

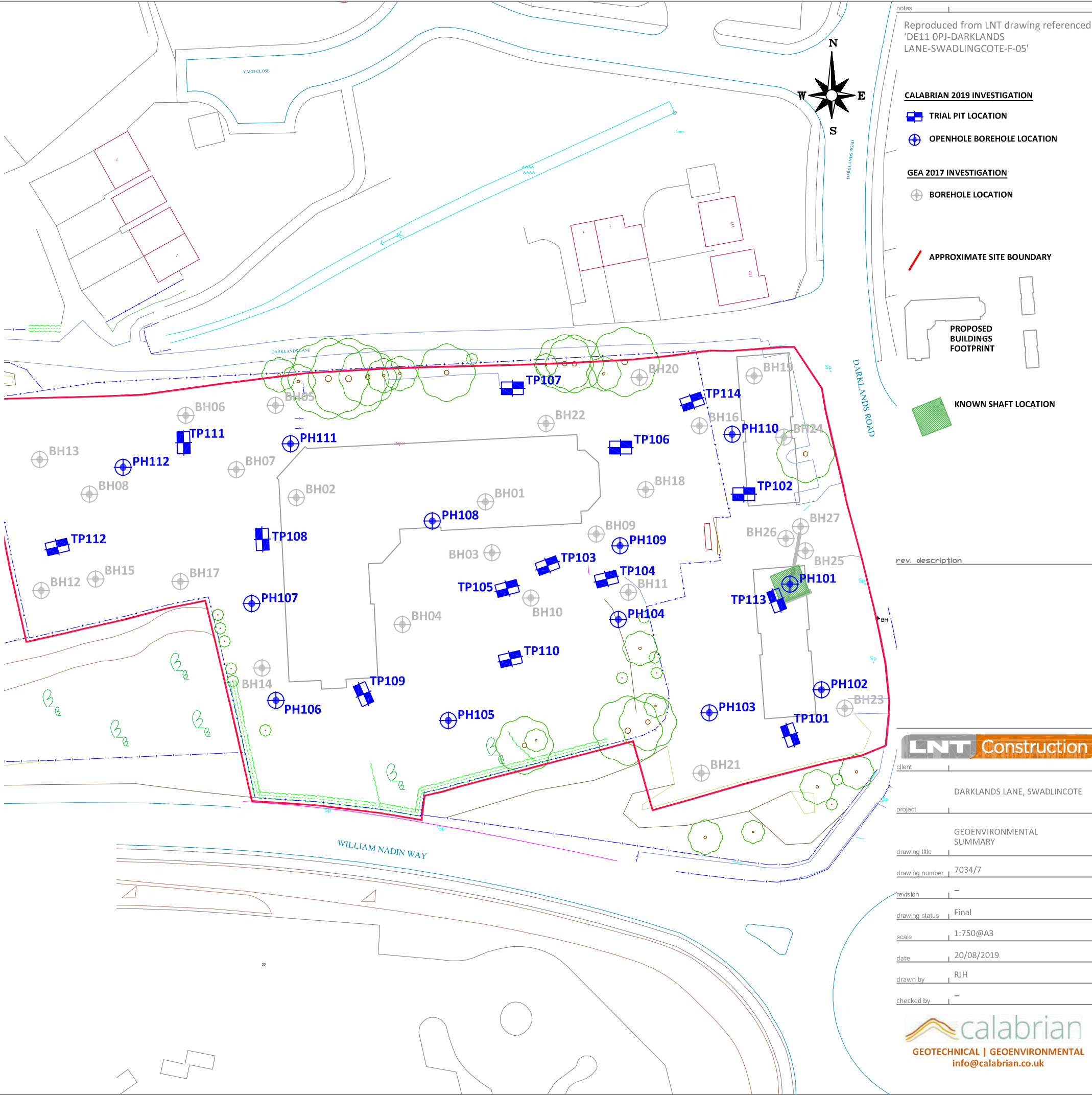
GEOENVIRONMENTAL APPRAISAL
of land at
DARKLANDS LANE, SWADLINCOTE

**Prepared on behalf of LNT Construction Limited
& South Derbyshire District Council**

Report 7034/1

August 2019

GEOENVIRONMENTAL SUMMARY	
Site Description	The eastern quarter of the site comprises a tarmac surfaced car park with grass surfaced landscaping in the south and east. To the west there are no structures or hardstand other than a concrete retaining wall in the south-western and south-eastern corners of the site. The site is currently unsurfaced, and a stockpile of crushed demolition arisings is located in the north.
History	As early as 1883 a railway ran east to west through the centre of the site. To the south-east of the railway lay 'Darklands Colliery (Disused)'. Land to the south-west and north of the railway was undeveloped. Around 1960 the site was developed as a council depot.
Made Ground	Made ground predominately comprises either colliery spoil (gravel and cobble sized mudstone and sandstone fragments with clay matrix) or cohesive made ground (reworked natural clay with inclusions such as brick and concrete).
Natural Ground	Natural ground was encountered in each of the exploratory holes and typically comprised completely weathered Coal Measures (firm and stiff clay) overlying Coal Measures mudstone
Contamination & Remediation	The ash and clinker in the east of the site is locally potentially combustible and contains elevated concentrations of a number of organic determinands. Localised asbestos fibres and fragments have also been identified. See recommendations below.
Hazardous Gas	On basis of previous monitoring the site would be classified as Green/CS1 with no special gas protection measures being required. Radon protective measures not required. A hydrocarbon resistant membrane will be required to be incorporated into the ground floor construction of the two apartment blocks.
Mining & Quarrying	There are no quarries within 250m of the site. One mineshaft located on site which has been infilled and capped. Shallow coal seams do underlie the site but no evidence of workings were identified in any of the rotary boreholes drilled at the site.
Foundations	Shallow strip or locally deepened trench fill foundations will be suitable for new low-rise structures at the site.
Groundwater & Excavations	Groundwater seepages were encountered at the interface of natural and made ground particularly in the west of the site. Stability of excavations within both made and natural ground was generally good.
Flooding & Drainage	Flood risk from rivers or the sea is classified as low. Soakaway will not provided a suitable means of surface water disposal at the site.
Significant developer abnormalities relating to geoenvironmental issues at the site are: • No 'hard' development within 3m of the mineshaft. • In the east or 600mm soil cover in landscaped areas with hydrocarbon resistant membrane beneath the apartments. • Elsewhere 300mm of 'clean' soils in all garden and landscaped areas; this should incorporate a basal hi-visibility geotextile layer. • Locally deepened trenchfill foundations due to made ground thickness and tree influence. <i>This brief summary should not be assumed to represent a complete account of all the potential geoenvironmental issues that may exist at the site. As such it is strongly recommended that the report be read in its entirety.</i>	



FOREWORD (Geoenvironmental Investigation Report)

This report has been prepared for the sole internal use and reliance of the LNT Construction Limited & South Derbyshire District Council. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Calabrian Limited (Calabrian); such authorisation not to be unreasonably withheld. If any unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill.

The report presents observations and factual data obtained during our site investigation and provides an assessment of geoenvironmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from Calabrian prior to significant revision of the development proposals.

The report should be read in its entirety, including all associated drawings and appendices. Calabrian cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context.

The findings and opinions conveyed in this report (including review of any third-party reports) are based on information obtained from a variety of sources as detailed within this report, and which Calabrian believes are reliable. All reasonable care and skill has been applied in examining the information obtained. Nevertheless, Calabrian cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

The report represents the findings and opinions of experienced geoenvironmental consultants. Calabrian does not provide legal advice and the advice of lawyers may also be required.

Intrusive investigation can only investigate shallow ground beneath a small proportion of the total site area. It is possible therefore that the intrusive investigation undertaken by Calabrian, whilst fully appropriate, may not have encountered all significant subsurface conditions. Consequently, no liability can be accepted for conditions not revealed by the exploratory holes. Any opinion expressed as to the possible configuration of strata between or below exploratory holes is for guidance only and no responsibility is accepted as to its accuracy

It should be borne in mind that the timescale over which the investigation was undertaken may not allow the establishment of equilibrium groundwater levels. Particularly relevant in this context is that groundwater levels are susceptible to seasonal and other variations and may be higher during wetter periods than those encountered during this commission.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

This report assumes that ground levels will not change significantly from those existing at present and that the apartments and care home will be of three storey construction respectively. If this is not to be the case, then some modification to this report may be required.

Calabrian cannot be responsible for the consequences of changing practices, revisions to waste management legislation etc that may affect the viability of proposed remediation options. Calabrian reserve the right to amend their conclusions and recommendations in the light of further information that may become available.



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1 INTRODUCTION

1.1 THE COMMISSION AND BRIEF

Calabrian Limited (Calabrian), were commissioned by LNT Construction Limited & South Derbyshire District Council (The Client) to carry out a geoenvironmental appraisal of land at Darklands Lane, Swadlincote.

Correspondence regarding Calabrian's appointment, including the brief for this investigation, is included in Appendix A. The agreed scope of works included:

- A review of third-party reports;
- a site walkover and inspection;
- an assessment of the land use history;
- determination of the site's environmental setting;
- an intrusive ground investigation comprising fourteen trial pits and eighteen boreholes;
- assessment of the geotechnical properties of the near surface deposits to enable provision of foundation and pavement recommendations;
- a qualitative assessment of contamination risks; and,
- recommendations for the necessary site preparatory and remediation works.

1.2 OBJECTIVES

Primary aims of this investigation were to identify salient geoenvironmental issues affecting the site to enable The Client to obtain budget costs for the necessary foundation, site preparatory and remediation works, and to support the submission of a planning application to the local authority.

1.3 DEVELOPMENT PROPOSALS

It is understood that consideration is being given to redevelopment of the site with a three-storey residential care home along with two blocks of two-storey apartments along with associated access road, car park and landscaping/gardens. A proposed site layout referenced 'DE11 OPJ-DARKLANDS LANE-SWADLINGCOTE-F-05' is copied as Drawing 7034/2.

1.4 REPORT FORMAT AND LIMITATIONS

General notes and limitations relevant to all Calabrian investigations are described in the Foreword and should be read in conjunction with this report. The text of the report draws specific attention to any modification to these procedures and to any other special techniques employed.

2 SITE DESCRIPTION

2.1 GENERAL

Details of the site are given below:

- Location: Immediately west of Swadlincote town centre
- Nearest Post Code: DE11 0PQ
- National Grid Reference: SK 296 198
- Area: 0.95 hectares

Known Services:

- None.

2.2 SITE FEATURES

Calabrian completed a walkover survey of the site on 5th August 2019.

The site currently comprises two adjoined areas.

The eastern quarter of the site comprises a tarmac surfaced car park with grass surfaced landscaping in the south and east. The landscaped area in the south slopes down relatively steeply to the north by around 2m. The remainder of the car park slopes from south to north by a further 2m. There are no physical boundaries to the north, south and east of this area of the site.

The remaining area to the west was a council depot that was recently demolished. There are no structures or hardstand on this area of the site other than a concrete retaining wall which has a maximum height of approximately 2.5m in the south-western and south-eastern corners of the area.

The western section of the site is currently unsurfaced, and a stockpile of crushed demolition arisings is located in the north-centre. The boundaries of this area are formed by steel palisade fencing with sporadic semi-mature trees.

To the south of the site lies Williamson Way with a supermarket beyond. To the west lie allotment gardens. To the north is Darklands Lane with housing beyond. To the east lies Darklands Road again with housing beyond.

Existing salient features, at the time of the walkover are presented on Drawing No. 7034/3. A selection of site photographs are included on Drawing 7034/4.

3 SITE HISTORY

In order to investigate the development history and previous land uses at the site and immediate surrounding land, site centred extracts from Ordnance Survey (OS) plans dating back to 1883 have been examined. These plans are presented in Appendix B.

Dates	On Site Features	Off Site Feature
1883	Railway line runs east to west through the centre of the site. To the south-east of the railway 'Darklands Colliery (Disused)' is shown; this comprises a number of small builds, earthworks and a shaft. Land to the south-west and north of the railway appears undeveloped with the exception of the extreme west where a railway cottage crosses the site boundary.	Surrounding land is mainly agricultural with Swadlincote lying to the south-east. The northern and eastern boundaries are formed by roads.
1901	The Darklands Colliery shaft is now referred to as 'Air Shaft' but is in the same location as previously shown.	
1923	Only a chimney (now referred to by name but shown on previous maps) remains on the colliery area.	
1960	'Council Yard' detailed on the former colliery area; buildings shown around western and southern perimeter. Chimney still shown. Railways has been dismantled.	
1981	Depot now extends across the whole site with buildings and hardstand areas in the most recent (post demolition) configuration.	
Present	Depot buildings demolished.	

It is not the intention of this report to describe in detail all the changes that have occurred on or adjacent to the site. Significant former uses/operations are highlighted in bold text for ease of reference.

Locations of former structures, railway and mine shaft are detailed on Drawing 7034/4.

4 ENVIRONMENTAL SETTING

4.1 GENERAL

The responses received from the Coal Authority and Landmark are presented in Appendix C.

Issue Data Reviewed	Remark
Geology 1:10,000 BGS map (Sheet SK21NE)	Superficial – Made Ground Solid – Middle Coal Measures. Strata Dip – 3° to south. Faults – None beneath site.
Quarrying Landmark Report Historical OS Plans	There are no quarries within 250m of the site.
Radon BRE Report BR211 Landmark Report	No measures required. The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level).
Hydrogeology Landmark Report Groundwater Vulnerability map	Source Protection Zone? No. Aquifers: None (Superficial); Secondary (Solid). Groundwater abstractions? None within 1.4km. Pollution incidents? None relating to the site.
Hydrology Landmark Report	Nearest watercourse(s) – Darklands Brook, immediately north. Water quality – D, Darklands Brook. Pollution incidents? One minor incident of inert suspended solids occurred to Darklands Brook from the site in May 1998. There have been numerous other incidents to Darklands Brook. Abstractions? Nearest 854m east. Discharge consents? None relating to the site.
Landfill Sites Landmark Report	None within 500m. Infilled land is noted on site.
Flood Risk Landmark Report	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low. Landmark report possible surface water flooding in the west and north of the site.

4.2 MINING

As of July 2011, the Coal Authority (CA) formalised their requirements in relation to planning applications and introduced some new terminology relating to coal mining development areas. This Section and Sections 8.8 provides the necessary mining risk assessment required by the proposed planning application.

The site lies with the CA Development High Risk Area.

Geological maps suggest that coal seams underlie the site at shallow depth. The Yard Coal (0.1m to 1.0m thick) is inferred to outcrop east to west through the centre of the site and dips at around 3° to the south-east; the approximate crop is shown on Drawing 7034/5.

The Block Coal (geologically above the Yard Coal) sub-crops approximately 75m south of the site's southern boundary.

The CA have provided abandonment records for all worked seams within 100m of the sites surface. Records of workings in only one seam are available; this plan '*Plan of the Little Coal Working at Swadlingcote (Old Colliery)*', copied as Drawing 7034/5, indicates workings to south of the site at around 75 feet (23m) above OD. This equates to around 50m beneath site level. The abandonment plan also notes '*Old Workings*' in the Little Coal Seam likely beneath the site.

Darklands Shaft noted to be "Sunk to Stanhope Seam - exact depth unknown".

Strata in the area dip at 1:11.7 to the south.

A CA Con29M mining report states that:

- The property is in a surface area that could be affected by underground mining in 7 seams of coal at 50m to 310m depth, and last worked in 1946. Any movement in the ground due to coal mining activity associated with these workings should have stopped by now;
- the property is not in the likely zone of influence of any present underground coal workings;
- The property is not in an area where the Coal Authority has received an application for and is currently considering whether to grant a licence to remove or work coal by underground methods. The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods. The property is not in an area likely to be affected from any planned future underground coal mining;
- the Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining. This confirms the absence of any known significant geological faults below the site;
- The property is not within the boundary of an opencast site from which coal has been removed by opencast methods. The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods. There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary. The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted; and,
- there is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

One mine entry is known to exist on site. The CA referenced 429319-002 shaft was drilled to 131 metres, grouted and capped by Structural Stabilisations Limited for British Coal in 1993.

ADA Consulting investigated the shaft location February 2017; trenching identified the location of the 600mm thick concrete shaft cap which was founded on mudstone at around 1.5m depth. Drawing referenced 12343/951 is copies in Appendix C.

The shaft location relates directly to that shown on the 1883 OS map.

5 PREVIOUS INVESTIGATIONS

5.1 GENERAL

The Client has provided Calabrian with a copy of the following report:

1. Phase 1 Geo Environmental Report, Site Off Darklands Lane, Swadlincote. Prepared by W^m Saunders Partnership LLP for D'zign Uk (Swadlincote) Ltd. & Riverside Housing Association. Report referenced 9749/12, dated August 2008.
2. Informative Intrusive Investigation Land known as: Darklands Depot, Darklands Road, Swadlincote. Prepared by Kiwa on behalf of South Derbyshire District Council. Report referenced 58925/NN/44994, dated November 2013.
3. Ground Investigation Report. Darklands Road Depot, Swadlincote, Derbyshire. Prepared by GEA on behalf of Wildgoose Construction & LSP Development. Report referenced J17101, dated June 2017.

5.2 SUMMARY OF FINDINGS

Report 1. provides a basic desk-based appraisal of the site. Greater detail is provided within this Calabrian report.

Report 2. included an investigation comprising five shallow window sample boreholes to around 3m depth in the immediate vicinity of the underground fuel tank and filler points. Made ground was found to a maximum depth of 0.65m and comprised concrete overlying recycled aggregate; beneath mudstone was encountered.

The site had a small tank farm consisting of two diesel tanks with a small petrol tank. These were located in the centre of the site (see Drawing 7034/3) and also had vent pipes and service pumps associated with them. It was understood that the tanks were set within brick linings. It is thought that there may have been a potential leakage from the petrol tank.

Laboratory analysis found concentrations of Total Petroleum Hydrocarbon (TPH) fractions but concluded that these were not significant.

Report 3. essentially looked at shallow foundation and contamination issues across the site although the investigation appears to have been undertaken using a brief provided by a structural engineer based on the requirements of foundations design and does not appear to address all potential contamination sources (most notably the three underground fuel storage tanks).

Made ground was been found across the site to up to 2.15m in thickness. The made ground comprised a variable mix including colliery spoil, ash and clinker and tarmac fragments. Natural ground comprised weathered coal measures (clay) with mudstone rockhead ranging in depths across the site of between 1.2m and 5.0m.

Elevated concentrations of PAH compounds and local asbestos fragments were encountered across the site. The GEA report suggests that removal of made ground or soil cover in garden areas would provide adequate remediation. The report is somewhat naive and does not address the indoor vapour risk associated with the elevated concentrations of volatile PAH compounds such as naphthalene.

Hazardous gas monitoring, although not complete, did not yield any significant concentrations of hazardous gas. Monitoring wells were targeted within the made ground deposits.

6 GROUND INVESTIGATION DESIGN

6.1 ANTICIPATED GROUND CONDITIONS

Based on the Environmental Setting and previous land use data reviewed anticipated ground conditions are expected to comprise:

- **Made Ground** - Made ground was been found across the site to up to 2.15m in thickness. The made ground comprised a variable mix including colliery spoil, ash and clinker and tarmac fragments.
- **Natural Soils** - Natural ground comprised weathered coal measures (clay) with mudstone beneath.
- **Bedrock** - Rockhead ranging in depths across the site of between 1.2m and 5.0m.
- **Mineworkings** – Possible shallow workings particularly in the south of the site.
- **Groundwater** – Not anticipated at shallow depth.

6.2 POTENTIAL ISSUES

Based on the data above and that in Sections 2 (Site Description) and 3 (History), potential ground-related issues associated with this site are likely to include:

Potential on-site contamination sources:

1. Former USTs.
2. Made Ground.
3. Rail lines.
4. Mine shaft (gas only).
5. Colliery.

Potential off-site contamination sources:

1. Made ground.

Potential geotechnical hazards:

1. Relict buried obstructions.
2. Shallow coal workings.
3. Mine shaft.

Other potential constraints:

1. None.

6.3 PRELIMINARY CONCEPTUAL SITE MODEL

The historical plans show that the site has been occupied by a colliery, railway and council depot (which included underground fuel storage tanks) all of which are considered to have the potential to have caused ground contamination.

Potential pollutant linkages are shown on a preliminary conceptual site model, presented as Drawing No 7034/7. Clearly the conceptual model will be subject to modification in light of data arising from the proposed intrusive ground investigation.

An assessment of potential contaminants associated with the former uses has been undertaken with reference to CLR8 and the following DETR Industry Profiles:

- Road vehicle fuelling, service and repair.
- Railway Lane.

As a consequence of this assessment, anticipated potential contaminants, within soil and/or groundwater include:

- Asbestos;
- Heavy metals;
- PAHs;
- TPH; and,
- BTEX.

6.4 INVESTIGATION STRATEGY

The preliminary conceptual site model has used as a basis for design of an appropriate ground investigation, the scope of which is summarised below:

Exploratory Hole Type	Purpose
Trail Pits (Machine Excavated)	To determine the general nature of soils underlying the site, including the: • nature, distribution and thickness of made ground • nature, degree and extent of contamination • proportion of undesirable elements eg biodegradable matter, foundations etc • suitability of the ground for founding structures and pavements • Confirm mine shaft location.
Rotary Openhole Boreholes	To check for the presence of voids or broken ground associated with possible unrecorded shallow mine workings. Check consolidation of fill at shallow depth beneath the shaft cap.

Proposed exploratory hole locations should be selected to provide a representative view of the strata beneath the site and to target potential areas of interest identified in Section 6.3 above. A nominal 30m grid spacing should be appropriate, with additional exploratory locations scheduled as necessary in light of the ground conditions actually encountered.

The number of soil samples taken should be reflective of the geological complexity actually encountered, but in general about two samples should be taken from most exploratory holes.

7 FIELDWORK

7.1 OBJECTIVES

The original investigation strategy is outlined in Section 6.3 above.

7.2 EXPLORATORY HOLE LOCATION CONSTRAINTS

No access was available within the landscaped area long the southern boundary of the site.

7.3 SCOPE OF WORKS

Fieldwork was supervised by Calabrian between 5th and 7th August 2019 and comprised the exploratory holes listed below.

Technique Type	Exploratory Holes	Final depth(s)	Remarks
Trial pitting (machine dug)	TP101 to TP114	Max 3.0m	Vane tests in cohesive soils
Rotary Open-Hole	PH101 to PH112	30m	Monitoring wells installed in even numbered boreholes with A suffix

Exploratory hole logs are presented in Appendices D. These logs include details of the:

- Samples taken;
- descriptions of the solid strata, and any groundwater encountered;
- results of the in-situ testing; and,
- the monitoring wells installed.

Exploratory hole locations are shown on Drawing No. 7034/6.

8 GROUND CONDITIONS

8.1 GENERAL

A complete record of strata encountered beneath the proposed development site is given on the various exploratory hole records, presented in Appendix D.

Typical ground conditions encountered in each of these areas are described below in Sections 8.2 (made ground) and 8.3 (natural ground).

8.2 MADE GROUND

The made ground on site is a heterogeneous mixture of materials and it is unlikely, even with a huge amount of sampling, that it could be accurately characterised. The made ground varies in thickness from 0.6m to 1.7m across the site although was absent in the central area.

Made ground predominately comprises either colliery spoil (gravel and cobble sized mudstone and sandstone fragments with clay matrix) or cohesive made ground (reworked natural clay with inclusions such as brick and concrete). Locally ash and clinker was encountered; this material contained clasts of weathered tarmac that yielded a naphthalene odour and tar appearance.

8.3 OBSTRUCTIONS

It is apparent from a review of historical OS Plans (see Section 3) that buildings have been present on the site area. Drawing No. 7034/4 shows the footprints of the former structures, and areas of hardstand.

No significant obstructions (except the mineshaft cap) were encountered at the site.

8.4 NATURAL GROUND

Natural ground was encountered in each of the exploratory holes, with the exception of TP103 which was located within the area of the former underground fuel tanks, and typically comprised completely weathered Coal Measures (firm and stiff clay) overlying Coal Measures mudstone.

8.5 VISUAL & OLFACTORY EVIDENCE OF ORGANIC CONTAMINATION

Clasts of weathered tarmac that yielded a naphthalene odour were locally encountered within the ash and clinker deposits.

Slight diesel odours were noted within the made ground and underlying natural ground in the vicinity of the former underground fuel tanks (TP103, TP104 and TP105).

Selected samples of potentially contaminated materials have been scheduled for chemical testing to determine the nature and extent of the identified contamination.

8.6 GROUNDWATER

No significant inflows of groundwater were encountered during the investigation although seepages were encountered at the interface of natural and made ground particularly in the west of the site.

8.7 STABILITY

Stability of excavations within both made and natural ground was generally good with the exception to TP103 where continuous collapse occurred within the former tank excavation.

8.8 MINING INVESTIGATION

Twelve rotary openhole boreholes were drilled to determine whether the site is underlain by unrecorded shallow mine workings. The strata encountered are summarised below.

Exp Hole	Final Depth (m)	Depth to Rockhead (m)	Depth to Coal (m)	Thickness of Coal (mm)	Remarks
PH102	30	1.5			Coal not encountered
PH103	30	1.7			Coal not encountered
PH104	30	0.4			Coal not encountered
PH105	30	1.8	2.3	1.1	
			10.3	1.2	
			13.2	0.9	
PH106	30	2.0	3.5	1.2	
			11.5	1.2	
			14.5	1.0	
PH107	30	2.1	8.5	1.2	
			1.1	1.1	
PH108	30	1.5	5.8	1.2	
PH109	30	0.8	3.3	1.2	
PH110	30	1.2	2.7	1.2	
PH111	30	2.5	5.5	1.2	
			8.2	1.2	
PH112	30	2.4	7.5	1.1	
			10.6	1.0	

Several coal seams underlie the site at shallow depth (see cross-section) on Page 13. These appear to dip at shallow depth towards the south.

There are no historical records of workings in these seams and no evidence of workings were encountered within any of the boreholes such as voids, broke ground or loss of flush returns.

ADA Consulting investigated the shaft location February 2017; trenching identified the location of the 600mm thick concrete shaft cap which was founded on mudstone at around 1.5m depth. Drawing referenced 12343/951 is copies in Appendix C.

The concrete shaft cap was exposed within TP113 in order to check the validity of the 2017 investigation; the cap was identified in the location previously described. PH101 was also drilled through the cap in order to further confirm its thickness and that consolidation of backfill material to the shaft to competent. No voids were identified within the shallow backfill within the shaft.

The CA have indicated that they would object to any 'hard' development over or within 3m of the existing mineshaft.

8.9 REVISED CONCEPTUAL GROUND MODEL (GROUND CONDITIONS)

The Preliminary Conceptual Site Model has been revised in light of data obtained during the ground investigation, most notably with respect to:

- The nature and distribution of made ground, including the presence of significant buried obstructions;
- the strength, nature and depth of underlying natural strata;
- the presence of coal/shallow workings; and,
- the nature and distribution of contamination (based on visual/olfactory evidence only).

Further refinement of the Conceptual Site Model is presented in Section 10, where the results of laboratory testing for contaminants have been considered.

9 CONTAMINATION (ANALYSIS)

9.1 GENERAL

The site was formally occupied by a colliery, railway and council depot (which included underground fuel storage tanks) all of these uses may have given rise to some ground contamination. Furthermore, made ground was encountered within the majority of the exploratory locations during the ground investigation.

An assessment of potential contaminants associated with the former uses has been undertaken; see Section 6.3.

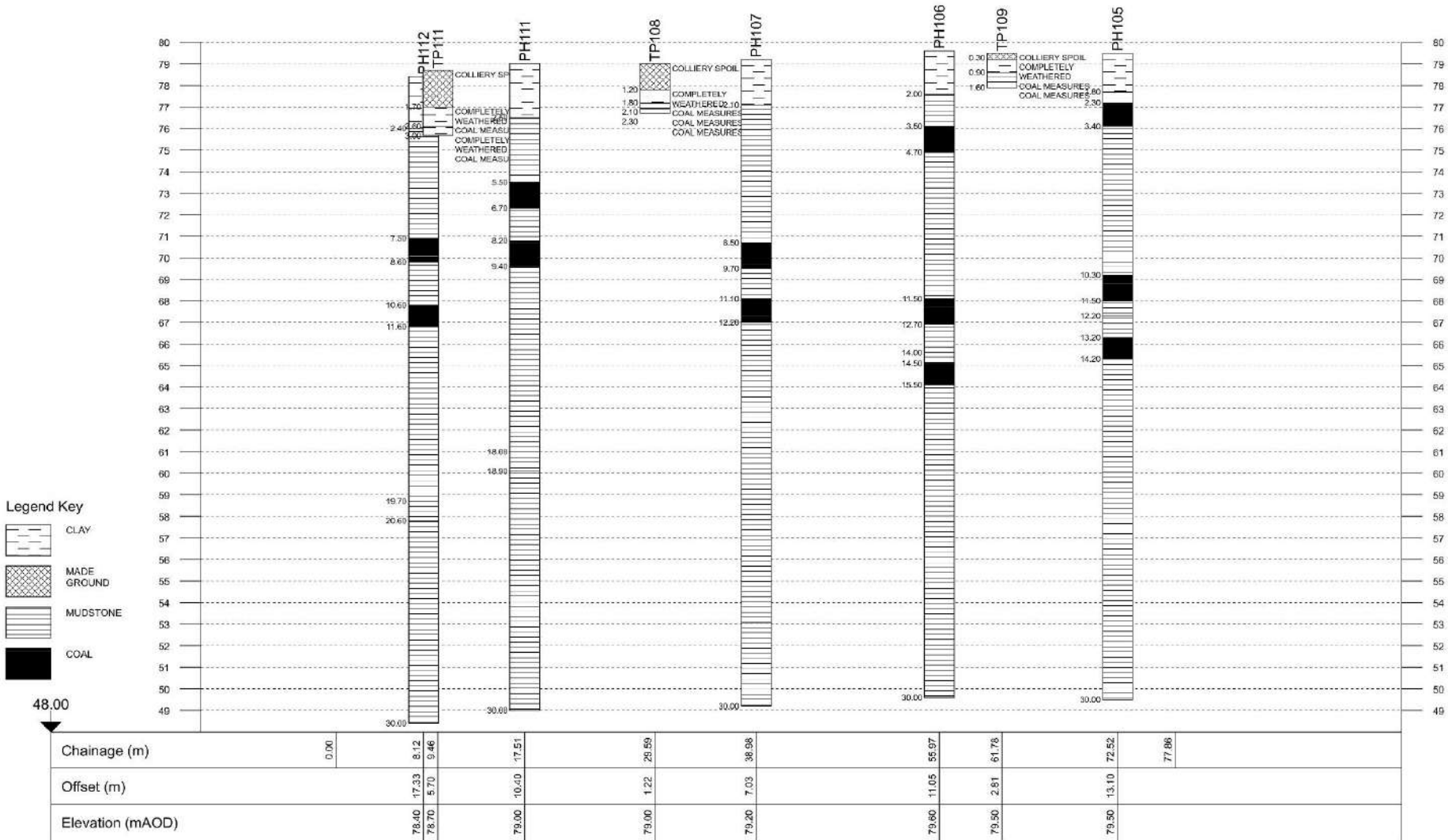
In the context of risks to human health associated with residential development, the Tier 1 Soil Screening Values referenced in this report have been derived by Land Quality Management Limited as their LQM/CIEH S4ULs, but amended, where appropriate, to be more specific to redevelopment within the planning process (see Notes in Annex I).

Where available, Category 4 Screening Levels (C4SL) have also been referenced; again, see Notes in Annex I for more detail.

This site is brownfield and underlain by made ground. Consequently, for organic compounds, the Tier 1 Values used in this report have been derived with reference to a CSM that assumes a minimum 600mm of clean soil cover will be placed in gardens/landscaped areas (Calabrian Scenario B); see Notes in Annex I for a more detailed explanation. In the event that no determinands exceed these Tier 1 Values, the results will be reassessed with reference to values derived using a CSM with no soil cover (Calabrian Scenario A).

Project Id: 7034
Project Title: Darklands Road
Location: Swadlincote
Client: LTN Construction Limited

Title: Section line 4
Vertical Scale: 1:250
Horizontal Scale: 1:500
Engineer: RJH



9.2 TESTING SCHEDULED

Based on the above assessment, Calabrian submitted a test schedule (summarised in the table below) to a UKAS accredited laboratory. We have also taken account of visual and olfactory evidence recorded during the ground investigation.

Type of Sample	No. of Samples	Determinands
Made Ground	15	Asbestos ID, pH, water soluble boron, and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc)
	7	Leachable metals: arsenic, boron, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc
	10	Water soluble sulphate, chloride, nitrate and magnesium.
	2	Calorific Value (CV).
	15	TOC, Speciated Poly Aromatic Hydrocarbons (PAH).
	3	Banded Total Petroleum Hydrocarbons (TPH).
	5	Speciated Total Petroleum Hydrocarbons (TPH).

Account was taken of previous uses in specific areas, with analysis concentrated on samples recovered from the vicinity of former underground fuel tanks.

9.3 SOIL CONTAMINATION RESULTS

The soil contamination test results are summarised in the Tables in Annex I.

Laboratory test certificates as received from the laboratory are presented in Appendix E.

Inorganic Determinands

Of the fifteen samples of natural and made ground analysed for inorganic parameters, none can be classified as contaminated.

GEA found only a single elevated concentration of arsenic (91mg/kg) within BH21 during their pre-demolition investigation. This would be considered an outlier given the low concentrations of arsenic yielded by the significant number of other samples.

These samples are classified by comparison of concentrations with Calabrian Tier 1 Values for an end use including domestic gardens and any area where plants are to be grown (the most sensitive of the proposed end-uses).

Calorific Value

The calorific value of two samples of ash and clinker, have yielded an average CV of <1.0MJ/kg and 2.9MJ/kg respectively. Materials whose CVs exceed 10MJ/kg are almost certainly combustible, while those with values below 2MJ/kg are unlikely to burn.

Asbestos

Screening for asbestos identified fibres in only one of the fifteen samples of made ground tested. Further analysis (asbestos quantification) was undertaken on this sample which yielded 0.001% of fibres. GEA previously found a single fragment of asbestos containing material within BH21.

Leachables

Of the leachability tests conducted on seven samples of made ground, none had concentrations of leachable contaminants above the maximum permissible concentrations as defined in the Water Supply (Water Quality) Regulations 1989, as amended in 2000.

Organic Determinands

Samples have been classified by comparison with Calabrian risk-derived Tier 1 Values. These screening values assume a Soil Organic Matter (SOM) of 6% (equivalent to a TOC of 3.5%). Many organic contaminants are more mobile when the SOM is lower, and consequently lower screening values are then more appropriate for many organic contaminants.

In order to check the validity of Calabrian Tier 1 Values, the average TOC for each common fill type (beyond any areas of obvious hydrocarbon impact) have been determined.

Fill Type	Typical TOC/%	Comparison with revised Screening Value necessary?
Ash & Clinker	Variable	Yes. Revised screening value adopted.
Granular Made Ground	<0.8	No.
Colliery Spoil	Variable	Yes. Revised screening value adopted.
Cohesive Made Ground	<2.8	No.
Coal Measures	<0.6	Yes. Revised screening value adopted.

Total Petroleum Hydrocarbons (TPH)

Calabrian have used the CLEA model to derive risk-based screening values for hydrocarbons, in accordance with the methodology detailed by the TPHCWG, and reviewed by a UK workshop of experts with respect to UK adoption of the method.

Within the ash and clinker deposits clasts of weathered tarmac were identified and these yielded a naphthalene odour and coal tar appearance. The concentrations of C₁₀ to C₄₀ in this material were significantly exceeded.

Assessment of TPH within the vicinity of the former underground fuel tanks has been undertaken in accordance with a 3-step approach, (see notes in Annex I). The first two steps involve review of speciated results. The third step assesses cumulative effects.

Step 1 – Consideration of Indicator Compounds (BTEX and naphthalene). None of the Indicator Compounds exceed their respective Tier 1 criteria.

Step 2 – TPH Fractions (does any individual fraction exceed Tier 1?). None of the fractions exceed their respective Tier 1 criteria.

Step 3 – Assessing Cumulative Effects. As TPH fractions are made up of a range of different substances it is possible that a number of these can affect the same ‘target organ’ (i.e. cause skin irritation or affect the liver), resulting in cumulative effects.

The cumulative effect, associated with each source material, has been assessed via calculation of a Hazard Index (HI); HI < 1 indicates no cumulative effects; HI > 1, cumulative risk requires further consideration.

The HI calculation for this site is contained in Annex I. The HI is < 1, therefore cumulative risks need not be considered further.

Poly Aromatic Hydrocarbons (PAH)

Speciated PAH analysis has been undertaken in order to determine concentrations of the key “marker” compounds: benzo(a)pyrene (considered the most toxic of the PAHs); and naphthalene (the most mobile and volatile of the PAHs).

Speciated analysis has confirmed the absence of significant concentrations of naphthalene in the soils beneath this site with the exception of ash and clinker and granular made ground in TP101 and TP102. These materials contained clasts of weathered tarmac and these yielded a naphthalene odour and coal tar appearance. A concentration of 160mg/kg was found in TP102 at 0.4m depth.

Three concentrations of benzo(a)pyrene in excess of Calabrian’ Tier 1 Value of 5mg/kg were recorded in TP101 and TP102 only. Elsewhere on-site concentrations did not exceed 1.2mg/kg with the vast majority of samples found to be below the limit of laboratory detection (0.03mg/kg).

10 CONTAMINATION (RISK ASSESSMENT & REMEDIATION)

10.1 SUMMARY OF SIGNIFICANT CONTAMINATION

Clasts of weathered tarmac have found within the ash and clinker deposits. The ash and clinker found only within TP101, TP102 and TP114 in the east of the site is locally potentially combustible and contains elevated concentrations of a number of organic determinands.

10.2 REVISED CONCEPTUAL GROUND MODEL (CONTAMINATION)

The Preliminary Conceptual Site Model has been amended in light of data obtained during the ground investigation, most notably with respect to the distribution of made ground and contaminants.

10.3 ENVIRONMENTAL SETTING & END USE

As discussed in Section 10.1 above, contamination exist locally within the soils beneath this site. In order to assess the significance of this contamination, consideration must be given to the site’s environmental setting and the proposed end use.

The underlying Coal Measures is classified as a secondary aquifer. The nearest surface watercourse is the Darklands Brook, which flows in an east to west direction, approximately 50m beyond the site’s northern boundary. Therefore, the site’s environmental setting is considered to be moderate sensitivity.

With respect to human health, the proposed end use (residential) is also sensitive. Transient risks to construction workers can be addressed by the adoption of appropriate health and safety measures, see Section 14.

10.4 POLLUTANT LINKAGES

In terms of a proposed redevelopment of this site, plausible pollutant linkages can be summarised as follows.

Contaminants

Contaminants have been summarised in Section 10.1 above.

Pathways

Potential contaminant pathways include:

- Ingestion;
- dermal contact;
- inhalation of contaminated particulates;
- surface water run-off, including existing drainage infrastructure; and,
- downward infiltration of leachable/mobile contaminants to groundwater.

Receptors

Potential contaminant receptors include:

- the environment – secondary aquifer and/or watercourse
- end users of the site (residents)

It can be concluded that there are plausible pathways between actual contaminant and potential receptors. Consequently, some remediation will be required; either treatment/removal of the contaminant, or “breakage” of the pathway.

10.5 POTENTIAL REMEDIATION OPTIONS

General

Approval of the recommendations given below should be sought from the appropriate regulatory authorities prior to commencement of site redevelopment.

The made ground across the majority of the site has been found to be essentially ‘clean’ (i.e. it has not yielded elevated concentrations of any contaminants) but does include ‘unsuitable’ materials (they contain a significant proportion brick, concrete etc). Very localised traces of asbestos fibres and fragments have also been identified within this material.

Therefore, where residual made ground remains beneath garden and landscaped areas (i.e. not beneath hardstanding) a 300mm thick surface cover of ‘clean’ soil is recommended with a hi-visibility geotextile separator at the interface of ‘clean’ soil and made ground. The site Health & Safety File should contain details of the soil cover systems to prevent breaching of the geotextile layer.

Combustibility

The ash and clinker within TP101 is considered potentially combustible and, in accordance with current guidance, the following remediation measures should be adopted if it is left on site:

- Garden areas: isolate beneath a minimum 1,000mm thickness of inert soil, comprising 850mm of “clean” subsoil plus 150mm topsoil.
- Services: utility trenches (especially those carrying potential heat sources e.g. electric cables) should be cut oversize and backfilled with clean, inert material. This applies to any utility trenches that run beneath estate roads or extend under houses. It is strongly recommended that further advice be sought from all statutory service bodies with respect to the ground conditions within which they will lay services.
- Access Road/Car park: no action required (although generally less than 1,000mm thick, the road construction is considered to provide adequate isolation as there will be no heat source). Local Authority Highways approval should be sought.
- Buildings: no action required (the floor slab will include insulation and therefore heat transfer into the ground will be negligible). Local Authority Building Control and Warranty Provider approval should be sought.

As further mitigation against the risk of spontaneous combustion, the ash could be

Asbestos

Only one sample of made ground identified asbestos fibres. Supplementary analysis (asbestos quantification) yielded only a trace (<0.001%) of fibres within the sample.

Nonetheless, made ground soils with only a trace of asbestos still have the potential to be hazardous to human health. This is because soil with a low asbestos content of say 0.001% may contain thousands, possibly hundreds of thousands, of potentially respirable asbestos fibres per gram of soil. However, asbestos fibres only pose a risk if they are allowed to become airborne, and release from soil to air can only occur if the soil is dry and then agitated (e.g. by vehicle movement, excavation, wind etc).

Provided soils are kept damp the risk of airborne fibre release, even during disturbance associated with excavation, should be negligible, and certainly below the control limit (as set by the Control of Asbestos Regulations 2012) of 0.1 f/cm³ airborne fibres averaged over a 4-hour period.

In our experience, damp soils do not allow the release of asbestos fibres, even from soils that contain concentrations in excess of the hazardous waste threshold (0.1%).

There may be transient risks during the excavation of made ground soils. Exposure to asbestos of personnel involved in these excavation works is considered likely to be sporadic and of low intensity (provided soils are kept damp). Therefore in accordance with Regulation 3(2) of the Control of Asbestos Regulations (2012), exemption from Regulations: 9 (notification of work with asbestos); 18(1)(a) (asbestos areas); and 22 (health records and medical surveillance) should apply, provided it is ‘clear from a suitable and sufficient risk assessment that the control limit of 0.1 f/cm³ airborne fibres averaged over a 4-hour period will not be exceeded’.

Nonetheless, risks must be mitigated by appropriate measures (principally damping down), working procedures, and PPE. Method Statements and Risk Assessments should be prepared by the Contractor, and then be reviewed by the Client and Calabrian.

Any fragments of asbestos cement sheeting encountered during the excavation works, should be gathered by hand and placed in double sealed bags. Personnel involved in this activity must be equipped with an appropriate respirator (i.e. a FFP3 or better), in addition to their “standard” PPE. The bags of asbestos waste should be placed in a sealed skip for off-site disposal at a suitably licensed landfill site; such material will be classified as hazardous waste.

Where residual made ground remains beneath garden and landscaped areas (i.e. not beneath hardstanding) a 300mm thick surface cover of ‘clean’ soil is recommended with a hi-visibility geotextile separator at the interface of ‘clean’ soil and made ground. The site Health & Safety File should contain details of the soil cover systems to prevent breaching of the geotextile layer.

Also see also in the ‘Waste Classification’ Section below.

Organic Contamination

Speciated analysis has confirmed the presence of elevated concentrations of both of the key marker compounds benzo(a)pyrene and naphthalene in the soils in the vicinity of TP101, TP102 and TP114.

Indoor vapour is the primary risk pathway for Naphthalene (and other volatile PAH compounds) and therefore where the weathered tarmac containing material underlies proposed structures (essentially the two apartment blocks) a hydrocarbon resistant membrane will be required to be incorporated into the ground floor construction. Alternatively, this material could be excavated and removed from site.

The ash and clinker and made ground in the east of the site has yielded elevated concentrations of a number of organic compounds. Therefore, where residual made ground remains beneath garden and landscaped areas (i.e. not beneath hardstanding) a minimum 600mm thick surface cover of “clean” soil comprising 500mm subsoil and 100mm topsoil is recommended. This cover will break potential pollutant linkages between the contaminated made ground and future end-users.

Estimation of the volume of grossly contaminated soil requiring removal or treatment can only be approximate at this stage and is dependent on the target concentration(s) agreed with the Local Authority and/or Environment Agency. Contractors with experience of brownfield sites should be asked to review the site investigation data and make their own assessment once target concentrations have been agreed.

Localised areas of more onerous contamination than that identified to date may be present on site. If any buried drums, “oily”, odorous, brightly coloured etc. materials are encountered, further advice should be sought from Calabrian.

Waste Classification

Disposal of the made ground off site is generally not considered appropriate, economically viable, nor in line with current Government philosophy regarding sustainable development. However, some excess arisings may be generated by excavations for foundations, sewers etc. Disposal to landfill (or an appropriate soil / aggregate transfer station) may be the most practical solution, if redistribution and retention on site is not feasible.

It should be noted that the classification and assessment of waste soils under the Environment Agency’s Technical Guidance WM3, is a complex process (as of 1st July 2015 WM2 was archived and replaced by technical guidance WM3).

If waste soil is classed as hazardous following classification under WM3, and destined for landfill, waste acceptance criteria (WAC) leachate testing will need to be undertaken. However, non-hazardous soil waste can go to a non-hazardous landfill facility; no further testing (eg WAC) is required.

WAC analysis is different to the 'routine' laboratory testing (such as that included earlier in this Section) undertaken in order to determine hazardous properties. Calabrian typically only include WAC analysis if significant off-site disposal (of soil classified as hazardous waste) is anticipated.

It is critical if material is to be exported from site that this is allocated an appropriate waste code, following the steps within WM3. Waste carriers transporting, and sites accepting, this material should have a corresponding code within their permits. It is the responsibility of those generating the waste (i.e. the site), to ensure that the waste is handled and disposed of appropriately.

With respect to asbestos, waste soils will be classed hazardous if the soil mass contains more than 0.1% asbestos fibres that are free and dispersed. However, the 2013 edition of WM2 now states that where the waste contains identifiable pieces of asbestos (i.e. any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye), then the waste is hazardous if the concentration of asbestos in the pieces alone is 0.1%. If a stockpile of soil contained rare fragments of broken asbestos-cement sheeting, the whole stockpile would be classed as hazardous unless all the fragments could be picked-out (even though the concentration of asbestos in the soil mass might be an orders of magnitude less than 0.1%).

Contractors exporting waste from the site should be asked to review the site investigation data and make their own assessment. Alternatively, Calabrian could undertake this assessment once exported waste streams have been identified.

If tarmac is to be removed from site, further testing of individual areas should be undertaken to establish the chemical composition. Different areas of tarmac should be stockpiled separately until test data has been reviewed to avoid mixing hazardous and non-hazardous material.

11 HAZARDOUS GAS

11.1 GENERAL

Consideration of the conceptual site model and potential linkages has enabled a preliminary qualitative assessment of risks associated with gas:

Source	Receptors	Hazard	Pathway	Initial Risk
On-site made ground	Human Health	Asphyxiation & explosion.	Vertical migration, ingress & accumulation	Very Low: made ground essentially inert, with little degradable matter.
Mineshaft	Human Health, buildings	Asphyxiation & explosion.	Vertical migration, ingress & accumulation	Very Low: workings are around 130m deep and shaft is backfilled with consolidated material.

Given the above, gas monitoring wells have been installed in six boreholes across the site. Details of the installations are given on the borehole logs presented in Appendix D.

The generation potential of the gas source was initially considered to be Very. Consequently, in accordance with CIRIA Report C665, given the proposed residential end use, six visits have been scheduled over a three-month period.

11.2 RADON

BRE Report BR211 (2015 Edition) indicates that radon protection measures are not required for new dwellings at the site. Information from Landmark confirms that the site is in an area where less than 1% of homes are estimated to be above the action level, and that radon protection measures are therefore not required.

11.3 HYDROCARBON VAPOUR BARRIER

Where the weathered tarmac containing material underlies proposed structures (essentially the two apartment blocks) a hydrocarbon resistant membrane will be required to be incorporated into the ground floor construction.

The following measures should be incorporated:

Traffic Light Classificn	Gas "score" req'd by BS 8485	Floor Slab (BS8485 "score")	Protective Measures	
			Sub-floor ventilation (BS8485 "score")	Membrane
				Type (BS8485 "score")
Amber 1	3	<i>Select one from:</i> i. Block & Beam – (0). ii. Reinforced ground bearing slab – (0.5). iii. Reinforced, cast in-situ suspended slab (with minimal service penetrations & water bars around all slab penetrations & at joints) – (1.5). Reinforced ground bearing raft (with limited service penetrations cast into slab). Note: the venting area through any downstand beam should be 3 times greater than provided by the side ventilation (air bricks) – (1.5).	<i>Select one from:</i> Passive sub-floor ventilation; venting layer could be: i. A min. 150mm clear void (2.5), or ii. A proprietary void former (expanded polystyrene shuttering) providing an equivalent clear void depth of 33mm (2.5), or iii. Min. 300mm thick blanket of 20mm single size gravel (1.0). Min. ventilation = 1,500 mm²/m run of external wall (via air bricks on each of 2 opposite sides), with 100mm pipes at 2m centres or honeycombing of any sub-floor sleeper walls.	Hydrocarbon resistant membrane (eg Puraflex VOC Membrane, Visqueen Ultimate GeoSeal). (0.5), but increase to 1.0 if workmanship is subject to inspection to 2.0 if also subject to integrity testing.

11.4 DISCUSSION

GEA installed six wells, generally within the made ground across the site during their 2017 investigation. These were monitored on three occasions between May and June 2017. Methane was not detected during any of the visits, carbon dioxide was recorded at a maximum concentration of 3.9% v/v and negligible flows were detected. On this basis the site would be classified as Green/CS1 with no special gas protection measures being required; other than those detailed in Section 11.3 above.

A hazardous gas risk assessment incorporating all of the results will be issued on completion of monitoring in November 2019.

12 GEOTECHNICAL TESTING

12.1 GENERAL

A total of ten samples of natural soil were delivered to a suitably accredited laboratory with a schedule of geotechnical testing drawn up by Calabrian.

The geotechnical laboratory test results are presented in Appendix F.

12.2 ATTERBERG LIMITS

The plasticity indices of six samples of cohesive soil have been determined; results are summarised below.

Soil type	Range of Plasticity Indices* (Average)	Shrinkability
Weathered Coal Measures	17 to 38 (28)	Medium

* Modified where appropriate in accordance with revised Chapter 4.2 of the NHBC Standards (April 2003).

Note. The term Shrinkability is equivalent to the term Volume Change Potential used in Chapter 4.2.

For the purposes of foundation design, it is recommended that all cohesive soils be regarded as being of medium shrinkability.

12.3 SOLUBLE SULPHATE AND PH

In accordance with BRE Special Digest 1:2005, this site has been classified as brownfield with a mobile groundwater regime.

It is envisaged foundations will extend to depths of about 1m through made ground and natural strata and samples taken from this depth range have been submitted for pH and water-soluble sulphate (2:1 soil/water extract)

The concentrations of sulphate in the aqueous natural soil extracts of ten samples were determined. In addition, ten samples of made ground were tested as part of the contamination suite. The pH value of each sample has also been determined.

The highest water-soluble sulphate concentration and the lowest pH value for each soil type analysed are shown in the Table below.

Soil type	Lowest pH values	Highest Soluble Sulphate Concentration (mg/l)
Made Ground	7.4	240
Weathered Coal Measures	6.2	110

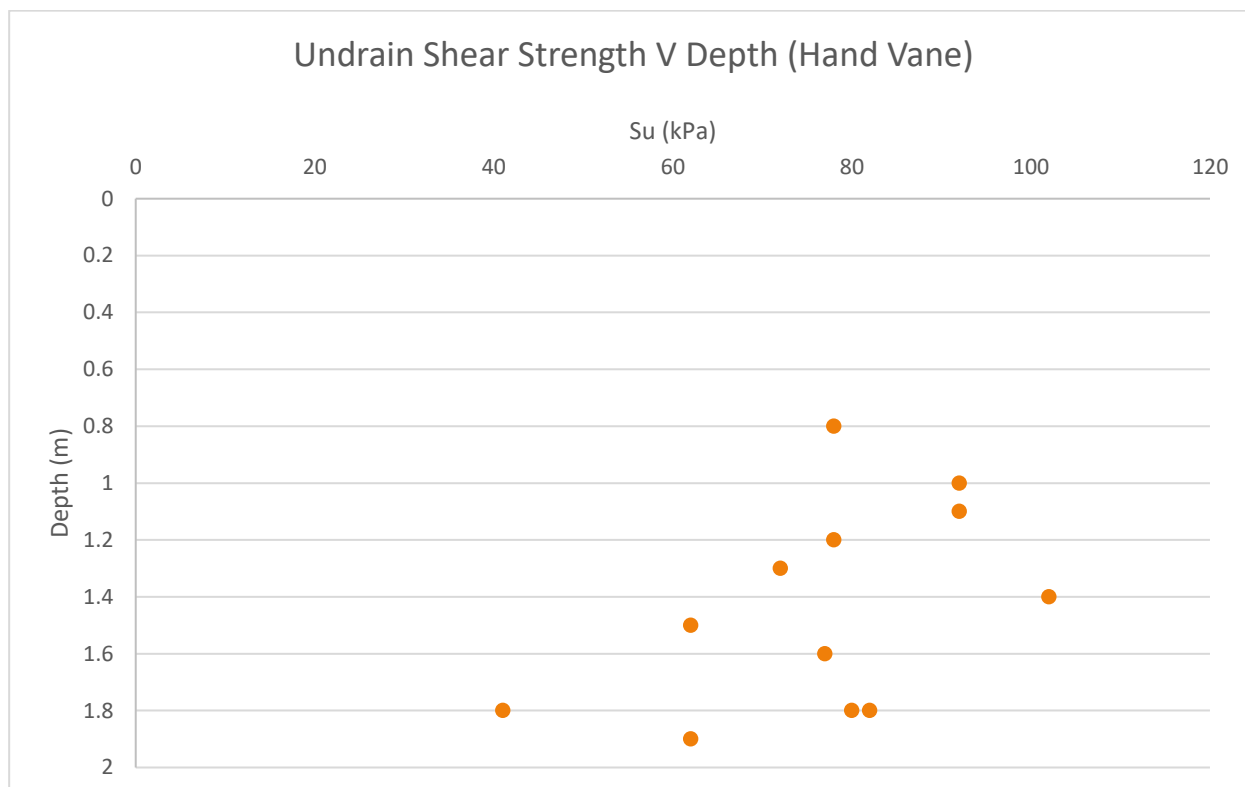
pH values were all above 5.5, therefore concentrations of chloride and nitrate are considered insignificant.

In accordance with Tables C1 and C2 of SD1, sub-surface concrete should be Design Sulphate Class DS-1, with the site allocated an ACEC Classification of AC-1.

12.4 UNDRAINED SHEAR STRENGTH TESTING

Hand Shear Vane Testing

Hand shear vane testing was undertaken from larger blocks of clay excavated from the trial pits. The results are summarised within the plot below and illustrate that undrained shear strength (S_u) with depth within the weathered Coal Measures deposits were above 60kPa.



13 GEOTECHNICAL ISSUES

13.1 CONCEPTUAL SITE MODEL

Made ground at the site varies in thickness from 0.6m to 1.7m across the site although was absent in the central area. Made ground predominately comprises either colliery spoil or cohesive made ground. Locally ash and clinker was encountered.

Natural ground was encountered in each of the exploratory holes, with the exception of TP103 which was located within the area of the former underground fuel tanks, and typically comprised completely weathered Coal Measures (firm and stiff clay) overlying Coal Measures mudstone.

No significant obstructions (except the mineshaft cap) were encountered at the site.

13.2 MINING & QUARRYING

This site is located within a Development High Risk Area.

Several coal seams underlie the site at shallow depth. These appear to dip at shallow depth towards the south.

There are no historical records of workings in these seams and no evidence of workings were encountered within any of the boreholes such as voids, broke ground or loss of flush returns.

A capped mineshaft is located in the east of the site. The CA have indicated that they would object to any 'hard' development over or within 3m of the existing mineshaft.

There are no known quarries on, or within 100m of the site.

13.3 FOUNDATION RECOMMENDATIONS

General

Foundation recommendations assume that redevelopment will be of three storey construction and that line loads will not exceed 110kN/m run. If this is not the case significant alteration to these recommendations will be required.

We have assumed that final development levels will not differ significantly from ground levels existing at the time of investigation. Any digital terrain modelling undertaken or commissioned by The Client should consider implications for the foundation recommendations outlined below.

Made ground is not considered a suitable foundation material and foundations should therefore be taken through these materials into underlying natural strata of adequate bearing capacity.

Sub-surface concrete in contact with the made and natural ground should be Design Sulphate Class DS-1, with the site allocated an ACEC Classification of AC-1.

Strip/Trench Fill Footings

It is considered that shallow strip or deepened trench fill footings will be the most suitable foundation solution for the three storey structures constructed at the site. This solution is viable where the made ground is less than about 2.5m thick and firm/stiff clay or mudstone is the founding material.

Clay/Cohesive Soils

Assuming a maximum foundation line load of 110kN/m run, a foundation geometry of length = 30m, breadth = 0.6m, thickness = 225mm, founding at 1m depth and assuming an undrained shear strength of 60kPa for the firm clay (typical minimum recorded on site) then theoretical safe bearing capacities as detailed below can be calculated:

- Meyerhof (Factor of Safety) Approach = 150kPa (FoS=2.5)
- Lumped Factor of Safety = 150kPa (FoS=2.5)

A Eurocode 7 approach provides the following ultimate bearing capacities including the use of depth factors. Applying 75mm of eccentricity to the line load has negligible effect in either case:

- DA1 Combination 1 = 150kPa (ultimate)
- DA2 Combination 2 = 150kPa

However, consideration should also be given to the effect of settlement on the above safe bearing capacities in order to assess meaningful allowable bearing capacities.

Assuming the foundation geometry detailed above, minimal settlements would be anticipated.

Clay classification tests suggest that natural cohesive soils at the site should be regarded as being of medium shrinkability. A minimum founding depth of 900mm is therefore recommended for all soils on the site where strip footings are proposed.

Bedrock

The mudstone is generally considered to have a safe bearing capacity of at least 250kPa and minimal settlements would be anticipated.

Where rock is encountered at shallow depth foundations should be placed entirely on rock and not partially on rock and partially on soil. This may, depending on surface gradient, necessitate significant overdeepening of foundations.

Bedrock at the site comprises mudstone which can be easily excavated using a backhoe excavator and will be recovered as a tabular gravel.

General

Reinforcement, as a precaution against differential settlement, is recommended only where foundation excavations encounter significant lateral and vertical variations in strata. One layer of B385 mesh placed 75mm above the base of the footing is likely to provide suitable reinforcement, but further advice should be sought from the Structural Engineer.

Founding depths are from original or finished ground level, whichever is the lower, to the underside of the footing.

Foundations should be deepened near trees in accordance with NHBC Standards Chapter 4.2. Foundations of plots placed over relict foundations should be taken to greater depth than the relict foundations and into natural ground of adequate bearing capacity. Overdeepened foundations should be stepped in accordance with NHBC Standards, Chapter 4.4.

Foundations will be required to be placed below a line drawn up at 45° from the base of any service or similar excavation.

In order to minimise softening and swelling of cohesive soils, it is recommended that footings are cast as soon as formation level is reached (or alternatively formation could be blinded using concrete with as low a water:cement ratio as possible).

The Client or their groundworker should seek further advice from Calabrian if unexpected ground conditions are encountered in foundation or sewer excavations, including any conflict between soft ground associated with a backfilled trial pit excavation and the line of a proposed footing.

13.4 FLOOR SLABS

Suspended floor slabs should be utilised where the depth of made ground or engineered stone exceeds 600mm in accordance with NHBC Standards Chapter 5.1 (to negate potential settlement problems).

13.5 DESIGNATED CONCRETE MIXES

The following designated mixes in accordance with BRE Special Digest SD1 and BS 8500: Part 1: 2006 will be suitable for use on this site.

Application	DS-1 conditions (natural ground) ACEC Class AC-1
Unreinforced strip/trench fill footings	GEN1
Reinforced strip/ trench fill footings (mesh reinforcement)	RC28/35
Pads, rafts and ground beams	RC28/35
Unreinforced concrete floor slabs	GEN2
In situ reinforced concrete floor slabs	RC28/35

13.6 EXCAVATIONS

Based on the results of the investigation it is unlikely that major groundwater flows will be encountered in shallow excavations.

Excavations should remain stable in the short term but if left open for any significant period of time may require shoring most notably in granular soils and made ground.

13.7 DRAINAGE

Based on observations made during the investigation, soakaways will not provide a suitable drainage solution for surface water run-off at the site. Consequently, it will be necessary to consider alternative sustainable drainage systems (SUDS), and there may be a need for surface water balancing.

It is recommended that the developer contact the local water services company with respect to capacity in existing foul and surface water sewers in the vicinity of the development area.

13.8 PAVEMENTS

Based on visual inspection of the natural materials and the recorded plasticity indices at the site, published tables (Interim Advice Note 73/06 Revision 1 (2009), Chapter 5. Characterisation of Materials Design Guidance for Road Pavement Foundations - Draft HD25) PDF p25 indicate that the natural deposits will have a CBR value of at least 3%. These values should be verified prior to or during construction.

Where made ground is present the full thickness should be excavated (up to a maximum of 2m) and replaced with suitable aggregate in accordance with Series 600 (Earthworks) of The Highways Agency (HA) "Specification for Highway Works" 1998.

Any residual made ground materials in the base of the excavation should be inspected and (where necessary) any soft spots removed and replaced with suitable engineered fill.

Crushing of demolition arisings already stockpiled on site should be suitable for use as unbound pavement materials within the highways.

The area where the underground tanks were removed in filled with soft and wet material and this would require excavation and engineered backfill where it impinges on any proposed access road or car park.

13.9 EXTERNAL WORKS

Any digital terrain modelling undertaken or commissioned by The Client should be made available to their Engineering Designer prior to issue of an External Works Drawing.

14 REDEVELOPMENT ISSUES

14.1 GENERAL

This report has presented options with respect to foundation solutions, treatment of contamination etc that are considered technically feasible and in line with current good practice. Consequently, we would expect to obtain regulatory approval for whichever option is adopted, although this cannot be guaranteed. Copies of this report should be forwarded to the relevant regulatory authorities (Local Authority) for their comment/approval.

14.2 REMEDIATION STRATEGY

Redevelopment of this site will almost certainly be subject to planning conditions relating to remediation and validation. Once a specific, preferred development strategy has been decided, Calabrian could liaise with local Planning Authority and prepare a detailed Remediation Strategy document for approval.

The Remediation Strategy document would include:

- General background information, including site location, site description and a summary of ground investigation data;
- an overview of existing constraints on development and the aims of the proposed remediation works;
- specific details of the anticipated site remediation/preparatory works;
- details of site supervision and verification; and,
- a summary of implications for redevelopment.

The Remediation Strategy will describe what is required, but not how it is achieved; the appointed Contractor would normally be expected to undertake an Options Appraisal, and then prepare a Method Statement.

The anticipated remediation works are summarised below:

- Excavation of up to a maximum depth of 2m beneath proposed pavement footprints where they are underlain by made ground and controlled re-engineering of selected materials (crushed demolition arisings) in layers;
- provision of a minimum 600mm thick cover layer of 'clean' soils in all garden and landscaped areas in the east of the site;

- Provision of a minimum 300mm thick amenity growing layer of 'clean' soils with basal hi-visibility geotextile layer in all garden and landscaped areas across the remaining site; and,
- Incorporation of a hydrocarbon resistant membrane into the ground floor construction of the apartment blocks in the east (or removal from site of soils containing weathered tarmac).

14.3 HEALTH & SAFETY ISSUES - CONSTRUCTION WORKERS

The bulk of the made ground will be retained on site. This made ground contains contaminants at concentrations above the guidance threshold values for an end use that includes domestic gardens. Workers involved in excavations for foundations, drainage, utilities etc are likely to come into direct contact with the made ground.

Although workers will only be exposed to the contaminated soil for a relatively short time, the contaminants represent a risk, and simple precautionary measures are required, i.e. good personal hygiene and basic personnel protective equipment.

Consequently, during the remediation and construction phases of the site development it will be necessary to protect the health and safety of site personnel. General guidance on these matters is given in the Health and Safety Executive (HSE) document "Protection of Workers and the General Public during the Redevelopment of Contaminated Land". In summary, the following measures are suggested to provide a minimum level of protection:

- All ground workers should be issued with protective clothing, footwear and gloves. Personnel should be instructed in why and how they are to be used;
- handwashing and boot-washing facilities;
- care should be taken to minimise the potential for off-site migration of contamination by the provision of dust suppression control and wheel cleaning equipment during the construction works;
- good practices relating to personal hygiene should be adopted on the site; and,
- the contractor should satisfy the Health & Safety Executive with regard to any other matters concerning the health, safety and welfare of persons on the site.

Access into excavations etc. must be controlled and only undertaken in accordance with the Confined Spaces Regulations 1997. The atmosphere in shored trenches in excess of 1.2m should be monitored for oxygen and hazardous gas (methane & carbon dioxide), prior to personnel entering such excavations. Monitoring should continue whilst personnel are working in deep excavations.

Before site operations are started, the necessary COSHH statements and Health & Safety Plan should be drafted in accordance with the CDM regulations.

14.4 CONTROL OF EXCAVATION ARISING

Excavations into made ground in the east of the site are likely to yield contaminated arisings. The groundworker should carefully segregate (and stockpile separately) made ground arisings from arisings of "clean" natural soils, in order that an excessive volume of unsuitable material is not generated.

Made ground arisings could be:

- Placed in area deliberately left low on completion of the remediation works in order to accommodate construction arisings;
- redistributed beneath areas of hardstanding, where they would be satisfactorily isolated from end users;
- isolated beneath the 600mm/300mm thick cover layer in garden or landscaped areas; or
- exported from site to a suitably licensed landfill facility.

14.5 NEW UTILITIES

It is strongly recommended that all statutory service bodies are consulted at an early stage with respect to the ground conditions within which they will lay services in order to enable them to assess at an early stage any potential abnormal costs.

It is recommended that trenches for services including site drainage are cut over size in order to isolate pipe materials from potential contaminants and to enable maintenance to be conducted in "clean" material.

Water Companies have a statutory duty to supply wholesome water, which could be compromised by the selection of an inappropriate pipe material. For example, certain compounds such as petroleum hydrocarbons and solvents can permeate commonly used plastics pipes, and/or corrosive chemicals can reduce the service life of metallic pipes. Guidance has been developed for the selection of pipes in brownfield sites and is contained in a UKWIR Report.

This site is brownfield, and therefore consideration of soil contaminant concentrations is required.

At the time of writing, the proposed route(s), and total length, of pipeline were unknown. Given the site's size, history, and ground conditions encountered, it is likely that the local water services company will require sampling within 15m of proposed water supply pipes, once infrastructure design has been completed.

15 CONCLUSIONS & RECOMMENDATIONS

15.1 GENERAL

Consideration is being given to redevelopment of the site with a three-storey residential care home along with two blocks of two-storey apartments along with associated access road, car park and landscaping/gardens.

Made ground at the site varies in thickness from 0.6m to 1.7m across the site although was absent in the central area. Natural ground was encountered in each of the exploratory holes and typically comprised completely weathered Coal Measures.

The site was formally occupied by a colliery, railway and council depot (which included underground fuel storage tanks). The former council depot has been demolished and hardstands removed. In the east a tarmac surfaced car park remains in use.

15.2 HAZARDOUS GAS

Methane was not detected during any of the previous GEA monitoring visits, carbon dioxide was recorded at a maximum concentration of 3.9% v/v and negligible flows were detected. On this basis the site would be classified as Green/CS1 with no special gas protection measures being required.

Six wells installed by Calabrian will be monitored and a hazardous gas risk assessment will be issued on completion of monitoring in November 2019.

The site is in an area where less than 1% of homes are estimated to be above the radon action level.

Where the weathered tarmac containing material underlies proposed structures (essentially the two apartment blocks) a hydrocarbon resistant membrane will be required to be incorporated into the ground floor construction.

15.3 MINING & QUARRYING

This site is located within a Development High Risk Area. Several coal seams underlie the site at shallow depth. These appear to dip at shallow depth towards the south.

There are no historical records of workings in shallow seams beneath the site and no evidence of workings were encountered within any of the boreholes such as voids, broke ground or loss of flush returns.

A capped mineshaft is located in the east of the site. The CA have indicated that they would object to any 'hard' development over or within 3m of the existing mineshaft.

There are no known quarries on, or within 100m of the site.

15.4 CONTAMINATION & REMEDIATION

The ash and clinker found only within TP101, TP102 and TP114 in the east of the site is locally potentially combustible and contains elevated concentrations of a number of organic determinands.

This material will require a minimum 600mm thick cover layer of 'clean' soils in all garden and landscaped areas and incorporation of a hydrocarbon resistant membrane into the ground floor construction of the apartment blocks.

Elsewhere on site a minimum 300mm thick amenity growing layer of 'clean' soils in all garden and landscaped areas; this should incorporate a basal hi-visibility geotextile layer.

15.5 FOUNDATIONS

Shallow strip or deepened trench fill footings will be the most suitable foundation solution for the three storey structures constructed at the site. This solution is viable where the made ground is less than about 2.5m thick and firm/stiff clay or mudstone is the founding material.

15.6 FLOODING

The EA indicate that the site is not located within an indicative floodplain.

15.7 DRAINAGE

Soakaways will not provide a suitable drainage solution for surface water run-off at the site. Consequently, it will be necessary to consider alternative sustainable drainage systems (SUDS), and there may be a need for surface water balancing.

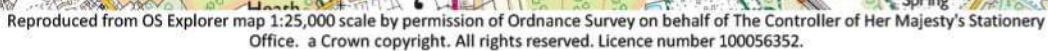
15.8 PAVEMENTS

The natural deposits will have a CBR value of at least 3%.

Where made ground is present excavation of the full thickness (up to a maximum of 2m) of made ground and replacement with suitable aggregate is recommended.

The area where the underground tanks were removed is filled with soft and wet material and this would require excavation and engineered backfill where it impinges on any proposed access road or car park.

DRAWINGS	
7034/1	Site Location Plan
7034/2	Proposed Site Layout
7034/3	Existing Site Features
7034/4	Historical Features
7034/5	Mining Features
7034/6	Site Photographs
7034/7	Preliminary Conceptual Site Model
7034/8	Exploratory Hole Location Plan
7034/9	Geoenvironmental Summary





min. 5.5m carriageway with 1.8m footpath

3 STOREY 66 BED CARE HOME

APPROX FFL - 80.000

PARKING REQUIREMENTS NEED
TO BE CONFIRMED.

APARTMENTS AND SITE
ENTRANCE ADJUSTED TO SUIT

rev. description

LNT Construction

client

DARKLANDS LANE, SWADLINGCOTE

project

PROPOSED LAYOUT

drawing title

drawing number 7034/2

revision

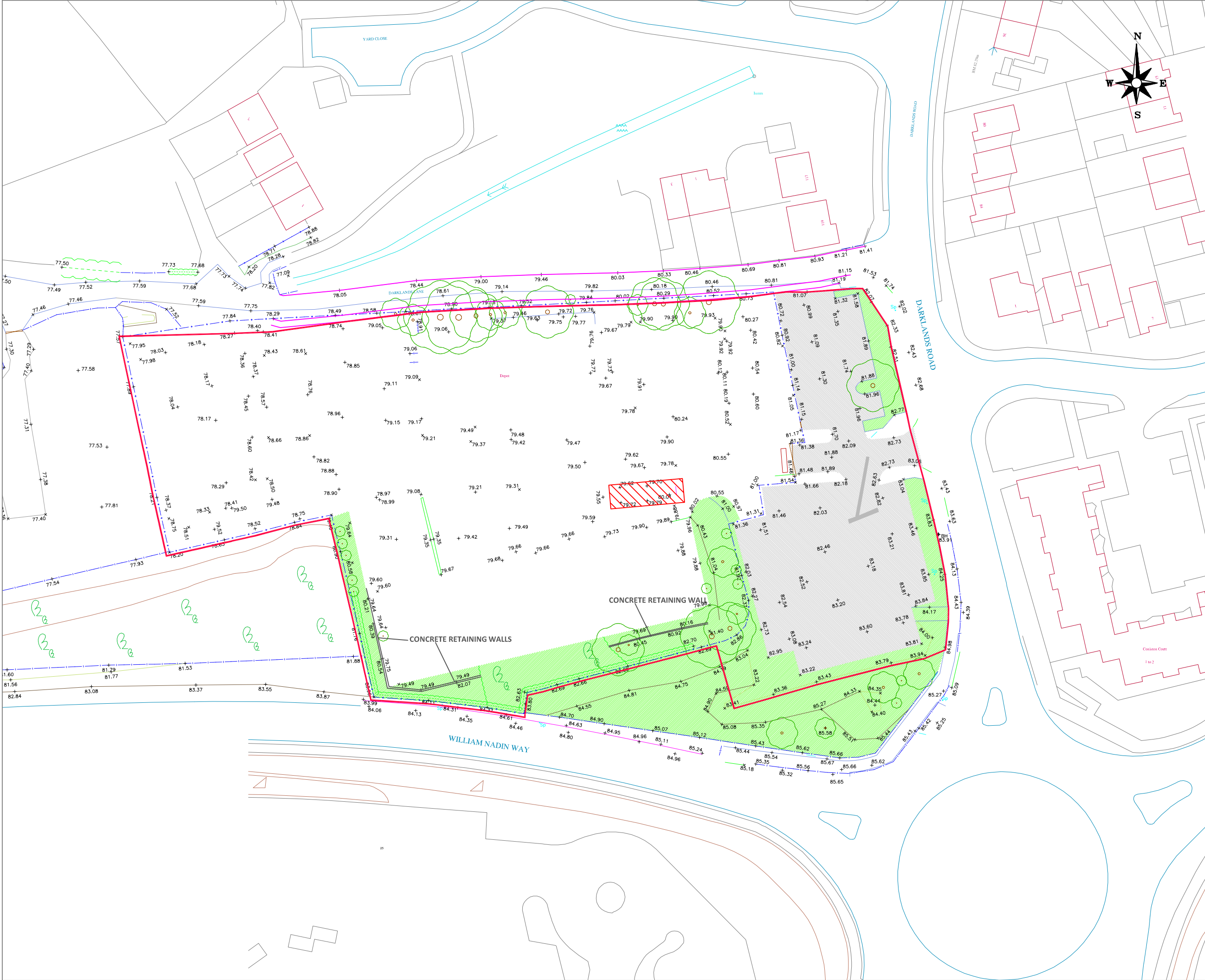
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date 17/07/2019

drawn by RJH

checked by



notes

- GRASS & OVERGROWN AREAS
- TARMAC HARDSTAND
- FORMER FUEL STORAGE TANKS
- APPROXIMATE SITE BOUNDARY

rev. description

LNT Construction

client

project

DARKLANDS LANE, SWADLINCOTE

drawing title

drawing number 7034/3

revision

drawing status Final

scale 1:500@A3

date 20/08/2019

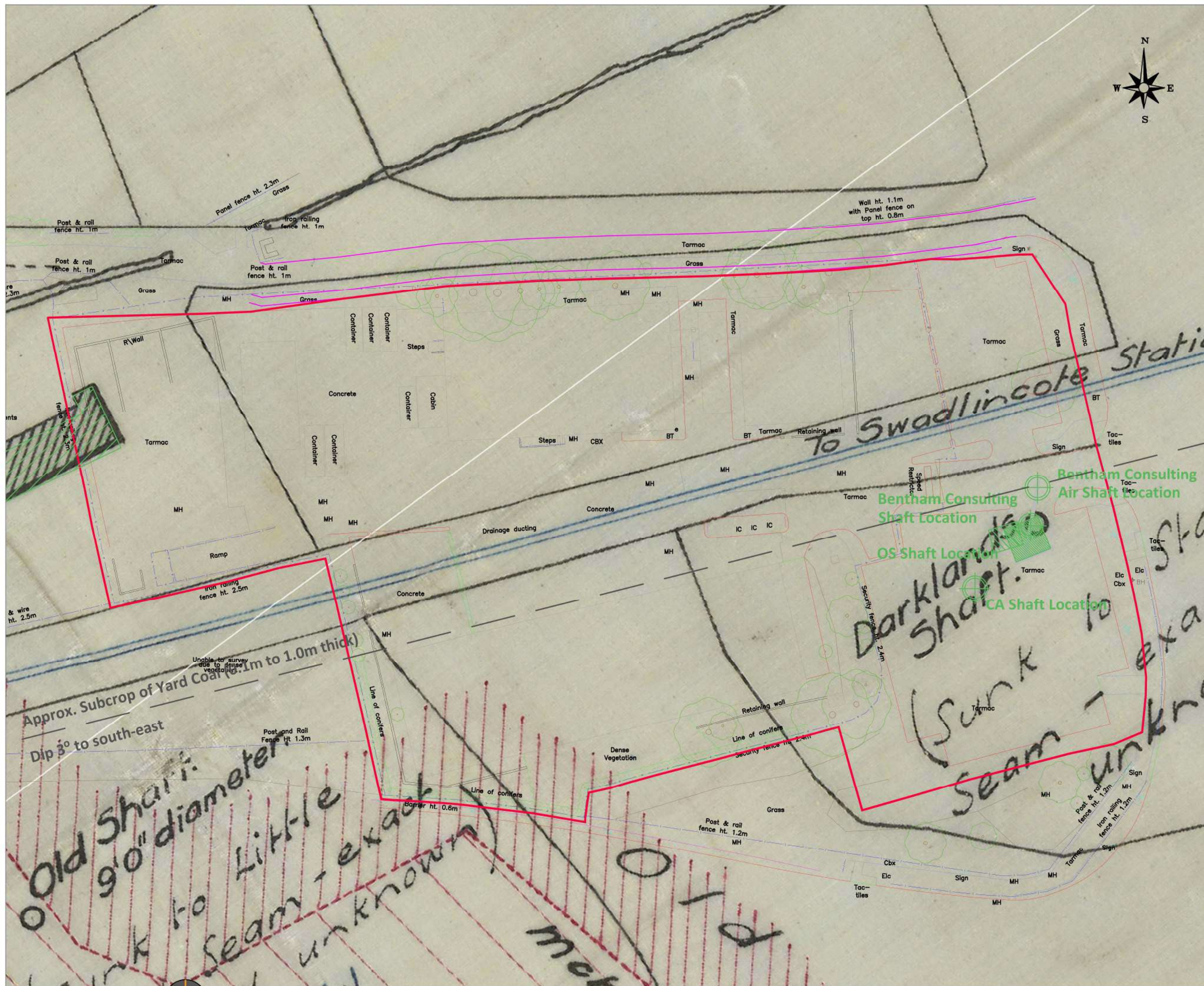
drawn by RJH

checked by

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notes

Based on CA Abandonment record 'Plan of the Little Coal Working at Swadlingcote (Old Colliery)'.

Workings to south around 75ft (23m) below OD; and around 50m beneath site levels.

Darklands Shaft noted to be "Sunk to Stanhope Seam - exact depth unknown".

Abandonment plan notes 'Old Workings' in the Little Coal Seam likely beneath the site.

Strata in the area dip at 1:11.7 to the south.

rev.	description

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client

DARKLANDS LANE, SWADLINGCOTE

project

SHALLOW MINING WORKINGS

drawing title

drawing number 7034/5

revision

drawing status Final

scale 1:500@A3

date 29/07/2019

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notes

APPROXIMATE SITE BOUNDARY

LOCATION & ORIENTATION
OF PHOTOGRAPH



rev. description

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DARKLANDS LANE, SWADLINCOTE

project

PHOTOGRAPHS

drawing title

drawing number 7034/4

revision

drawing status Final

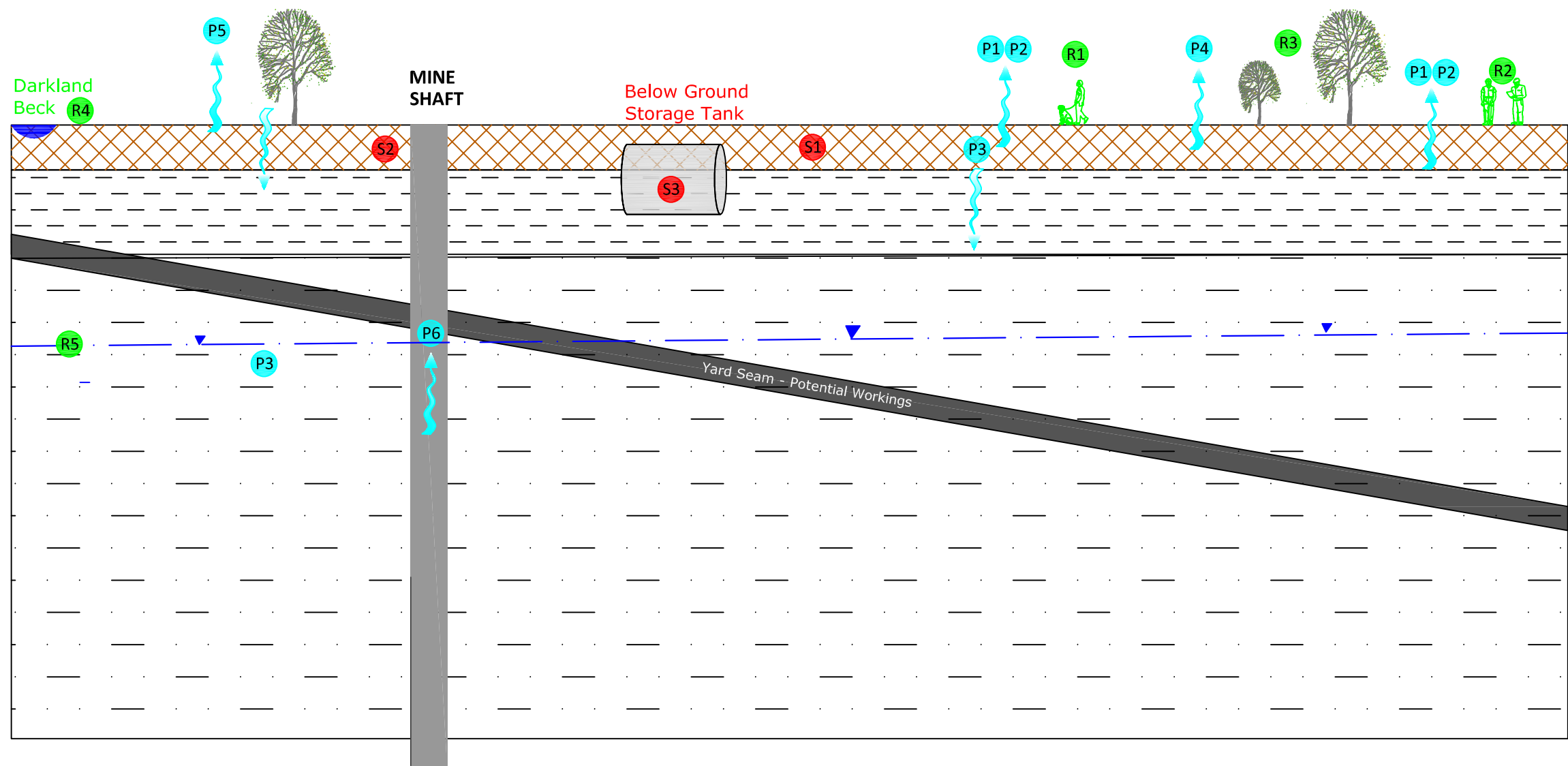
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rev. description



client

project

drawing title

drawing number

revision

drawing status

scale

date

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GEOLOGY

-  MADE GROUND
-  WEATHERED COAL MEASURES
-  COAL MEASURES (Mudstone)

SOURCES

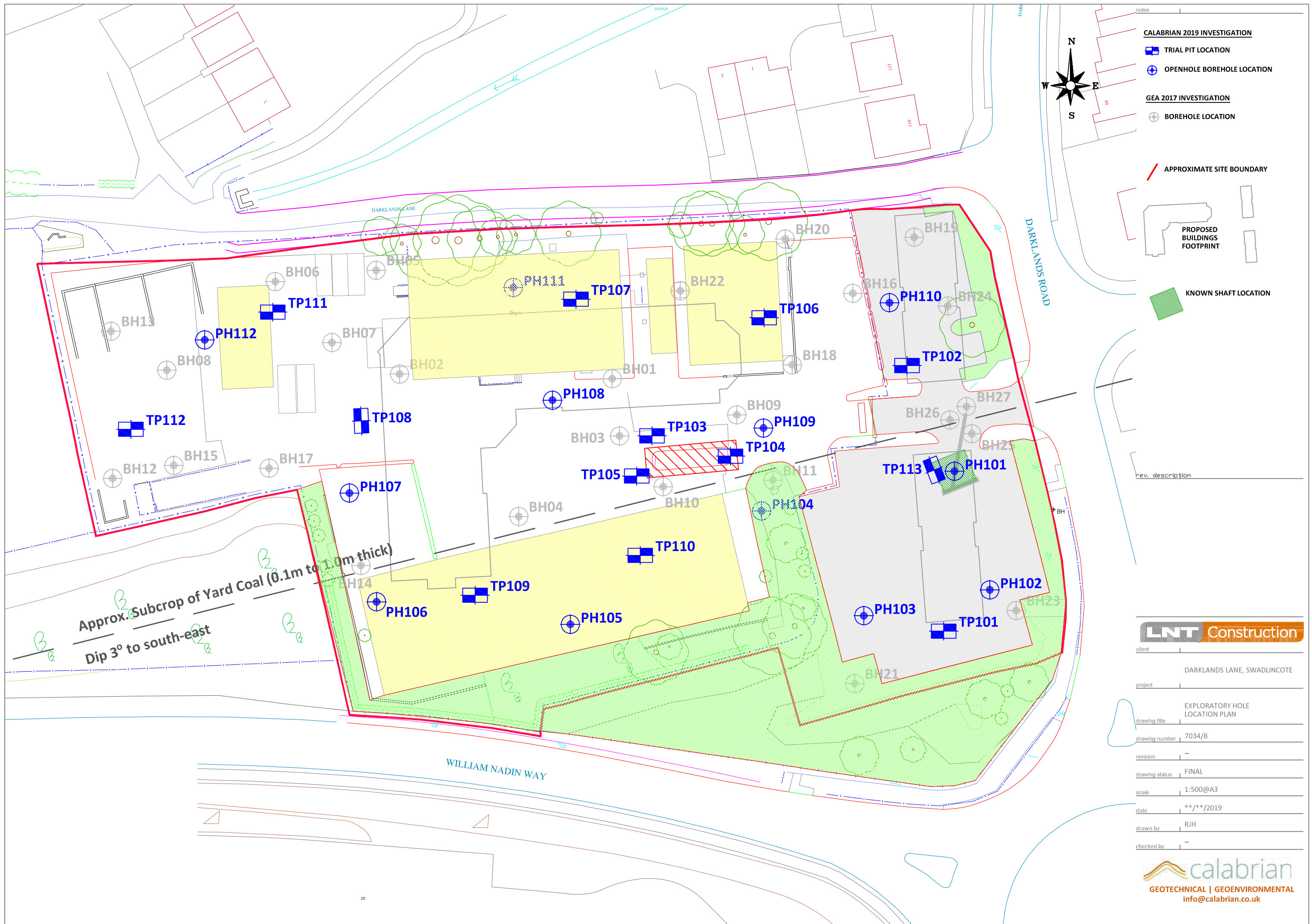
-  S1 MADE GROUND
-  S2 MINES GAS
-  S3 FORMER UNDERGROUND FUEL TANKS

POTENTIAL PATHWAYS

-  P1 DERMAL CONTACT
-  P2 INGESTION\INHALATION
-  P3 LEACHING OF CONTAMINANTS
-  P4 UPTAKE BY PLANTS
-  P5 VOLATILISATION
-  P6 HAZARDOUS GAS MIGRATION

SIGNIFICANT RECEPTORS

-  R1 END USERS (RESIDENTS)
-  R2 SITE WORKERS
-  R3 VEGETATION
-  R4 SURFACE WATERS
-  R5 SECONDARY AQUIFER - SOLID



ANNEX I	SUMMARY CONTAMINATION DATA (SOILS)
Table A	Summary of Contamination Results
Table B	Summary of Contamination Results (Leachability)
Table C	Summary of Contamination Results

Summary of Degree of Ground Contamination (Inorganics)

Expl Hole	Depth (m)	Material	Concentrations in mg/kg unless otherwise stated. Results are quoted to 1 decimal place if <10, and whole numbers if >10. Trigger Level Concentrations are shown in BLACK and assume a residential with homegrown produce end-use.												
			pH	As	B	Cd	Cr (III)	Cu	Pb	Hg (inorganic)	Ni	Se	Zn	CV	Asbestos
				37	290	11	910	2400	200	40	130	250	3700	2	
TP101	0.2	Granular Made Ground	9	3.1	< 0.2	0.6	2.5	11	17	0.09	3.3	0.9	22		Not Identified
TP101	0.8	Ash & Clinker	8.7	11	2.2	0.3	12	63	74	< 0.05	37	< 0.5	73	2.9	Not Identified
TP102	0.4	Ash & Clinker	8.6	3.3	1.6	0.3	6	14	14	< 0.05	6.2	0.7	30	< 1.0	Not Identified
TP103	1	Granular Made Ground	10.6	6.7	0.7	0.3	15	24	24	< 0.05	22	< 0.5	85		Not Identified
TP104	1.3	Coal Measures	8.8	7.7	0.7	0.3	18	27	12	< 0.05	34	< 0.5	140		Not Identified
TP104	1.8	Coal Measures	9.2	9.1	0.9	0.4	19	30	11	< 0.05	33	< 0.5	120		Not Identified
TP105	1.2	Coal Measures	8.9	4.7	0.7	0.2	19	31	12	< 0.05	32	< 0.5	85		Not Identified
TP105	1.6	Coal Measures	8.2	2.8	0.8	0.4	21	29	14	< 0.05	32	< 0.5	97		Not Identified
TP106	0.2	Cohesive Made Ground	7.4	18	0.8	1.2	18	33	28	< 0.05	43	0.8	160		Not Identified
TP107	0.3	Topsoil	7.4	28	1.7	0.8	18	72	170	0.15	36	0.7	250		Not Identified
TP108	0.5	Colliery Spoil	8.7	28	2.8	0.5	14	78	150	0.13	30	< 0.5	150		Not Identified
TP109	0.2	Colliery Spoil	8.3	8.3	1.9	0.3	9.8	29	45	< 0.05	19	0.7	73		Not Identified
TP110	0.3	Colliery Spoil	8	9.7	1.1	0.9	13	28	31	< 0.05	23	1.5	67		Chrysotile fibres
TP111	0.4	Colliery Spoil	8.2	15	1.5	0.5	12	49	92	0.11	19	< 0.5	110		Not Identified
TP112	0.3	Cohesive Made Ground	8.3	10	1.4	0.5	10	38	79	0.1	20	< 0.5	110		Not Identified

KEY

36	Parameter tested for and found to be in excess of Tier 1 concentration
179	Parameter tested for and found to be > 5 x Tier 1 concentration
12	Parameter tested for but not found to be in excess of Tier 1 concentration

Summary of the Leachability Testing

Expl Hole	Depth (m)	Material	Concentration in µg/litre unless otherwise Shown. Results are quoted to 1 decimal place if <10, and whole numbers if >10. Tier 1 Screening Concentrations are shown in BLACK .										
			pH	As* 10	B* 1000	Cd* 5	Cr* 50	Cu* 2000	Pb* 25	Hg* 1	Ni* 20	Se* 10	Zn* 500
TP101	0.2	Granular Made Ground	7.1	0.42	12	< 0.03	< 0.25	0.7	0.79	< 0.01	< 0.5	0.62	< 1.3
TP102	0.4	Ash & Clinker	6.2	1	160	< 0.03	< 0.25	1.2	0.19	< 0.01	0.5	0.28	< 1.3
TP103	1	Granular Made Ground	8.3	2.9	24	< 0.03	0.29	2.5	0.32	< 0.01	< 0.5	0.36	< 1.3
TP106	0.2	Cohesive Made Ground	6.9	0.32	18	< 0.03	< 0.25	0.5	0.26	< 0.01	< 0.5	< 0.25	< 1.3
TP109	0.2	Colliery Spoil	6.6	0.92	35	< 0.03	0.41	1.9	0.77	< 0.01	0.8	0.37	< 1.3
TP111	0.4	Colliery Spoil	6.9	2.4	56	< 0.03	0.26	3.5	2.2	< 0.01	0.9	0.7	< 1.3
TP112	0.3	Cohesive Made Ground	7	3.6	52	< 0.03	0.28	3.7	2.2	0.01	0.9	0.75	< 1.3

KEY

36	Parameter tested for and found to be in excess of Tier 1 concentration
179	Parameter tested for and found to be > 5 x Tier 1 concentration
12	Parameter tested for but not found to be in excess of Tier 1 concentration

Summary of Degree of Ground Contamination (Organics)

Expl Hole	Depth (m)	Material	Concentrations in mg/kg. Results are quoted to 1 decimal place if <10, and whole numbers if >10. Trigger Level Concentrations are shown in BLACK and assume a residential with homegrown produce end use									
			% TOC	Benzene	Toluene	Ethyl Benzene	Xylenes	PAH		TPH - C6 to C40		
								B(a)P	Naphth-alene	GRO~ C ₆ to C ₁₀	DRO◇ C ₁₀ to C ₂₀	LRO C ₂₀ to C ₄₀
								5	13	15	151	1000
TP101	0.2	Granular Made Ground	0.5					6.1	1.7			
TP101	0.8	Ash & Clinker	5.3	< 0.01	< 0.01	< 0.01	< 0.01	16	6.1	< 0.1	2390	3000
TP102	0.4	Ash & Clinker	1.6	0.41	0.05	0.66	1.1	33	160	3.1	4300	2600
TP103	1	Granular Made Ground	0.8	< 0.01	< 0.01	< 0.01	0.03	< 0.03	< 0.03	0.93	123.2	13.8
TP104	1.3	Coal Measures	0.4	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.01	64.4	10.2
TP104	1.8	Coal Measures	0.6	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.01	63.9	3.8
TP105	1.2	Coal Measures	0.4	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.01	39.8	1.5
TP105	1.6	Coal Measures	0.4	< 0.01	< 0.01	< 0.01	< 0.01	< 0.03	< 0.03	< 0.01	<1.5	0
TP106	0.2	Cohesive Made Ground	1.6					< 0.03	< 0.03			
TP107	0.3	Topsoil	5.4					0.44	0.23			
TP108	0.5	Colliery Spoil	2.9					0.07	< 0.03			
TP109	0.2	Colliery Spoil	4					0.68	0.14			
TP110	0.3	Colliery Spoil	2.9					< 0.03	< 0.03			
TP111	0.4	Colliery Spoil	2.9					0.5	0.24			
TP112	0.3	Cohesive Made Ground	2.8	< 0.01	< 0.01	< 0.01	< 0.01	1.2	0.28	< 0.1	129	254

KEY

36	Parameter tested for and found to be in excess of Tier 1 concentration
179	Parameter tested for and found to be > 5 x Tier 1 concentration
12	Parameter tested for but not found to be in excess of Tier 1 concentration

Soil Screening Values used by Calabrian

In March 2002 DEFRA and the Environment Agency published a series of technical papers (R&D Publications CLR 7, 8, 9 and 10) outlining the UK approach to the assessment of risk to human health from land contamination. In 2008 CLR 7, 9 and 10 and all corresponding SGV and Tox reports were withdrawn and superseded by new guidance including:

- Guidance on Comparing Soil Contamination Data with a Critical Concentration - CL:AIRE and CIEH, May 2008
- Evaluation of models for predicting plant uptake of chemicals from soil - Science Report – SC050021/SR
- Human health toxicological assessment of contaminants in soil - Science Report: SC050021/SR2
- Updated technical background to the CLEA model - Science Report: SC050021/SR3
- CLEA Software (Version 1.05) Handbook Science report: SC050021/SR4
- Compilation of data for priority organic pollutants for derivation of Soil Guideline Values - Science Report: SC050021/SR7

The approach set out in these documents represents current scientific knowledge and thinking; and includes the Contaminated Land Exposure Model (CLEAv1.06). The Environment Agency are in the process of using this updated approach to regenerate a selection of Soil Guideline Values (SGVs).

CLEA SGVs were derived for standard land use scenarios predominantly in the context of Part IIA, using a conceptual site model (CSM) defined in SR3. Calabrian have incorporated amendments to the CSM used to derive SGVs that more accurately reflect redevelopment within the planning regime; consequently, Calabrian have not necessarily adopted any published SGV as a screening value.

The CLEA conceptual site model assumes a source located in a sandy loam, with 6% soil organic matter (SOM) - equivalent to 3.5% total organic carbon (TOC). Calabrian consider it reasonable to adopt the CLEA default TOC for made ground. However, where the average TOC value for a particular soil type is significantly lower than the 3.5%, Calabrian adopt refined Screening Values.

In March 2014 DEFRA published Category 4 Screening Levels (C4SLs) for six substances (arsenic, cadmium, chromium IV, lead, benzene & benzo(a)pyrene) for four generic land-uses comprising residential, commercial, allotments and public open space.

The methodology for deriving both the previous Soil Guideline Values and the new Category 4 Screening Levels is based on the Environment Agency's Contaminated Land Exposure Assessment (CLEA) methodology. Development of Category 4 Screening Levels has been achieved by modifying the toxicological and/or exposure parameters used within CLEA (while maintaining current exposure parameters).

The Part 2A Statutory Guidance was developed on the basis that Category 4 Screening Levels could be used under the planning regime. However, policy responsibility for the National Planning Policy Framework falls to the Department for Communities and Local Government. Defra anticipate that, where they exist, C4SLs will be used as generic screening criteria, and Calabrian consider C4SLs to be suitable for use as Tier 1 Screening Values. Calabrian have discussed this matter with both NHBC and YAHPAC (collection of Yorkshire & Humberside local authorities) and received confirmation that they are satisfied with this approach.

In general Calabrian have adopted the use of the LQM/CIEH Suitable 4 Use Levels (S4ULs) as Tier 1 Screening Criteria. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3373. All rights reserved.

Calabrian have adopted Tier 1 Screening Criteria for four different CSMs (Scenarios); these are:

- A - Residential with homegrown produce, but no cover (or only up to 300mm)
- B - Residential with homegrown produce and 600mm 'clean' cover
- C – Residential apartments with landscaping (i.e. no home grown produce)
- D - Commercial/industrial with landscaping.

The **exposure** pathways considered for each scenario are detailed in the Table below.

Scenario	Land use	Pathways	Justification
A	Residential with homegrown produce, but no cover (or only up to 300mm)	• Direct ingestion of soil • Dermal contact • Consumption of vegetables and soil attached to vegetables • Inhalation of indoor vapours and dust • Inhalation of outdoor vapours and dust	Minimal cover – insufficient to break any pathways therefore all exposure pathways are relevant
B	Residential with homegrown produce minimum 600mm cover	• Inhalation of indoor vapours • Inhalation of outdoor vapours	The 600mm cover removes the risk from all pathways other than inhalation.
C	Residential apartments with landscaped areas and minimum 300mm cover	• Direct ingestion of soil • Dermal contact • Inhalation of indoor vapours and dust • Inhalation of outdoor vapours and dust	All pathways applicable due to possible exposure from landscaped areas. However consumption of home grown produce not included as unlikely to be grown in landscaped areas. Where vegetables are to be grown site specific QRA may be required.
D	Commercial/ industrial with landscaped areas no cover	• Direct ingestion of soil • Dermal contact • Inhalation of indoor vapours and dust • Inhalation of outdoor vapours and dust	All pathways applicable due to possible exposure from landscaped areas. Assumed the commercial development consists of offices to provide a conservative assessment.
E	Grassed area or play park in close proximity to housing. Assumes minimum 300mm cover (growing medium).	• Direct ingestion of soil • Dermal contact • Inhalation of outdoor vapours and dust	All pathways applicable due to possible exposure from landscaped areas. Assumes an area where some children play regularly and others less.
F	Dedicated sports grounds. Assumes minimum 300mm cover (growing medium).	• Direct ingestion of soil • Dermal contact • Inhalation of outdoor vapours and dust	All pathways applicable due to possible exposure from landscaped areas. Assumes an where exposure only occurs to players and grounds staff

The Soil Screening Values referred to in this document are **not** intended to be used when considering potential risks associated with:

- existing land uses in the context of Part IIA of the Environment Protection Act 1990;
- end uses such as allotments, sports fields, children's playgrounds, care homes, hospitals etc; and
- controlled waters.

With respect to **inorganic** determinands, Calabrian derived Tier 1 values for the four Scenarios A to D are presented below:

Inorganic Contaminant	Source	Tier 1 Assessment Criteria (mg/kg) for Scenarios A to D									Comments/Notes
		SGV*	C4SL*	LQM/ CIEH S4UL	A	B	C	D	E	F	
As	CLEA	32	37	37	37	Use (A) in SI Report for initial "screen". If >5 x A, then consider increase of cover to 1,000mm	40	640	79	170	C4SLs adopted
Cd	CLEA	10	26	11	11		85	190	120	532	LQM/CIEH S4UL adopted
Cr	CLEA				910		910	8600	1,500	33,000	Assumes Cr is CrIII.
Pb	CLEA	(450)	200		200		310	2,330	630	1,300	C4SLs adopted
Ni	CLEA	130		130	130		180	980	230	3,400	LQM/CIEH S4UL. Assessment of health risk only
Se	CLEA	350		250	250		430	12,000	1,100	1,800	LQM/CIEH S4UL adopted
Hg	CLEA	170		40	40		56	11,000	120	240	LQM/CIEH S4UL. Assumes in an inorganic compound.
B	Drinking			290	290		11,000	240,000	21,000	46,000	LQM/CIEH S4UL adopted
Cu	EPA			2,400	2,400		7100	68,00	12,000	44,000	LQM/CIEH S4UL adopted
Zn	DoE	200		3,700	3,700		40,000	73,000	81,000	170,000	LQM/CIEH S4UL adopted
Cyanide	CLEA				527		530	14,000			

* For a residential end use

With respect to **organic** determinands, Calabrian derived Tier 1 values (assuming 6% SOM) for the four Scenarios A to D are presented below:

Organic Contaminant (all sourced via CLEA)	Tier 1 Assessment Criteria (mg/kg) for Scenarios A to D									Comments/Notes
	SGV*	C4SL*	LQM/ CIEH S4UL*	A	B	C	D	E	F	
Benzene	0.33	0.87	0.37	0.87	0.87	3.3	98	140	230	C4SLs adopted
Toluene	610		660	497	1,440	1,690	4,360	56,000 [#]	100,000 [#]	
Ethyl Benzene	350		260	240	416	498	2,840	25,000 [#]	27,000 [#]	
Xylenes	240		310	127	146	183	2,620	43,000 [#]	31,000 [#]	
Phenol	420			412	2,360	557	38,700			
PCBs				1.7	1.8	1.8	1.8			Based on toxicity of EC7.
Benzo(a)pyrene		5	3	5	25	5.3	77	10	21	C4SLs adopted. Where source not a coal tar.
Naphthalene			13	13	13	13	432	4,900 [#]	3,000 [#]	
Gasoline Range Organics				15	16	21	1,000	21	21	See 3-step assessment of TPH below.
Diesel Range Organics				151	153	232	5,000	232	232	
Lubricating Range Org				1,000	5,000	1,000	5,000	1,000	1,000	

* For a residential end use

[#] LQM/CIEH S4UL adopted, 6% SOM

Note: **PAH** cannot be assessed as a single “total” value, as each individual PAH compound has different toxicity and mobility in the environment. Speciated analysis is required to determine the concentrations of the various compounds, most notably the key PAHs: Benzo(a)Pyrene (considered the most toxic of the PAHs); and Naphthalene (the most mobile and volatile of the PAHs).

Similarly, **TPH** cannot be assessed as a single “total” value, and reference has been made to the Environment Agency’s document P5-080/TR3, “*The UK approach for evaluating human health risks from petroleum hydrocarbons in soils*”. This document supports the assumptions and recommendations made by the US Total Petroleum Hydrocarbons Criteria Working Group (TPHCWG). The TPHCWG have broken down “TPH” into thirteen representative constituent fractions or “EC Bandings”. The TPHCWG have derived a series of physiochemical and toxicological parameters for each of the thirteen bandings. The significance of speciated TPH results can be assessed by following the 3 steps outlined in the below.

Step	Result	Action
1. Consider indicator compounds: Are BTEX, Naphthalene, Benzo(a)pyrene above their respective Tier 1 values?	Yes	Remediation or DQRA required
	No	Proceed to Step 2
2. Consider individual TPH fractions: are they above respective screening values?	Yes	Remediation or DQRA required
	No	Proceed to Step 3
3. Assess Cumulative effects: Is the calculated Hazard Index for each source >1	Yes	Remediation or DQRA required
	No	TPH compounds pose no significant risk

Step 1 - Assessing indicator compounds

TPH fraction Indicator compound	End use specific screening value (mg/kg)			
	A: Residential no cover	B: Residential with 600mm cover	C: Residential no gardens	D: Commercial\ Industrial
Benzene	0.87	0.87	3.3	98
Toluene	497	1,440	1,690	4,360
Ethyl Benzene	240	416	498	2,840
Xylenes	127	146	183	2,620
Naphthalene	13	13	13	432

Step 2 - Assessing individual TPH fractions

TPH fraction		End use specific screening value (mg/kg)					
		A: Residential no cover	B: Residential with 600mm cover	C: Residential with no gardens	D: Commercial/ industrial	E: POS (Residential) ^{S4UL}	F: POS (Park) ^{S4UL}
Aliphatic 5-6	GRO	41	41	63	5,000^	160	160
Aliphatic 6-8	GRO	123	123	191		530	530
Aliphatic 8-10	GRO	30	31	48		150	150
Aliphatic 10-12	DRO	151	153	232		760	770
Aliphatic 12-16	DRO	500^	500^	500^		4,300	4,400
Aliphatic 16-21	DRO	1,000^	5,000#	1,000^		11,000	11,000
Aliphatic 21-35	LRO	1,000^	5,000#	1,000^			
Aromatic 5-7	GRO	52	56	72	5,000^	300	1,400
Aromatic 7-8	GRO	15	16	21		660	3,900
Aromatic 8-10	GRO	47	50	77		190	270
Aromatic 10-12	DRO	212	282	390		380	1,200
Aromatic 12-16	DRO	683	1,000*	1,000*		660	2,500
Aromatic 16-21	DRO	1,000^	5,000#	1,000^		930	1,900
Aromatic 21-35	LRO	1,000^	5,000#	1,000^		1,700	1,900

* Calculated Screening Value exceeded soil saturation limit and could indicate free product, therefore calculated soil saturation limit adopted as a target

^ Calculated Screening Value close to soil saturation limit, screening value selected by Calabrian considering visual and olfactory impacts.

Five times the screening value for Scenario A.

^{S4UL} LQM/CIEH S4UL adopted, 6% SOM

Step 3 - Assessing Cumulative Effects

$$HI = \sum_{i=1}^{16} HQ F_i = \frac{\text{Measured concentration } F_i \text{ (mg kg}^{-1}\text{)}}{SGV F_i \text{ (mg kg}^{-1}\text{)}}$$

where HI = Hazard Index
 HQ = Hazard Quotient
 F_i = Fraction i
 SGV = Soil Guideline Value

With respect to the interpretation of the **calorific values**, at present there are no accepted methods to assess whether a sample is combustible and under what circumstances it might smoulder. Some guidance is given in ICRL Note 61/84 "Notes on the fire hazards of contaminated land" which states that:

"In general ... it seems likely that materials whose CV's exceed 10MJ/kg are almost certainly combustible, while those with values below 2MJ/kg are unlikely to burn".

Tier 1 **groundwater** risk assessments are undertaken by comparing leachate or groundwater concentrations with the appropriate water quality standard. Tier 1 Screening Values have been discussed with the Environment Agency, and typically those in **bold** below are adopted.

Analyte	Source of Tier 1 Screening Value (µg/l)			
	Surface Water (Abstraction for Drinking) 1996	Water Supply Regulations. 2000	Water Framework Directive	Environment Agency Advice
Arsenic	50	10	50	
Selenium	10	10		
Cadmium	5	5	1.5	
Chromium	50	50	32	
Copper	50	2,000	28	
Lead	50	10	7.2	
Nickel		20	20	
Zinc	3,000		125	
Boron		1,000		
Mercury	1	1	0.05	
Polyromantic Hydrocarbons		0.01~	0.002[#]	
Petroleum Hydrocarbons				10
1,1,1-Trichloroethane			100	
1,1 Dichloroethane				100
1,2-Dichloroethane		3	10	
1,1-Dichloroethene				100
Benzene		1	10	
Ethylbenzene				10
Tetrachloroethene		10	10	
Toluene			50	
Trichloroethene		10	10	
Vinyl Chloride		0.5		
Trichloromethane			2.5	
Xylenes			30	
Chloroethane				100

~ sum of benzo(g,h,i)perylene + indeno(1,2,3-cd)pyrene

[#] sum of Benzo(b)fluoranthene + Benzo(k)fluoranthene + Benzo(g,h,i)perylene + Indeno(1,2,3-cd)pyrene

Possible Action in event of Tier I exceedance

Should any of the Tier I criteria detailed above be exceeded, then three potential courses of action are available. (The first is only applicable in terms of human health, but the second and third could also be applied to groundwater or landfill gas).

1. Undertake further statistical analysis following the approach set out in “*Guidance on Comparing Soil Contamination Data with a Critical Concentration - CL:AIRE and CIEH, May 2008*” in order to determine whether contaminant concentrations of inorganic contaminants within soil/fill actually present a risk (only applicable to assessing the risk to human health).
2. Carry out a more detailed quantitative risk assessment in order to determine whether contamination risks actually exist.
3. Based on a qualitative risk assessment, advocate an appropriate level of remediation to “break” the pollutant linkage - for example the removal of the contaminated materials or the provision of a clean cover.

Prior to undertaking any statistical analysis the issue of the **averaging area** requires further consideration. The CL:AIRE\CIEH document still refers to CLR 7, which suggests averaging area should reflect receptor behaviour and therefore might be a single garden, or an open area used by the local community as a play area. This approach to averaging areas is considered applicable within the context of Part IIA of the Environmental Protection Act (EPA) 1990, in terms of an existing residential development.

However, Calabrian consider the concept of a single garden as an averaging area to be inappropriate with respect to brownfield redevelopment, which is regulated by the planning regime. In this context, contamination across the entire site needs to be characterised by reference to the Conceptual Site Model. Consequently, Calabrian gather and analyse sample results by fill type, and/or by former use in a given sub-area of the site, before undertaking statistical analysis; ie the averaging area is associated with the extent of a particular fill type, or an area affected by spillage/leakage.

In terms of brownfield redevelopment, this is considered a more appropriate methodology which provides a more representative sample population for statistical analysis. As such the entire site is considered in terms of the proposed end use, be this residential with, or without gardens.

Analysis by soil/fill type is appropriate for essentially immobile contaminants associated with a particular fill type, for example arsenic in colliery spoil, metals in ash & clinker, sulphate in plaster-rich demolition rubble etc.

Analysis by former use is appropriate where more mobile contaminants have entered the ground, for example diesel associated with leakage from a former fuel tank, downward migration of leachable metals through granular materials, various soluble contaminants present in a wastewater leaking into the ground via a fractured sewer etc. In these circumstances, it may be appropriate to undertake statistical analysis of sample results from a variety of different soil/fill types. However, consideration would have to be given to factors such as porosity which might influence impregnation of a mobile contaminant into the soil mass; ie contamination would normally be more pervasive and significant in granular soils than cohesive soils.

APPENDIX A COMMISSION

7034/002/RJH/rjh

26th June 2019

K Sharpe
LNT Construction Limited
Helios 47
Leeds
West Yorkshire
LS25 2DY

Dear Keeley

Darklands Lane, Swadlingcote

Please find enclosed our fee proposal for undertaking a site investigation on the above land.

Your drawing (referenced DE11 OPJ-DARKLANDS LANE-SWADLINGCOTE-F-05) suggests that the site consists of a single parcel of land with a plan area of approximately 0.95 hectares. Your proposed layout indicates an L-shaped three storey residential care home along with two blocks of apartments with associated gardens/landscaped areas, access road and car parking.

We have been provided with a copy of the following report:

- Ground Investigation Report. Darklands Road Depot, Swadlingcote, Derbyshire. Prepared by GEA on behalf of Wildgoose Construction & LSP Development. Report referenced J17101, dated June 2017.

This report essentially looked at shallow foundation and contamination issues across the site although the investigation appears to have been undertaken using a brief provided by a structural engineer based on the requirements of foundations design and does not appear to address all potential contamination sources (most notably the three underground fuel storage tanks). Regulators would be critical of this approach.

Elevated concentrations of PAH compounds and local asbestos fragments were encountered across the site. The GEA report suggests that removal of made ground or soil cover in garden areas would provide adequate remediation. The report is somewhat naive and does not address the indoor vapour risk associated with the elevated concentrations of volatile PAH compounds such as naphthalene.

The GEA report makes reference to a number of other important reports but does not provide a detailed review of these, they include:

- Coal Mining Risk Assessment by William Saunders (report ref: 9749/12 dated January 2011);
- WSP Limited (Report Ref 9749 Dated July 2010); and,
- Bentham Geoconsulting – mineshaft investigation?

The site was formally occupied by a colliery and an evolving council depot from the 1960's. A mineshaft is known to exist on site and is believed to have been capped and grouted to an unknown specification.

Calabrian Limited

Market Chambers | 14 Market Place | Bedale | DL8 1EQ | Tel: 01677 422040
email: info@calabrian.co.uk



Made ground has been found across the site to up to 2.15m in thickness. The made ground comprises a variable mix including colliery spoil, ash and clinker and tarmac fragments. Natural ground comprises weathered coal measures (clay) with mudstone rockhead ranging in depths across the site of between 1.2m and 5.0m.

Our site investigation proposal allows for the following works (assuming that a new standalone investigation is required):

Phase 1 Desk Study

Environmental search data and historical maps (obtained from Landmark), will be reviewed in order to determine whether any past land uses have had any effect on the proposed development. In addition, published geological plans of the area will be examined. We will also visit site to and undertake a walkover survey.

This site is located within the Coal Authority's 'Development High Risk Area', therefore a mining report will be obtained. We understand that a mineshaft exists on site and we will obtain details records of this.

Fieldwork

We have allowed for three day's trial pitting (around 20 trial pits and exposure of the shaft cap) and the drilling of twelve openhole rotary boreholes (no allowance has been made for soakaway testing). All trial pits and boreholes will be supervised and logged by an experienced geoenvironmental engineer.

Representative soil samples of natural and man-made ground, including any contaminated samples, will be taken during the works. In-situ shear strengths of any cohesive soils encountered will be determined by the use of a hand-held shear vane.

The mechanical excavator will be equipped with a breaker to enable excavation through near-surface and buried concrete slabs and obstructions.

We will make every effort to compact arisings and 'sweep' them over each pit. However, you should be aware that on completion of the investigation, "graves" of spoil (each about 3m long by 1m wide) unsuitable for trafficking, will be left up to 400mm proud at each trial pit location. At this stage, no allowance has been made for any further reinstatement such as removal of excess arisings or replacement of tarmac.

The boreholes are primarily intended to enable the retrieval of geotechnical data from depth but will also allow the installation of gas wells.

The site is underlain at shallow depth by the Yard coal seam which is up to 1.0m thick in the area, and therefore we have allowed for the drilling for twelve openhole rotary boreholes including one through the shaft cap in order to determine the nature of the shafts grout consolidation. This drilling should be sufficient to determine whether old mineworkings are present and pose a significant risk to surface stability of the site. However, if a potential risk is perceived to exist, further boreholes may be required to delineate the extent of workings in order to obtain fixed price quotations for the necessary consolidation works.



It will be necessary to submit an application (with the associated fee) to the Coal Authority (CA) for 'Permission to enter CA mining interests'; and we have allowed for this. Given the proximity of surrounding housing (within 50m of some site areas), and in accordance with CA requirements we have had to assume that a proportion of the boreholes will need to be advanced using water as the flushing medium (as reinforced by recent CA guidance on managing the risk of hazardous gas). Our drilling sub-contractor will need to locate the wash outs close to the site and procure a standpipe and licence from Trent Water.

A telehandler or additional excavator will be required during the drilling works in order to move materials and a shaft safety platform.

Given the likely presence of adjacent area of infilled land and potential shallow mineworkings, we have allowed for the installation of wells in eight boreholes and monitoring for hazardous gas (and any shallow groundwater).

The generation potential of this gas source is considered likely to be moderate. Therefore, in general accordance with CIRIA Report C665, we have initially allowed for six monitoring visits over a three-month period. A hazardous gas risk assessment will be issued on completion of monitoring.

This proposal has been put together without a visit to the site and it has been assumed that access is available for a JCB-type excavator along with a track mounted drilling rig and associated tele-handler.

Soils Testing: This will comprise routine geotechnical soils analysis, typical of that normally required for greenfield sites. Although no allowance has been made for in-situ or laboratory CBR testing, CBR values will be estimated from the strata descriptions and classification test results, where appropriate (i.e. if no significant regrading or reworking of made ground is proposed).

Appropriate chemical analyses, based on our review of existing SI report and knowledge of the site's history, have been allowed for; this will comprise thirty samples for a suite including asbestos, heavy metals, TPH and PAH. In the event that ground contamination is more significant or different to that anticipated, it might be necessary to carry out additional chemical testing.

Reporting & Timescales

In order to provide you with sufficient information to enable assessment of abnormal costs at the earliest opportunity we will issue a concise overview report within five days of fieldwork completion.

On completion of the desk study, fieldwork and laboratory testing a comprehensive, factual and interpretative report will be issued. This will contain detailed engineering records, laboratory test results, copies of all relevant correspondence and drawings of the site. The report will include qualitative risk assessment with respect to both controlled waters and human health.

The report will also provide technically feasible options for redevelopment of the site with a care home and housing, including consideration of foundation types and treatment\removal of contamination.

Fieldwork could be commenced within four weeks of receipt of your written instruction to proceed. Our comprehensive geoenvironmental appraisal report will be issued within four weeks of fieldwork completion. This report will comment on issues associated with hazardous gas, but the gas risk assessment will not be issued until monitoring is completed.

Given previous usage of this land, it is considered highly likely that significant contamination will be encountered. Consequently, a Remediation Strategy report will be required by the Local Authority at an early stage in the planning approval process, and our proposal allows for this.

It should be noted that a Remediation Strategy outlines the remediation objectives necessary to protect environmental receptors and render a site suitable for the proposed end use. A Remediation Strategy is not the same as a Method Statement; the latter should be prepared subsequently, usually by a Contractor, in order to detail how the objectives will be achieved.

A copy of the final report will be issued to the relevant regulatory authorities on receipt of written instruction from yourselves.

Invoicing: The attached proposal provides a breakdown of the costs associated with this project. This breakdown is for information only and the proposal can be regarded as a lump sum price of £**,*** plus VAT. Variation will only occur in the event that a given item is not undertaken or that substantial additional works are recommended, in which case we will inform you immediately, provide costs for the required works, and seek your prior consent.

Our proposal allows for submission of the report to the Local Authority, and for submission of a single piece of subsequent correspondence with each regulator to address any queries they may have. Any further meetings, correspondence etc, would be chargeable.

The investigation should be considered to comprise four elements. Each will be invoiced on completion of the relevant report as defined below:

1. Items A to D within five days of fieldwork completion, with exploratory hole logs and an interim letter report outlining our initial findings and Preliminary Recommendations Report;
2. Items E to G on issue of the comprehensive geoenvironmental appraisal report;
3. Item H on issue of the Remediation Strategy Report; and,
4. Item I after completion of the gas monitoring/issue of the Hazardous Gas risk Assessment Report.

Health, Safety & Welfare

The works outlined above will be carried out in accordance with Calabrian task- and site- specific Risk Assessments and Method Statements.

Details of welfare will be included within the Method Statements.

Utility plans are required in order to protect operatives from the hazards associated with striking buried services and avoid potentially substantial disruption\repair costs. We will make every effort not to damage any services (including review of utility plans and use of a CAT detector).

Calabrian will obtain copies of the necessary utility plans (including electricity, gas, water, drainage & telecom) directly from each of the utility companies; however, if you already hold these it would be appreciated if you could forward these prior to the proposed fieldworks.

It is highly likely that the site is underlain by many “private” services and drains etc which will not be shown on statutory utility plans. Consequently, it would be appreciated if copies of plans showing these services could be made available to our field engineer, and\or someone with site knowledge could advise us with respect to safe locations for our exploratory holes.

Terms & Conditions

This work will be undertaken in accordance with our Standard Terms and Conditions, a copy of which are enclosed.

Should you require any further information, please contact the undersigned.

Yours sincerely

A large black rectangular box redacting the signature of Richard Hey.

Richard Hey - Managing Director
for and on behalf of
CALABRIAN LIMITED

enc



Terms and Conditions for the Appointment of Calabrian Limited

1 DEFINITIONS AND INTERPRETATION

- 1.1 In this Agreement, unless the context otherwise requires, the following words and expressions have the following meanings:
- “Agreement” shall mean these Terms (entitled “Terms and Conditions for the Appointment of Calabrian Limited”), the Proposal, any document recording the Client’s unequivocal acceptance of the Proposal and any other documents or parts of other documents expressly referred to in any of the foregoing;
- “Client” shall mean the party for whom the Services are being provided by Calabrian;
- “Documents” shall mean all documents of any kind and includes plans, drawings, reports, programmes, specifications, Bills of Quantities, calculations, letters, e-mails, faxes, memoranda, films and photographs (including negatives), or any other form of record prepared or provided or received by, or on behalf of Calabrian, and whether in paper form or stored electronically or on disk, or otherwise;
- “Calabrian” shall mean Calabrian Limited whose registered office is at Market Chambers, 14 Market Place Bedale, DL8 1EQ.
- “Intellectual Property” includes all rights to, and any interests in, any patents, designs, trade marks, right, know-how, trade secrets and any other proprietary rights or forms of intellectual property (protectable by registration or not) in respect of any technology, concept, idea, data, programme or other software (including source and object codes), specification, plan, drawing, schedule, minutes, correspondence, scheme, programme, design, system, process logo, mark, style, or other matter or thing, existing or conceived, used, developed or produced by any person;
- “Parties” shall mean the Client and Calabrian
- “Project” shall mean the project described in the Proposal and any enquiry from the Client on which Calabrian has based its Proposal;
- “Proposal” means the offer document prepared by Calabrian in response to an enquiry or otherwise, in connection with the proposed provision of the Services;
- “Services” means the work and services relating to the Project to be provided by Calabrian pursuant to the Agreement and as set out in the Proposal and shall include any additions or amendments thereto made in accordance with these Terms;
- “Terms” means these terms entitled “Calabrian Terms of Appointment”;
- 1.2 Words importing the singular only shall also include the plural and vice versa, where the context requires.
- 1.3 Words importing persons or parties shall include firms, corporations and any organisation having legal capacity and vice versa, where the context requires; and words importing a particular gender include all genders.
- 1.4 The sub-headings to the clauses of these Terms are for convenience only and shall not affect the construction of the Agreement.
- 1.5 A reference to legislation includes that legislation as from time to time amended, re-enacted or substituted and any Orders in Council, orders, rules, regulations, schemes, warrants, by-laws, directives or codes of practice issued under any such legislation.
- 1.6 In the event of conflict between the documents forming part of the Agreement, the Proposal shall prevail, followed by the Terms.
- ## 2 APPOINTMENT
- 2.1 The Client agrees to engage Calabrian and Calabrian agrees to provide the Services in accordance with the provisions of the Agreement.
- ## 3 OBLIGATIONS OF CALABRIAN
- 3.1 Calabrian shall perform the Services using the reasonable standard of skill and care normally exercised by similar professional Environmental firms in performing similar services under similar conditions.
- 3.2 Calabrian shall use all reasonable endeavours to perform the Services in accordance with all relevant environmental and safety legislation.
- ## 4 OBLIGATIONS OF THE CLIENT
- 4.1 Throughout the period of this Agreement the Client shall afford to Calabrian or procure the affording to Calabrian of access to any site where access is required for the performance of the Services.
- 4.2 The Client accepts responsibility for ensuring that Calabrian is notified in writing of all special site and/or plant conditions, including without prejudice to the generality of the foregoing, the existence and precise location of all underground services, cables, pipes, drains or underground buildings, constructions or any hazards known or suspected by the Client, which the Client shall clearly mark on the ground or identify on accurate location plans supplied to Calabrian prior to the commencement of the Services. The Client shall also inform Calabrian in writing of any relevant operating procedures including any site safe operating procedures and any other regulations relevant to the carrying out of the Services. The Client shall indemnify Calabrian against all costs, claims, demands and expenses arising as a result of any non-disclosure in this respect, including but not limited to indemnification against any action brought by the owner of the land or otherwise.
- 4.3 If the Client discovers any conflict, defect or other fault in the information or designs provided by Calabrian pursuant to the Agreement, he will advise Calabrian in writing of such defect, conflict or other fault and Calabrian shall have the right to rectify the same or where necessary, to design the solution for rectification of any works carried out by others pursuant the conflicting, defective or in any other way faulty information or designs.
- ## 5 INTELLECTUAL PROPERTY
- 5.1 The copyright in all Intellectual Property prepared by or on behalf of Calabrian in connection with the Project for delivery to the Client shall remain vested in Calabrian.
- 5.2 The Client shall have a non-exclusive licence to copy and use such Intellectual Property for purposes directly related to the Project. Such licence shall enable the Client to copy and use the Intellectual Property but solely for its own purposes in connection with the Project and such use shall not include any licence to reproduce any conceptual designs or professional opinions contained therein nor shall it include any licence to amend any drawing, design or other Intellectual Property produced by Calabrian.
- 5.3 Should the Client wish to use such Intellectual Property in connection with any other works or for any other purpose not directly related to the Project or wish to pass any Intellectual Property to any third party, it must obtain the prior written consent of Calabrian. The giving of such consent shall be at the discretion of Calabrian and shall be upon such terms as may be required by Calabrian. Calabrian shall not be liable for the use by any person of such Intellectual Property for any purpose other than that for which the same were prepared by or on behalf of Calabrian.
- 5.4 Ownership of any proposals submitted to the Client that are not subsequently confirmed as part of the Services to be provided for the Client remain with Calabrian and such proposals must not be used as the basis for any future work undertaken by the Client or a third party and no liability can be accepted howsoever arising from such proposals.
- 5.5 In the event of the Client being in default of payment of any fees or other amounts due, Calabrian may suspend further use of the licence on giving 2 days’ notice of the intention to do so. Use of the licence may be resumed on receipt of the outstanding amounts
- ## 6 TITLE
- 6.1 Calabrian shall transfer only such title or rights in respect of the Documents as it has, and if any part is purchased from a third party Calabrian shall transfer only such title or rights as that party had and has transferred to Calabrian.
- 6.2 Title in the Documents shall remain with and shall not pass to the Client until the amount due under the invoice(s) (including interest and costs) has been paid in full.
- 6.3 Until title passes, the Client shall hold the Documents as bailee for Calabrian and shall store or mark them so that they can at all times be identified as the property of Calabrian.
- 6.4 At any time before title passes (save and except where payment is not due), but only after prior consultation with the Client, Calabrian may without any liability to the Client repossess and use or sell all or any of the Documents and by doing so terminate the right of the Client to use, sell or otherwise deal in the Documents.
- 6.5 Calabrian may maintain an action for the price of the Documents notwithstanding that title in them has not passed to the Client.
- ## 7 CONFIDENTIALITY
- 7.1 Calabrian undertakes not to divulge or disclose to any third party without the written consent of the Client information which is designated confidential by the Client or which can reasonably be considered to be confidential and arises during the performance of the Services unless required to do so by law or necessary in the proper performance of its duties in relation to the Project, or in order to make full frank and proper disclosure to its insurers or intended insurers, or to obtain legal or accounting advice.
- 7.2 Subject to the above, Calabrian shall be permitted to use information related to the Services it provides in connection with the Project for the purposes of marketing its services and in proposals for work of a similar type.

8 THIRD PARTIES

- 8.1 The Agreement or any part thereof or any benefit or interest thereunder may not be assigned by the Client without the prior written consent of Calabrian. The giving of such consent shall be at the discretion of Calabrian and Calabrian will only agree to an assignment on its terms and in return for payment of a fee by the Client to Calabrian to cover Calabrian’s legal and other costs associated with any assignment.
- 8.2 The Agreement shall not confer and shall not purport to confer on any third party any benefit or any right to enforce any term of this Agreement for the purposes of the Contracts (Rights of Third Parties) Act 1999 or otherwise.
- 8.3 Calabrian will consider and may consent to any request from the Client for Calabrian to enter a collateral warranty with a third party with regard to the Services provided under the Agreement. The giving of such consent shall be at the discretion of Calabrian and Calabrian will only enter a collateral warranty on its terms and in return for payment of a fee by the Client to Calabrian to cover Calabrian’s legal and other costs associated with any collateral warranty.
- ## 9 INSURANCE
- 9.1 Calabrian warrants to the Client that there is in force a policy of Professional Indemnity insurance covering its liabilities for negligence under this Agreement, with a limit of indemnity of £5,000,000 (FIVE MILLION POUNDS) any one Single Claim, Defence Costs in addition. This policy is annually renewable and whilst renewal is not automatic, Calabrian agrees to use reasonable endeavours to maintain such insurance at all times until six years from the date of the completion (or termination) of the Services under the Agreement, provided such insurance is available at commercially reasonable rates having regard, inter alia, to premiums required and policy terms obtainable.
- 9.2 If for any period such insurance is not available at commercially reasonable rates, Calabrian shall forthwith inform the Client and shall obtain in respect of such period such reduced level of Professional Indemnity insurance as is available and as would be fair and reasonable in the circumstances for Calabrian to obtain.
- ## 10 LIMITATIONS ON LIABILITY
- 10.1 Unless otherwise agreed in writing, Calabrian’s liability under or in connection with the Agreement whether in contract, tort, negligence, breach of statutory duty or otherwise (other than in respect of personal injury or death) shall be limited to and shall not exceed the lesser of either five million pounds in the aggregate or 10 times the total value of invoices issued to the Client for consultancy work instructed under the Agreement.
- 10.2 No action or proceedings under or in respect of the Agreement whether in contract, tort, negligence, under statute or otherwise shall be commenced against Calabrian after the expiry of a period of six years from the date of the completion (or termination) of the Services under the Agreement.
- 10.3 Whilst Calabrian will scan all potential exploratory locations with a Cable Avoidance Tool, Calabrian shall not be liable for any damage to underground services, cables, pipes, drains or underground buildings, constructions and the like which were either not marked on site or for which accurate plans were not provided.
- 10.4 Calabrian shall not be liable for the cost of rectifying any defect, conflict or other fault in the information or designs provided by Calabrian or for the cost of designing a solution for and rectifying any subsequent works carried out by others pursuant to the conflicting, defective or in any other way faulty information or designs, unless Calabrian has been advised in writing of the same by the Client and has been given the opportunity to rectify the same or where necessary, to design the solution for rectification of any subsequent works carried out by others pursuant to the same.

11 PAYMENT

- 11.1 Invoices for services rendered will be submitted for payment in accordance with the Proposal.
- 11.2 The due date for payment is the date of the invoice and the final date for payment is 28 days from the date of the invoice.
- 11.3 If the Client disputes the amount included for payment in an invoice a written notice must be served on Calabrian by the Client not later than 14 days before the final date for payment. If no notice is given the amount due shall be the amount stated in the invoice.
- 11.4 In the event of failure on the part of the Client to pay any monies in accordance with the foregoing payment provisions, Calabrian will be entitled to charge interest on any monies owed to it by the Client, such interest to be at a rate of 8% above the base rate of a clearing bank from time to time calculated from the final date for payment to the date of actual payment on a compound basis.

12 DELAY

- 12.1 Calabrian will comply with any timescale agreed for completion of the Services unless delayed or prevented by circumstances beyond its reasonable control and in the event of any such circumstances arising Calabrian undertakes to complete the Services within a reasonable period, but will not be liable to the Client for any delay as a result.

13 TERMINATION

- 13.1 The Agreement may be determined by either party in the event of the other making a composition or arrangement with its creditors, becoming bankrupt, or being a company, making a proposal for a voluntary arrangement for a composition of debts, or has a provisional liquidator appointed, or has a winding-up order made, or passes a resolution for voluntary winding-up (except for the purposes of a bona fide scheme of amalgamation or reconstruction), or has an administrator or an administrative receiver appointed to the whole or any part of its assets. Notice of determination must be given to the party which is insolvent by the other party.
- 13.2 If for any reason the performance of the Services by Calabrian is suspended for a period in excess of three calendar months then Calabrian shall be entitled to determine its appointment in respect of the Services by seven days written notice to the Client.
- 13.3 If the Client shall fail to pay in full any sum due under the terms of the Agreement by the final date for payment for that sum and no effective notice of intention to withhold payment has been issued, Calabrian may serve written notice on the Client demanding payment within 14 days of such notice. If the Client shall fail to comply with such notice, Calabrian shall be entitled to terminate its employment under the Agreement forthwith.
- 13.4 Any determination of the appointment of Calabrian howsoever caused shall be without prejudice to the right of Calabrian to require payment for all services performed up to the date of such determination including but not limited to payment of a fair and reasonable proportion of any figure identified in the Proposal or otherwise for fees in respect of a particular service which Calabrian has started, but not completed.

14 NOTICES

- 14.1 Any notice provided for in the Agreement shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post to the address of the relevant party as may have been notified by each party to the other or, in the absence of notification, to the address of Calabrian set out above or to the registered address of the Client.
- 14.2 Such notice shall be deemed to have been received on the day of delivery if delivered by hand or on the second working day after the day of posting if sent by first class post.

15 ENTIRE AGREEMENT

- 15.1 The Agreement constitutes the complete and entire agreement between the Client and Calabrian with respect to the Services and supersedes any prior oral and/or written warranties, terms, conditions, communications and representations, whether express or implied and any claim against Calabrian in respect of the Services can only be made in contract under the provisions of the Agreement and not otherwise under the law or tort or otherwise.
- 15.2 No amendments, modifications or variation of the Agreement shall be valid unless made in writing and agreed to by both the Client and Calabrian; such agreement must be recorded in writing by at least one of the Parties.
- 15.3 Calabrian will not be bound by any standard or printed terms or conditions furnished by the Client in any of its documents unless Calabrian specifically states in writing separately from such documents that it intends such terms and conditions to apply.

16 DISPUTES AND GOVERNING LAW

- 16.1 The Agreement shall be governed by and construed in accordance with English law and the Parties irrevocably and unconditionally submit to the jurisdiction of the English Courts.
- 16.2 Where the Housing Grants, Construction and Regeneration Act 1996 applies, any dispute between the Parties may be referred to adjudication in accordance with The Scheme for Construction Contracts Regulations 1998 or any amendment or modification thereof being in force at the time of the dispute, as applicable to England, Wales, Scotland and Northern Ireland.

APPENDIX B HISTORICAL OS PLANS

Derbyshire

Published 1883

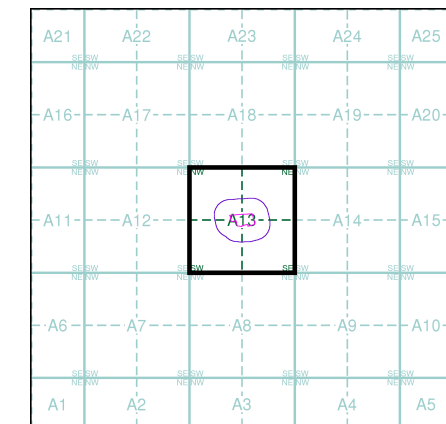
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

060_02	1883	1:2,500
060_06	1883	1:2,500

Historical Map - Segment A13

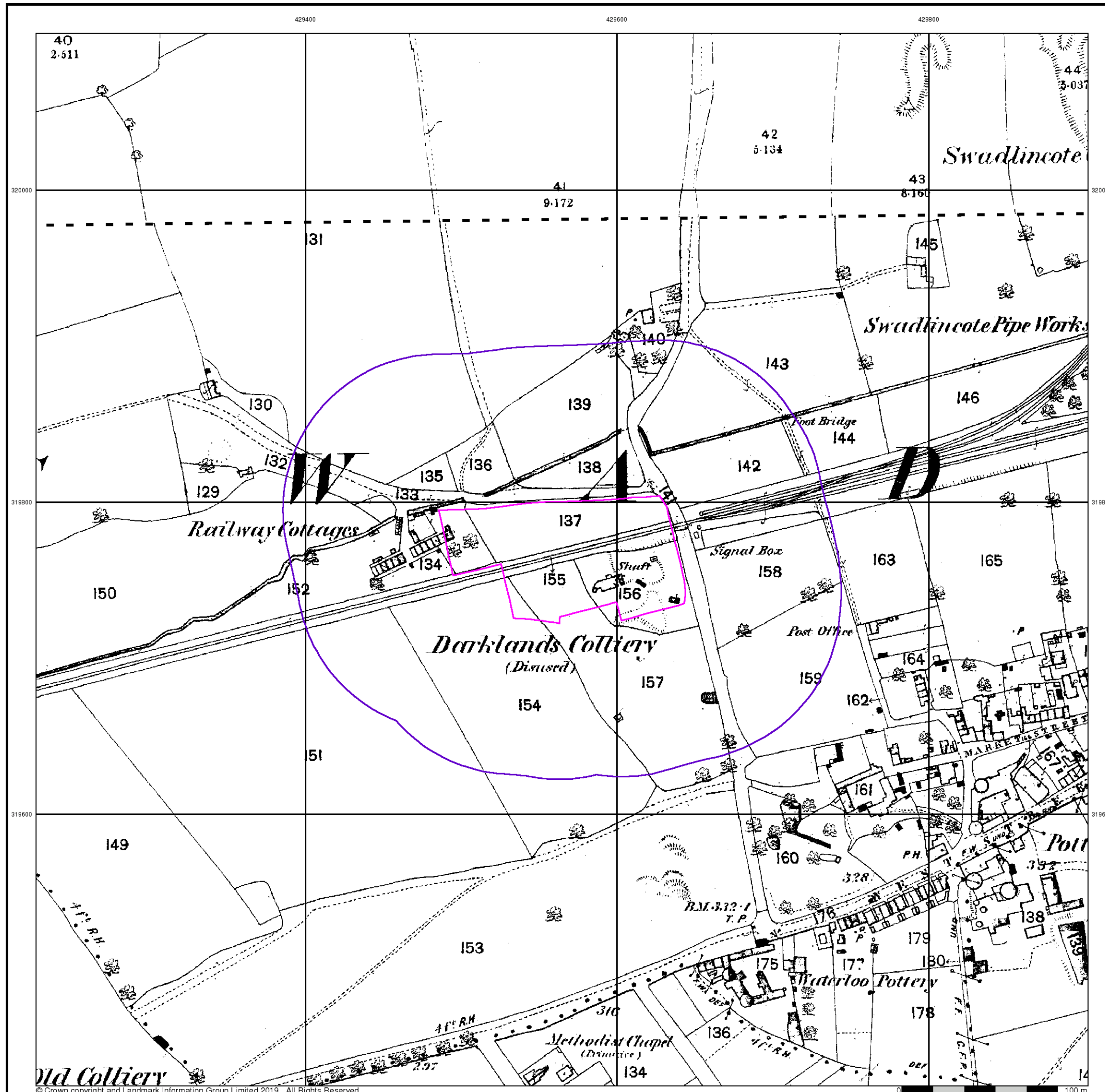


Order Details

Order Number: 211447594_1_1
 Customer Ref: PO2150/7034/RJH
 National Grid Reference: 429570, 319770
 Slice: A
 Site Area (Ha): 0.95
 Search Buffer (m): 100

Site Details

Site at 429565,319763



Derbyshire

Published 1901

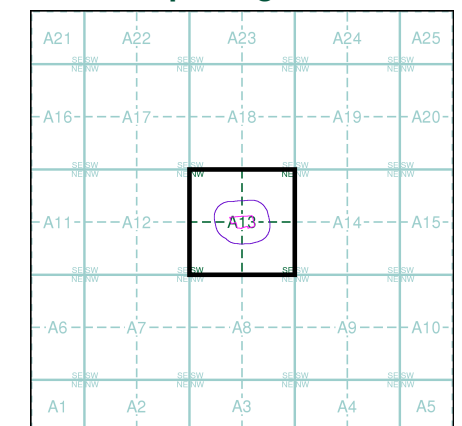
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

060_02	1901	1:2,500
060_06	1901	1:2,500

Historical Map - Segment A13

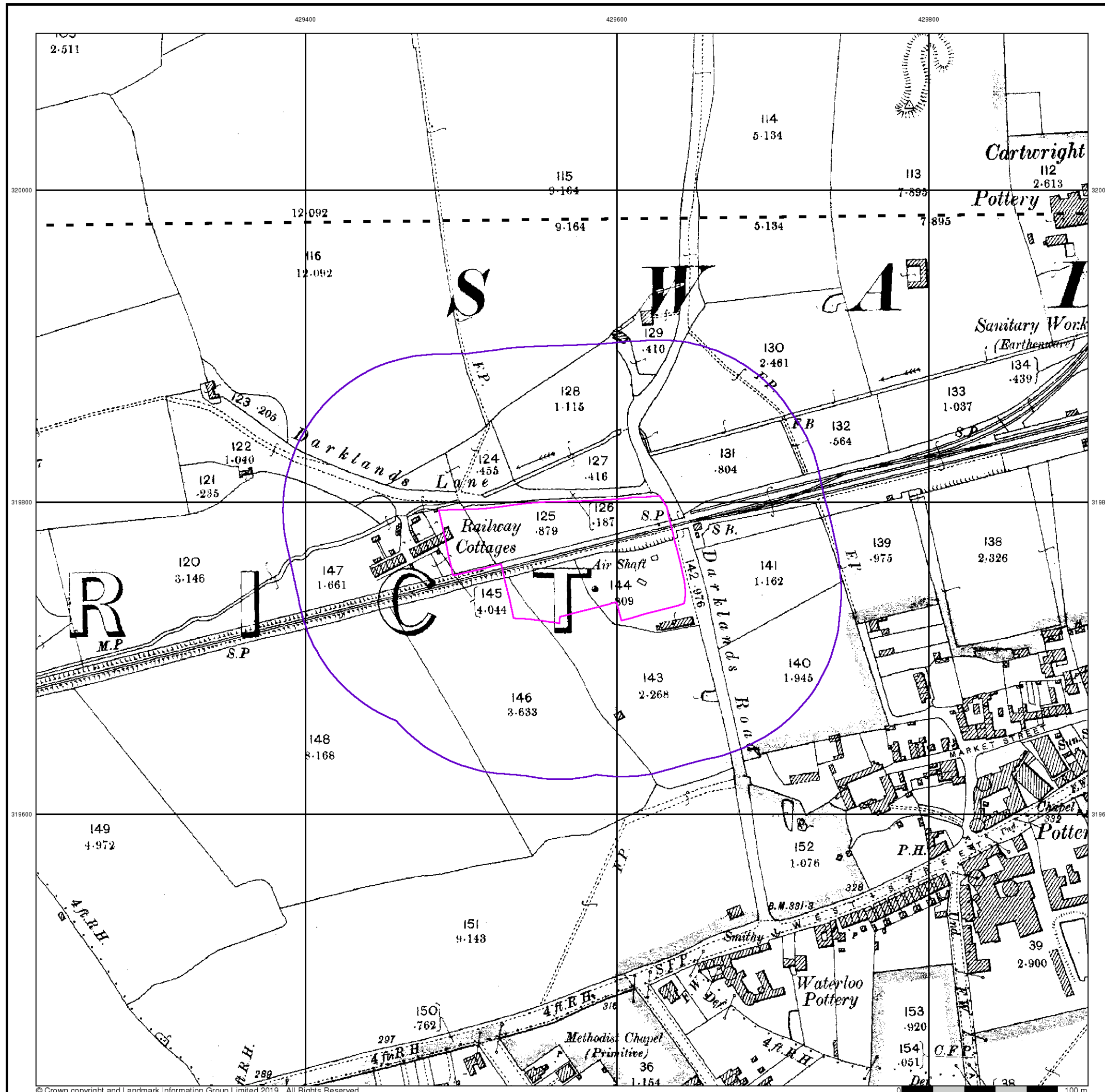


Order Details

Order Number: 211447594_1_1
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 National Grid Reference: 429570, 319770
 Slice: A
 Site Area (Ha): 0.95
 Search Buffer (m): 100

Site Details

Site at 429565,319763



Ordnance Survey Plan

Published 1960

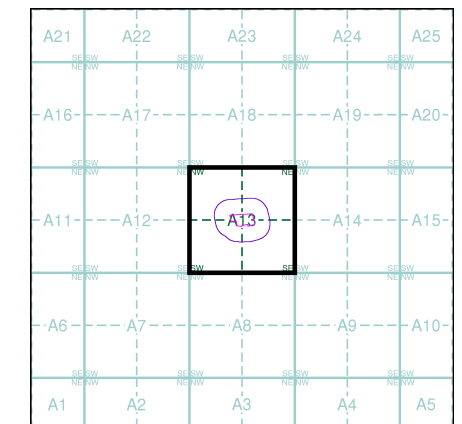
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SK2920
1960
1:2,500
SK2919
1960
1:2,500

Historical Map - Segment A13

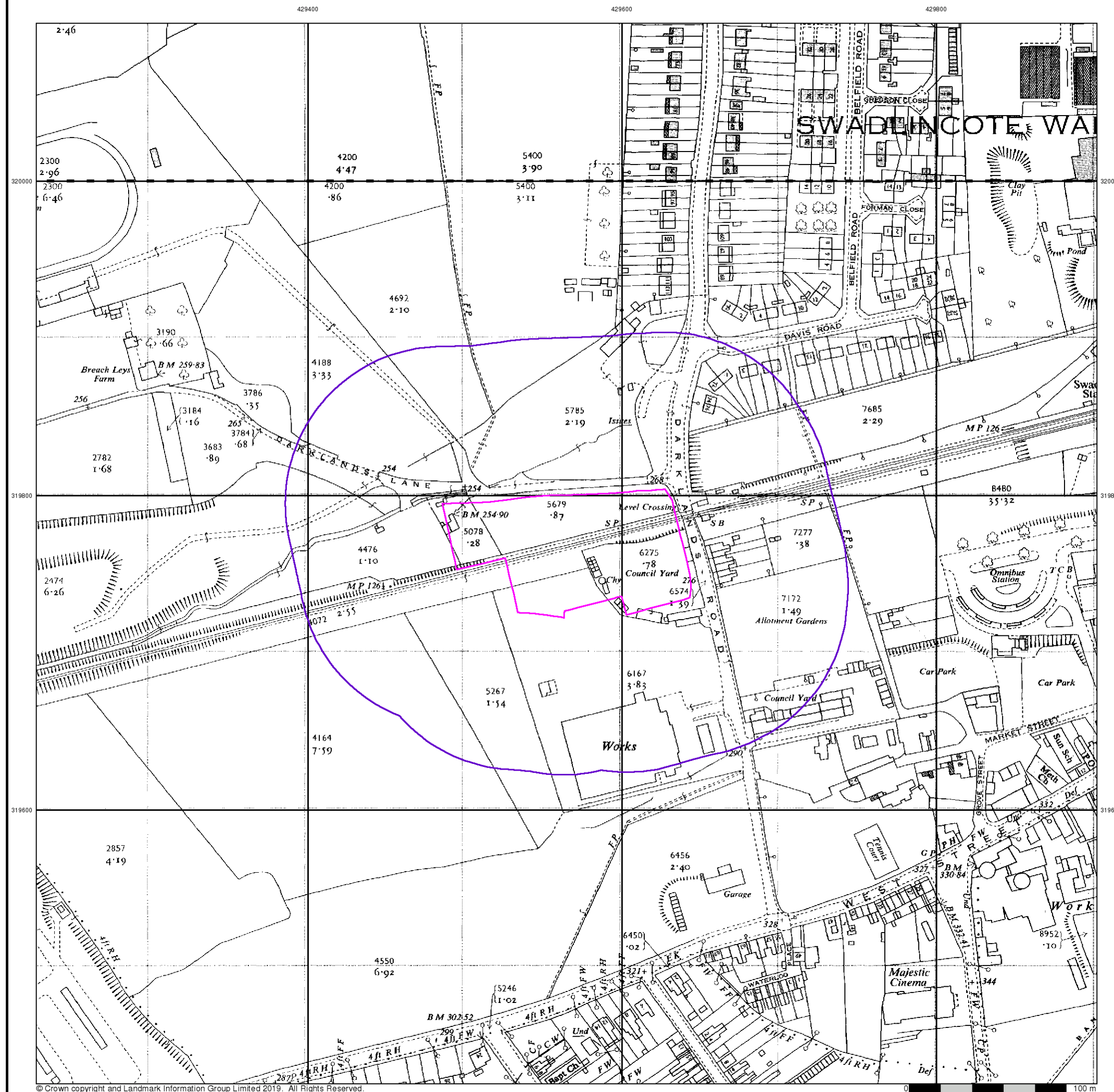


Order Details

Order Number: 211447594_1_1
 Customer Ref: PO2150/7034/RJH
 National Grid Reference: 429570, 319770
 Slice: A
 Site Area (Ha): 0.95
 Search Buffer (m): 100

Site Details

Site at 429565,319763



Ordnance Survey Plan

Published 1968

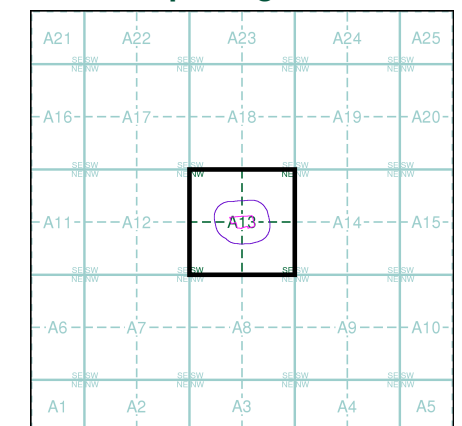
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SK2920
1968
1:2,500
SK2919
1968
1:2,500

Historical Map - Segment A13

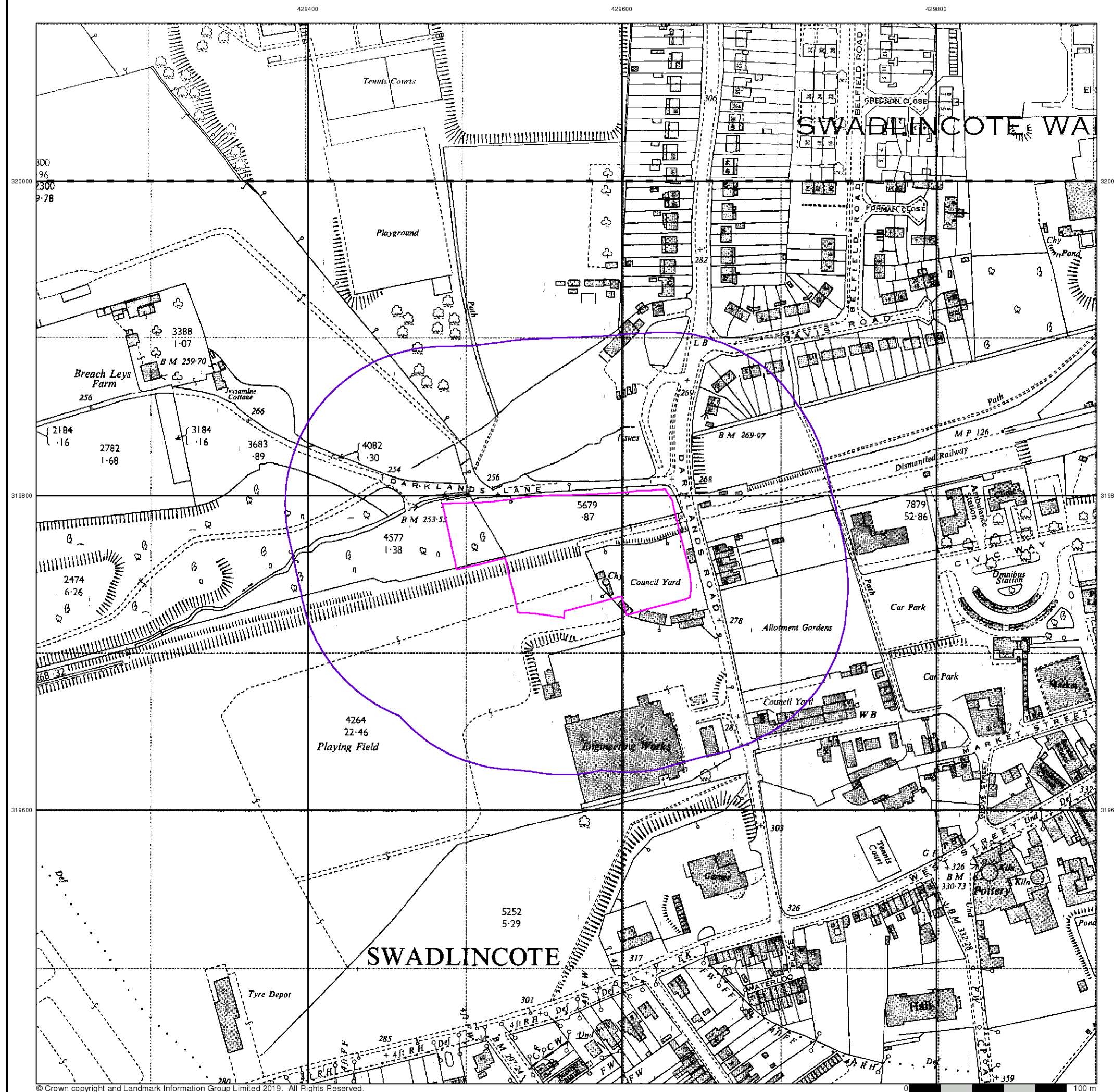


Order Details

Order Number: 211447594_1_1
 Customer Ref: PO2150/7034/RJH
 National Grid Reference: 429570, 319770
 Slice: A
 Site Area (Ha): 0.95
 Search Buffer (m): 100

Site Details

Site at 429565,319763



Ordnance Survey Plan

Published 1971 - 1981

Source map scale - 1:2,500

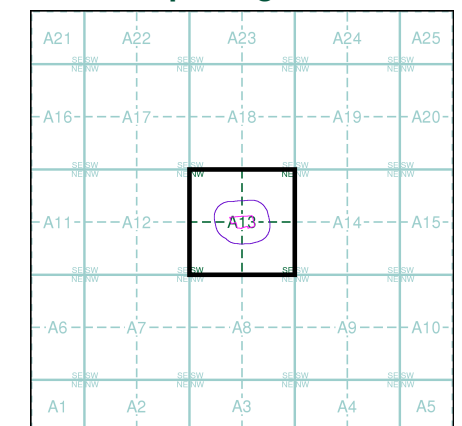
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

SK2920
1971
1:2,500

SK2919
1981
1:2,500

Historical Map - Segment A13

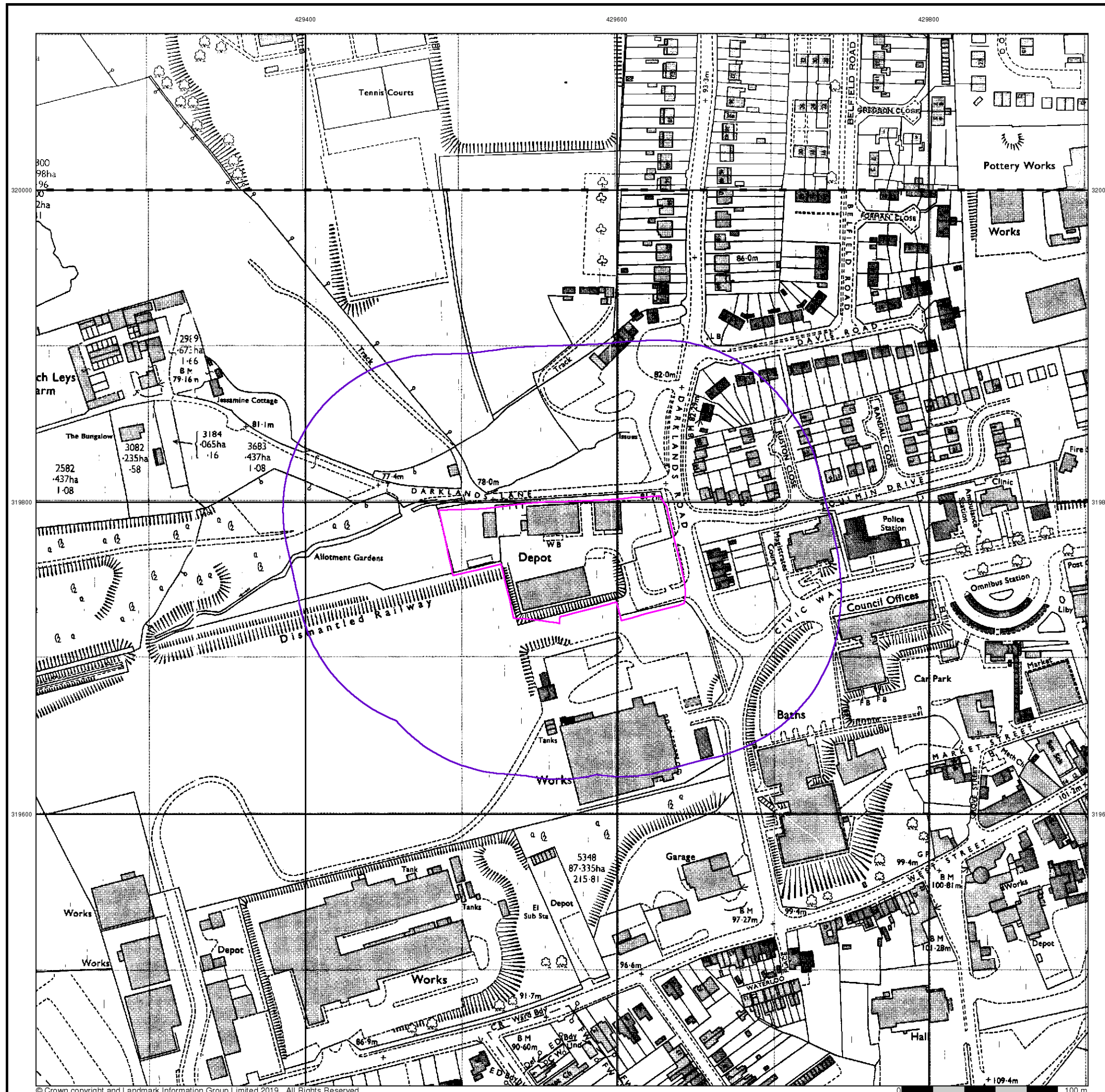


Order Details

Order Number: 211447594_1_1
Customer Ref: PO2150/7034/RJH
National Grid Reference: 429570, 319770
Slice: A
Site Area (Ha): 0.95
Search Buffer (m): 100

Site Details

Site at 429565,319763



APPENDIX C	SEARCHES
Landmark	Envirocheck Report
Coal Authority	Coal Mining Report
ADA Consulting	Drawing referenced 12343/951
Lees Industrial Services	Fuel Tank Decommissioning, November 2013

Envirocheck[®] Report:

Datasheet

Order Details:

Order Number:

211447594_1_1

Customer Reference:

PO2150/7034/RJH

National Grid Reference:

429570, 319770

Slice:

A

Site Area (Ha):

0.95

Search Buffer (m):

1000

Site Details:

Site at 429565,319763

Client Details:

Mr R Hey
Calabrian Limited
Market Chambers
14 Market Place
Bedale
North Yorkshire
DL8 1EQ

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 2		2	1	4
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls					
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 3		2	7	7
Local Authority Pollution Prevention and Control Enforcements					
Nearest Surface Water Feature	pg 5		Yes		
Pollution Incidents to Controlled Waters	pg 6	1	14		1
Prosecutions Relating to Authorised Processes					
Registered Radioactive Substances					
River Quality	pg 8		1		
River Quality Biology Sampling Points	pg 9		1		
River Quality Chemistry Sampling Points					
Substantiated Pollution Incident Register	pg 9			1	
Water Abstractions	pg 9				1 (*1)
Water Industry Act Referrals					
Groundwater Vulnerability Map	pg 10	Yes	n/a	n/a	n/a
Groundwater Vulnerability - Soluble Rock Risk			n/a	n/a	n/a
Groundwater Vulnerability - Local Information			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 10	Yes	n/a	n/a	n/a
Superficial Aquifer Designations			n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences	pg 10		Yes	n/a	n/a
Flooding from Rivers or Sea without Defences	pg 10		Yes	n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 10		6	8	58

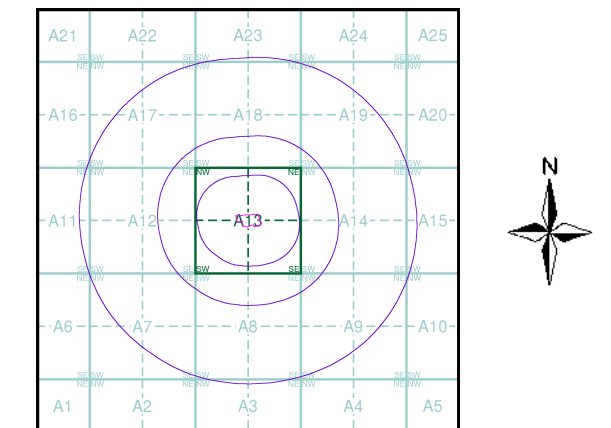
Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites					
Historical Landfill Sites	pg 19				1
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)	pg 19				1
Licensed Waste Management Facilities (Locations)	pg 19		1		
Local Authority Landfill Coverage	pg 19	2	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Potentially Infilled Land (Non-Water)	pg 19	1		5	12
Potentially Infilled Land (Water)	pg 20		3	3	13
Registered Landfill Sites	pg 21				1
Registered Waste Transfer Sites					
Registered Waste Treatment or Disposal Sites	pg 22		1		
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)	pg 23				1
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology	pg 24	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 24	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 25	1		3	12
BGS Urban Soil Chemistry					
BGS Urban Soil Chemistry Averages					
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas	pg 28	Yes	n/a	n/a	n/a
Mining Instability	pg 28	Yes	n/a	n/a	n/a
Man-Made Mining Cavities	pg 28				1
Natural Cavities					
Non Coal Mining Areas of Great Britain	pg 28	Yes	Yes	n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 28	Yes	Yes	n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 28	Yes	Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 29	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 29	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 29	Yes	Yes	n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 31		18	88	63
Fuel Station Entries	pg 45		1	1	2
Points of Interest - Commercial Services	pg 46		9	23	31
Points of Interest - Education and Health					
Points of Interest - Manufacturing and Production	pg 51		9	31	26
Points of Interest - Public Infrastructure	pg 56		6	4	12
Points of Interest - Recreational and Environmental	pg 58				6
Gas Pipelines					
Underground Electrical Cables					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 60	2			
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

- General**
- Specified Site
 - Specified Buffer(s)
 - Bearing Reference Point
 - Map ID
 - Several of Type at Location
- Agency and Hydrological**
- Contaminated Land Register Entry or Notice (Location)
 - Contaminated Land Register Entry or Notice
 - Discharge Consent
 - Enforcement or Prohibition Notice
 - Integrated Pollution Control
 - Integrated Pollution Prevention Control
 - Local Authority Integrated Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control Enforcement
 - Pollution Incident to Controlled Waters
 - Prosecution Relating to Authorised Processes
 - Prosecution Relating to Controlled Waters
 - Registered Radioactive Substance
 - River Network or Water Feature
 - River Quality Sampling Point
 - Substantiated Pollution Incident Register
 - Water Abstraction
 - Water Industry Act Referral
- Hazardous Substances**
- COMAH Site
 - Explosive Site
 - NIHHS Site
 - Planning Hazardous Substance Consent
 - Planning Hazardous Substance Enforcement
 - BGS Recorded Mineral Site
- Waste**
- BGS Recorded Landfill Site (Location)
 - BGS Recorded Landfill Site
 - EA Historic Landfill (Buffered Point)
 - EA Historic Landfill (Polygon)
 - Integrated Pollution Control Registered Waste Site
 - Licensed Waste Management Facility (Landfill Boundary)
 - Licensed Waste Management Facility (Location)
 - Local Authority Recorded Landfill Site (Location)
 - Local Authority Recorded Landfill Site
 - Potentially Infilled Land (Non-water)
 - Potentially Infilled Land (Non-water)
 - Potentially Infilled Land (Non-water)
 - Potentially Infilled Land (Water)
 - Potentially Infilled Land (Water)
 - Potentially Infilled Land (Water)
 - Registered Landfill Site (Location)
 - Registered Landfill Site (Point Buffered to 100m)
 - Registered Landfill Site (Point Buffered to 250m)
 - Registered Waste Transfer Site (Location)
 - Registered Waste Transfer Site
 - Registered Waste Treatment or Disposal Site (Location)
 - Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Slice A

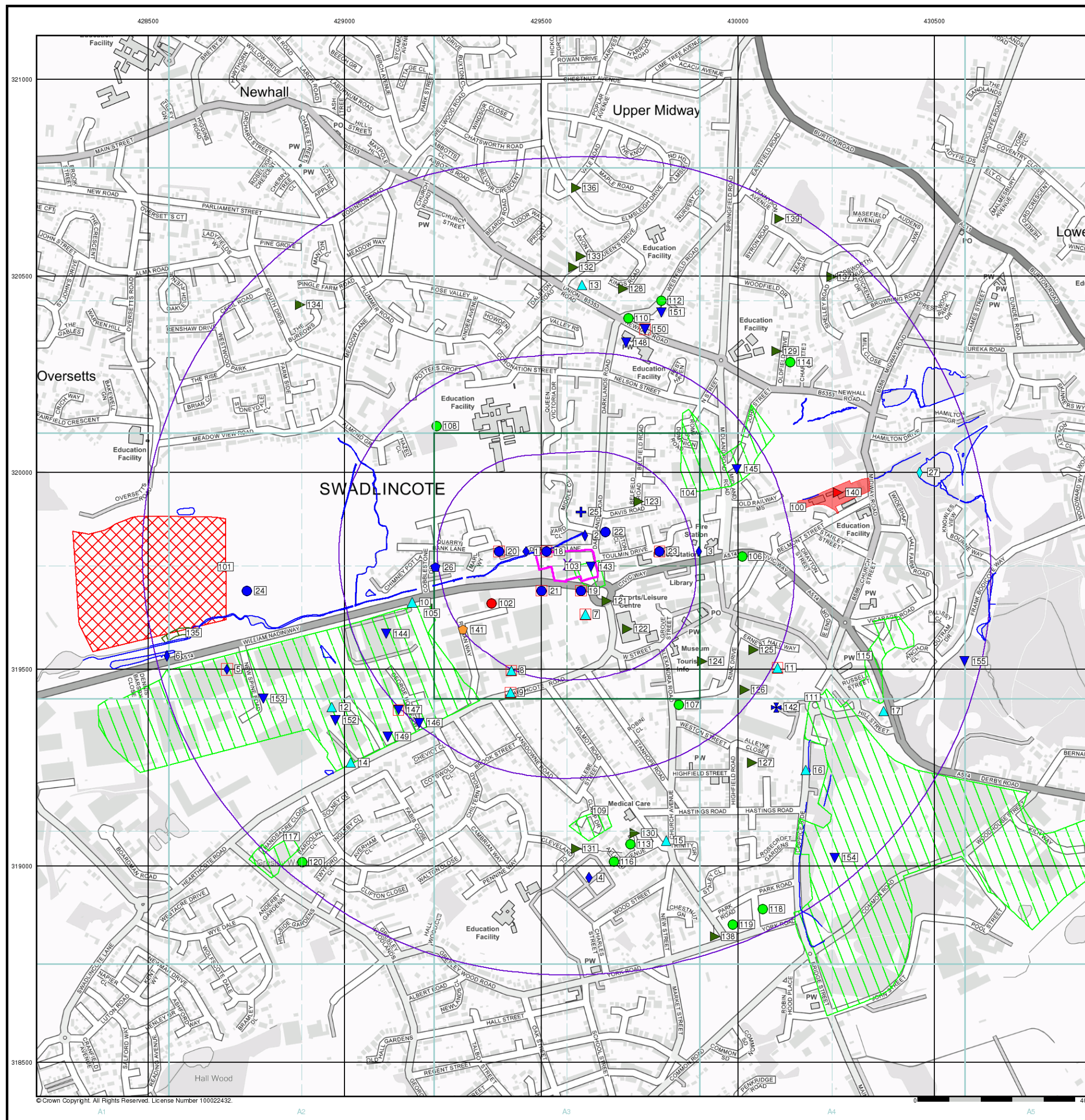


Order Details

Order Number: 211447594_1_1
 Customer Ref: PO2150/7034/RJH
 National Grid Reference: 429570, 319770
 Slice: A
 Site Area (Ha): 0.95
 Search Buffer (m): 1000

Site Details

Site at 429565,319763



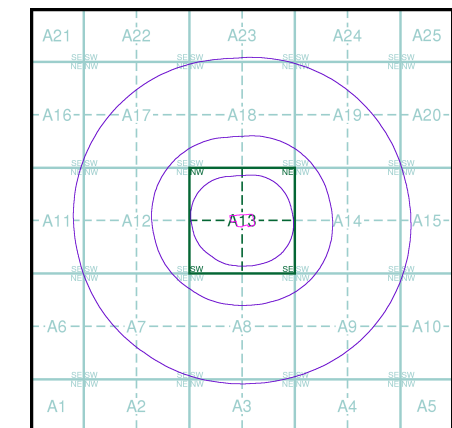
General

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

Agency and Hydrological (Flood)

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

Flood Map - Slice A

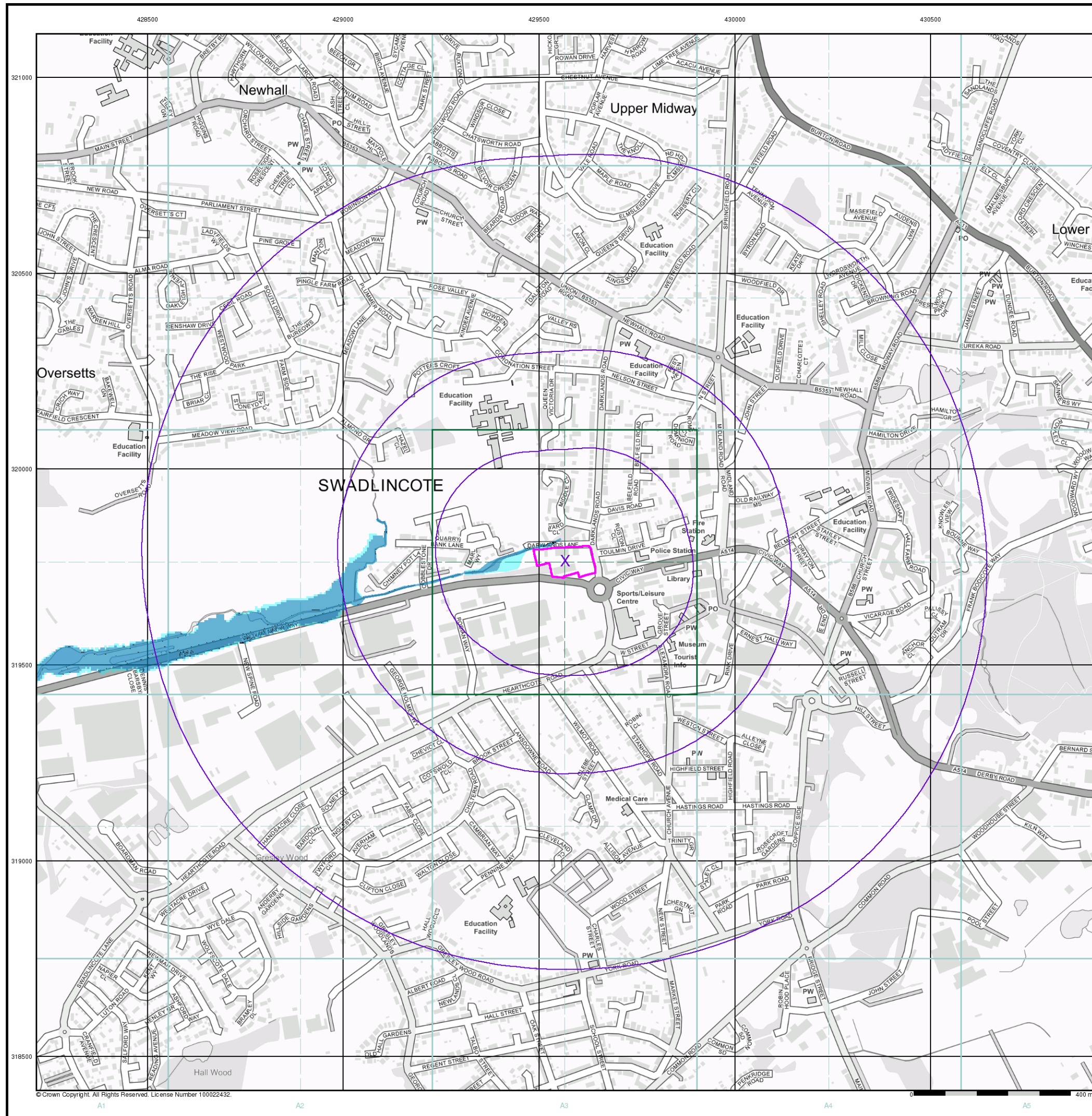


Order Details

Order Number: 211447594_1_1
 Customer Ref: PO2150/7034/RJH
 National Grid Reference: 429570, 319770
 Slice: A
 Site Area (Ha): 0.95
 Search Buffer (m): 1000

Site Details

Site at 429565,319763



General

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

Risk of Flooding from Surface Water

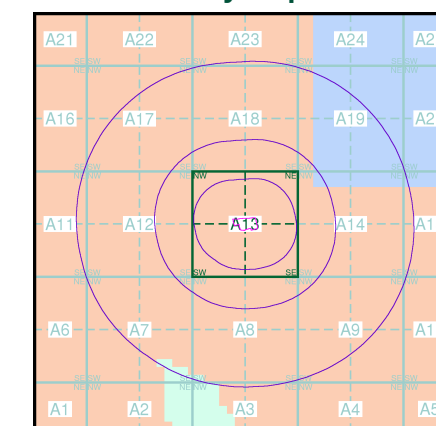
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A

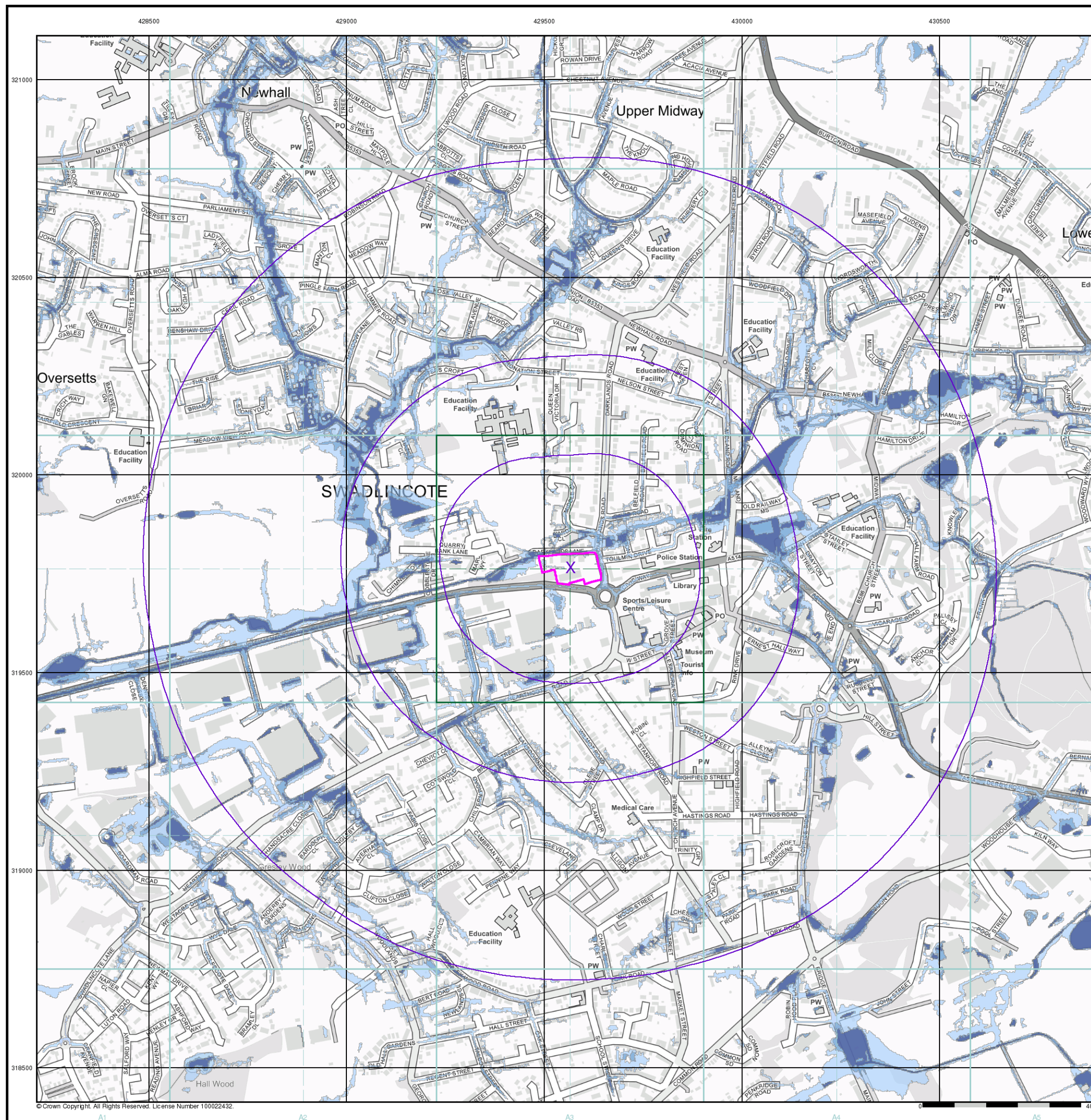


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 Search Buffer (m): 1000

Site Details

Site at 429565,319763





The Coal
Authority

CON29M

coal mining report

SITE AT 429565,319763, DERBYSHIRE



Known or potential coal mining risks

Past underground coal mining	Page 4
Future underground coal mining	Page 4
Mine entries	Page 5



Further action

These additional reports can give further detail on the risks identified:

- Mine entry interpretive report
- Mine entry plan and data sheets

For more information please see our [Further action reports](#) on page 10



Professional opinion

According to the official mining information records held by the Coal Authority at the time of this search, evidence of, or the potential for, coal mining related features have been identified. In view of the coal mining circumstances we would recommend that any planned or future development should follow detailed technical advice before beginning work on site. Please see [page 3](#) for further details on [Future development](#).

Your reference: [211447594_2](#)
Our reference: [51002151105005](#)
Date: [17 July 2019](#)

Client name:
[LANDMARK INFORMATION
GROUP LIMITED](#)

If you require any further assistance please
contact our experts on:
[0345 762 6848](#)
groundstability@coal.gov.uk



The Law
Society

Enquiry boundary

Key

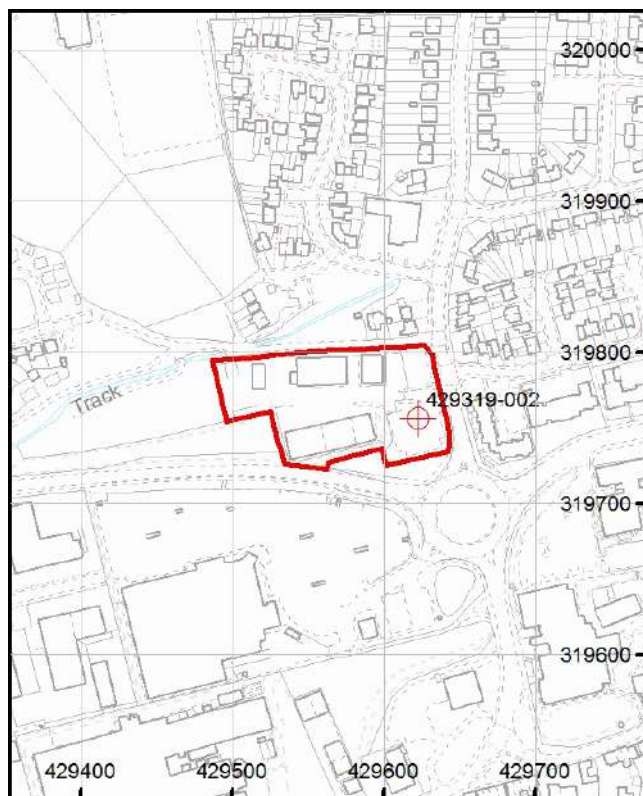
Approximate position of enquiry boundary shown



Disused mineshaft



We can confirm that the location is
on the coalfield



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This report is prepared in accordance with the latest Law Society's Guidance Notes 2018, the User Guide 2018 and the Coal Authority's Terms and Conditions applicable at the time the report was produced.



Accessibility

If you would like this information in an alternative format, please contact our communications team on 0345 762 6848 or email communications@coal.gov.uk.

Your reference: **211447594_2**
Our reference: **51002151105005**
Date: **17 July 2019**

Client name:
**LANDMARK INFORMATION
GROUP LIMITED**

If you require any further assistance please
contact our experts on:
0345 762 6848
groundstability@coal.gov.uk

Professional opinion



Mine entries

The enquiry boundary shows the approximate location of the disused mine entry/entries referred to in this report. Property owners have the benefit of statutory protection (under the Coal Mining Subsidence Act 1991). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage caused by disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by visiting www.coal.gov.uk. Please note this Act is not valid where coal was worked or extracted by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

If you wish to discuss the relevance of any of the information contained in this report, you should seek the advice of a qualified mining engineer or surveyor. If you or your advisor wishes to examine the source plans from which the information has been taken, these are available to view, at our Coal Authority head office in Mansfield. To book an appointment please call **01623 637 225**. Should you or your advisor wish to carry out a physical investigation that may enter, disturb or interfere with any disused mine entry, prior permission must be sought from the owner. For coal mine entries, the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency, 24 hour call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). To report an emergency you can call **01623 646 333**.



Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed.

If you are looking to develop, or undertake works, within a coal mining development high risk area your Local Authority planning department may require a Coal Mining Risk Assessment to be undertaken by a qualified mining geologist or engineer. Should you require any additional information then please contact the Coal Authority on **0345 762 6848** or email cmra@coal.gov.uk.

Detailed findings

Information provided by the Coal Authority in this report is compiled in response to the Law Society's CON29M Coal Mining enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL.

The Coal Authority owns the copyright in this report and the information used to produce this report is protected by our database rights. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

1 Past underground coal mining

The property is in a surface area that could be affected by underground mining in 7 seams of coal at 50m to 310m depth, and last worked in 1946.

Any movement in the ground due to coal mining activity associated with these workings should have stopped by now.

In addition the property is in an area where the Coal Authority believes there is coal at or close to the surface. This coal may have been worked at some time in the past. The potential presence of coal workings at or close to the surface should be considered, particularly prior to any site works or future development activity, as ground movement could still be a risk. Your attention is drawn to the Professional opinion sections of the report.

2 Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3 Future underground coal mining

The property is not in an area where the Coal Authority has received an application for, and is currently considering whether to grant a licence to remove or work coal by underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

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

4 Mine entries

Within, or within 20 metres of, the boundary of the property there is 1 mine entry, the approximate position of which is shown on the enquiry boundary plot. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Our records disclose the following information:

429319-002. was drilled to 131 metres, grouted and capped by Structural Stabilisations Limited for British Coal in 1993.

This information is based on the information that the Coal Authority has at the time of this enquiry.

Based on the Coal Authority's knowledge of the mining circumstances at the time of this enquiry, there may be unrecorded mine entries in the local area that do not appear on Coal Authority records.

For an additional fee, the Coal Authority can provide a Mine Entry Interpretive Report. The report will provide a separate assessment for the mine entry/entries referred to in this report. It gives an opinion on the likelihood of mining subsidence damage caused from ground movement as a consequence of the mine entry/entries. It also gives details of the remedies available for subsidence damage where the mine entry was sunk in connection with coal mining.

Please note that it may not be possible to produce a report if the main building to the property cannot be identified from Coal Authority plans (ie for development sites and new build).

For further advice on how to order this additional information please visit www.groundstability.com.

5 Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6 Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7 Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8 Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9 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.

10 Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11 Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures.

12 Withdrawal of support

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.

13 Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14 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.

Statutory cover



Coal mining subsidence

In the unlikely event of any coal mining related subsidence damage, the Coal Authority or the mine operator has a duty to take remedial action in respect of subsidence caused by the withdrawal of support from land or property in connection with lawful coal mining operations.

When the works are the responsibility of the Coal Authority, our dedicated public safety and subsidence team will manage the claim. The house or land owner ("the owner") is covered for these works under the terms of the Coal Mining Subsidence Act 1991 (as amended by the Coal Industry Act 1994). Please note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

If you believe your land or property is suffering from coal mining subsidence damage and you need more information on what to do next, please use the following link to our website which sets out what your rights are and what you need to consider before making a claim.

www.gov.uk/government/publications/coal-mining-subsidence-damage-notice-form



Coal mining hazards

Our public safety and subsidence team provide a 24 hour a day, 7 days a week hazard reporting service, to help protect the public from hazards caused by past coal workings, such as a mine shaft or shallow working collapse. To report any hazards please call **01623 646 333**. Further information can be found on our website: www.gov.uk/coalauthority.

Glossary



Key terms

adit - horizontal or sloped entrance to a mine

coal mining subsidence - ground movement caused by the removal of coal by underground mining

Coal Mining Subsidence Act 1991 - the Act setting out the duties of the Coal Authority to repair damage caused by coal mining subsidence

coal mining subsidence damage - damage to land, buildings or structures caused by the removal of coal by underground mining

coal seams - bed of coal of varying thickness

future opencast coal mining - a licence granted, or licence application received, by the Coal Authority to excavate coal from the surface

future underground coal mining - a licence granted, or licence application received, by the Coal Authority to excavate coal underground. Although it is unlikely, remaining coal reserves could create a possibility for future mining, which would be licensed by the Coal Authority

mine entries - collective name for shafts and adits

payments to owners of former copyhold land - historically, copyhold land gave rights to coal to the copyholder. Legislation was set up to allow others to work this coal, but they had to issue a notice and pay compensation if a copyholder came forward

shaft - vertical entry into a mine

site investigation - investigations of coal mining risks carried out with the Coal Authority's permission

stop notice - a delay to repairs because further coal mining subsidence damage may occur and it would be unwise to carry out permanent repairs

subsidence claim - a formal notice of subsidence damage to the Coal Authority since it was established on 31 October 1994

withdrawal of support - a historic notice informing landowners that the coal beneath their property was going to be worked

working facilities orders - a court order which gave permission, restricted or prevented coal mine workings



Further action reports

Mine entry interpretive report - assesses the risk of ground movement from mine entries in, or within 20 metres of, the property boundary. To order this report, use the same boundary as the CON29M report, then draw the building on the additional map screen.

For more information and to order this report please visit:

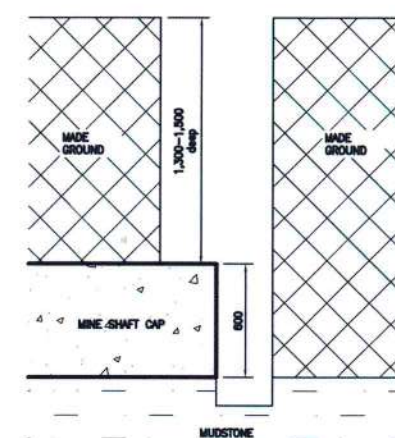
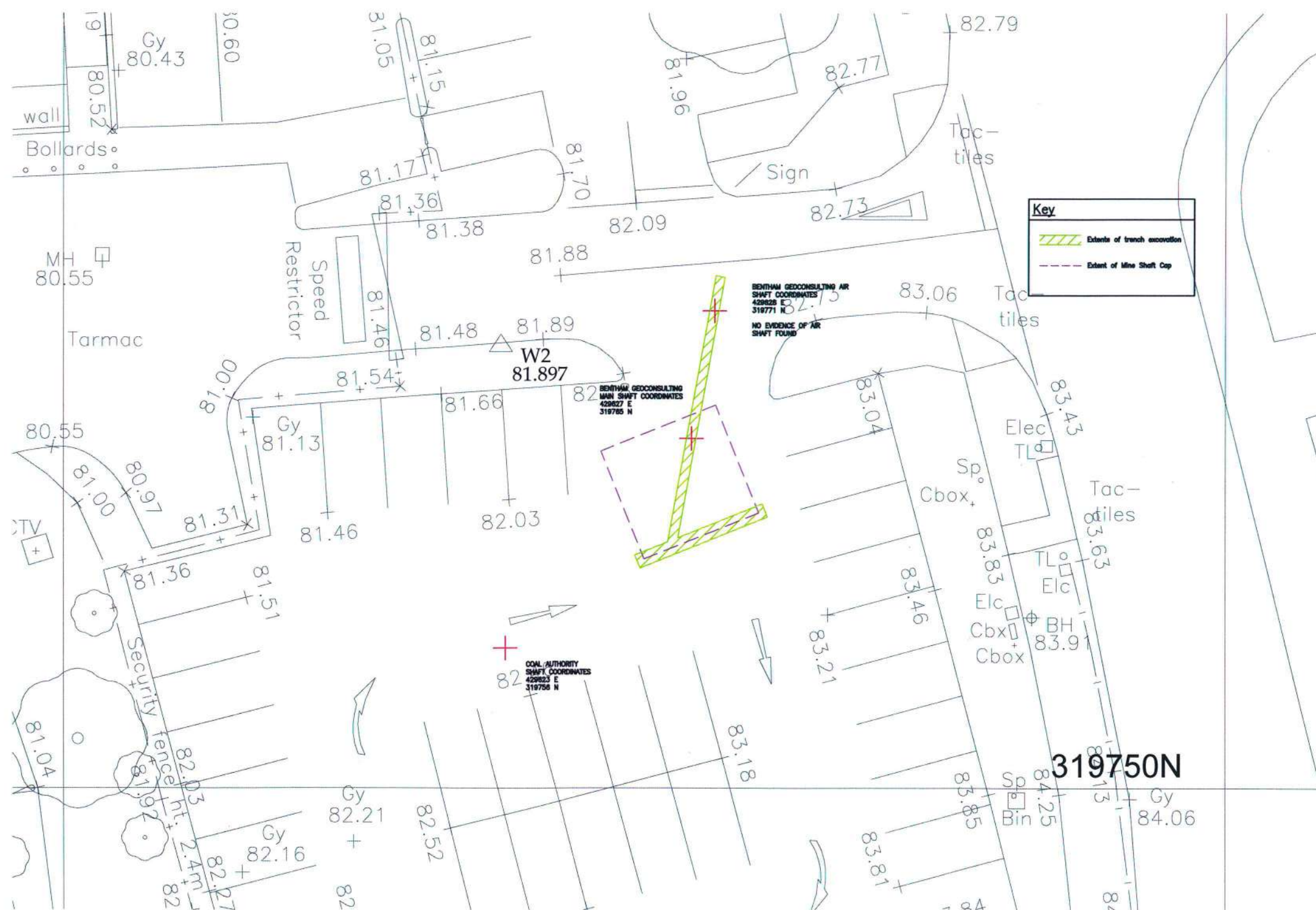
<https://www2.groundstability.com/interpretive-report>

Mine entry plan and data sheets - give additional information on mine entries recorded on a piece of land. To order this report use the same boundary as the CON29M report and a member of our team will contact you to confirm the mine entries to include in this bespoke report.

For more information and to order this report please visit:

<https://www2.groundstability.com/plan-and-data-sheets>

- NOTES**
1. ALL DIMENSIONS IN mm. DO NOT SCALE IF IN DOUBT ASK
 2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ABA AND SPECIALIST DRAWINGS AND SPECIFICATIONS.



TYPICAL SECTION THROUGH EXCAVATION
Scale 1:20

REV	DATE	DESCRIPTION	BY
SHEET SIZE A1			
CLIENT			
Wildgoose Marston's			
PROJECT			
Darklands Road Swadlincote			
DRAWING TITLE			
Mine Shaft Investigation Works			
PRELIMINARY			
 aba consulting Consulting Civil & Structural Engineers			
■ Unit A Racecourse Business Park Dovefields, Uttoxeter Staffordshire, ST14 8GB			
Tel : 01889 569856 Fax : 01889 567154 info@aba-consulting.co.uk			
DRAWN BY		GH	DATE
			09/02/17
CHECKED BY		AB	SCALE
			As Shown
PROJECT No	DRAWING No	REVISION	
12343	951	~	



Certificate of Tank Decommissioning

Site and address:

The Depot
South Derbyshire District Council
Darklands Road
Swadlincote
Derbyshire, DE11 0PQ

Date: 13th November 2013

Decommissioning Method: Foam filling
with BritFoam®, a resin based hardfoam

Customer:

Pennine Pump and Tank Limited
151-153 Haslingden Road, Blackburn, Lancashire, BB1 2ND

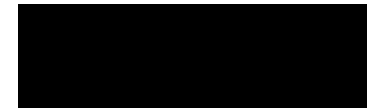
Copy to: Keith Covell/Mark Leatherland (Protection Policy), Derbyshire
Fire & Rescue Service, Ilkeston Community Fire Station, Derby Road,
Ilkeston, DE7 5EZ

Tank No	Capacity (Litres)	Product
1	9000	Petrol

We certify that the above below ground tank, associated pipework and manhole chamber have been decommissioned with BritFoam®, a resin-based hard foam using an approved procedure. All works carried out by us are in line with the guidelines set out in APEA/IP's Design, Construction, Modification, Maintenance and Decommissioning of Filling Stations, 3rd Edition, Revised 2011 (the "Blue Book").

Operative: Paul Lees

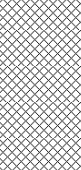
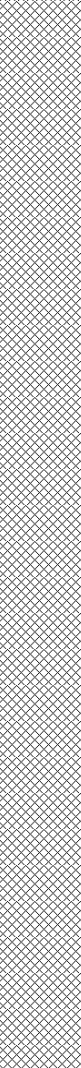
Signature:



For and on behalf Lees Industrial Services Limited
322 Haydock Lane
Haydock Industrial Estate,
Haydock,
St Helens, Merseyside, WA11 9UY
T: 01508 471600 or 01942 722244
F: 01508 471602 or 01942 722266
Email: lees_ind_services@btinternet.com
Website: www.leesindustrialservices.co.uk

APPENDIX D	EXPLORATORY HOLE RECORDS
Trial Pits	TP101 to TP114
Rotary Openhole Boreholes	PH101 to PH112

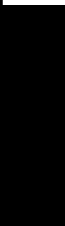
					Borehole Log			Borehole No. PH101 Sheet 1 of 1	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429626.00 - 319763.00		Hole Type RO
Location: Swadlincote					Level: 82.80		Scale 1:50		Logged By Driller
Client: LNT Construction Limited					Dates: 07/08/2019 - 07/08/2019				

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.20	81.60		OVERBURDEN	1
					1.80	81.00		VERY HARD CONCRETE (SHAFT CAP)	
								FIRM GROUND (NO RETURNS)	2
									3
									4
									5
									6
									7
									8
					9.00	73.80		End of borehole at 9.00 m	9
									10

Remarks
 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



				Borehole Log				Borehole No. PH102 Sheet 1 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429632.00 - 319745.00		Hole Type RO	
Location: Swadlincote				Level: 83.80		Scale 1:50		Logged By Driller	
Client: LNT Construction Limited				Dates: 06/08/2019 - 06/08/2019					

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.50	82.30	OVERBURDEN	1	
							MUDSTONE / SANDSTONE BANDS	2	
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	
							Continued on next sheet		

Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.		
--	--	---

Borehole Log

Borehole No.

PH102

Sheet 2 of 3

Project Name: Darklands Road

Project No.
7034

Co-ords: 429632.00 - 319745.00

Hole Type
RO

Location: Swadlincote

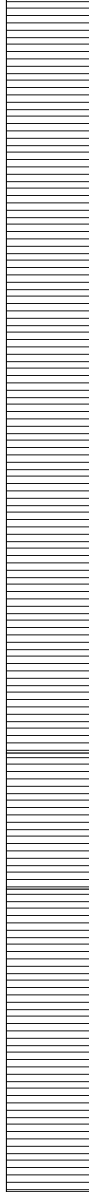
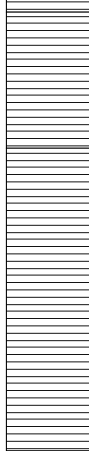
Level: 83.80

Scale
1:50

Client: LNT Construction Limited

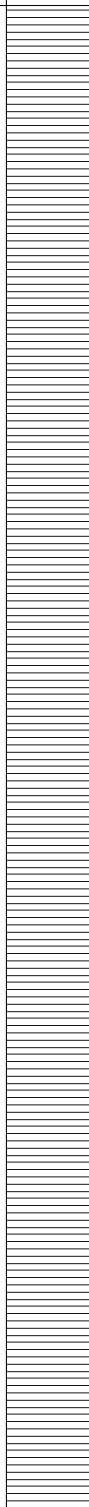
Dates: 06/08/2019 - 06/08/2019

Logged By
Driller

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					10.40	73.40		DARK MUDSTONE / COAL TRACES	11
					12.10	71.70		MUDSTONE / SANDSTONE BANDS	12
					17.10	66.70		DARK MUDSTONE	17
					18.00	65.80		MUDSTONE / SANDSTONE BANDS	18
								Continued on next sheet	20

Remarks

1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.

					Borehole Log			Borehole No. PH102 Sheet 3 of 3										
Project Name: Darklands Road					Project No. 7034		Co-ords: 429632.00 - 319745.00		Hole Type RO									
Location: Swadlincote					Level: 83.80		Scale 1:50											
Client: LNT Construction Limited					Dates: 06/08/2019 - 06/08/2019		Logged By Driller											
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description										
		Depth (m)	Type	Results														
									21									
									22									
									23									
									24									
									25									
									26									
									27									
									28									
									29									
									30									
									31									
									32									
									33									
									34									
									35									
									36									
									37									
									38									
									39									
														30.00	53.80		End of borehole at 30.00 m	30
									Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									

Borehole Log

Borehole No.

PH102A

Sheet 1 of 1

Project Name: Darklands Road

Project No.
7034

Co-ords: -

Hole Type
RO

Location: Swadlincote

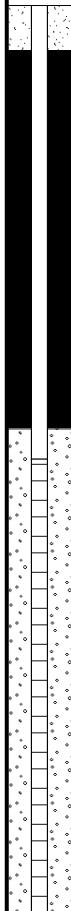
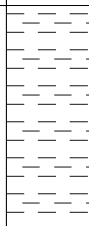
Level:

Scale
1:50

Client: LNT Construction Limited

Dates: 06/08/2019 - 06/08/2019

Logged By
Driller

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.50			OVERBURDEN	1
					6.00			MUDSTONE / SANDSTONE BANDS	2
									3
									4
									5
									6
									7
									8
									9
									10

End of borehole at 6.00 m

Remarks

				Borehole Log				Borehole No. PH103 Sheet 1 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429613.00 - 319741.00		Hole Type RO	
Location: Swadlincote				Level: 82.70		Scale 1:50		Logged By Driller	
Client: LNT Construction Limited				Dates: 06/08/2019 - 06/08/2019					

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.70	81.00		OVERBURDEN	1
								MUDSTONE / SANDSTONE BANDS	2
									3
									4
									5
									6
									7
									8
									9
									10

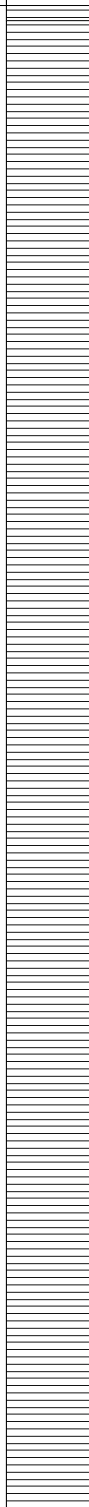
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Remarks

1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



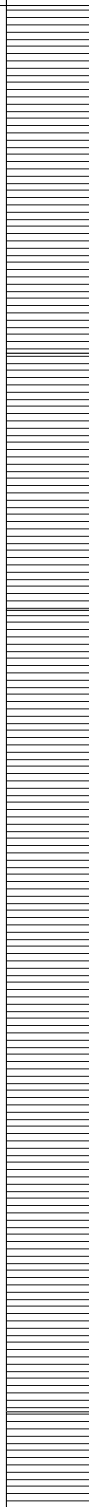
					Borehole Log			Borehole No. PH103 Sheet 2 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429613.00 - 319741.00		Hole Type RO
Location: Swadlincote					Level: 82.70		Scale 1:50		
Client: LNT Construction Limited					Dates: 06/08/2019 - 06/08/2019		Logged By Driller		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					12.20	70.50			11
									12
									13
									14
									15
									16
									17
									18
									19
									20
					19.20	63.50		DARK MUDSTONE	
Continued on next sheet									
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									
									

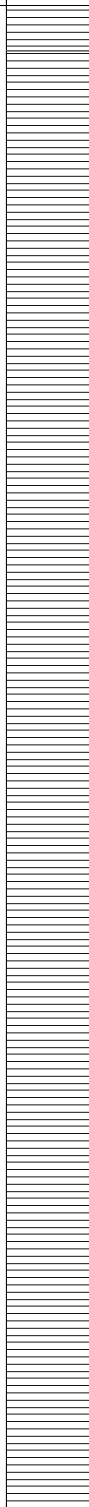
					Borehole Log			Borehole No. PH103 Sheet 3 of 3								
Project Name: Darklands Road					Project No. 7034		Co-ords: 429613.00 - 319741.00		Hole Type RO							
Location: Swadlincote					Level: 82.70		Scale 1:50									
Client: LNT Construction Limited					Dates: 06/08/2019 - 06/08/2019		Logged By Driller									
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description								
		Depth (m)	Type	Results												
					20.10	62.60		MUDSTONE / SANDSTONE BANDS								
												30.00	52.70		End of borehole at 30.00 m	30

Remarks
 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



					Borehole Log			Borehole No. PH104 Sheet 1 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429597.00 - 319757.00		Hole Type RO
Location: Swadlincote					Level: 80.40		Scale 1:50		
Client: LNT Construction Limited					Dates: 07/08/2019 - 07/08/2019		Logged By Driller		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40	80.00		OVERBURDEN	
								MUDSTONE / SANDSTONE BANDS	1
									2
									3
									4
									5
									6
									7
									8
									9
Continued on next sheet								10	
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									

					Borehole Log			Borehole No. PH104 Sheet 2 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429597.00 - 319757.00		Hole Type RO
Location: Swadlincote					Level: 80.40		Scale 1:50		
Client: LNT Construction Limited					Dates: 07/08/2019 - 07/08/2019		Logged By Driller		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					12.30	68.10			11
									12
									13
									14
									15
									16
									17
									18
									19
									20
					19.30	61.10		DARK MUDSTONE	
Continued on next sheet									
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									
									

					Borehole Log			Borehole No. PH104 Sheet 3 of 3							
Project Name: Darklands Road					Project No. 7034		Co-ords: 429597.00 - 319757.00		Hole Type RO						
Location: Swadlincote					Level: 80.40		Scale 1:50								
Client: LNT Construction Limited					Dates: 07/08/2019 - 07/08/2019		Logged By Driller								
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description							
		Depth (m)	Type	Results											
					20.30	60.10		MUDSTONE / SANDSTONE BANDS	21						
					22										
					23										
					24										
					25										
					26										
					27										
					28										
					29										
					30										
					31										
					32										
					33										
					34										
					35										
					36										
					37										
					38										
											30.00	50.40		End of borehole at 30.00 m	30
					Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.										

Borehole Log

Borehole No.

PH104A

Sheet 1 of 1

Project Name: Darklands Road

Project No.
7034

Co-ords: -

Hole Type
RO

Location: Swadlincote

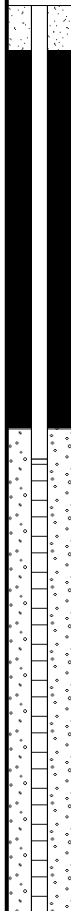
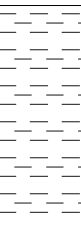
Level:

Scale
1:50

Client: LNT Construction Limited

Dates: 07/08/2019 - 07/08/2019

Logged By
Driller

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.50			OVERBURDEN	1
					6.00			MUDSTONE / SANDSTONE BANDS	2
									3
									4
									5
									6
									7
									8
									9
									10

End of borehole at 6.00 m

Remarks

				Borehole Log			Borehole No. PH105 Sheet 1 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429567.00 - 319739.00		Hole Type RO
Location: Swadlincote				Level: 79.50		Scale 1:50		
Client: LNT Construction Limited				Dates: 06/08/2019 - 06/08/2019		Logged By Driller		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								OVERBURDEN	1
					1.80	77.70		MUDSTONE	2
					2.30	77.20		COAL	3
					3.40	76.10		MUDSTONE / SANDSTONE BANDS	4
								5	
								6	
								7	
								8	
								9	
								10	

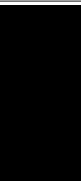
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Remarks

1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



					Borehole Log			Borehole No. PH105 Sheet 2 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429567.00 - 319739.00		Hole Type RO
Location: Swadlincote					Level: 79.50		Scale 1:50		
Client: LNT Construction Limited					Dates: 06/08/2019 - 06/08/2019		Logged By Driller		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					10.30	69.20		COAL	11
					11.50	68.00		DARK MUDSTONE	
					12.20	67.30	MUDSTONE	13	
					13.20	66.30	COAL		14
					14.20	65.30	MUDSTONE / SANDSTONE BANDS	15	
								16	
								17	
								18	
								19	
								20	

Continued on next sheet

Remarks
 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



					Borehole Log			Borehole No. PH105 Sheet 3 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429567.00 - 319739.00		Hole Type RO
Location: Swadlincote					Level: 79.50		Scale 1:50		
Client: LNT Construction Limited					Dates: 06/08/2019 - 06/08/2019		Logged By Driller		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30
									31
									32
									33
									34
									35
									36
									37
									38
									39
									40
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									

				Borehole Log			Borehole No. PH106 Sheet 1 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429538.00 - 319743.00		Hole Type RO
Location: Swadlincote				Level: 79.60		Scale 1:50		
Client: LNT Construction Limited				Dates: 05/08/2019 - 05/08/2019		Logged By Driller		

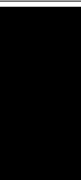
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
							OVERBURDEN	1	
					2.00	77.60		MUDSTONE	2
					3.50	76.10		COAL	4
					4.70	74.90		MUDSTONE / SANDSTONE BANDS	5
									6
									7
									8
									9
									10

Continued on next sheet

Remarks
 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



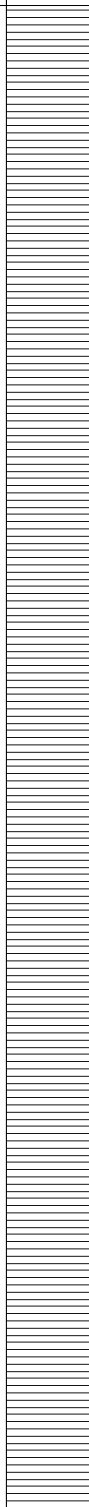
					Borehole Log			Borehole No. PH106 Sheet 2 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429538.00 - 319743.00		Hole Type RO
Location: Swadlincote					Level: 79.60		Scale 1:50		Logged By Driller
Client: LNT Construction Limited					Dates: 05/08/2019 - 05/08/2019				

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					11.50	68.10		COAL	11
					12.70	66.90		DARK MUDSTONE	12
					14.00	65.60	MUDSTONE	13	
					14.50	65.10	COAL	14	
					15.50	64.10	MUDSTONE / SANDSTONE BANDS	15	
								16	
								17	
								18	
								19	
									20

Continued on next sheet

Remarks
 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



					Borehole Log			Borehole No. PH106 Sheet 3 of 3										
Project Name: Darklands Road					Project No. 7034		Co-ords: 429538.00 - 319743.00		Hole Type RO									
Location: Swadlincote					Level: 79.60		Scale 1:50											
Client: LNT Construction Limited					Dates: 05/08/2019 - 05/08/2019		Logged By Driller											
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description										
		Depth (m)	Type	Results														
									21									
									22									
									23									
									24									
									25									
									26									
									27									
									28									
									29									
									30									
									30									
									30									
									30									
									30									
									30									
									30									
									30									
									30									
									30									
									Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									

Borehole Log

Borehole No.

PH106A

Sheet 1 of 1

Project Name: Darklands Road

Project No.
7034

Co-ords: -

Hole Type
RO

Location: Swadlincote

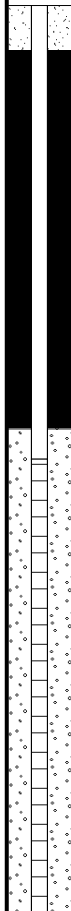
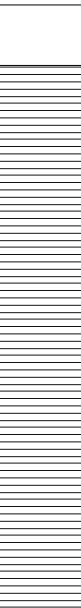
Level:

Scale
1:50

Client: LNT Construction Limited

Dates: 06/08/2019 - 06/08/2019

Logged By
Driller

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					2.00			OVERBURDEN	1
					6.00			MUDSTONE / SANDSTONE BANDS	2
									3
									4
									5
									6
									7
									8
									9
									10

End of borehole at 6.00 m

Remarks

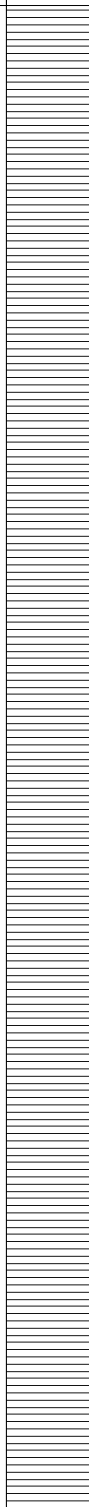
				Borehole Log			Borehole No. PH107 Sheet 1 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429534.00 - 319760.00		Hole Type RO
Location: Swadlincote				Level: 79.20		Scale 1:50		
Client: LNT Construction Limited				Dates: 05/08/2019 - 05/08/2019		Logged By Driller		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
							OVERBURDEN	1	
					2.10	77.10		MUDSTONE / SANDSTONE BANDS	2
									3
									4
									5
									6
									7
					8.50	70.70		COAL	9
					9.70	69.50		MUDSTONE	10
								Continued on next sheet	

Remarks
 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.





					Borehole Log			Borehole No. PH107 Sheet 3 of 3										
Project Name: Darklands Road					Project No. 7034		Co-ords: 429534.00 - 319760.00		Hole Type RO									
Location: Swadlincote					Level: 79.20		Scale 1:50											
Client: LNT Construction Limited					Dates: 05/08/2019 - 05/08/2019		Logged By Driller											
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description										
		Depth (m)	Type	Results														
									21									
									22									
									23									
									24									
									25									
									26									
									27									
									28									
									29									
									30									
									31									
									32									
									33									
									34									
									35									
									36									
									37									
									38									
									39									
														30.00	49.20			End of borehole at 30.00 m
									Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									

				Borehole Log				Borehole No. PH108 Sheet 1 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429565.00 - 319774.00		Hole Type RO	
Location: Swadlincote				Level: 79.30		Scale 1:50		Logged By Driller	
Client: LNT Construction Limited				Dates: 07/08/2019 - 07/08/2019					

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
							OVERBURDEN	1	
					1.50	77.80		MUDSTONE	2
									3
									4
									5
					5.80	73.50		COAL	6
					7.00	72.30		MUDSTONE	7
									8
					8.50	70.80		DARK MUDSTONE	9
					9.70	69.60		MUDSTONE / SANDSTONE BANDS	10

Continued on next sheet

Remarks
 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



				Borehole Log				Borehole No. PH108 Sheet 2 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429565.00 - 319774.00		Hole Type RO	
Location: Swadlincote				Level: 79.30		Scale 1:50		Logged By Driller	
Client: LNT Construction Limited				Dates: 07/08/2019 - 07/08/2019					
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20
					19.20	60.10		MUDSTONE / SANDSTONE BANDS	19
Continued on next sheet								20	
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									
									



Borehole Log

Borehole No.

PH108A

Sheet 1 of 1

Project Name: Darklands Road

Project No.
7034

Co-ords: -

Hole Type
RO

Location: Swadlincote

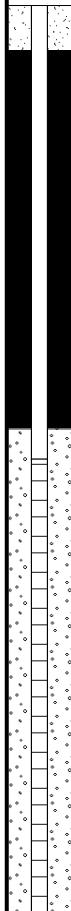
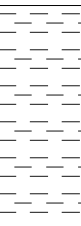
Level:

Scale
1:50

Client: LNT Construction Limited

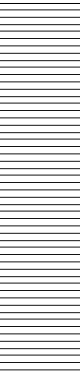
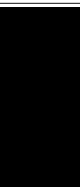
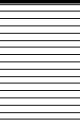
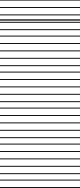
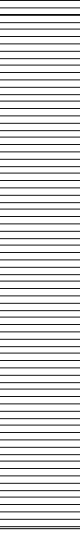
Dates: 07/08/2019 - 07/08/2019

Logged By
Driller

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.50			OVERBURDEN	1
					6.00			MUDSTONE	2
									3
									4
									5
									6
									7
									8
									9
									10

End of borehole at 6.00 m

Remarks

				Borehole Log			Borehole No. PH109 Sheet 1 of 3		
Project Name: Darklands Road				Project No. 7034		Co-ords: 429597.00 - 319770.00		Hole Type RO	
Location: Swadlincote				Level: 80.50		Scale 1:50			
Client: LNT Construction Limited				Dates: 07/08/2019 - 07/08/2019		Logged By Driller			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.80	79.70		OVERBURDEN	
								MUDSTONE	1
					3.30	77.20		COAL	2
					4.50	76.00		MUDSTONE	3
					5.40	75.10		DARK MUDSTONE	4
					6.60	73.90		MUDSTONE / SANDSTONE BANDS	5
									6
Continued on next sheet								7	
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									

					Borehole Log			Borehole No. PH109 Sheet 2 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429597.00 - 319770.00		Hole Type RO
Location: Swadlincote					Level: 80.50		Scale 1:50		
Client: LNT Construction Limited					Dates: 07/08/2019 - 07/08/2019		Logged By Driller		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20
					17.40	63.10		MUDSTONE / SANDSTONE BANDS	17
Continued on next sheet								20	
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									
									

					Borehole Log			Borehole No. PH109 Sheet 3 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429597.00 - 319770.00		Hole Type RO
Location: Swadlincote					Level: 80.50		Scale 1:50		
Client: LNT Construction Limited					Dates: 07/08/2019 - 07/08/2019		Logged By Driller		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30
									30
									30
									30
									30
									30
									30
									30
									30
									30
									30
									End of borehole at 30.00 m
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									

				Borehole Log				Borehole No. PH110 Sheet 1 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429617.00 - 319789.00		Hole Type RO	
Location: Swadlincote				Level: 81.20		Scale 1:50		Logged By Driller	
Client: LNT Construction Limited				Dates: 06/08/2019 - 06/08/2019					

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
							OVERBURDEN	1	
					1.20	80.00		MUDSTONE / SANDSTONE BANDS	2
					2.70	78.50		COAL	3
					3.90	77.30		MUDSTONE	4
									5
									6
									7
									8
									9
									10

Continued on next sheet

Remarks

1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



					Borehole Log			Borehole No. PH110 Sheet 2 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429617.00 - 319789.00		Hole Type RO
Location: Swadlincote					Level: 81.20		Scale 1:50		
Client: LNT Construction Limited					Dates: 06/08/2019 - 06/08/2019		Logged By Driller		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					14.00	67.20			11
									12
									13
									14
									15
									16
									17
									18
									19
									20
									Continued on next sheet
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									
									

					Borehole Log			Borehole No. PH110 Sheet 3 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429617.00 - 319789.00		Hole Type RO
Location: Swadlincote					Level: 81.20		Scale 1:50		
Client: LNT Construction Limited					Dates: 06/08/2019 - 06/08/2019		Logged By Driller		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30
									31
									32
									33
									34
									35
									36
									37
									38
									39
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									

Borehole Log

Borehole No.

PH110A

Sheet 1 of 1

Project Name: Darklands Road

Project No.
7034

Co-ords: -

Hole Type
RO

Location: Swadlincote

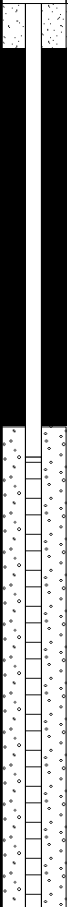
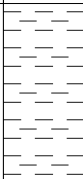
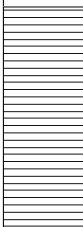
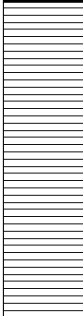
Level:

Scale
1:50

Client: LNT Construction Limited

Dates: 06/08/2019 - 06/08/2019

Logged By
Driller

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
					1.20			OVERBURDEN	1		
					2.70			MUDSTONE / SANDSTONE BANDS	2		
					3.90			COAL	3		
					6.00			MUDSTONE	4		
		End of borehole at 6.00 m									6
											7
									8		
									9		
									10		

Remarks

				Borehole Log			Borehole No. PH111 Sheet 1 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429540.00 - 319787.00		Hole Type RO
Location: Swadlincote				Level: 79.00		Scale 1:50		
Client: LNT Construction Limited				Dates: 05/08/2019 - 05/08/2019		Logged By Driller		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
							OVERBURDEN	1	
					2.50	76.50		MUDSTONE / SANDSTONE BANDS	2
									3
									4
									5
					5.50	73.50		COAL	6
					6.70	72.30		MUDSTONE	7
									8
					8.20	70.80		COAL	9
					9.40	69.60		MUDSTONE / SANDSTONE BANDS	10

Continued on next sheet

Remarks
 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



				Borehole Log				Borehole No. PH111 Sheet 2 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429540.00 - 319787.00		Hole Type RO	
Location: Swadlincote				Level: 79.00		Scale 1:50		Logged By Driller	
Client: LNT Construction Limited				Dates: 05/08/2019 - 05/08/2019					

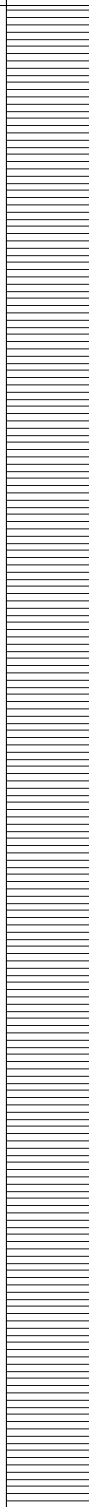
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									
							18.00	61.00	
					18.90	60.10		MUDSTONE / SANDSTONE BANDS	19
									20

Continued on next sheet

Remarks

1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



					Borehole Log			Borehole No. PH111 Sheet 3 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429540.00 - 319787.00		Hole Type RO
Location: Swadlincote					Level: 79.00		Scale 1:50		
Client: LNT Construction Limited					Dates: 05/08/2019 - 05/08/2019		Logged By Driller		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									21
									22
									23
									24
									25
									26
									27
									28
									29
									30
									31
									32
									33
									34
									35
									36
									37
									38
									39
									40
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									

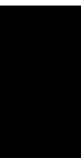
				Borehole Log			Borehole No. PH112 Sheet 1 of 3	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429511.00 - 319783.00		Hole Type RO
Location: Swadlincote				Level: 78.40		Scale 1:50		
Client: LNT Construction Limited				Dates: 05/08/2019 - 05/08/2019		Logged By Driller		

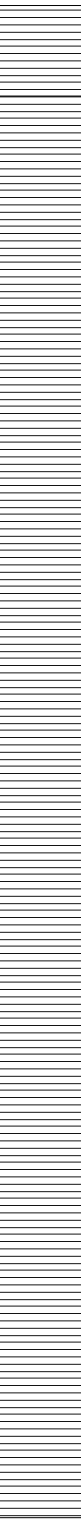
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
							OVERBURDEN	1	
					2.40	76.00		MUDSTONE / SANDSTONE BANDS	2
									3
									4
									5
									6
									7
					7.50	70.90		COAL	8
					8.60	69.80		MUDSTONE	9
									10

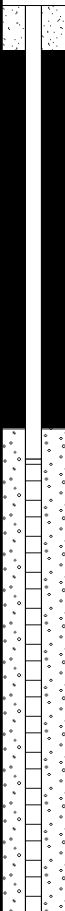
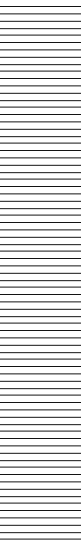
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Remarks
 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.



					Borehole Log			Borehole No. PH112 Sheet 2 of 3	
Project Name: Darklands Road					Project No. 7034		Co-ords: 429511.00 - 319783.00		Hole Type RO
Location: Swadlincote					Level: 78.40		Scale 1:50		
Client: LNT Construction Limited					Dates: 05/08/2019 - 05/08/2019		Logged By Driller		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					10.60	67.80		COAL	11
					11.60	66.80		MUDSTONE / SANDSTONE BANDS	12
					13				
					14				
					15				
					16				
					17				
					18				
					19				
					20				
Continued on next sheet									
Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									
									

					Borehole Log			Borehole No. PH112 Sheet 3 of 3										
Project Name: Darklands Road					Project No. 7034		Co-ords: 429511.00 - 319783.00		Hole Type RO									
Location: Swadlincote					Level: 78.40		Scale 1:50											
Client: LNT Construction Limited					Dates: 05/08/2019 - 05/08/2019		Logged By Driller											
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description										
		Depth (m)	Type	Results														
					20.60	57.80		MUDSTONE / SANDSTONE BANDS	21									
									22									
									23									
									24									
									25									
									26									
									27									
									28									
									29									
									30									
									31									
									32									
									33									
									34									
									35									
									36									
									37									
									38									
									39									
														30.00	48.40		End of borehole at 30.00 m	40
									Remarks 1. Prior to drilling a Cable Avoidance Tool (CAT) survey was carried out.									

				Borehole Log			Borehole No. PH112A Sheet 1 of 1		
Project Name: Darklands Road				Project No. 7034		Co-ords: -		Hole Type RO	
Location: Swadlincote				Level:		Scale 1:50			
Client: LNT Construction Limited				Dates: 05/08/2019 - 05/08/2019		Logged By Driller			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					2.40			OVERBURDEN	1
								MUDSTONE / SANDSTONE BANDS	2
					6.00			End of borehole at 6.00 m	3
									4
									5
									6
									7
									8
									9
									10
Remarks									

Trial Pit Log

Trialpit No

TP101

Sheet 1 of 1

Project Name: Darklands Road

Project No.
7034

Co-ords: 429627.00 - 319737.00

Level: 83.60

Date

05/08/2019

Location: Swadlincote

Dimensions
(m):

Depth
2.00

Scale
1:25

Logged
RJH

Client: LNT Construction Limited

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	J,K&T		0.10	83.50		TARMAC	
				0.30	83.30		MADE GROUND: Loose brown angular and subangular gravel and cobble sized concrete fragments with rare brick and tarmac fragments.	
				0.45	83.15		GRANULAR MADE GROUND	
	0.80	J,K&T					MADE GROUND: Compact grey rubble sand with some angular gravel and cobble sized fragments of brick and concrete.	
							GRANULAR MADE GROUND	
							MADE GROUND: Loose black clinker gravel and ash sand with occasional gravel and cobble sized fragments of weathered tarmac. Slight naphthalene odour.	
							ASH & CLINKER	1
	1.70	D	HVP=77 HVP=82	1.50	82.10		Stiff blue grey and brown mottled CLAY with occasional randomly orientated mudstone lithorelicts.	
							COMPLETELY WEATHERED COAL MEASURES	
				2.00	81.60		End of pit at 2.00 m	2
								3
								4
								5

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.

Stability:



Trial Pit Log

Trialpit No

TP102

Sheet 1 of 1

Project Name: Darklands Road

Project No.
7034

Co-ords: 429619.00 - 319778.00

Level: 81.30

Date

06/08/2019

Location: Swadlincote

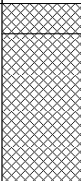
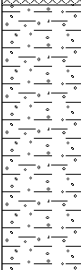
Dimensions
(m):

Depth
1.50

Scale
1:25

Logged
RJH

Client: LNT Construction Limited

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.40	J,K&T		0.10	81.20		TARMAC	
							MADE GROUND: Loose black clinker gravel and ash sand with occasional gravel and cobble sized fragments of weathered tarmac. Slight naphthalene odour. ASH & CLINKER	
	1.00	D	HVP=78 HVP=92	0.60	80.70		Stiff orange brown and light grey mottled CLAY with occasional randomly orientated mudstone lithorelicts. COMPLETELY WEATHERED COAL MEASURES	1
				1.50	79.80		End of pit at 1.50 m	2
								3
								4
								5

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.

Stability:



				Trial Pit Log			Trialpit No TP103 Sheet 1 of 1		
Project Name: Darklands Road				Project No. 7034		Co-ords: 429585.00 - 319766.00 Level: 79.50		Date 05/08/2019	
Location: Swadlincote						Dimensions (m):		Scale 1:25	
Client: LNT Construction Limited						Depth 2.00		Logged RJH	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	1.00	J,K&T					MADE GROUND: Loose (wet) grey sandy clay with some angular and subangular gravel and cobble sized fragments of brick and concrete. Slight diesel odour. Mudstone noted in western face of trial pit.	1
				2.00	77.50			
							End of pit at 2.00 m	3
								4
								5

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was encountered at 1.8m. 3. The sides of the trial pit were unstable below the surface. 4. Backfilled with materials arising upon completion.		
Stability:		

				Trial Pit Log			Trialpit No TP104 Sheet 1 of 1		
Project Name: Darklands Road				Project No. 7034		Co-ords: 429595.00 - 319764.00 Level: 79.50		Date 05/08/2019	
Location: Swadlincote						Dimensions (m):		Scale 1:25	
Client: LNT Construction Limited						Depth 2.00		Logged RJH	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.10	79.40		Firm orange brown slightly sandy CLAY. COMPLETELY WEATHERED COAL MEASURES	
							Stiff indistinctly fissured light blue grey slightly mottled orange brown CLAY. Rare cobble sized ironstone nodules. COMPLETELY WEATHERED COAL MEASURES	
				0.70	78.80		Weak very closely bedded closely to medium fractured blue grey MUDSTONE. Stained orange brown on fracture surfaces.	
	1.00	D						1
	1.30	J,K&T					At 1.3m, slight diesel odour.	
	1.80	J,K&T						
				2.00	77.50		End of pit at 2.00 m	2
								3
								4
								5

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.		
Stability:		

				Trial Pit Log			Trialpit No TP105 Sheet 1 of 1		
Project Name: Darklands Road				Project No. 7034		Co-ords: 429578.00 - 319762.00 Level: 79.50		Date 05/08/2019	
Location: Swadlincote				Dimensions (m):		Scale 1:25		Logged RJH	
Client: LNT Construction Limited				Depth 2.20					

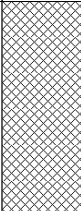
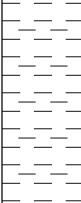
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.25	79.25		Firm orange brown slightly sandy CLAY. COMPLETELY WEATHERED COAL MEASURES	1
				0.60	78.90		Stiff indistinctly fissured light blue grey slightly mottled orange brown CLAY. Rare cobble sized ironstone nodules. COMPLETELY WEATHERED COAL MEASURES	
	1.20	J,K&T					Weak very closely bedded closely to medium fractured blue grey MUDSTONE. Stained orange brown on fracture surfaces.	
	1.60	J,K&T					Below 1.5m, very slight diesel odour.	2
				2.20	77.30		End of pit at 2.20 m	3
								4
								5

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.

Stability:



				Trial Pit Log			Trialpit No TP106 Sheet 1 of 1		
Project Name: Darklands Road				Project No. 7034		Co-ords: 429597.00 - 319787.00 Level: 79.90		Date 05/08/2019	
Location: Swadlincote						Dimensions (m):		Scale 1:25	
Client: LNT Construction Limited						Depth 2.20		Logged RJH	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	J,K&T				 MADE GROUND: Firm locally soft orange brown, light brown and grey clay with occasional angular brick cobbles. COHESIVE MADE GROUND		
				0.70	79.20		Firm orange brown slightly sandy CLAY. COMPLETELY WEATHERED COAL MEASURES	
	1.00	D	HVP=78	0.90	79.00		Stiff indistinctly fissured light blue grey slightly mottled orange brown CLAY. Rare cobble sized ironstone nodules. COMPLETELY WEATHERED COAL MEASURES	1
				1.60	78.30		Weak very closely bedded closely to medium fractured blue grey MUDSTONE. Stained orange brown on fracture surfaces. COAL MEASURES	
				1.90	78.00		Weak very closely bedded very closely fractured black carbonaceous MUDSTONE. COAL MEASURES	2
				2.20	77.70		End of pit at 2.20 m	
								3
								4
								5

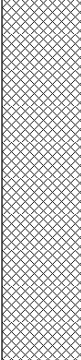
Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.		
Stability:		

				Trial Pit Log				Trialpit No TP107 Sheet 1 of 1	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429579.00 - 319797.00 Level: 79.60		Date 05/08/2019	
Location: Swadlincote						Dimensions (m):		Scale 1:25	
Client: LNT Construction Limited						Depth 2.10		Logged RJH	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	J,K&T	HVP=92 HVP=102	0.25	79.35		MADE GROUND: Compact light brown angular gravel sized limestone fragments with a little sand. SUB-BASE	1
				0.70	78.90		MADE GROUND: Friable dark brown organic rich clay with some angular gravel sized mudstone fragments. Rare brick cobbles. TOPSOIL	
	1.10	D		1.00	78.60		Firm orange brown slightly sandy CLAY. COMPLETELY WEATHERED COAL MEASURES	
				1.80	77.80		Stiff indistinctly fissured light blue grey slightly mottled orange brown CLAY. Rare cobble sized ironstone nodules. COMPLETELY WEATHERED COAL MEASURES	
				2.10	77.50		Weak very closely bedded closely to medium fractured blue grey MUDSTONE. Stained orange brown on fracture surfaces.	
							3	
							4	
							5	

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.		
Stability:		

				Trial Pit Log			Trialpit No TP108 Sheet 1 of 1		
Project Name: Darklands Road				Project No. 7034		Co-ords: 429535.00 - 319771.00 Level: 79.00		Date 05/08/2019	
Location: Swadlincote						Dimensions (m):		Scale 1:25	
Client: LNT Construction Limited						Depth 2.30		Logged RJH	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.50	J,K&T	HVP=72	1.20	77.80		MADE GROUND: Firm brown slightly sandy clay with occasional angular gravel sized mudstone and sandstone fragments. Occasional angular cobbles of brick and sandstone. Slight naphthalene odour. COLLIERY SPOIL	1
	1.50	D		1.80	77.20		Stiff indistinctly fissured light blue grey slightly mottled orange brown CLAY. Rare cobble sized ironstone nodules. COMPLETELY WEATHERED COAL MEASURES	
				2.10	76.90		Weak very closely bedded closely to medium fractured blue grey MUDSTONE. Stained orange brown on fracture surfaces. COAL MEASURES	2
				2.30	76.70		Weak very closely bedded very closely fractured black carbonaceous MUDSTONE. COAL MEASURES	
				End of pit at 2.30 m				
								3
								4
								5

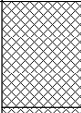
Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.		
Stability:		

				Trial Pit Log			Trialpit No TP109 Sheet 1 of 1		
Project Name: Darklands Road				Project No. 7034		Co-ords: 429553.00 - 319744.00 Level: 79.50		Date 05/08/2019	
Location: Swadlincote						Dimensions (m):		Scale 1:25	
Client: LNT Construction Limited						Depth 1.60		Logged RJH	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	J,K&T		0.30	79.20		MADE GROUND: Firm brown slightly sandy clay with occasional angular gravel sized mudstone and sandstone fragments. Occasional angular cobbles of brick and sandstone. COLLIERY SPOIL Firm to stiff indistinctly fissured light blue grey slightly mottled orange brown CLAY with occasional gravel sized mudstone lithorelicts. COMPLETELY WEATHERED COAL MEASURES	
	1.00	D		0.90	78.60		Weak very closely bedded closely to medium fractured orange brown and blue grey MUDSTONE. Stained orange brown and black on fracture surfaces. COAL MEASURES	1
				1.60	77.90		----- End of pit at 1.60 m	2
								3
								4
								5

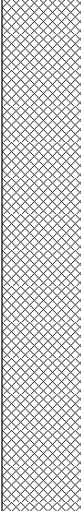
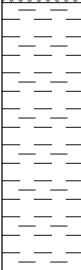
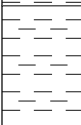
Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.		
Stability:		

				Trial Pit Log				Trialpit No TP110 Sheet 1 of 1	
Project Name: Darklands Road				Project No. 7034		Co-ords: 429578.00 - 319750.00 Level: 79.50		Date 05/08/2019	
Location: Swadlincote						Dimensions (m):		Scale 1:25	
Client: LNT Construction Limited						Depth 1.60		Logged RJH	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	J,K&T		0.35	79.15		MADE GROUND: Firm brown slightly sandy clay with occasional angular gravel sized mudstone and sandstone fragments. Occasional angular cobbles of brick and sandstone. Slight naphthalene odour. COLLIERY SPOIL	1
							MADE GROUND: Firm locally soft orange brown, light brown and grey clay with occasional angular brick cobbles. COHESIVE MADE GROUND	
				0.70	78.80		Firm orange brown slightly sandy CLAY. COMPLETELY WEATHERED COAL MEASURES	
	1.20	D		1.10	78.40		Weak very closely bedded closely to medium fractured orange brown and blue grey MUDSTONE. Stained orange brown and black on fracture surfaces. Fractures locally infilled up to 10mm of firm clay. COAL MEASURES	
				1.40	78.10		Weak very closely bedded closely to medium fractured blue grey MUDSTONE. Stained orange brown on fracture surfaces. COAL MEASURES	
				1.60	77.90		Weak very closely bedded closely to medium fractured blue grey MUDSTONE. Stained orange brown on fracture surfaces. COAL MEASURES	
End of pit at 1.60 m								2
								3
								4
								5

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.	
Stability:	

				Trial Pit Log			Trialpit No TP111 Sheet 1 of 1		
Project Name: Darklands Road				Project No. 7034		Co-ords: 429522.00 - 319787.00 Level: 78.70		Date 05/08/2019	
Location: Swadlincote				Dimensions (m):		Scale 1:25		Logged RJH	
Client: LNT Construction Limited				Depth 3.00					

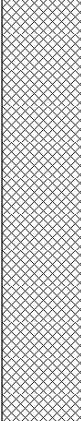
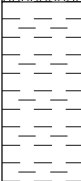
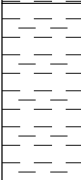
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.40	J,K&T					MADE GROUND: Firm brown slightly sandy clay with occasional angular gravel sized mudstone and sandstone fragments. Occasional angular cobbles of brick and sandstone. Slight naphthalene odour. COLLIERY SPOIL	1	
	2.00	D	HVP=41 HVP=62	1.70	77.00			Firm becoming stiff orange brown and light blue-grey mottle CLAY. COMPLETELY WEATHERED COAL MEASURES	2
				2.60	76.10				Stiff indistinctly fissured light blue grey slightly mottled orange brown CLAY with occasional gravel and cobbles sized sandstone lithorelicts. COMPLETELY WEATHERED COAL MEASURES
				3.00	75.70		End of pit at 3.00 m		3
								4	
								5	

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. A slight groundwater seepage was encountered at 1.6m. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.

Stability:



				Trial Pit Log			Trialpit No TP112 Sheet 1 of 1		
Project Name: Darklands Road				Project No. 7034		Co-ords: 429500.00 - 319769.00 Level: 78.20		Date 05/08/2019	
Location: Swadlincote						Dimensions (m):		Scale 1:25	
Client: LNT Construction Limited						Depth 2.80		Logged RJH	

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description							
	Depth	Type	Results											
	0.30	J,K&T					MADE GROUND: Firm brown slightly sandy clay with some angular gravel and cobble sized mudstone, brick and weathered tarmac fragments. Occasional angular cobbles of brick and sandstone. Rare would fragments and tarmac boulders <350mm. COHESIVE MADE GROUND	1						
	1.60	D	HVP=62	1.40	76.80					Firm becoming stiff orange brown and light brown mottled CLAY. COHESIVE COMPLETELY WEATHERED COAL MEASURES	2			
			HVP=80	2.00	76.20								Stiff brown and grey CLAY with some horizontally orientated gravel sized mudstone lithorelicts. COHESIVE COMPLETELY WEATHERED COAL MEASURES	3
				2.60	75.60									
				2.80	75.40	End of pit at 2.80 m		5						

Remarks:	1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. A slight groundwater seepage was encountered at 1.2m. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.
Stability:	

Trial Pit Log

Trialpit No

TP114

Sheet 1 of 1

Project Name: Darklands Road

Project No. 7034

Co-ords: 429610.00 - 319794.00

Level: 80.40

Date

05/08/2019

Location: Swadlincote

Dimensions (m):

Depth 3.80

Scale

1:25

Logged

Client: LNT Construction Limited

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	J,K&T		0.30	80.10		MADE GROUND: Friable black slightly sandy clay with some angular gravel and cobble sized fragments of mudstone, concrete and brick. Rare cobble sized fragments of weathered tarmac. Slight naphthalene odour. COHESIVE MADE GROUND Firm orange brown slightly sandy CLAY. COMPLETELY WEATHERED COAL MEASURES	
	1.20	D		0.80	79.60		Loose black angular gravel sized fragments of carbonaceous mudstone with a little clay matrix. Possible made ground. WEATHERED COAL MEASURES	1
				2.40	78.00		Stiff indistinctly fissured light blue grey slightly mottled orange brown CLAY. Rare cobble sized ironstone nodules. WEATHERED COAL MEASURES	3
				3.80	76.60		End of pit at 3.80 m	4

Remarks: 1. Prior to excavation a Cable Avoidance Tool (CAT) survey was carried out. 2. Groundwater was not apparent during excavation. 3. The sides of the trial pit remained stable during excavation. 4. Backfilled with materials arising upon completion.

Stability:



APPENDIX E CHEMICAL TEST RESULTS



Certificate of Analysis

Certificate Number 19-15342-1

21-Aug-19

Client Calabrian
Market Chambers
14 Market Place
Bedale
DL8 1EQ

Our Reference 19-15342-1

Client Reference 7034

Order No 2177/7034/RJH

Contract Title Darklands Road, Swadlincote

Description 15 Soil samples, 7 Leachate samples.

Date Received 09-Aug-19

Date Started 09-Aug-19

Date Completed 21-Aug-19

Test Procedures Identified by prefix DETSn (details on request).

Notes **This report supersedes 19-15342, extra testing.**

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Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 19-15342-1

Client Ref 7034

Contract Title Darklands Road, Swadlincote

Lab No	1544578	1544579	1544580	1544581	1544582	1544583
Sample ID	TP101	TP101	TP102	TP103	TP104	TP104
Depth	0.20	0.80	0.40	1.00	1.30	1.80
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	06/08/19	06/08/19	06/08/19	05/08/19	05/08/19	05/08/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Asbestos Quantification	DETSC 1102	0							
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	3.1	11	3.3	6.7	7.7	9.1
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	< 0.2	2.2	1.6	0.7	0.7	0.9
Cadmium	DETSC 2301#	0.1	mg/kg	0.6	0.3	0.3	0.3	0.3	0.4
Chromium	DETSC 2301#	0.15	mg/kg	2.5	12	6.0	15	18	19
Chromium III	DETSC 2301*	0.15	mg/kg	2.5	12	6.0	15	18	19
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	11	63	14	24	27	30
Lead	DETSC 2301#	0.3	mg/kg	17	74	14	24	12	11
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	33	< 10		
Mercury	DETSC 2325#	0.05	mg/kg	0.09	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	3.3	37	6.2	22	34	33
Selenium	DETSC 2301#	0.5	mg/kg	0.9	< 0.5	0.7	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	22	73	30	85	140	120
Inorganics									
pH	DETSC 2008#		pH	9.0	8.7	8.6	10.6	8.8	9.2
Calorific Value	DETSC 5008	1	MJ/kg		2.9	< 1.0			
Total Organic Carbon	DETSC 2002	0.1	%	0.5	5.3	1.6	0.8	0.4	0.6
Chloride Aqueous Extract	DETSC 2055	1	mg/l	55	16	220	54		
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	< 1.0	< 1.0	< 1.0	1.5		
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	12	73	84	170		
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg				< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg				< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg				0.44	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg				3.4	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg				19	8.5	8.0
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg				22	11	11
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg				6.0	3.5	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg				51	24	23
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg				< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg				< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg				0.49	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg				5.8	1.9	4.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg				33	18	18
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg				40	25	22
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg				7.8	6.7	3.8
Aromatic C5-C35	DETSC 3072*	10	mg/kg				87	52	48
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg				140	76	71

Summary of Chemical Analysis

Soil Samples

Our Ref 19-15342-1

Client Ref 7034

Contract Title Darklands Road, Swadlincote

Lab No	1544578	1544579	1544580	1544581	1544582	1544583
Sample ID	TP101	TP101	TP102	TP103	TP104	TP104
Depth	0.20	0.80	0.40	1.00	1.30	1.80
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	06/08/19	06/08/19	06/08/19	05/08/19	05/08/19	05/08/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
EPH (C6-C10)	DETSC 3321*	0.1	mg/kg		< 0.1	3.1			
EPH (C10-C12)	DETSC 3311	10	mg/kg		< 100.0	500			
EPH (C12-C16)	DETSC 3311	10	mg/kg		390	1200			
EPH (C16-C21)	DETSC 3311	10	mg/kg		2000	2600			
EPH (C21-C35)	DETSC 3311	10	mg/kg		3000	2600			
EPH (C35-C40)	DETSC 3311	10	mg/kg		< 100.0	< 100.0			
Benzene	DETSC 3321#	0.01	mg/kg		< 0.01	0.41	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg		< 0.01	0.05	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg		< 0.01	0.66	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg		< 0.01	1.1	0.03	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	1.7	6.1	160	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	1.2	6.2	59	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	6.1	2.0	18	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	5.8	11	62	0.06	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	34	62	200	0.12	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	8.8	23	62	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	41	75	110	0.07	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	34	64	84	0.10	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	11	25	45	0.04	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	7.6	19	40	0.04	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	7.4	19	41	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	3.1	7.3	14	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	6.1	16	33	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	2.1	5.1	8.8	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.60	1.4	2.4	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	2.0	5.0	8.5	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	170	350	950	0.42	< 0.10	< 0.10

Summary of Chemical Analysis

Soil Samples

Our Ref 19-15342-1

Client Ref 7034

Contract Title Darklands Road, Swadlincote

Lab No	1544584	1544585	1544586	1544587	1544588	1544589
Sample ID	TP105	TP105	TP106	TP107	TP108	TP109
Depth	1.20	1.60	0.20	0.30	0.50	0.20
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	05/08/19	05/08/19	05/08/19	05/08/19	05/08/19	05/08/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Asbestos Quantification	DETSC 1102	0							
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	4.7	2.8	18	28	28	8.3
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.7	0.8	0.8	1.7	2.8	1.9
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.4	1.2	0.8	0.5	0.3
Chromium	DETSC 2301#	0.15	mg/kg	19	21	18	18	14	9.8
Chromium III	DETSC 2301*	0.15	mg/kg	19	21	18	18	14	9.8
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	31	29	33	72	78	29
Lead	DETSC 2301#	0.3	mg/kg	12	14	28	170	150	45
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l			11		< 10	< 10
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	0.15	0.13	< 0.05
Nickel	DETSC 2301#	1	mg/kg	32	32	43	36	30	19
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.8	0.7	< 0.5	0.7
Zinc	DETSC 2301#	1	mg/kg	85	97	160	250	150	73
Inorganics									
pH	DETSC 2008#		pH	8.9	8.2	7.4	7.4	8.7	8.3
Calorific Value	DETSC 5008	1	MJ/kg						
Total Organic Carbon	DETSC 2002	0.1	%	0.4	0.4	1.6	5.4	2.9	4.0
Chloride Aqueous Extract	DETSC 2055	1	mg/l			53		110	200
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l			30		16	4.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l			91		230	240
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01				
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01				
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01				
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5				
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	5.1	< 1.2				
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	3.6	< 1.5				
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4				
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10				
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01				
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01				
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01				
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	2.1	< 0.9				
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	14	< 0.5				
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	15	< 0.6				
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	1.5	< 1.4				
Aromatic C5-C35	DETSC 3072*	10	mg/kg	33	< 10				
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg	42	< 10				

Summary of Chemical Analysis

Soil Samples

Our Ref 19-15342-1

Client Ref 7034

Contract Title Darklands Road, Swadlincote

Lab No	1544584	1544585	1544586	1544587	1544588	1544589
Sample ID	TP105	TP105	TP106	TP107	TP108	TP109
Depth	1.20	1.60	0.20	0.30	0.50	0.20
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	05/08/19	05/08/19	05/08/19	05/08/19	05/08/19	05/08/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
EPH (C6-C10)	DETSC 3321*	0.1	mg/kg						
EPH (C10-C12)	DETSC 3311	10	mg/kg						
EPH (C12-C16)	DETSC 3311	10	mg/kg						
EPH (C16-C21)	DETSC 3311	10	mg/kg						
EPH (C21-C35)	DETSC 3311	10	mg/kg						
EPH (C35-C40)	DETSC 3311	10	mg/kg						
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01				
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01				
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01				
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01				
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01				
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.23	< 0.03	0.14
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.05	< 0.03	0.18
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.15	< 0.03	0.07
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.17	< 0.03	0.21
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	1.2	0.12	1.6
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.33	0.04	0.50
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	1.8	0.35	2.7
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	1.6	0.32	2.3
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.66	0.15	1.1
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.60	0.15	0.90
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.57	0.11	0.89
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.29	0.06	0.46
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.44	0.07	0.68
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.21	0.05	0.32
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.07	< 0.03	0.10
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	0.19	0.04	0.29
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10	8.4	1.5	12

Summary of Chemical Analysis

Soil Samples

Our Ref 19-15342-1

Client Ref 7034

Contract Title Darklands Road, Swadlincote

Lab No	1544590	1544591	1544592
Sample ID	TP110	TP111	TP112
Depth	0.30	0.40	0.30
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	05/08/19	05/08/19	05/08/19
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Asbestos Quantification	DETSC 1102	0		Y		
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	9.7	15	10
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	1.1	1.5	1.4
Cadmium	DETSC 2301#	0.1	mg/kg	0.9	0.5	0.5
Chromium	DETSC 2301#	0.15	mg/kg	13	12	10
Chromium III	DETSC 2301*	0.15	mg/kg	13	12	10
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	28	49	38
Lead	DETSC 2301#	0.3	mg/kg	31	92	79
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	< 10	< 10	< 10
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.11	0.10
Nickel	DETSC 2301#	1	mg/kg	23	19	20
Selenium	DETSC 2301#	0.5	mg/kg	1.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	67	110	110
Inorganics						
pH	DETSC 2008#		pH	8.0	8.2	8.3
Calorific Value	DETSC 5008	1	MJ/kg			
Total Organic Carbon	DETSC 2002	0.1	%	2.9	2.9	2.8
Chloride Aqueous Extract	DETSC 2055	1	mg/l	170	110	400
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	190	5.8	19
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	120	150	170
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg			
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg			
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg			
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg			
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg			
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg			
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg			
Aliphatic C5-C35	DETSC 3072*	10	mg/kg			
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg			
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg			
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg			
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg			
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg			
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg			
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg			
Aromatic C5-C35	DETSC 3072*	10	mg/kg			
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg			

Summary of Chemical Analysis

Soil Samples

Our Ref 19-15342-1

Client Ref 7034

Contract Title Darklands Road, Swadlincote

Lab No	1544590	1544591	1544592
Sample ID	TP110	TP111	TP112
Depth	0.30	0.40	0.30
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	05/08/19	05/08/19	05/08/19
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
EPH (C6-C10)	DETSC 3321*	0.1	mg/kg			< 0.1
EPH (C10-C12)	DETSC 3311	10	mg/kg			< 10
EPH (C12-C16)	DETSC 3311	10	mg/kg			19
EPH (C16-C21)	DETSC 3311	10	mg/kg			110
EPH (C21-C35)	DETSC 3311	10	mg/kg			220
EPH (C35-C40)	DETSC 3311	10	mg/kg			34
Benzene	DETSC 3321#	0.01	mg/kg			< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg			< 0.01
Toluene	DETSC 3321#	0.01	mg/kg			< 0.01
Xylene	DETSC 3321#	0.01	mg/kg			< 0.01
MTBE	DETSC 3321	0.01	mg/kg			< 0.01
PAHs						
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.24	0.28
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.05	0.07
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.31	0.14
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.25	0.24
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.07	2.1	2.4
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.48	0.80
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	2.5	4.1
Pyrene	DETSC 3303#	0.03	mg/kg	0.09	2.3	3.7
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.03	0.74	1.4
Chrysene	DETSC 3303	0.03	mg/kg	0.05	0.56	1.1
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	0.66	1.4
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.21	0.50
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.50	1.2
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.14	0.36
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04	0.09
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.15	0.36
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.35	11	18

Summary of Chemical Analysis

Leachate Samples

Our Ref 19-15342-1

Client Ref 7034

Contract Title Darklands Road, Swadlincote

Lab No	1544593	1544594	1544595	1544596	1544597	1544598
Sample ID	TP101	TP102	TP103	TP106	TP109	TP111
Depth	0.20	0.40	1.00	0.20	0.20	0.40
Other ID						
Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
Sampling Date	06/08/19	06/08/19	05/08/19	05/08/19	05/08/19	05/08/19
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Preparation									
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.42	1.0	2.9	0.32	0.92	2.4
Boron, Dissolved	DETSC 2306*	12	ug/l	12	160	24	18	35	56
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	0.29	< 0.25	0.41	0.26
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.7	1.2	2.5	0.5	1.9	3.5
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.79	0.19	0.32	0.26	0.77	2.2
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	0.5	< 0.5	< 0.5	0.8	0.9
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.62	0.28	0.36	< 0.25	0.37	0.70
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3	< 1.3
Inorganics									
pH	DETSC 2008		pH	7.1	6.2	8.3	6.9	6.6	6.9

Summary of Chemical Analysis

Leachate Samples

Our Ref 19-15342-1

Client Ref 7034

Contract Title Darklands Road, Swadlincote

Lab No	1544599
Sample ID	TP112
Depth	0.30
Other ID	
Sample Type	LEACHATE
Sampling Date	05/08/19
Sampling Time	n/s

Test	Method	LOD	Units	
Preparation				
NRA Leachate Preparation	DETSC 1009*			Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	3.6
Boron, Dissolved	DETSC 2306*	12	ug/l	52
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.28
Copper, Dissolved	DETSC 2306	0.4	ug/l	3.7
Lead, Dissolved	DETSC 2306	0.09	ug/l	2.2
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.9
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.75
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3
Inorganics				
pH	DETSC 2008		pH	7.0

Summary of Asbestos Analysis

Soil Samples

Our Ref 19-15342-1

Client Ref 7034

Contract Title Darklands Road, Swadlincote

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1544578	TP101 0.20	SOIL	NAD	none	Rebecca Burgess
1544579	TP101 0.80	SOIL	NAD	none	Rebecca Burgess
1544580	TP102 0.40	SOIL	NAD	none	Rebecca Burgess
1544581	TP103 1.00	SOIL	NAD	none	Rebecca Burgess
1544582	TP104 1.30	SOIL	NAD	none	Rebecca Burgess
1544583	TP104 1.80	SOIL	NAD	none	Rebecca Burgess
1544584	TP105 1.20	SOIL	NAD	none	Rebecca Burgess
1544585	TP105 1.60	SOIL	NAD	none	Rebecca Burgess
1544586	TP106 0.20	SOIL	NAD	none	Rebecca Burgess
1544587	TP107 0.30	SOIL	NAD	none	Rebecca Burgess
1544588	TP108 0.50	SOIL	NAD	none	Rebecca Burgess
1544589	TP109 0.20	SOIL	NAD	none	Rebecca Burgess
1544590	TP110 0.30	SOIL	Chrysotile	bundle of Chrysotile fibres	Rebecca Burgess
1544591	TP111 0.40	SOIL	NAD	none	Rebecca Burgess
1544592	TP112 0.30	SOIL	NAD	none	Rebecca Burgess

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 19-15342-1

Client Ref 7034

Contract Title Darklands Road, Swadlincote

Lab No	1544590
Sample ID	TP110
Depth	0.30
Other ID	
Sample Type	SOIL
Sampling Date	05/08/19
Sampling Time	

Test	Method	Units	
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	< 0.001
Gravimetric Quantification (a)	DETSC 1102	Mass %	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na

Breakdown of Gravimetric Analysis (a)

Mass of Sample		g	702.65
ACMs present*		type	
Mass of ACM in sample		g	
% ACM by mass		%	
% asbestos in ACM		%	
% asbestos in sample		%	

Breakdown of Detailed Gravimetric Analysis (b)

% Amphibole bundles in sample		Mass %	na
% Chrysotile bundles in sample		Mass %	<0.001

Breakdown of PCOM Analysis (c)

% Amphibole fibres in sample		Mass %	na
% Chrysotile fibres in sample		Mass %	na

Breakdown of Potentially Respirable Fibre Analysis (d)

Amphibole fibres		Fibres/g	na
Chrysotile fibres		Fibres/g	na

* Denotes test or material description outside of UKAS accreditation.
 % asbestos in Asbestos Containing Materials (ACMs) is determined by
 by reference to HSG 264.
 Recommended sample size for quantification is approximately 1kg
 # denotes deviating sample

Information in Support of the Analytical Results

Our Ref 19-15342-1
 Client Ref 7034
 Contract Darklands Road, Swadlincote

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1544578	TP101 0.20 SOIL	06/08/19	GJ 250ml, GV, PT 1L		
1544579	TP101 0.80 SOIL	06/08/19	GJ 250ml, GV, PT 1L		
1544580	TP102 0.40 SOIL	06/08/19	GJ 250ml, GV, PT 1L		
1544581	TP103 1.00 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544582	TP104 1.30 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544583	TP104 1.80 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544584	TP105 1.20 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544585	TP105 1.60 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544586	TP106 0.20 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544587	TP107 0.30 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544588	TP108 0.50 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544589	TP109 0.20 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544590	TP110 0.30 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544591	TP111 0.40 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544592	TP112 0.30 SOIL	05/08/19	GJ 250ml, GV, PT 1L		
1544593	TP101 0.20 LEACHATE	06/08/19	GJ 250ml, GV, PT 1L		
1544594	TP102 0.40 LEACHATE	06/08/19	GJ 250ml, GV, PT 1L		
1544595	TP103 1.00 LEACHATE	05/08/19	GJ 250ml, GV, PT 1L		
1544596	TP106 0.20 LEACHATE	05/08/19	GJ 250ml, GV, PT 1L		
1544597	TP109 0.20 LEACHATE	05/08/19	GJ 250ml, GV, PT 1L		
1544598	TP111 0.40 LEACHATE	05/08/19	GJ 250ml, GV, PT 1L		
1544599	TP112 0.30 LEACHATE	05/08/19	GJ 250ml, GV, PT 1L		

Key: G-Glass P-Plastic J-Jar V-Vial T-Tub

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Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

APPENDIX F GEOTECHNICAL TEST RESULTS



LABORATORY REPORT



4043

Contract Number: PSL19/4842

Report Date: 15 August 2019
Client's Reference: 7034
Client Name: Calabrian
Market Chambers
14 Market Place
Bedale
DL8 1EQ

For the attention of: Richard Hey

Contract Title: Darklands Road, Swadlincote
Date Received: 9/8/2019
Date Commenced: 9/8/2019
Date Completed: 15/8/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

L Knight
(Senior Technician)



S Eyre
(Senior Technician)

R Cowles
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

Darklands Road, Swadlincote

Contract No:

PSL19/4842

Client Ref:

7034

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

[illegible]

SYMBOLS : NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**



4043

PSL
Professional Soils Laboratory

Darklands Road, Swadlincote

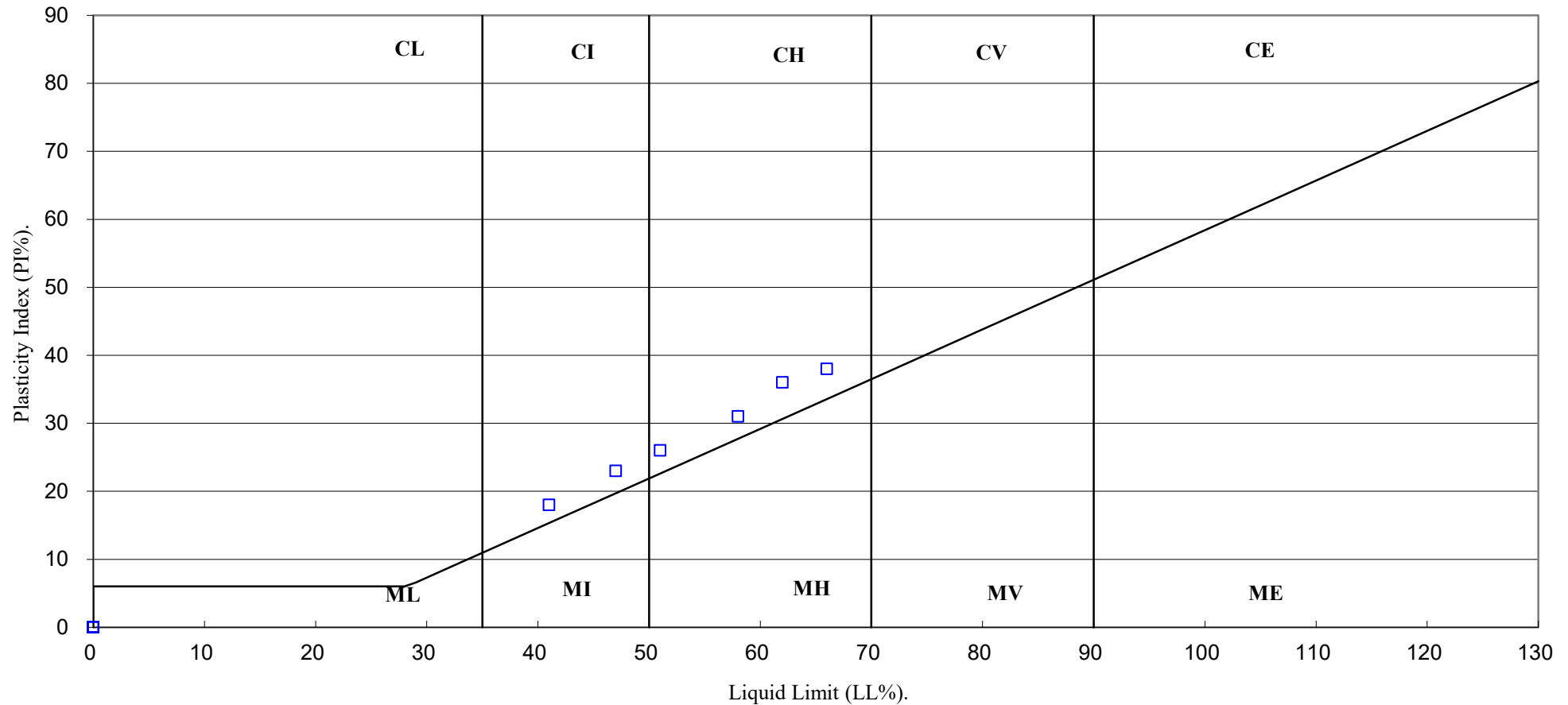
Contract No:

PSL19/4842

Client Ref:

7034

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

Darklands Road, Swadlincote

Contract No:

PSL19/4842

Client Ref:

7034



Certificate of Analysis

Certificate Number 19-15602

16-Aug-19

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 19-15602

Client Reference PSL19/4842

Order No (not supplied)

Contract Title Darklands Road, Swadlincote

Description 10 Soil samples.

Date Received 13-Aug-19

Date Started 13-Aug-19

Date Completed 16-Aug-19

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis Soil Samples

Our Ref 19-15602

Client Ref PSL19/4842

Contract Title Darklands Road, Swadlincote

Lab No	1546327	1546328	1546329	1546330	1546331	1546332	1546333	1546334	1546335	1546336
Sample ID	TP101	TP102	TP104	TP106	TP107	TP108	TP109	TP110	TP111	TP112
Depth	1.70	1.00	1.00	1.00	1.10	1.50	1.00	1.20	2.00	1.60
Other ID	3	2	1	2	2	2	2	2	2	2
Sample Type	D	D	D	D	D	D	D	D	D	D
Sampling Date	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units										
Inorganics													
pH	DETSC 2008#		pH	7.7	7.2	7.4	7.8	7.3	7.7	6.9	6.2	7.0	7.9
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	58	58	85	85	70	54	110	78	53	110

Information in Support of the Analytical Results

Our Ref 19-15602
 Client Ref PSL19/4842
 Contract Darklands Road, Swadlincote

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1546327	TP101 1.70 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1546328	TP102 1.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1546329	TP104 1.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1546330	TP106 1.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1546331	TP107 1.10 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1546332	TP108 1.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1546333	TP109 1.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1546334	TP110 1.20 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1546335	TP111 2.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1546336	TP112 1.60 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

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Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months