



Little Crow

Solar Park

Little Crow Solar Park, Scunthorpe

ENVIRONMENTAL STATEMENT: TECHNICAL APPENDICES

APPENDIX 3.5

REVIEW OF POTENTIALLY EXTRACTABLE MINERALS

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REVIEW OF POTENTIALLY EXTRACTABLE MINERALS

Lease to British Steel
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1.0 Introduction

1.1 General

Brocklesby Estate has instructed SLR Consulting Ltd (SLR) to undertake a review of the potentially extractable minerals covered by a lease agreement between Brocklesby Estate and British Steel.

1.2 Scope

In order to undertake this review, the following factors have been assessed:

- The feasibility of extracting any iron ore deposits covered by the lease regarding the global iron ore market and steelworks requirements,
- The current planning and planning policy situation,
- The potential viability of any such iron ore deposits that may be deemed to be extractable,
- The current known extent of any sand and gravel deposits at the site,
- The rate of sand and gravel extraction, and;
- The likelihood that such extraction could impact on the lands which have been selected for a major solar farm development.

1.3 Development Site

1.3.1 Site Information

The site, which comprises the surface and underlying mineral, is owned by Brocklesby Estate and leased to British Steel. The site is located directly north-east of British Steel's steelworks in Scunthorpe, North Lincolnshire.

The site covers an approximate area of 393 hectares (971 acres), extending from the village of High Santon and Dawes Lane on its northern boundary, Manby Wood on its southern boundary and centred on the grid reference point of SE 94077, 10741. Surrounding current land uses are predominately arable agriculture, woodland and a small superficial sand extraction site.

Drawing 01 comprises a site location plan detailing the geographical location and relevant site boundaries.

2.0 Geology and Minerals

2.1 Site Specific Geology

2.1.1 Superficial Geology

Superficial deposits across the site comprise Quaternary fine grained silty sand which lies predominately upon the central and western proportion of the lease area. The deposit is mapped as the Sutton Sand Formation within the British Geological Survey (BGS) 1:50,000 superficial geological map¹ and described as “*Blown sand (silica sand)*” within the British Geological Survey Humberside 1:100,000 scale mineral resources map.²

‘Blown’ sand deposits are aeolian deposits, i.e. their nature has been dictated through the action of the wind. Within this region the deposits are aeolian reworkings of fluvial and glaciofluvial sands. They are generally composed of fine to medium sub-rounded to well-rounded quartz grain sand with an average fines (<0.063mm) content of c.8%.³

Within these blown sand deposits there are recognised to be specific deposits within the county worked for silica sand. Silica sand is a safeguarded mineral resource due to its high silica (SiO₂) content, lack of impurities and scarcity. Its high purity makes it highly suitable for a range of industrial uses and its scarcity means that it is a nationally important mineral. Silica sand is classed as an industrial mineral by the National Planning Policy Framework and, where individual workable sites exists, a suitable landbank must be maintained.³

The deposit within the site has been mapped as having the potential to contain silica sand within the BGS 1:100,000 scale mineral resources map; as mentioned above. However, the deposit within the site area has not been specifically safeguarded by the local planning.

2.1.2 Bedrock Geology

The bedrock geology across the site area comprises a series of lower and middle Jurassic strata, decreasing in age from west to east across the site. These strata dip towards the east and comprise the Frodingham and Pecten Ironstone beds which lie below and within the Charmouth mudstone formation respectively. These are unconformably overlain by the sandstone, limestone and mudstone beds of the Marlstone, Whitby, Nottingham and Kirton formations.

A summary of the bedrock and superficial geology across the site is presented in Table 1 below.

The superficial and bedrock geology of the area is illustrated in drawings 02 and 03 respectively.

¹ British Geological Survey, 2018. *Geindex* – *British Geological Survey*. [Website] Available at: <<http://mapapps2.bgs.ac.uk/geindex/home.html>> [Accessed July 2018]

² Harrison, D J, and 10 others. 2005. Mineral Resource Information for National, Regional and Local Planning: Humberside (comprising East Riding of Yorkshire, North Lincolnshire, North East Lincolnshire and City of Kingston upon Hull). *British Geological Survey Commissioned Report CR/04/22/7N*

³ Harrison, D J, et al., *Mineral Resource Information in Support of National, Regional and Local Planning: Humberside (comprising East Riding of Yorkshire, North Lincolnshire, North east Lincolnshire and City of Kingston upon Hul)*. [Public Report Online] British Geological Survey. Available at: <<https://www.bgs.ac.uk/downloads/start.cfm?id=2626>> [Accessed 12/07/2018]

**Table 2-1
 Geological Summary⁴**

Age	Formation	Lithology	Average Thickness (m)
Quaternary	Sutton Sand Formation - Sand	Fine grained silty sand	To c. 7m
Jurassic	Kirton Cementstone Beds – Limestone & Mudstone and Limestone Interbedded	Silicate- and calcareous mudstone, interbedded with thin and more or less argillaceous limestones	To c. 9.5m
	Northampton Sand Formation - Ferruginous Sandstone	Sandy, berthierine-oidal and sideritic ironstone, greenish grey where fresh, weathering to brown limonitic sandstone, typically displaying a box-stone structure	To c.21m. Typically 4-8m.
	Whitby Mudstone Formation - Mudstone	Medium and dark grey fossiliferous mudstone and siltstone	To c. 120m
	Marlstone Rock Formation - Ferruginous Limestone and Ferruginous Sandstone	Sandy, shell-fragmental and ooidal ferruginous limestone interbedded with ferruginous calcareous sandstone, and generally subordinate ferruginous mudstone beds	To c. 10m
	Pecten Ironstone (Bed) - Ironstone	Yellow-brown ironstone containing significant shelly fauna that includes an abundance of very large Pecten bivalve shells. ⁵	Data not assessed
	Charmouth Mudstone Formation - Mudstone	Dark grey laminated shales, and dark, pale and bluish grey mudstones	To c. 335m
	Frodingham Ironstone Member - Ironstone	Iron-rich, fossiliferous, oolitic lime-mudstone	Average c.9m

⁴ BGS,2018. The BGS Lexicon of Named Rock Units. [Website] Available at: <<http://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=MACK> > [Accessed 11/07/2018]

⁵ Historic England, 2018. Strategic Stone Study. [Pdf online] Historic England. Available at<
<https://www.bgs.ac.uk/downloads/start.cfm?id=2634>>[Accessed 13/07/2018]

3.0 Frodingham Ironstone

3.1 Geometry and nature

The Frodingham ironstone is described predominantly as an iron-rich, fossiliferous, oolitic lime-mudstone. Goldring (1974)⁶ describes the unoxidised ore as composing “a variety of shelly oolites (chamosite plus limonite) with a matrix comprising calcite, chamosite and siderite in varying proportions.”

From the BGS borehole data assessed, the ironstone has an average thickness of 9m and dips towards the east at between 1 and 5 degrees.

3.2 Grade

Assay data collected from borehole records located within the site area have been collected from the BGS Geoindex website. An average iron percentage for the Frodingham seam intersected within each of the boreholes, where data exists, has been calculated. Results are shown in drawing 03 and appendix 01.

The total average iron percentage for the assay data recorded for the Frodingham seam across the site is 24.95%.

The results from the raw data analysis correlate with various reports written regarding the Frodingham seam Iron ore.

Goldring’s (1974)⁴ assessment of the major iron ore fields within the UK describes the Frodingham ironstone has having an average iron content of 25% and therefore “enjoying the dubious distinction of being the poorest quality ore in the world that is exploited on a large scale without being beneficated.”

The ironstone is also recognised by the British Geological Survey as possessing an extremely low grade “(averaging 25 per cent Fe)”⁷ which is stated within the accompanying report to the 1:100,000 scale Mineral Resources Map for Humberside.

It is globally recognised that iron ores used in the steel industry currently require iron content at greater than 58% as a minimum before being considered commercially viable. Typically, usable ore for making pig iron and steel ranges from 58% to 65% Iron.⁸

Iron ore with grades below 62% require Iron Ore Beneficiation (IOB) to remove gangue (waste) minerals and bring to standard for pelletisation and use in blast furnaces. IOB varies by deposit type but can include washing, jigging, magnetic separation, gravity separation and flotation.

The ironstones within the Humberside region have been excluded from the mineral resources map because it has been concluded and reported that “technological and economic changes within the UK make it unlikely that the ironstones within the region are likely to have any future commercial value.”

3.3 Historic working and extraction feasibility

Historically, most UK ironstone has been worked opencast, although relatively shallow underground workings do exist in many areas.

⁶ Goldring, D C., 1974. British iron ores: their future use. 339,313-328.

⁷ Harrison, D J, et al., *Mineral Resource Information in Support of National, Regional and Local Planning: Humberside (comprising East Riding of Yorkshire, North Lincolnshire, North east Lincolnshire and City of Kingston upon Hull)*. [Public Report Online] British Geological Survey. Available at: <<https://www.bgs.ac.uk/downloads/start.cfm?id=2626>> [Accessed 12/07/2018]

⁸ USGS, 2017, Global iron ore production data: Clarification of reporting from the USGS. *Mining engineering*. [Pdf Online] USGS. Available at: <https://minerals.usgs.gov/minerals/pubs/commodity/iron_ore/global_iron_ore_data.pdf> [Accessed 03/07/2018]

Within the site area, leased to British Steel, the geological strata dip towards the east. As a result of the dip of beds and local topography, the site area has increasing overburden towards the east; further reducing the viability of opencast ore extraction.

Stripping of overburden is a further cost on extracting ore, and there would be a ratio whereby should extraction be considered viable in the first place, underground working would be more cost effective than opencast.

However, both are unlikely to be economically viable within the current global market.

3.4 Ironstone Viability

3.4.1 Global iron grades, price and production

Individual deal prices vary depending on many factors including supply and demand, grade, scale of deal etc. Global prices are tracked based on a daily 'spot price', which is benchmarked at a standard grade of 62%. Ores with Iron contents greater than 65% are considered high grade and 58% contents are considered low grade.⁹ The current price of iron ore, as of 11/07/2018 is \$63.19 USD/t NYMEX traded at 62% Fe.

Complexities in reporting of data based on grades between different countries, especially China, makes figures unreliable, but this is indication of order of magnitude. The Chinese steel industry can work low grade (<30%) ore due to economies of scale; estimated at 375Mt during 2015, which is not true for the same grade ore deposits within the UK.

Global iron ore production is greater than 2 billion tonnes per year over last few years.¹⁰

In regard to global reserves, i.e. known and economically viable iron ore deposits, there are estimated to be 185 billion tonnes as of 2016.¹¹ At a working rate of 2.5 billion tonnes per year this permits for 74 years with no new discoveries or developments; at recognised suitable grades of 58%-65% Iron.

The UK import between 2010 and 2014, to supply TATA and British Steel, was an average of 11.7 million tonnes per year at an average grade of 60%.¹²

From the assessment undertaken, it has been concluded that the extraction of the Frodingham ironstone as an iron ore resource is not currently viable due to:

- The Frodingham's low grade (25% Fe content) and its requirement for beneficiation to be a requisite grade for making pig iron and steel,
- The Frodingham's low grade in comparison to the availability of economically viable global reserves which do not require beneficiation,
- The nature of its easterly dipping geometry which increases the volume of overburden towards the east and the cost of any potential opencast extraction, and;
- A current lifespan of available global tonnages of iron ore, at requisite usable grade, of 75 years (at 2.5 billion tonnes a year production) without any further need for extension or exploration.

⁹ Market Index, 2018. *Fe Iron Ore*. [Website] Available at:<<https://www.marketindex.com.au/iron-ore>> [Accessed 12/07/2018]

¹⁰ USGS, 2017, Global iron ore production data: Clarification of reporting from the USGS. *Mining engineering*. [Pdf Online] USGS. Available at:<https://minerals.usgs.gov/minerals/pubs/commodity/iron_ore/global_iron_ore_data.pdf> [Accessed 03/07/2018]

¹¹ BusinessWire, 2018. *Global iron ore mining to 2020 – Research and Markets*. [Website] Available at:<<https://www.businesswire.com/news/home/20160429005590/en/Global-Iron-Ore-Mining-2020---Research>> [Accessed 11/07/2018]

¹² British Geological Survey, 2015. *United Kingdom Minerals yearbook 2015*. [Pdf Online] British Geological Survey. Available at:<<https://www.bgs.ac.uk/downloads/start.cfm?id=3094>> [Accessed 11/07/2018]

4.0 Sand Deposits

4.1 Description

As previously described, superficial blown sand deposits directly overlie the bedrock geology over the majority of the site area. The extent of blown sand distribution is illustrated in Drawing 02.

Review of BGS borehole records suggest that the sand deposit varies in thickness from west to east across the site. The deposit approximately varies from c.0.5m at the boundaries of the deposit within the site area to c.4m at the centre.

Extraction of this fine slightly silty sand by British Steel for use in the Steel works has been documented from 1992. The estimated current extraction perimeter, taken from aerial photography, is detailed in Drawing 02.

4.2 Historic rates of working

Extraction data provided by Brocklesby Estate has been used to estimate, at a current rate of working, how many years of extractable sand remain within the area which is leased to British Steel and within the planning application boundary. This area is indicated and shaded in blue within drawing 02.

Over the past 10 years (2008-2017) 5,035t of sand have been extract from the site.

The area which lies within the lease and the planning application boundary has an average volume of sand, calculated with an average thickness of 2m, of 589,000m³. Using a conversion factor of 1.6t/m³ this provides 942,400t of sand.

At the current rate of extraction, the remaining lifespan within this area totals some 187 years.

Therefore, it is not likely that the potential requirement for sand extraction would impact on the lands which have been selected for a major solar farm development.

5.0 Planning Review

5.1 Planning Policy

5.1.1 The Development Plan

The site is situated in an area administered by North Lincolnshire Council ('the council'), a unitary authority where the Development Plan includes the following documents:

- The Local Development Framework, comprising:
 - North Lincolnshire Core Strategy Development Plan Document ('DPD') (Adopted June 2011)
 - The Housing and Employment Land Allocations DPD (Adopted March 2016)
 - Lincolnshire Lakes Area Action Plan (Adopted May 2016)
 - Supplementary Planning Documents including Planning for Solar Photovoltaic (PV) Development (Adopted January 2016) and Supplementary Planning Guidance
- The Saved Policies of the North Lincolnshire Local Plan Adopted May 2003.

The site has been considered within the context of adopted and emerging planning policy and the key policies are summarised below.

5.1.2 North Lincolnshire Core Strategy (Adopted June 2011)

The Key Diagram of the Core Strategy DPD identifies the site and the general area east of Scunthorpe as a Minerals Safeguarding Area. This is covered by Policy CS21. An extract from the plan showing **Policy CS21: Minerals** is shown in Figure 5-2, below:

Figure 5-2
Policy CS21: Minerals

CS21: MINERALS

The Council will safeguard mineral resources in North Lincolnshire from other development that would prejudice future mineral extraction. To achieve this Mineral Safeguarding Areas will be identified in the Minerals and Waste DPD.

Based on the geologically mapped resources that are considered to be of current and future economic importance; specifically including all unsterilised deposits of aggregates (sand, gravel, limestone and sandstone), ironstone, silica sand, clay, brickearth, and chalk. Major developments in the Mineral Safeguarding Areas will only be permitted where it has been demonstrated that:

- a) the mineral is no longer of any value, or
- b) the mineral can be extracted prior to the development taking place, or
- c) the development will not inhibit extraction if required in the future, or
- d) there is an overriding need for the development and prior extraction cannot be reasonably undertaken, or
- e) the development is allocated in a local development plan document, or
- f) the development is not incompatible

Mineral Safeguarding Areas along with Specific Sites, Preferred Areas, and Areas of Search will be identified as appropriate in the Minerals and Waste DPD, through formal consultation with operators, land owners and others.

5.1.3 Saved North Lincolnshire Local Plan (Adopted May 2003)

The Proposals Map within the saved North Lincolnshire Local Plan 2003 shows the following saved policies affecting the site:

- **Policy IG9** Area Safeguarded from Future Development
- **Policy LC4** Development Affecting Sites of Local Nature Conservation Importance

Policy LC 8-2 which designated part of the site as an Area of High Landscape Value in the Local Plan was not saved and was deleted from the Local Plan in 2007.

5.1.4 Policy IG9 - Area Safeguarded from Future Development

With respect to **Policy IG9**, this relates to the area known within the Local Plan as the Ironstone Gulleys. The Ironstone Gulleys are a series of large excavations created by the open cast extraction of ironstone from the Frodingham Ironfield. The Gulleys are said to provide an outstanding environmental resource and afford a major opportunity for nature conservation, water-based recreation and form a significant element in the strategy for the enhancement of the landscape and setting of the countryside surrounding Scunthorpe.

Paragraph 13.20 of the Ironstone Gulleys Policy states that the: *'Ironstone Gulleys area contains existing reserves of both Ironstone and oil'*.

Policy IG9 states that *'the area east of Yarborough Gullet will be safeguarded from development which would result in the sterilisation of the ironstone reserves'*.

Paragraph 13.21 containing the amplifying text recognises that, *'While no ironstone is being extracted at present, working in the long term could recommence should international ore market conditions change. The substantial remaining ore reserves, although largely located below agricultural land, will need to be safeguarded from future potentially sterilising development'*.

5.1.5 Policy LC4 - Development Affecting Sites of Local Nature Conservation Importance

Policy LC4 states that *'Any development or land use change which is likely to have an adverse impact on a Local Nature Reserve, a Site of Importance for Nature Conservation or a Regionally Important Geological Site will not be approved unless it can be clearly demonstrated that there are reasons for the proposal which outweigh the need to safeguard the intrinsic nature conservation value of the site or feature'*.

5.1.6 Draft Local Aggregates Assessment (2013)

Within the LAA, page 11 refers to the deposits of Ironstone within the Humber Region, stating at Paragraph 2.17 that *'Most of the ironstone used in the steel industry is currently imported but significant deposits of ironstone exist around Scunthorpe. There is no indication that it will be worked in the short term; however, the mineral remains a significant resource and may be required in the future.'*

5.1.7 Emerging Policy

North Lincolnshire Council is progressing with the preparation of a single Local Plan document which will replace the Development Plan shown above and is to cover the period between 2017 and 2036.

The consultation on the Issues and Options (Stage 2) of the local plan finished on the 12th March 2018. The Issues and Options did not refer to Ironstone specifically, apart from to say that ironstone extraction in the local authority area has ceased. The next opportunity to make representations to the local plan to shape its development will be as part of the Preferred Options consultation which is planned to commence in 2019.

A Minerals and Waste DPD was to be prepared as part of the LDF but has not been progressed due to the emerging Local Plan. Minerals and Waste Policy will form part of the new Local Plan.

A draft Local Aggregate Assessment (LAA) was prepared in 2013 for the Humber area as part of the evidence base for the Minerals and Waste DPD jointly with East Riding of Yorkshire Council, Hull City Council and North-East Lincolnshire Council.

5.2 Planning History

The planning history relating to the site is provided in Table 5-3, below.

The permissions we have identified are those relating to the extraction of minerals on the western edge of the site but which straddle the adjacent land which is owned by British Steel, where mineral extraction and landfill activities have already taken place. These consents include planning permission ref. MIN/2004/0968 granted in 2004 and shown in green and planning permission ref. 7/1979/0780 shown edged in orange on Drawing Number 01.

There are currently no other planning consents which directly relate to the site, those that do relate to the site are listed in Table 5-3 below:

Table 5-3
Relevant Planning History

Application Number	Reference	Decision	Date of Decision	Proposal
MIN/2004/0968		Granted	03/11/2004	Planning permission to amend conditions of planning permission 2003/1422 dated 29/03/2004 namely conditions 3 and 4 to allow 12 months from the date of consent to submit a scheme for the disposal of surface and foul water; condition 6 to remove the current sand extraction area from the area of archaeological potential; and condition 9 to allow unrestricted hours and days of operation for the disposal of slag and waste and restrict the hours of operation for quarrying and landfilling to 6.00 am-6.00 pm with no restriction on days of working

Application Number	Reference	Decision	Date of Decision	Proposal
MIN/2003/1422		Granted	29/03/2004	Planning permission for continued extraction of minerals and restoration by disposal of steelworks waste and importation of limited quantities of sand and treatment and recycling of steelworks waste and stocking and weathering of materials.
7/1979/0780		Granted	02/10/1980	To extract ironstone by open cast methods.

The area of the site covered by the March 2004 planning permission (ref. MIN/2003/1422) is edged in green on Drawing 01. This consent was varied in November 2004 by permission ref. Min/2004/0968. The working plan attached to the planning consent shows an area for the working of the blown sand deposits and a slag weathering and stocking area. There is no extraction of the ironstone permitted within the predominant or varied consents granted in 2004.

The historic mineral permission granted in 1980 (ref. 7/1979/0780) is edged in orange on Drawing 0001 and permitted the extraction of ironstone by open cast methods. The consent covers an area of the site which includes the south-western edge of the solar farm. Due to the age of the consent there are no further details available online, but aerial photography suggests that the area of the site was never worked for mineral extraction.

5.3 Summary

Planning permissions have been granted on two small areas of the site; the first is the strip of land along the western boundary of the site (the eastern edge of British Steel's 2004 consent allowing sand extraction and shown in green on Drawing 01); and the historic planning consent (approved in 1980 and shown in orange on Drawing 01) which permits mineral extraction and extends across the southern boundary of the site into part of the site planned for the solar farm development. Our review concludes that there are no other planning consents currently relating to the site.

With respect to planning policy, the site is shown within the saved 2003 Local Plan as a Mineral Safeguarding Area within the Ironstone Gulleys Policy (Policy IG9 – Ironstone Extraction) of the Local Plan. This policy seeks to protect the acknowledged resource (in the adopted Local Plan) of Ironstone and Oil by stating that the Ironstone Reserves (note that it states reserves / not resources), will be safeguarded from development, recognising that the no iron ore is being extracted due to international iron ore markets.

This mineral safeguarding policy was enshrined into the Core Strategy DPD as part of Policy CS21: Minerals; by identifying the area to the west of Scunthorpe as a Mineral Safeguarding Area, specifically referring to the geologically mapped resources (Note resources not reserve) of ironstone (*et al*) as having current and future economic importance.

However, Policy CS21 does state that Major Developments **will** be permitted where it can be demonstrated that;

- a) The mineral is no longer of economic value
- b) The mineral can be extracted prior to the development
- c) The development will not inhibit the extraction of the required minerals in the future

- d) There is an overriding need for the development and prior extraction cannot be reasonably undertaken
- e) The development is allocated in the local development document, or
- f) The development is not incompatible.

A solar farm may be considered a Major Development and a development that may not interfere with the mineral resource because either the mineral may be worked underground, or the solar farm can be considered temporary and could be moved.

6.0 Review of Mineral Lease

6.1.1 Lease of Ironstone and Iron Ore at Yarborough Quarry

There is a mineral lease dated 1st November 1956 between the two landlords the Right Honourable Marcus Herbert Pelman Sixth Earl of Yarborough, The Honourable John Edward Pelham and the tenant, British Steel.

The mineral lease relates to the land shown edged blue on Drawing 001 and has 31 years of the term unexpired. A table summarising the main lease clauses is shown in Table 6-1, below.

Table 6-1
Lease Synopsis

Lease Clause	Summary
Landlord ('Lessor')	Right Honourable Marcus Herbert Pelman Sixth Earl of Yarborough (of the first part) The Honourable John Edward Pelham (of the second part)
Tenant ('The Lessees')	United Steel Companies Limited Now British Steel
Lease Date	1 st November 1956
The Described Lands	990.598 acres of land which is delineated on the plan edged brown.
The Demised Minerals	The quarries, vein, seam, bed and layer of Ironstone and iron ore in or under the Described Lands. Together with limestone, chalkstone, sand gravel, clay and brick earth overlying the ironstone and iron ore.
The Adjacent Lands	Lands delineated on the plan edged red.
Term	6 th April 1956, expiring on the 30 th June 2050
Liberties	(1) To win work and dispose of the Demised Minerals and to let down the surface of the Demised Lands minerals which was not covered by buildings on the 13 th January 1932. (2) to Enter upon any of the surface of the Described Lands (not occupied by buildings prior to 13 th Jan 1932) after giving notice and paying compensation. (5) To make bricks from the demised minerals and to erect kilns on the Demised Lands. (6) To fell and remove trees (7) To stockpile demised minerals on the Demised Lands or waste and minerals from adjacent or adjoining lands. (10) Rights to win and work Demised Minerals
Exceptions and Reservations	(1) All mines and minerals other than the Demised Minerals (2) All timber, the right to remove the same and the game on the Demised lands.

Lease Clause	Summary
	<p>(3) The right to cultivate the surface of the Demised Lands</p> <p>(4) An amount of the Demised Minerals that may be required to protect the surface and the buildings which existed before 13th Jan 1932.</p> <p>(5) The Right to use the roads railways and tramways over the surface of the Demised Lands.</p>
Minimum Rent (6)	<p>Until 30th June 1990 - £500 per annum for iron ore and iron in the demised Minerals. Minimum and Royalty Rent Merge.</p> <p>In 2017 the Minimum Rent is £9,050 per annum.</p> <p>The minimum rent may not be set off against the royalty for: limestone, chalkstone, sand, gravel and clay and brick earth</p>
Rent Payment Frequency	Half yearly on 1 st January and 1 st July
Royalty Rent	<p>Iron or Ironstone which is worked by:</p> <p>Open cast: £0.08 per ton of</p> <p>Underground mining: £0.04 per ton.</p> <p>Limestone, Chalkstone, sand & or gravel: £0.03 per ton (Passing Rent on Sand is £0.62 per tonne)</p> <p>Clay or brick earth: 1/6d for each 1000 bricks or tiles</p> <p>All above royalties to be reviewed on 1st July 1990</p>
Definition of a 'Ton'	1 ton in the lease is 21 hundredweight or 1,066.85 kilogrammes (1.06685 metric tonnes)
Short and over-workings	There is a short-workings provision in the lease 3 (i) for both underground and open cast working of the ironstone and iron ore. Over-workings shall not be carried forward into any subsequent year.
Rent Review Period	5 Yearly
Rent Review Clause	Both to be reviewed by agreement on 1 st July 1990 upwards only.
Marketable Quality of Mineral	Tenant shall not be liable to pay a royalty for Iron ore or ironstone: As soon as all commercially workable material is extracted not of a marketable quality (to be agreed with landlord) left as a barrier for flooding or as a pillar for support.
Wayleave Rent	Wayleave royalty of 1 farthing for all minerals not demised by the lease brought onto the Described Lands.

Lease Clause	Summary
	This wayleave shall not apply to ironstone or iron from the Adjacent Lands or from land held by the Santon Mining Co. Ltd.
Surface Rent	<p>Two Pounds per acre per annum to be reviewed on 1st July 1990.</p> <p>Surface Rent to be paid half yearly on 1st January and 1st July until the land is not occupied or used.</p> <p>Surface Rent to be paid until the land is restored or compensation is paid to the Landlord to restore the land.</p> <p>Surface Rent Passing is £19,136.48</p>
Restoration and Compensation	<p>The Tenant may landfill the Described Lands which shall be completed within 6 months of the end or sooner determination of the term.</p> <p>Described Lands to be restored to agriculture or woodland.</p> <p>Tenant may instead of landfilling, pay compensation to the Lessor which, before 1st July 1990 shall be: £20 per acre for agricultural land £10 per acre for woodland</p> <p>After 1st July the compensation to be paid shall be agreed between the landlord and tenant taking into account all relevant factors applicable at the same date.</p>
Alienation	Tenant must not assign or underlet all of the Lease or the demised minerals without Landlord’s approval, which shall not be unreasonably withheld.
Yielding Up	Tenant to yield the quarries mines and premises, including demised minerals still on the Property in good working order.
Right to buy Buildings, Machinery & Engines	Subject to giving the Tenant 6 months’ notice the Landlord may buy the buildings, engines, utensils and implements for an agreed price.
Lessors’ Covenants	<p>(Clause 9a) The Lessee shall have quiet enjoyment of the demised minerals, liberties and premises.</p> <p>(Clause 9b) Lessor shall put in all Agricultural Tenancies a clause which allows the Lessor to resume possession of the Farm (excluding the Farmhouses, buildings and gardens) for any purpose on giving the Tenant at least 2 months’ notice. In return substituting the land taken for other land, paying the Tenant compensation or allowing a proportionate reduction in the rent.</p> <p>(Clause 9d) The Lessor shall not obstruct or interfere with the Lessees enjoyment of the demised minerals and shall make reasonable compensation for all damage or injury made.</p>

Lease Clause	Summary
Late Payment of Rent	If rents are not paid after 30 days of being demanded, the lessor may distress property owned by the Tenant and associated with working the demised minerals and sell to recover the outstanding rents.
Early determination	Term may be ended by the Tenant by giving 6 months' notice to the Landlord on the 30 th June 1960 or 30 th June on each of the 10-year anniversaries of this date. This is conditional on there being no ironstone or iron ore of marketable quality remaining in the premises.
Right of Pre-emption	The tenant has a right of pre-emption on the Described Lands including the demised minerals.
Disputes	All disputes to be dealt with by Arbitration.

6.2 Summary of Mineral Lease

We have reviewed the mineral lease and have the following observations to make:

- There is a term equating to 31.9 years remaining on the lease.
- The tenant has the right to let down the surface to work the minerals open cast or by underground mining.
- The Tenant may landfill the site.
- The site is to be restored to agriculture and woodland.
- The demised mineral includes the ironstone/ore together with the minerals overlying the ironstone/ore (e.g. sand, gravel limestone, brick earth).
- The term may be ended by the tenant who must give 6 months' notice on the condition of there being no ironstone or iron ore of marketable quality remaining in the premises being satisfied.
- The landlord has reserved the rights to use the roadways and accesses on the site and the right to cultivate the land.
- The majority of the income comes from the surface rent with the passing rents understood to equate to approx. £28,000 per annum, split as follows:
 - Surface Rent £19,136.48 per annum
 - Minimum rent is current £9,050 per annum, this was revised down from £12,500 per annum in 1992 as it included a wayleave payment.

There is no excess mineral royalty payable over the minimum rent due to there being no ironstone extraction taking place and the low sand extraction rates. No wayleave rent is currently paid by the tenant.

We have not been able to confirm which buildings were in place prior to 13th January 1932 and we have not seen an official lease plan identifying the property as none was provided or was attached to the lease.

There are no clear rights within the lease which allows:

- the Landlord to break the lease (notwithstanding the forfeiture provisions) to develop the surface of the property; and
- apart from the right of access and cultivation, the right to develop the surface of the site.

7.0 Mineral Viability

We understand that the Brocklesby Estate would like to develop a solar farm on the southern half of the subject site.

We have considered the potential viability of the mineral in the context of the site specific geological, planning and tenure situation, reviewed as part of the instruction.

The subject site is currently leased to British Steel, which has a mineral lease of the site until 2050. This lease does not allow the landlord to develop the surface of the site for any purpose including a solar farm; therefore, an agreement between the parties may be necessary.

The current liability to the tenant within the lease is approx. £28,000 per annum. The Net Present Value of this liability over the remaining lease term is approximately £400,000 @ say a 6% yield.

As no extraction of ironstone is being undertaken within the site and as most of the site does not have consent to extract the ironstone/ore, the current, estimated profits relating to mineral extraction is assumed to be £nil.

Viability is defined as, *'the ability for the something to be worked successfully'*¹³.

Currently the indication is that extracting the ironstone and iron ore at the site over the next 30 years is **not viable** due to the lack of demand for the product, the global over supply of ore of a superior quality and the likely projected costs of extraction far exceeding projected revenue.

¹³ <https://en.oxforddictionaries.com/definition/viability>

8.0 Conclusions

8.1 Ironstone Deposits

It has been deemed that the ironstone present within the site area owned by Brocklesby Estate and leased to British Steel is not viable for extraction due to:

- The low-grade nature of the deposits (c.25% Fe) in relation to typical steel plant requirements (>58% Fe);
- The surplus of current global iron ore reserves available at suitable higher grades which are currently more economical to import.

8.2 Sand Deposits

It has also been determined that the remaining available sand deposits at current extraction rates represent an estimated remaining lifespan of 187 years of workable sand deposit within the permitted area.

It is therefore apparent that the current superficial sand extraction will not impact upon the land which has been selected for a major solar farm development during the projected period of operation of the solar farm.

8.3 Mineral Planning and Viability

There is policy in place within the adopted Local Plan's saved policies and the Core Strategy which protects the ironstone and iron ore deposits located in the site from development; however, there is policy within the adopted Core Strategy to suggest that the principle of development of the site as a solar farm would be acceptable due to the type of development not permanently interfering with the resource. Planning representations to the emerging Local Plan should be made to support the removal of the mineral sterilisation area from the plan.

With regards to viability, we consider that extracting the ironstone and iron ore at the site over the next 30 years is not currently viable due to the lack of demand for the product, the global over supply of ore of a superior quality and the likely projected costs of extraction far exceeding projected revenue.

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APPENDIX 01

BGS Borehole Summary Data

BGS_BHID	Easting	Northing	Top of frodingham (mbgl)	Thickness of Frodingham (m)	Assay data present	Average iron %
SE91SW4	493779	411503			0	
SE91SW5	493757	411447			0	
SE91SW6	494009	411560			0	
SE91SW140	493665	411085	34		0	
SE91SW143	493922	411495	55.95		0	
SE91SW146	493434	412046	20.85		0	
SE91SW401	494029	412303	70.1		0	
SE91SW299	492917	411064	16.61	9.38	1	25.38
SE91SW300	493003	411061	18.11	9.55	1	24.79
SE91SW301	492907	411193	15.24	9.37	1	24.09
SE91SW303	493009	411314	16.92	9.25	1	22.21
SE91SW304	493141	411060	19.86	9.68	1	24.76
SE91SW307	492887	411308	13.82	9.25	1	23.2
SE91SW309	492967	411439	17.07	9.22	1	25.31
SE91SW311	492882	411556	15.09	9.32	1	22.47
SE91SW313	492757	411550	11.21	9.14	1	22.79
SE91SW314	493025	410955	19.26	9.65	1	32.78
SE91SW315	492894	411440	13.94	9.3	1	24.09
SE91SW316	492910	410941	16.51	9.6	1	31.15
SE91SW317	492779	411433	11.81	8	1	23.61
SE91SW318	492915	410829	16.36	9.53	1	24.61
SE91SW320	493195	410107	24.4	9.32	1	24.06
SE91SW401	494029	412303	70.1	9.45	0	
SE91SW306	493152	410962	21.08	9.5	1	31.5
SE91SW312	493038	410832	19.29	9.48	1	24.6
SE91SW308	493152	410820	21.72	9.6	1	24.86
SE91SW297	493152	410718	23.24	9.75	1	25.24
SE91SW310	493042	410708	20.6	9.4	1	23.75
SE91SW298	492918	410709	17.98	9.53	1	23.97

SE91SW327	493051	410580	21.18	9.45	1	23.93
SE91SW324	492917	410578	19.05	9.53	1	24.38
SE91SW329	493165	410470	24.08	8.84	1	23.76
SE91SW326	493052	410462	21.03	9.5	1	23.19
SE91SW325	492932	410460	19.15	9.4	1	24
SE91SW322	493063	410348	20.55	9.42	1	23.59
SE91SW323	493178	410308	23.67	9.47	1	24.01
SE91SW321	493065	410205	20.65	9.3	1	25.53
SE91SW319	493101	410104	21.29	9.22	1	24.46
SE91SW142	493293	411665	34.4	9.29	0	
SE91SW137	494394	411592	88.39	5.52	0	
SE91SW145	493618	410670	34.75	9.37	0	
SE91SW138	494468	410687	92.35	9.45	0	
SE91SW395	494087	410523	66.14	8.75	0	
SE91SW141	493859	410390	56.16	8.61	0	
SE91SW392	494208	410142	76.81	9.24	0	
SE91SW393	493793	410059	54.86	9.45	0	
SE91SW394	493392	410044	32.2	9.3	0	

DRAWING 01

Site Location Plan

492000.000

493000.000

494000.000

495000.000

496000.000

412000.000

412000.000

411000.000

411000.000

410000.000

410000.000

409000.000

409000.000

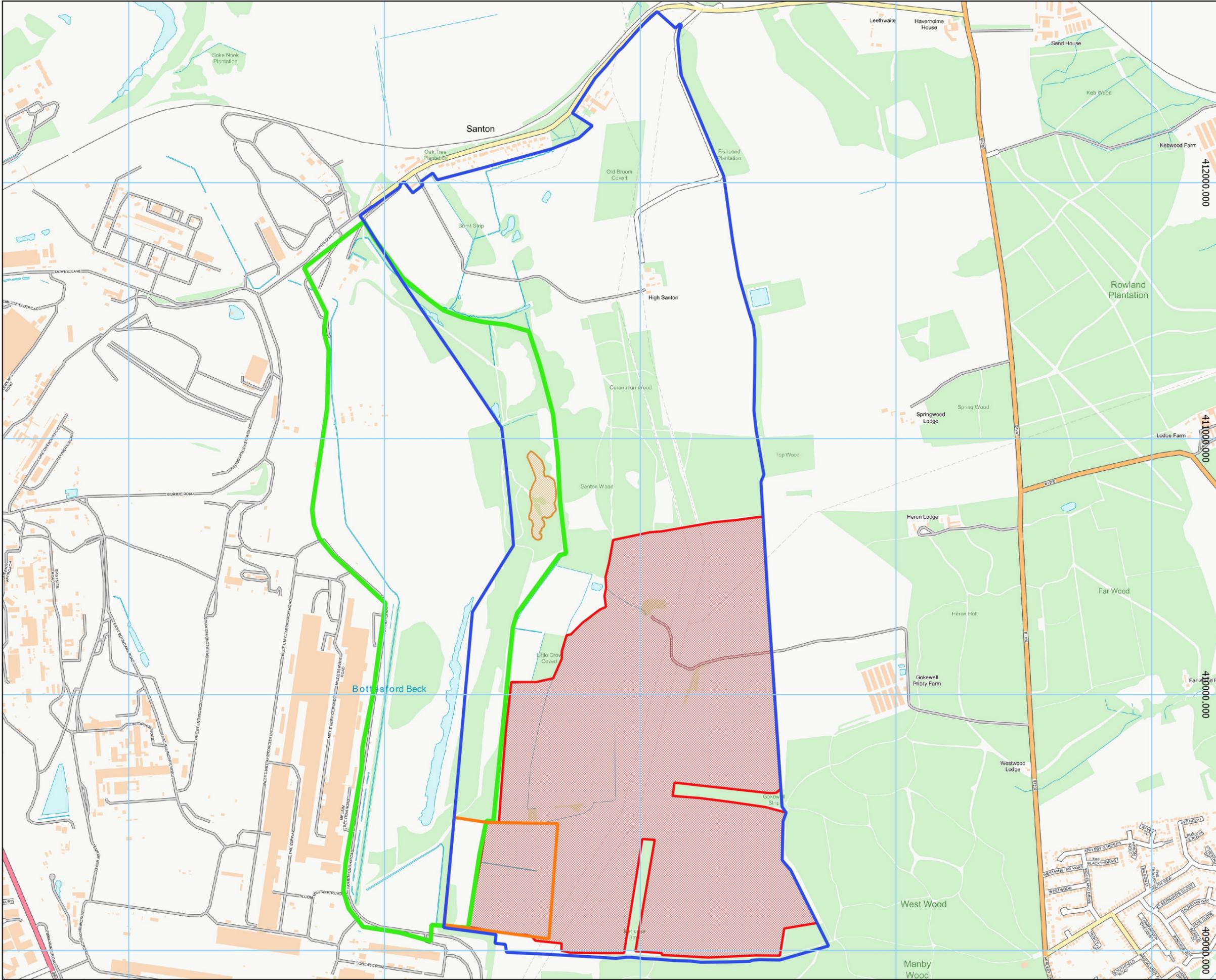
492000.000

493000.000

494000.000

495000.000

496000.000



Legend

-  Brocklesby Estate surface & mineral ownership leased to British Steel
-  Approximate area of sand extraction
-  Planning Consent MIN/2004/0968
-  Planning Consent 7/1979/0780
-  Extent of proposed solar farm



Note:
Areas and boundaries shown derived from historic mapping sources and not to be used for scaling or setting out

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Brocklesby Estate



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Review of Extractable Minerals

Site Location Plan

SLR Project Ref:	419.08612.00001
Drawing No:	001
Scale:	1:14,000 (A3)
Date:	JULY 2018

DRAWING 02

Superficial Geology

492000.000

493000.000

494000.000

495000.000

496000.000

412000.000

412000.000

411000.000

411000.000

410000.000

410000.000

409000.000

409000.000

492000.000

493000.000

494000.000

495000.000

496000.000

Legend

-  Brocklesby Estate surface & mineral ownership leased to British Steel
-  Approximate area of sand extraction
-  Planning Consent MIN/2004/0968
-  Extent of proposed solar farm

-  BGS Boreholes used for geological assessment

BGS 1:50,000 Scale Superficial Geology

-  Sutton Sand Formation - Sand (Blown Sand)
-  Blown Sand - Sand
-  Linear feature - Dune (line at base)

Area leased to British Steel within the planning application boundary



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Brocklesby Estate

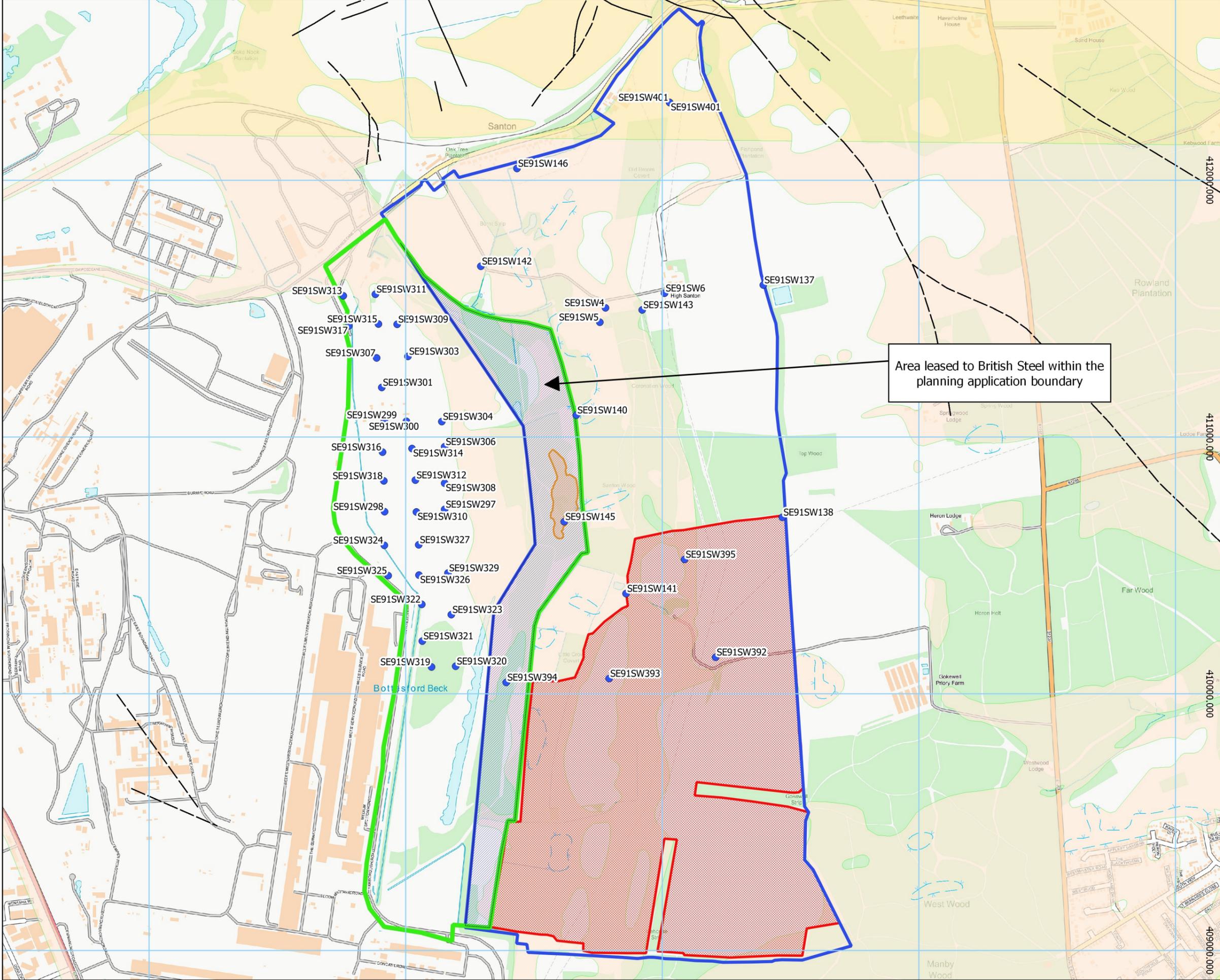


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Review of Extractable Minerals

Superficial Geology

SLR Project Ref:	419.08612.00001
Drawing No:	002
Scale:	1:14,000 (A3)
Date:	JULY 2018



DRAWING 03

Bedrock Geology

492000.000

493000.000

494000.000

495000.000

496000.000



412000.000

411000.000

410000.000

409000.000

412000.000

411000.000

410000.000

409000.000

Figures displayed are average Iron% taken from assay data for the associated borehole.

- 22.79 22.47
- 23.61 24.09
- 23.2 22.21
- 24.09
- 25.38 24.76
- 31.15 32.78 31.5
- 24.61 24.6 24.86
- 23.97 23.75 25.24
- 24.38 23.93
- 24 23.19 23.76
- 23.59 24.01
- 25.53
- 24.46 24.06

Legend

- Brocklesby estate surface & mineral ownership leased to British Steel
- Planning Consent MIN/2004/0968
- Extent of proposed solar farm

- BGS Borehole data:
Depth to top of the Fordingham Ironstone
- 11m - 20m
 - 20m - 40m
 - 40m - 60m
 - 60m - 80m
 - 80m - 92m

BGS 1:50,000 Scale Bedrock Geology

- Fordingham Ironstone Member - Ironstone
- Charmouth Mudstone Formation - Mudstone
- Pecten Ironstone (Bed) - Ironstone
- Marlstone Rock Formation - Ferruginous Limestone and Ferruginous Sandstone
- Whitby Mudstone Formation - Mudstone
- Northampton Sand Formation - Ferruginous Sandstone
- Kirton Cementstone Beds - Limestone
- Kirton Cementstone Beds - Mudstone and Limestone
- Hibaldstow Limestone - Ooidal Limestone
- Thorncroft Sand Member - Sandstone
- Rutland Formation, Blisworth Limestone Formation and Blisworth Clay Formation - Argillaceous rock and limestone interbedded
- Cornbrash Formation - Limestone
- Kellaways Clay Member - Mudstone
- Kellaways Sand Member - Sandstone and Siltstone

Brocklesby Estate

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Review of Extractable Minerals

Bedrock Geology

SLR Project Ref: 419.08612.00001

Drawing No: 003

Scale: 1:14,000 (A3) Date: JULY 2018

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