, with the potential for unrecorded shallow mineworking to be present within the shallower seams, such as the Top Busty Coal or Tilley Coal. The Blaydon Main Colliery located approximately 1,800m south from the site records the last activity mining under the site took place in 1907.

7.9.4. The CMRA concludes that *'there is a possible risk to the stability of site from unrecorded historic shallow coal mining…. An intrusive investigation of 6 holes to 30m minimum depth, taken down in all cases to a minimum of 15m below rockhead, will be required to determine whether there are unrecorded shallow workings'.* However, it then says, *'The development is for a Battery Storage Facility where subject to evidence provided to the LPA/CA, the investigation could be limited to the area of permanent structure (substation area) only. Remedial stabilisation work by drilling and grouting any shallow mine workings under any proposed permanent structures will be required where there is less than 15m of solid rock cover'.*

7.9.5. NKC Geotech have also consulted with the Coal Authority as part of a similar development (battery storage site) within the locality as the temporary structures which reside within modular units which may fall under the CA exemption list[7] of "non-permanent structures with no significant ground works" (e.g., back-up generators; solar arrays; portacabins). The CA state that if the applicant considers the site (or part of) to fall within the exemption list, then it is for them to demonstrate that a CMRA is not required.

7.9.6. NKC Geotech advises that if it was demonstrated and agreed with by the LPA that investigation is not required within the area of the battery storage facility, an investigation would still be

[7] https://www.gov.uk/guidance/planning-applications-coal-mining-risk-assessments

required within the area of the proposed substation. In any case the proposed scope of investigation should be agreed with the CA in advance.

UXO Risk Assessment

7.9.7. The UXO risk map identifies the Site as being located within an area of low risk with regard to potential unexploded ordnance. No further assessment of the potential UXO risk is deemed necessary. A copy of the UXO risk map is provided in Appendix D.

8. Conclusions and Recommendations

8.1. Conclusions

8.1.1. The earliest available mapping (1859-1921) shows the Site to have been occupied by a public house (Doctor Syntax), 2 industrial premises and railway sidings (Wallbottle Wagonway and the Mineral Railway) serving the Lemington Coal Staiths. From 1950 the site was the location of a refuse / slag heap located in the north / centre of the site. Within the same year a tunnel, was mapped entering the site in the south travelling under the remaining railway sidings. One building remains in the centre of the site, Staith house. By approximately 1981-1984 available mapping indicates the site's remaining infrastructure had been demolished, and the removal of spoil heaps and railway sidings had been completed. An embankment from previous activity remains on site. The site has been vacant since approximately 1981 to present day (2022).

8.1.2. The surrounding area has a long industrial land use including Lemington Glass Works and Iron Works dominated land to the north and north/ east of the site. The Lemington Staiths (1859-1950) related infrastructure including railway sidings, buildings and track roads became the footprint for future development further south of the site on the banks on the River Tyne. Historical reclamation works have also taken place to the east with the infilling of a meander of the River Tyne to form the Lemington Gut, a tidal watercourse which currently remains. Within the wider area a former power station (Stella North) was constructed between 1957a and 1971 545m to the east and a graphite works with spoil heap 250m to the south. Both were demolished in 1999-2000 and subject to remedial and reclamation works to prepare the site for commercial / industrial land use.

8.1.3. Made ground is anticipated to be widespread across the site, however the depth and composition remains uncertain. Ashy soils were observed in the southeast at the site surface during the site walkover, and this could be associated with historical embankments / refuse heaps. The presence of domestic refuse is unlikely given the age in which refuse heaps were mapped, however this can only be confirmed through investigation. Similarly, a historic landfill is mapped on the site, with information suggesting the filling of inert and industrial waste with information confirming the EA prohibited the import of degradable or putrescible wastes. There is therefore some uncertainty on the composition of fills on the site and potential deep deposits could be present.

8.1.4. The presence of ashy fills which have been observed can contain elevated concentrations of heavy metals and PAHs which could exceed industrial / commercial generic risk assessment values. Similarly, the placement of fills from unknown sources could contain asbestos and hydrocarbons. Ash fills can also contain elevated sulphate which can give result in aggressive concrete conditions for concrete.

8.1.5. The presence of deep fills both on and off-site and the potential for shallow mineworkings can give rise to ground / mine gas resulting in elevated concentrations of carbon dioxide (asphyxiant) and methane (flammable) as well as severely depleted oxygen.

8.1.6. The CMRA identified that there is a possible risk to the stability of the site from past activity in the Tilley Coal and Top Busty Coal.

8.1.7. A tunnel was mapped in the south (1949-1992) of the site going beneath an embankment and railway sidings and by 1981 it was no longer shown. It is uncertain whether the tunnel remains, has been infilled or removed. If the structure remains there is potential for collapse which could result in surface instability.

8.1.8. The proposed use of the Site is industrial in nature and includes full surface hardstanding or areas of aggregate to form a surface cover across the site. A series of batteries will be housed in storage containers (shipping containers) whilst the welfare, control room and storage will be located with portacabin units or similar rather than permanent buildings. A substation will also be constructed with access road. Some landscaped areas will be included in the north and the south of the site.

8.1.9. The risk of exposure to future site users to underlying ground conditions is considered low.

8.1.10. Any shallow ground contamination present could pose an acute risk to site workers during construction works and future maintenance workers and suitable mitigation measures and precautions would be required. Any services may require laying trenches backfilled with clean material and provided with suitable construction material.

8.1.11. The risk to future users due to ground / mine gas is low due to the nature of the proposed construction. Ingress of ground gas is unlikely under current proposals where a venting space is present beneath the floor and the modular units and the gravel which will allow dispersion and dilution of any ground gases present. It is understood that construction works will be limited to shallow excavations to install services. Gas meters should be used prior to entering any excavations as part of a standard precautionary procedure.

8.1.12. It is concluded that the main risk to human health is to construction workers, particularly during any excavation / ground disturbance works which may result in direct contact / inhalation of contaminants if present.

8.1.13. Similarly, releases (associated with existing ground contamination) from the site with the potential to cause pollution or harm in the immediate surrounds are most likely during the construction phase when the maximum level of mechanical disturbance can be anticipated.

8.1.14. Due to the close proximity of two surface watercourses, a pond to the immediate east and Lemington Gut there is potential for the surface run-off of silts during construction works.

8.2. Recommendations

Contamination

8.2.1. It is recommended that a site investigation is carried out across the site to determine the composition and chemistry of shallow soils. This could be undertaken to satisfy any contaminated land conditions once planning permission is granted. Such works could be completed concurrently with any geotechnical investigation to inform the structural design / bearing capacity. Sampling of the soils should include analysis for a range of typical industrial contaminants including pH, heavy metals, speciated PAHs, fractionated hydrocarbons and asbestos.

8.2.2. A programme of ground gas monitoring is not considered necessary due to the proposed design of the facility where enclosed spaces are limited to within modular units which reside above ground level on legs / frames and therefore break the migration pathway for any mine / ground gas. However, if design proposal changes to incorporate permanent enclosed structures situated on ground level, then a ground gas monitoring programme would be required.

8.2.3. The proposals for further investigation with regards to ground contamination should be agreed in advance with the NCC Contaminated Land Officer. However, SGP considers that the site is suitable for the proposed use with regards to ground contamination subject to implementation of certain mitigation measures.

Coal Mining

8.2.4. The Coal Mining Risk Assessment identified that an intrusive investigation is required to determine the presence of shallow mineworkings and the overlying deposits to confirm remedial requirements.

Other Considerations

8.2.5. It is assumed that a geotechnical investigation will be undertaken to confirm the shallow ground conditions and bearing capacity of the underlying stratum to inform the design of the development. This should include the confirmation of the depth of made ground and could be carried out concurrently with the recommended contamination investigation.

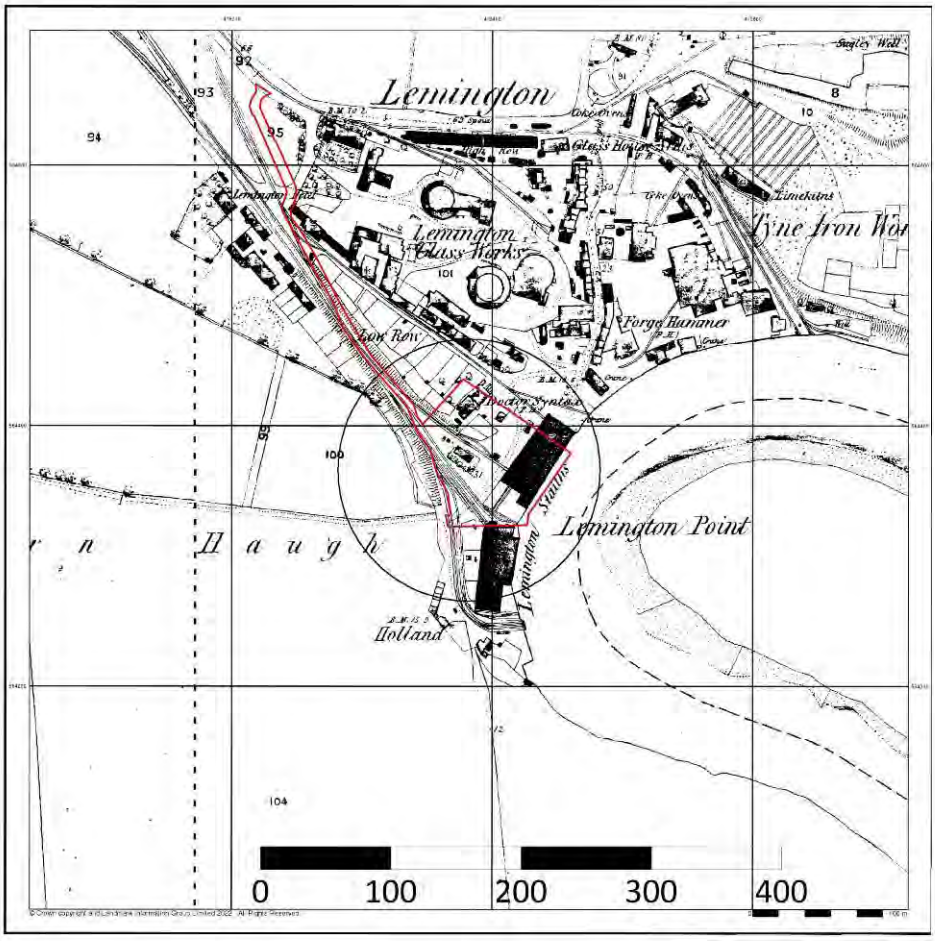
8.3. Limitations

8.3.1. This report has been prepared by SGP for the sole and exclusive use of Axis P.E.D Ltd. and Balance Power Projects. Reasonable skill, care and diligence has been exercised within the budget available, and in accordance with the technical requirements of the brief. Notwithstanding the efforts made by the professional team in undertaking the assessment and preparing this report, it is possible that other ground conditions and contamination as yet undetected may exist. Reliance on the findings of this report must therefore be limited

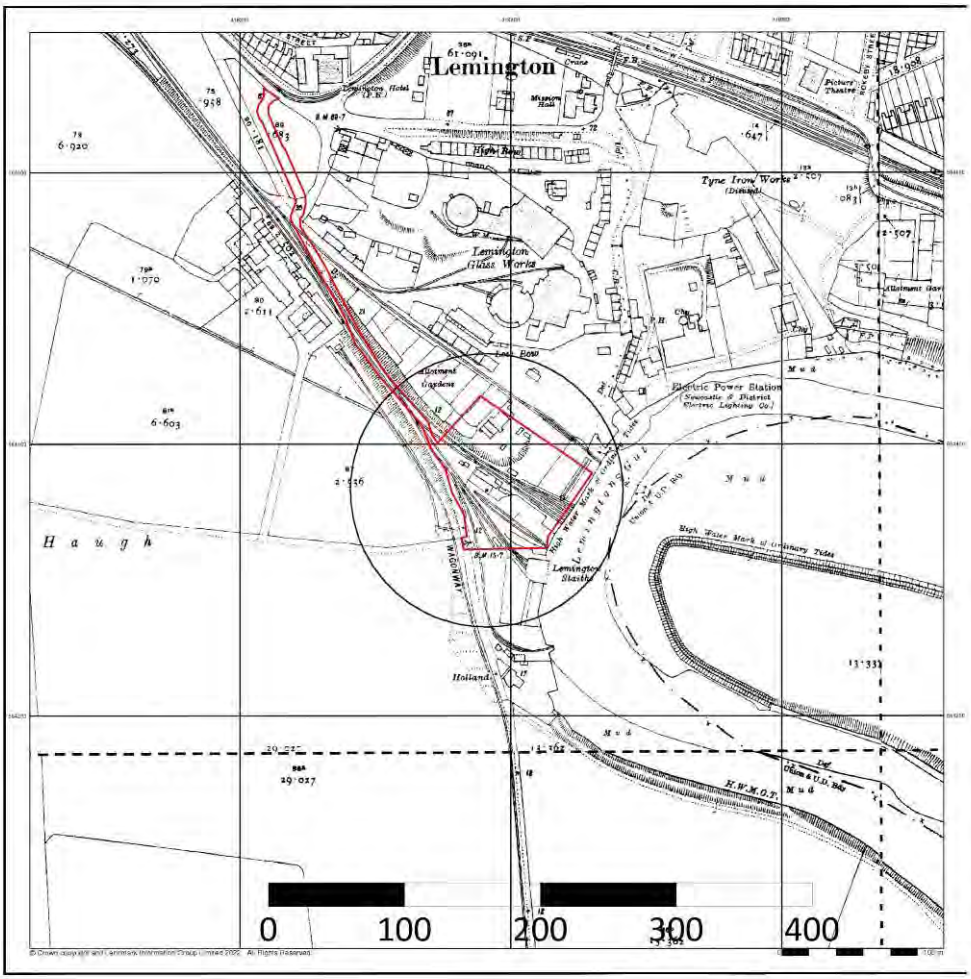
accordingly. Such reliance must be based on the whole report and not on extracts which may lead to incomplete or incorrect conclusions when taken out of context.

8.3.2. SGP reserves the right to alter any of the foregoing information in the event of new information being disclosed or provided and in the light of changes to legislation, guidelines and responses by the statutory and regulatory authorities.

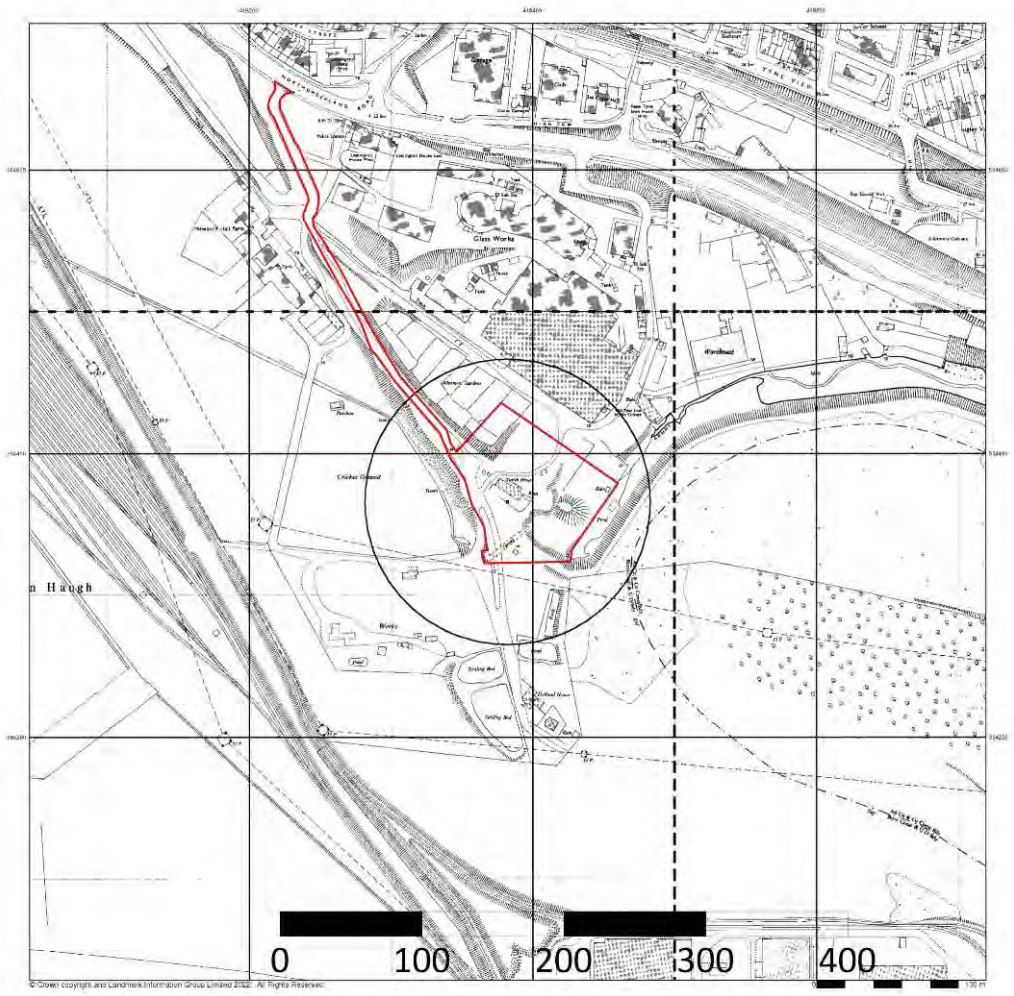
DRAWINGS



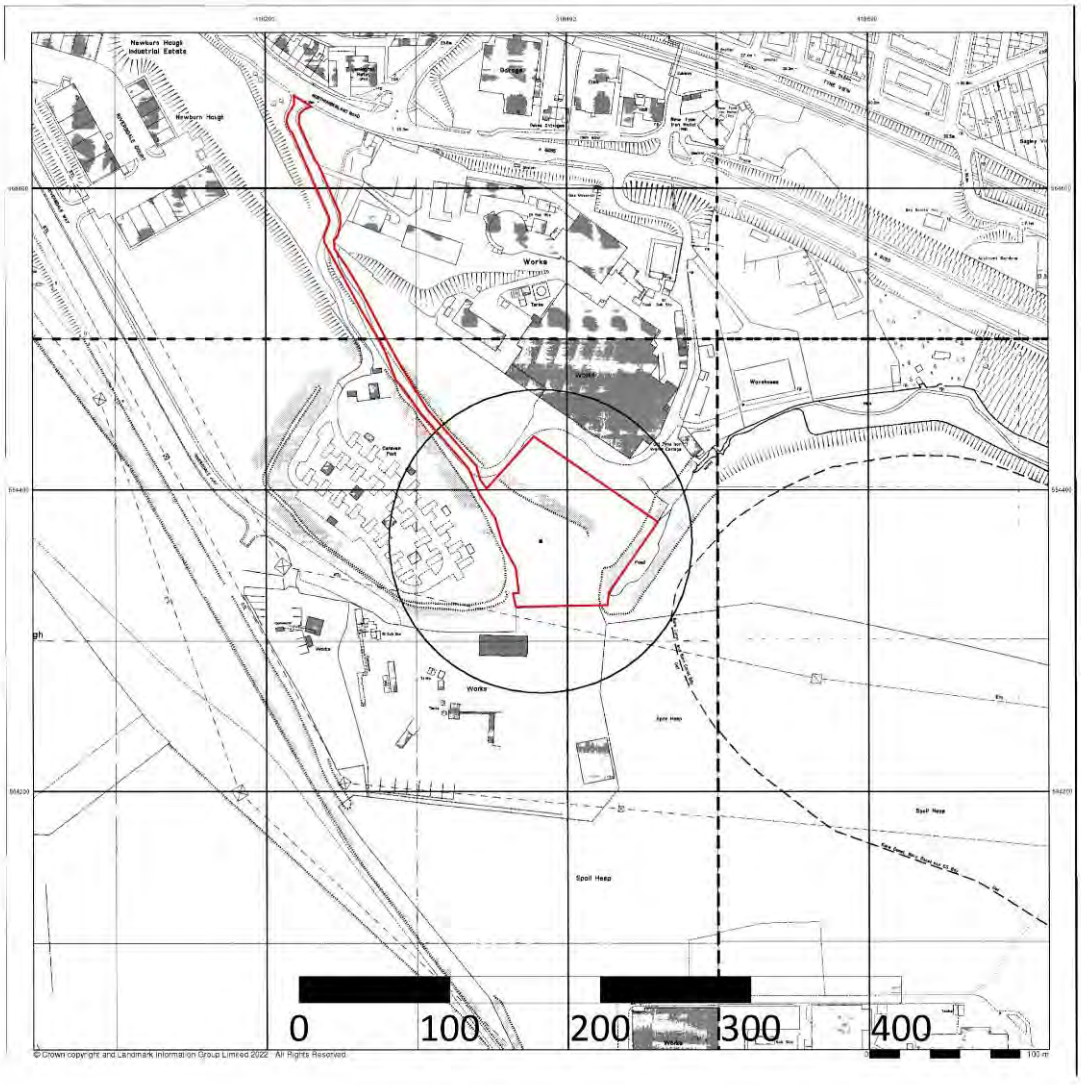
D01: Historical Map – 1859 (1:2,500 scale)



D02: Historical Map – 1920 (1:2,500 scale)



D03: Historical Map – 1959-71 (1:2,500 scale)

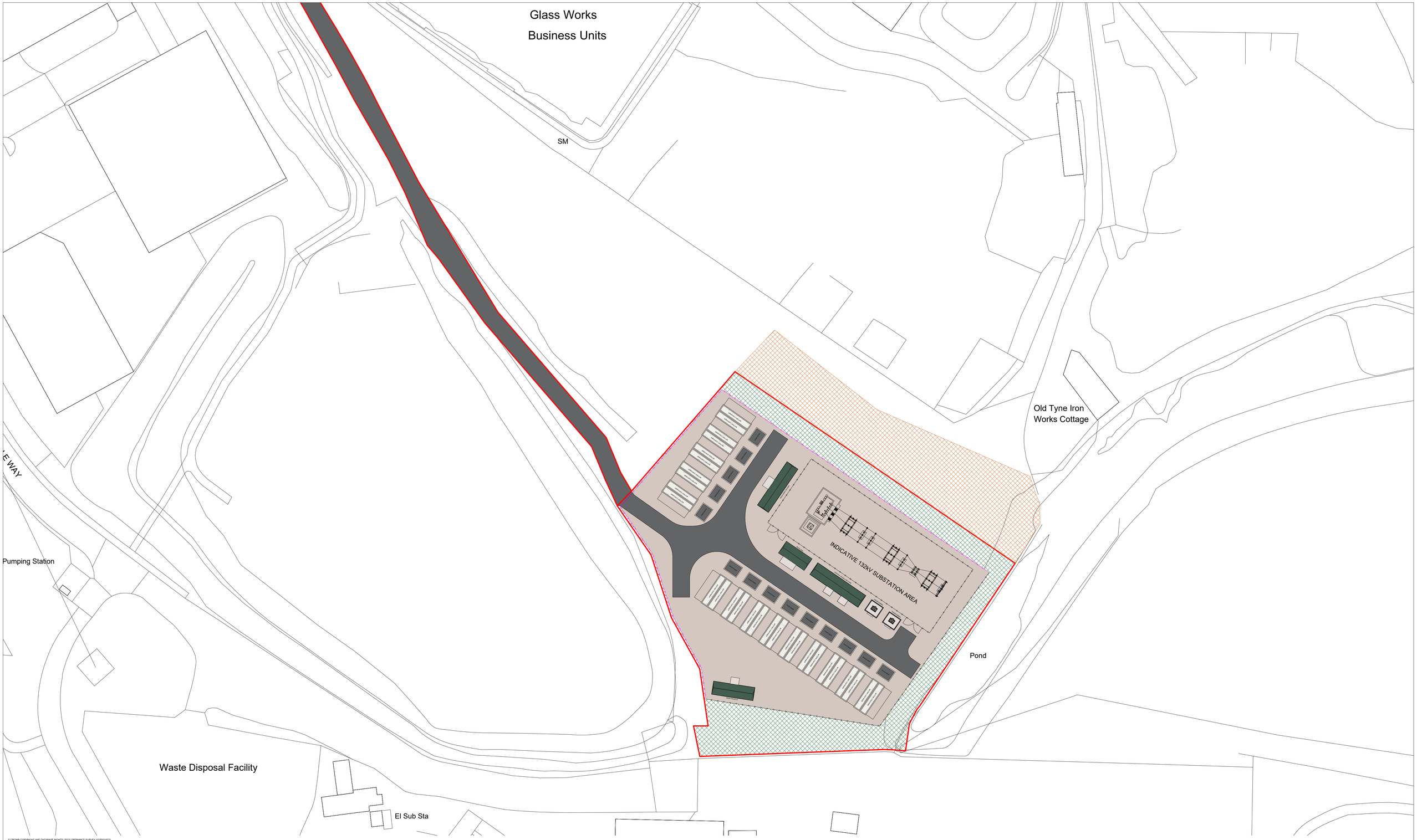


D04: Historical Map – 1983-89 (1:2,500 scale)

D05: Historical Map - 1993 (1:2,500scale)

APPENDIX A

Proposed Layout



APPLICATION SITE | PROPOSED SECURITY FENCE | PROPOSED ACOUSTIC FENCE | PROPOSED ACCESS ROAD | PROPOSED SITE SURFACE | PROPOSED LAYDOWN AREA | PROPOSED PLANTING SCHEME | PROPOSED SERVICE STRIP

0m 10m 20m 30m 40m

N

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DO NOT SCALE FOR CONSTRUCTION PURPOSES

NOTES

(1) N/A

EQUIPMENT LIST

BATTERY CONTAINERS
INVERTER & TRANSFORMER MODULES
DNO ROOM
TRANSFORMERS
PRIVATE SUBSTATION
WELFARE & CONTROL ROOM
STORAGE ROOM

PROJECT NUMBER
062 - PL - NE158SG - 101

PROJECT TITLE
NEWBURN HAUGH

PROJECT ADDRESS
NEWBURN HAUGH - NE15 8SG

DATE
21/06/2023

PROJECT TYPE
ENERGY DEVELOPMENT

DRAWING TYPE
PROPOSED PLAN

DESIGNER
I. WILLIAMS

CHECKED BY
D. LEVY

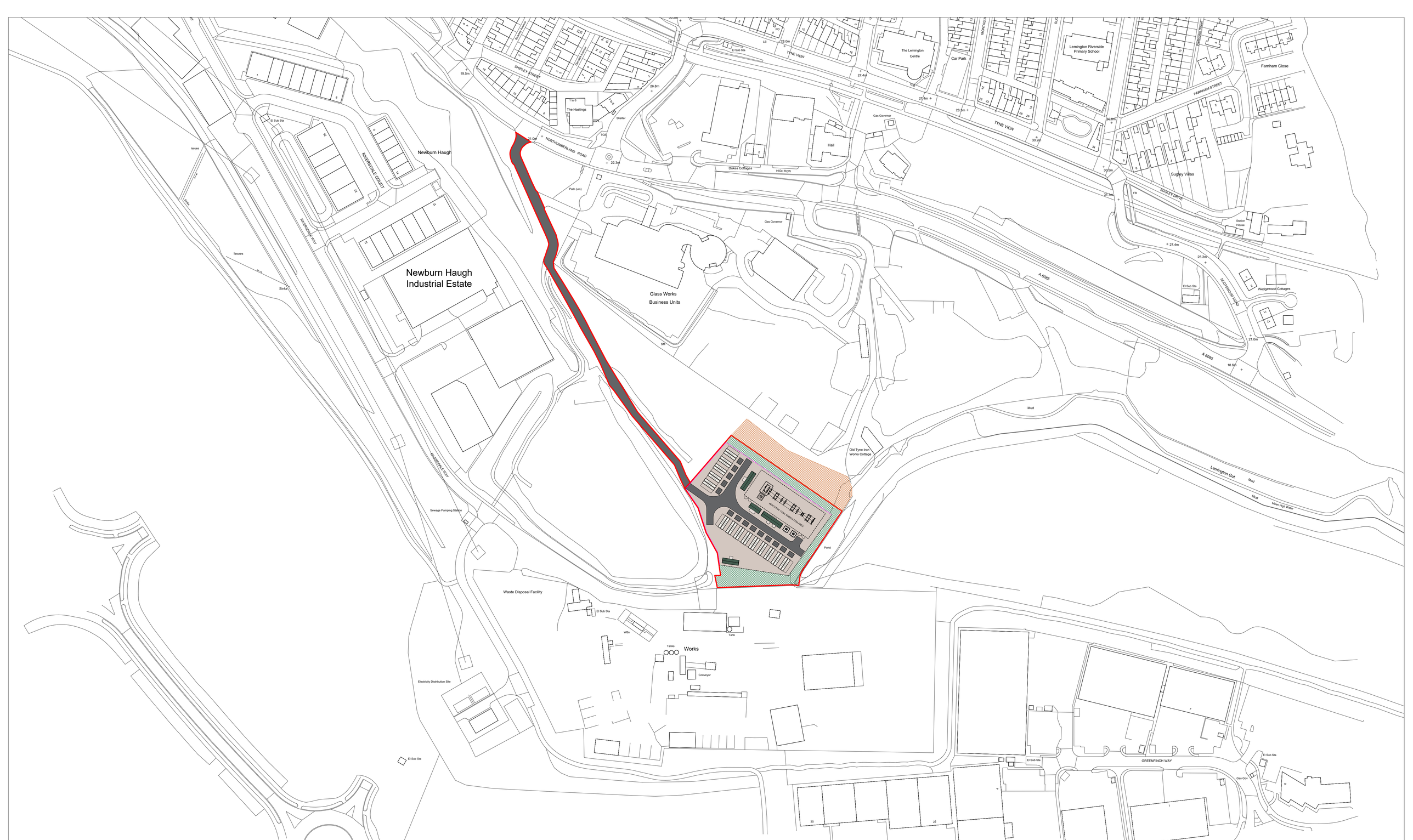
APPROVED BY
R. MITCHELL

SCALE
1:500

REVISION
REV F

PAPER SIZE
A1

DRAWING PURPOSE
PLANNING



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NOTES

(1) N/A

EQUIPMENT LIST

BATTERY CONTAINERS
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DRAWING TYPE
PROPOSED PLAN

DESIGNER
I. WILLIAMS

CHECKED BY
D. LEVY

APPROVED BY
R. MITCHELL

SCALE
1:1250

REVISION
REV F

PAPER SIZE
A1

DRAWING PURPOSE
PLANNING

APPENDIX B

Photographic Record

1.

24.11.22 – View south from northwest corner

2.

24.11.22 – View along west boundary with lumber yard

3.

24.11.22 – Brick and masonry fragments present at site surface

4.

24.11.22 – Evidence of small camp fire

5.

24.11.22 – View along northern boundary

6.

24.11.22 – Poorly spread gravel in northwest corner of site

7.

24.11.22 – Bund along east boundary

8.

24.11.22 – View to southeast of adjacent industrial works with large stockpile

9.

24.11.22 – View towards pond located on east boundary. No standing water was visible.

10.

24.11.22 – Stockpiled timber beams – either remains of old railway or old footbridge to the northeast.

11.

24.11.22 – Various items stored along the southern boundary

12.

24.11.22 – Ashy made ground located in along the southern boundary

13.

24.11.22 – Stockpiled material on southern boundary

14.

24.11.22 – View towards southwest corner

15.

24.11.22 – View across site towards northwest

16.

24.11.22 – Made ground present at site surface

17.

24.11.22 – Relict foundations in the centre of the site

18.

24.11.22 – Old footbridge to the northeast

19.

24.11.22 – View of stored items in the southeast corner

20.

24.11.22 – Relict truck along southeast boundary

21.

24.11.22 – View towards northeast

22.

24.11.22 – Small wooden structure in southwest corner (part of lumber yard)

23.

24.11.22 – View east from site entrance

24.

24.11.22 – Site entrance from Lumber yard

APPENDIX C

Envirocheck Report
(Including Historical Maps)

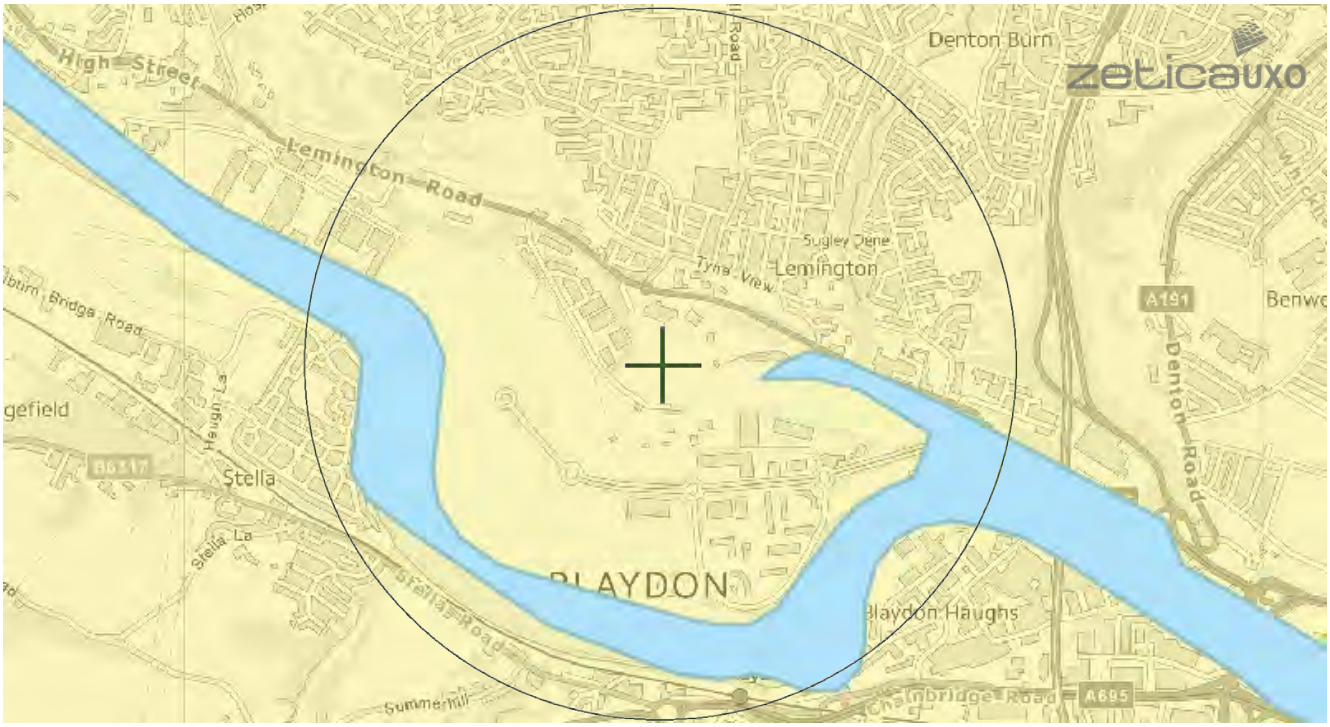
APPENDIX D

UXO Screening Report

UNEXPLODED BOMB RISK MAP

SITE LOCATION

Map Centre: 418336,564434



LEGEND

- **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- **Low:** Areas indicated as having 15 bombs per 1000acre or less.

miltary | **industry** | **UXO find**
transport | **dock** | **Luftwaffe targets**
utilities | **Bombing decoy** | **other**

How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: **(https://zeticauxo.com/downloads-and-resources/risk-maps/)**

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

APPENDIX E

Coal Mining Report

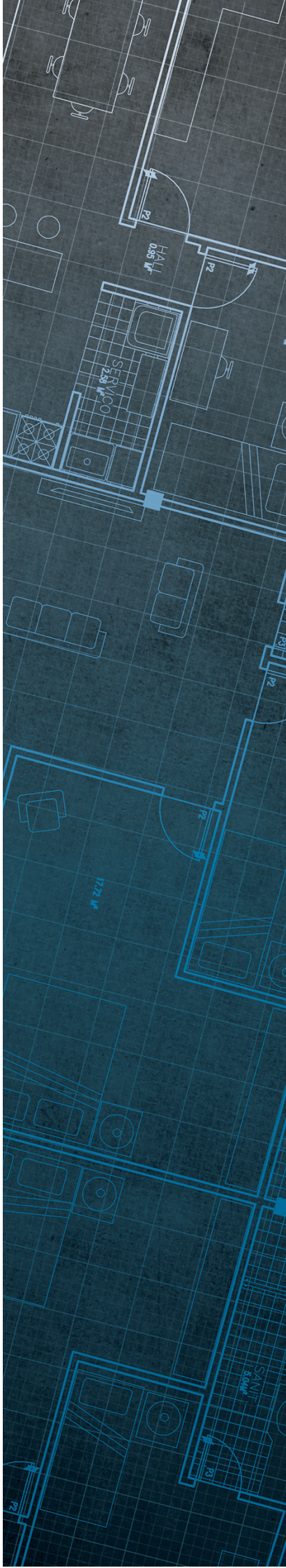
The Coal Authority

Consultants

Coal Mining Report

Newburn Haugh Industrial Estate
Newburn Haugh Industrial Estate
Newcastle Upon Tyne
NE15 8SG

Date of enquiry:	**10 November 2022**
Date enquiry received:	**10 November 2022**
Issue date:	**10 November 2022**
Our reference:	**51003324000001**
Your reference:	**R3127**



Consultants

Coal Mining Report

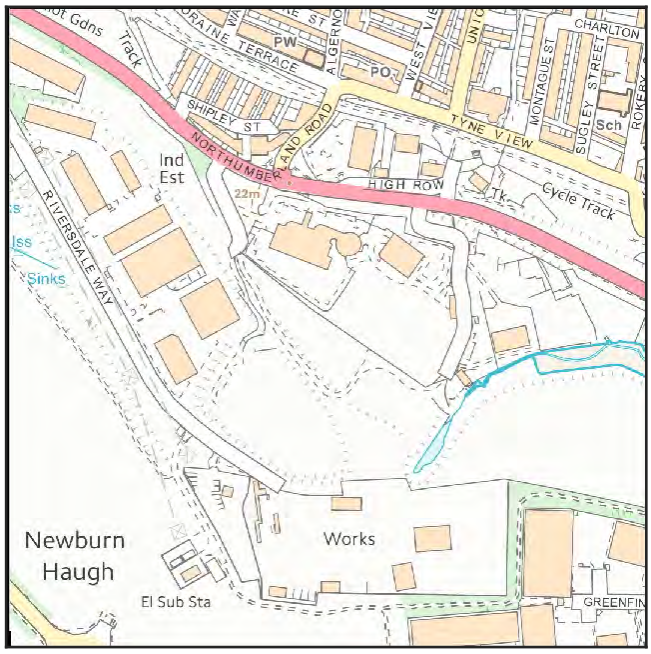
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

Megan Jones

Enquiry address

Newburn Haugh Industrial Estate
Newburn Haugh Industrial Estate
Newcastle Upon Tyne
NE15 8SG



Approximate position of property

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How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
BLAYDON MAIN	BTM. BUSTY	Coal	5FLY	43	Beneath Property	2.7	East	100	1907
BLAYDON MAIN	BROCKWELL	Coal	5FI8	63	Beneath Property	2.0	East	90	1890
BLAYDON MAIN	BROCKWELL	Coal	5FI4	64	Beneath Property	2.7	East	90	1903

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

R388A	D62	832
PO0	7302	D153

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
TILLEY	Coal	Yes	Within	N/A	137

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations
None recorded within 50 metres of the enquiry boundary.

Remediated sites
None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence
The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas
None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes
None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders
None recorded.

Section 46 notices
No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices
The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines
Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips
Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations
Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites
Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence
Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes
Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining
Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing
Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders
Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices
Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices
Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

The Coal Authority

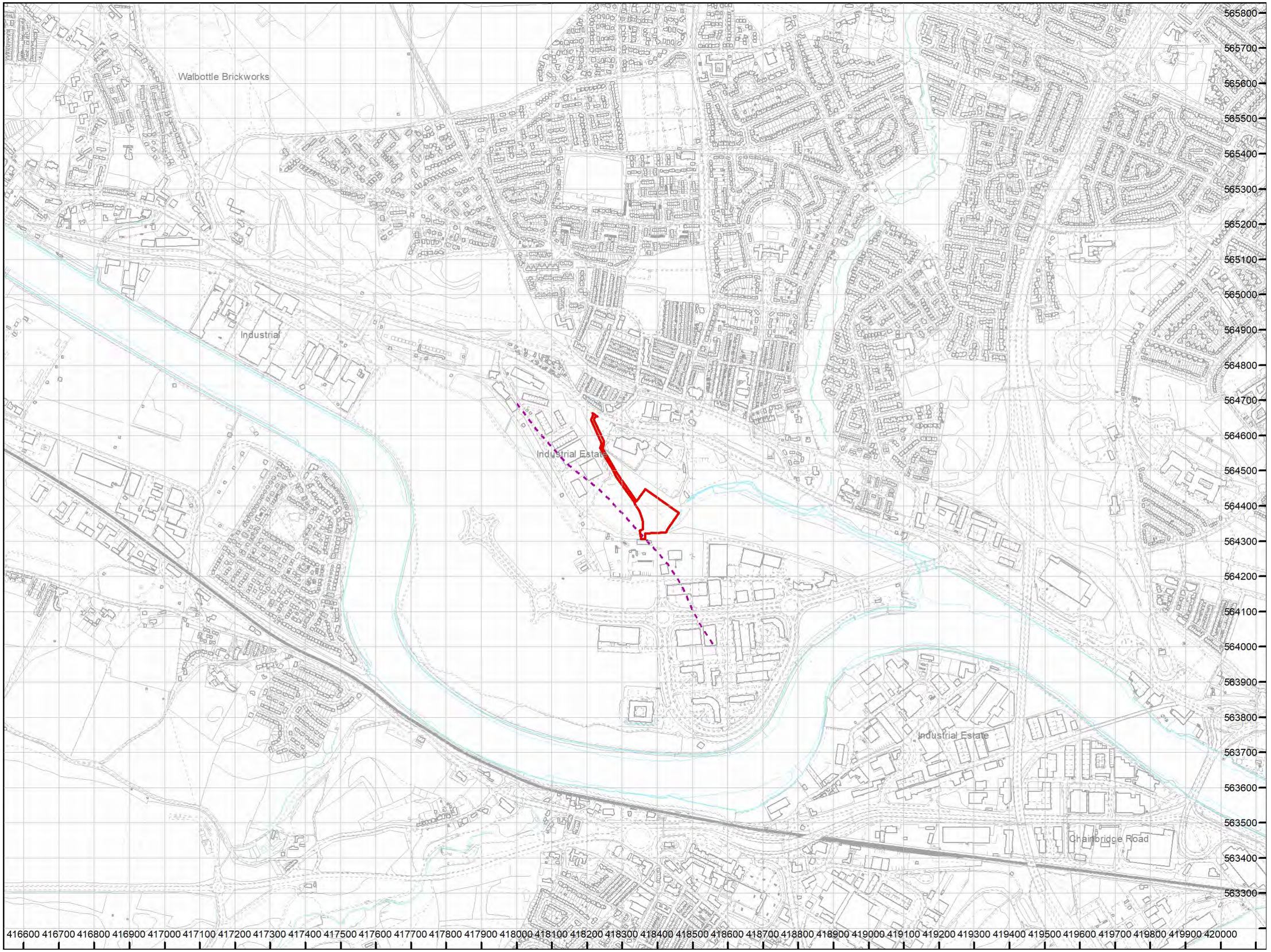
Summary of findings

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown

Outcrop (Conjectured)



How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

APPENDIX F

Coal Mining Risk Assessment
NKC Geo Tech Ltd

NKC Geotech Ltd
engineering geologist specialising in the investigation and treatment of disused mineworkings

25 Grosvenor Road
Wrexham LL11 1BT

t 01352 762080

e neil@nkc.co.uk
w www.nkc.co.uk

Coal Mining Risk Assessment

Newburn Haugh Industrial Estate, Newcastle Upon Tyne

Smith Grant LLP
Station House
Ruabon
Wrexham
LL14 6DL

2222
14 November 2022

NKC Geotech Ltd

Site

A site for industrial development at Newburn Haugh Industrial Estate, Newcastle Upon Tyne.

Risk Assessment by
Neil Catlow B.Sc F.G.S Engineering geologist.

Summary of relevant mining information
CIRIA Special Publication C758D 'Abandoned Mineworkings Manual'
Coal Authority Report 51003309073001 dated 2 September 2022
Ordnance Survey 1:2500 First Edition 1878
Geological Survey 1:10560 plans 1998

Assessment of risk that past mining activity poses to the proposed development

Geology
The site is underlain by Carboniferous Westphalian 'A' Langsettian strata of the Coal Measures dipping east at 1 in 20.

The Coal Measures of the Northumbrian Coalfield are predominantly shales and sandstones laid down in a tropical delta environment 315 million years ago when Europe lay on the equator as part of the continent of Pangea. Westphalian strata contains seams of coal upto 4.5m in thickness at vertical intervals typically varying from 4.0m to 40.0m and interbedded with ironstone beds. Those coal and ironstone seams which were of economic importance were given an identity when they were of sufficient quality and thickness to justify extraction by mining. Typical names for coal seams reflect primarily on locality, quality and thickness, for example Low Main Coal, Yard Coal, and Maudlin Coal.

Past underground coal mining
Coal mining in the Newburn area is first recorded in 1239, and coal was being shipped to London before 1367. Coal mining under and adjacent to the site terminated in 1921 when the Blaydon Main Colliery, 1800m south of the site, closed, the last date of working under the site being 1907. Industrial mining deeper than the outcrop workings and simple bell pits of the 'cole farms' above the River Tyne dates from the 16th century when horse-drawn waggonways were constructed to transport coal from collieries inland of Newburn to loading staithes on the River Tyne for onward coastal shipment by the keelmen. The line of the North Walbottle Waggonway from the collieries at Blucher forms the western boundary. Later developments pioneered in the Great Northern Coalfield included wooden then iron railways and the use of steam powered pumping, winding and railway engines from 1715.

There are records of 2 seams of coal which have been mined directly under the site since 1934, but older and unrecorded shallower mining may have taken place in two shallower seams, the Tilley Coal and the Top Busty Coal, before the Mines Act of 1887 required the preservation of mining plans. The Tilley Coal is shown by the Geological Survey as dipping under the site from the subcrop under the western site boundary at perhaps 10m depth. The next seam below the Tilley Coal is the Top Busty Coal at an anticipated depth of 15m.

In descending order the relevant coal seams mined under the site are:

Tilley Coal probably at 10m depth dependent on drift cover
Top Busty Coal probably at 15m depth
Bottom Busty Coal worked at 43m depth in 1907
Brockwell Coal worked at 61m depth in 1903

Present underground coal workings
There is no current coal mining within 20km of the site.

Future underground coal workings
None

nkc Geotech Ltd

Recorded coal mine entries on or within 20m of the site boundary
There are no records of any mine entries on or within 20m of the site. The nearest recorded shaft has Coal Authority reference 418564-002 and is located 300m north of the site boundary.

Coal mining geology
The Coal Authority have no records of any geological faults under the site.

Past opencast coal mining
There are no former opencast coal mining sites within 200m of the site.

Present opencast coal mining
There are no current opencast coal mining sites within 200m of the site.

Future opencast coal mining
There are no proposed opencast coal mining sites within 800m of the site.

Coal mine gas emissions
There are no recorded mine gas emissions within the site boundary.

Coal mining surface hazards
There have been no claims for coal mining subsidence. The Coal Authority report that all ground movement due to past coal mining activity should now have stopped.

Conclusions

There is a possible risk to the the stability of site from unrecorded historic shallow coal mining activity in the Tilley Coal and the Top Busty Coal. An intrusive investigation of 6 holes to 30m minimum depth, taken down in all cases to a minimum of 15m below rockhead, will be required to determine whether there are unrecorded shallow workings in the Tilley Coal and the Top Busty Coal. A Coal Authority Permit will be required for this intrusive investigation. There are no recorded mineshafts requiring investigation.

The site lies on the floor of the Tyne Valley and the depth to rockhead will increase towards the river. The proposed intrusive investigation boreholes may need to be 40m deep to prove the extent of the area on the site with the necessary 15m rock cover to the shallow workings.

The development is for a Battery Storage Facility (see proposed layout attached) where subject to evidence provided to the LPA/CA, the investigation could be limited to the area of permanent structure (substation area) only. Remedial stabilisation work by drilling and grouting any shallow mineworkings under any proposed permanent structures will be required where there is less than 15m of solid rock cover.

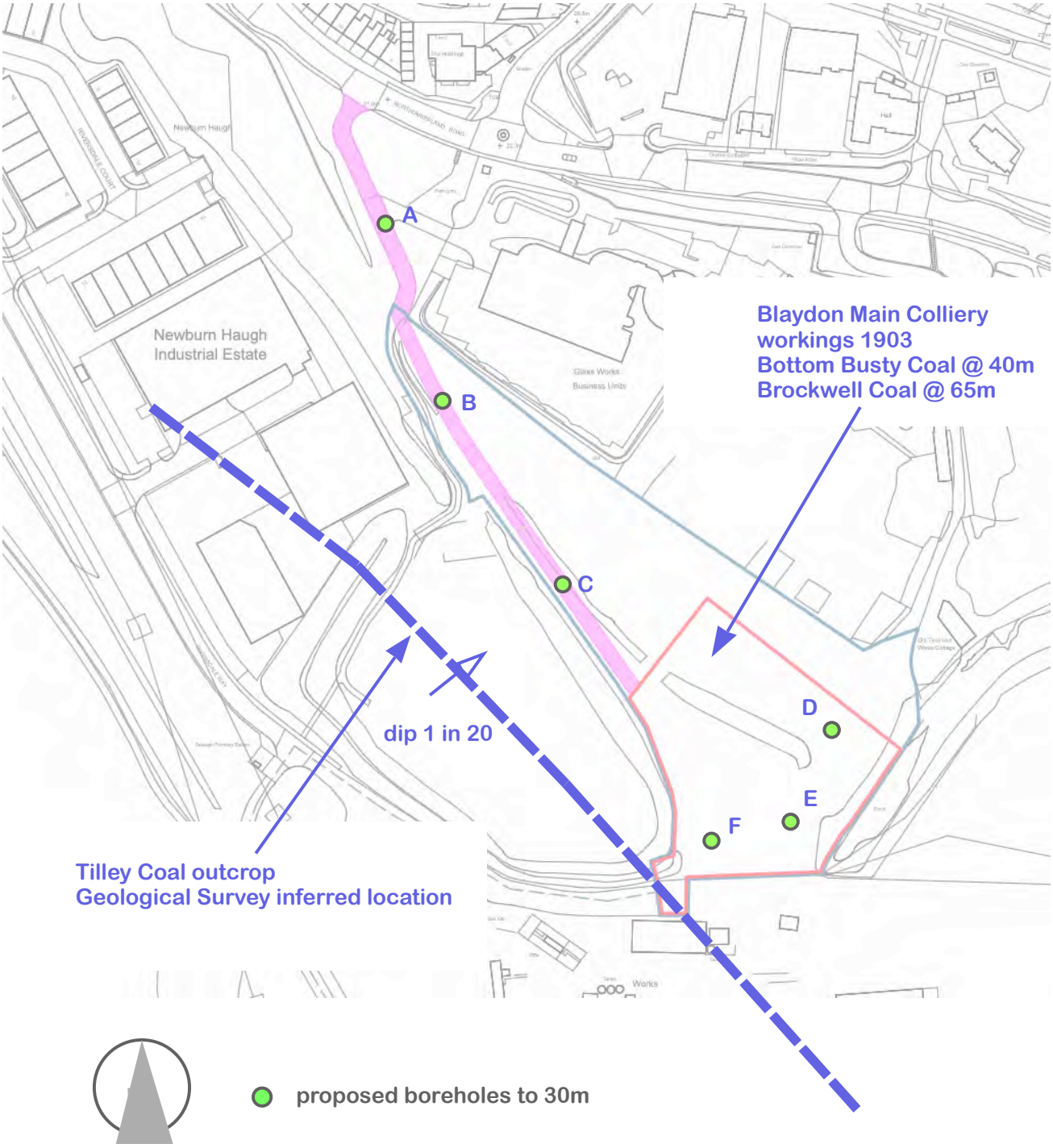
For Nkc Geotech Ltd

Neil Catlow, B.Sc, F.G.S

NKC Geotech Ltd

Geology and proposed boreholes

scale 1:2500 @ A4



NKC Geotech Ltd

Proposed battery storage layout

APPENDIX G

Local Authority Consultancy

From:	Pickering, Chris
To:	Megan Jones
Subject:	RE: Requesting a Contaminated Land Search - Newburn Haugh Industrial Estate
Date:	11 November 2022 12:26:01
Attachments:	image001.png

Hi,

There's no VAT so just a straight £140.

Here's the info (prepared it in anticipation), hope it helps.

I have investigated the site using historic maps, local knowledge and Departmental records. All distances given are approximations.

1856 OS Map 1:2500
The site is occupied by Lemington Staiths on the bank of the River Tyne, which runs adjacent the site to the east. Railway lines/sidings are also shown on site servicing the staiths. The majority of land to the S and W appears agricultural. The majority of land to the N is industrial, making up Lemington Glass Works and Tyne Iron Works, with the addition of what appears to be a row of allotment gardens between the site and the glass works (within the blue line boundary on the submitted location plan). Coke ovens are shown 250 m N and 220 m NE. Limekilns are shown 250 m NE.

1898 Map 1:2500
The site is still shown as occupied by Lemington Staiths on the bank of the River Tyne, including railway lines/sidings. The land to the S and the W still appears to be agricultural. The land to the N remains occupied by Lemington Glass Works and Tyne Iron Works, however the iron works is now shown as disused. The coke ovens and limekilns are no longer shown.

1921 OS Map 1:2500
The site and the surrounding area appear as previously described, with the only apparent exception being the addition of an "Electric Power Station" shown 110 m NE of the site, occupying part of the site of the former Tyne Iron Works.

1936 OS Map 1:2500
Again, the site and surrounding area appear largely as previously described. The land which appeared to be allotment gardens is now labelled as allotment gardens. I would suspect the allotment gardens to have received FBA from the glass works and former iron works as a soil-improver, however as far as I am aware this has not been confirmed.

1950's Maps
The staiths are no longer shown on site, but some of the railway lines remain. Areas of cut and fill are indicated on site. Refuse heaps are shown 15 m N of the site adjacent the allotments, and on the site of the glass works 150 m N. Tanks are shown on the site of the glass works 130 m N and 150 m N, along with an electricity sub-station 150 m N. The former power station to the NE is now shown as a warehouse with a chimney.

1945-1950 Aerial Images
The aerial images show a view similar to that described for the 1950's map above. The chimneys at the glass works and warehouse can be seen to be substantially large, approximately the same size as the remaining chimney which is c.115 ft.

1960/70/80's
The site is shown as vacant. Further development of the area has taken place. A "Works" is now located adjacent the site to the S, with tanks (50 m SW, 60 m SW) and an electricity sub-station (75 m W) on the works site. A graphite works is located 250 m S. A caravan park is located adjacent the site to the W. To the N, the glass works (with tanks and sub-station) and the warehouse remain. Significant in-filling of the former channel of the River Tyne immediately to the E of the site has taken place.

NCC Shape Files
The former channel of the River Tyne to the E of the site is recorded as landfill. There is also additional landfill on the site of the former graphite works, 170 m S.

BGS Maps
The drift geology for the site and most of the area to the W, S and E is recorded as alluvium. The in-filled river channel is recorded as made ground. The drift geology N of the site is recorded as till (diamicton).
The solid geology is recorded as the Pennines Lower Coal Measures formation, consisting of interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part.

Notes

The site has not been identified for inspection under Newcastle City Council's Contaminated Land Inspection Strategy. If proposals were brought forward for development, any planning approval would require an intrusive site investigation and risk assessment.

I hope that the above information answers your questions regarding this site.

Chris

From: Megan Jones <megan.jones@smithgrant.co.uk>
Sent: 11 November 2022 12:19
To: Pickering, Chris <chris.pickering@newcastle.gov.uk>
Subject: RE: Requesting a Contaminated Land Search - Newburn Haugh Industrial Estate

Hi Chris,

Thank you for responding. I'll put together a purchase order today, does the price include VAT?

Kind regards,

Meg Jones, Consultant
BSc MSc AMIEnvSc

Smith Grant LLP
Bryn Estyn Business Centre, Bryn Estyn Road, Wrexham, LL13 9TY.

Tel: 01978 822367
Fax: 01978 824718
Mobile: 07960 293834

Email: megan.jones@smithgrant.co.uk
Web: www.smithgrant.co.uk

From: Pickering, Chris <chris.pickering@newcastle.gov.uk>
Sent: 11 November 2022 07:29
To: Megan Jones <megan.jones@smithgrant.co.uk>
Subject: RE: Requesting a Contaminated Land Search - Newburn Haugh Industrial Estate

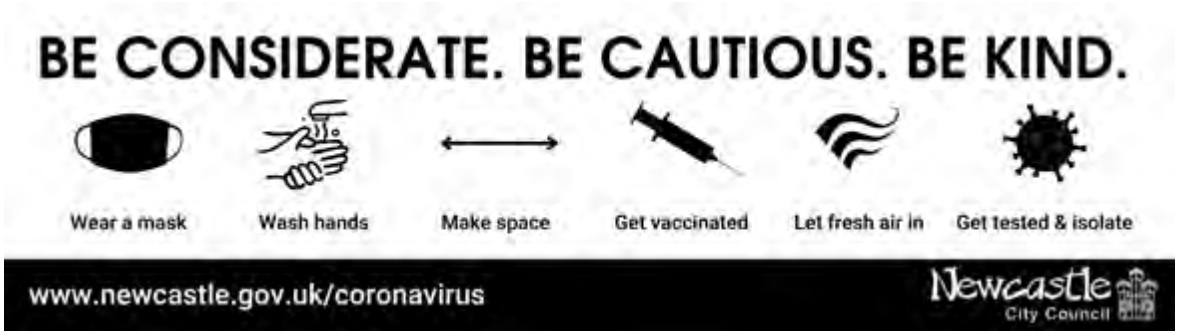
Hello Meg,

Yes this can be done for a fee of £140.

If you wish to proceed I will need a Purchase Order Number.

Thanks

Chris
Chris Pickering
Senior Technical Officer
Public Safety & Regulation
Newcastle City Council
Civic Centre
Newcastle upon Tyne **www NCC website:** www.newcastle.gov.uk
NE1 8QH
Please consider the environment before printing this e-mail.



From: Megan Jones <megan.jones@smithgrant.co.uk>

Sent: 10 November 2022 14:49
To: Public Safety and Regulation <psr@newcastle.gov.uk>
Subject: Requesting a Contaminated Land Search - Newburn Haugh Industrial Estate

Good afternoon,

I'm a consultant from an Environmental Consultancy based in North Wales. We've been instructed on a Phase 1 Desk Study on a site at Newburn Haugh Industrial Estate. The details for the site location are in the table below:

Site Name	Newburn Haugh Industrial Estate
Postcode	NE15 8SX
Grid Reference	418392, 564364

I have also attached a drawing with the site boundary to this email.

Do you hold any information with regards to land contamination on or immediately adjacent to the site? I appreciate there will likely be a charge for this information. Please could you provide your fee before proceeding?

Kind regards,

Meg Jones, Consultant
BSc MSc AMIEnvSc

Smith Grant LLP
Bryn Estyn Business Centre, Bryn Estyn Road, Wrexham, LL13 9TY.

Tel: 01978 822367
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