

**National Reserves Department**

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Our Ref: NR/MDF

11<sup>th</sup> January 2018

Mr Steven Osborne-James  
Planning Policy Team  
Nottinghamshire County Council  
Trent Bridge House  
West Bridgford  
Nottingham NG2 6BJ

Dear Mr Osborne-James

**Nottinghamshire Minerals Local Plan  
Call for Sites 2017/2018**

I refer to your letter of 3<sup>rd</sup> November 2017 inviting the minerals industry, landowners and other interested parties to submit site specific information for potential new quarries or extensions. Accordingly, I can confirm that CEMEX wish to promote the following sites the details of which are set out below for your attention and information:

**Land north of CEMEX's existing East Leake Quarry**

As shown on the attached plan ref M/689/8 this site is an area of arable land located directly north of our existing East Leake Quarry

CEMEX have secured a prospecting agreement with the landowner to facilitate further geological investigations with drilling programmed to take place in May. Consequently, based on our existing understanding of the local geology I can only confirm at this stage a provisional net volume of 750,000 tonnes. The site would be worked as an extension to the existing quarry towards 2026 and would be worked over a 3 to 4 year period. Dialogue with the landowner regarding how the site might be restored has yet to take place but options would likely include nature conservation, fishing or a return to agriculture with the aid of inert land-filling.

The mineral would supply the existing markets of Loughborough, North Leicestershire and surrounding areas, and the M1 corridor south to J23.

Landowner Details

Chris Brown  
Elms Farm  
Leake Road

Costock  
Loughborough  
LE12 6XA

### **Land at Cromwell North**

You will recall our previous recent discussions regarding our difficulty in securing an extension to the life of the easement on the land that links the existing Cromwell site with the public highway and which falls under the control of another landowner. As a consequence I had informed you that we were commencing preparation of assessment work for the potential working of land located to the north. I can now confirm that the easement matter has been resolved enabling working to continue at the existing site. Notwithstanding, our most recent geological reserve assessment has indicated that the remaining mineral reserve and quarry life has been reduced due to a higher than expected fines content meaning that we will be a need to proceed with the replacement site in the near future in any event.

CEMEX have previously promoted land to the south of the existing quarry but due to complicated land ownership issues I can confirm that we will now not be pursuing this option.

Accordingly, to ensure continuity of production and supply to the existing market area North of Nottingham, the M1 corridor to J28 North and the A1 corridor heading north of the site a replacement site will need to be in place in approximately 4 years time. CEMEX are therefore continuing with the assessment work for land at Cromwell North with the intention of running an application concurrent with the evolution of the Minerals Local Plan. This land is situated on a 'S' bend of the River Trent approximately 900m northeast of Cromwell village and 630m southeast of the village of Carlton-on-Trent. It consists of flat and open agricultural land and enjoys access onto a lorry parking area that accesses direct onto the southbound carriageway of the A1.

Geological investigations have indicated that the site contains circa. 1.7mt which would be worked over a period of 5 to 6 years. I attach a topographical survey ref 1709-S235-CRN-D-000 with our provisional phasing. I also attach a Phase 1 plan ref 1709-S235-CRN-D-001 again showing the phases but also the proposed location of a plant and access. The scheme is being designed to avoid harm to a SAM located directly to the west of Phase 5.

I finally attach a plan for your intention and information that shows the land we are currently pursuing but in addition 2 further areas to the north and south. Desk top geological investigations indicate that the land to the north contains 500,000 tonnes and the triangular land to the south some 210,000 tonnes. These additional areas are being promoted as possible future extensions if we are successful to gaining planning permission and implementing the Cromwell North site. Please note that CEMEX does not have interest over these two additional areas of land and at this stage has not entered into a dialogue with the landowners.

### Landowner Details

Triangle area of land to the south of site

Adrian Peter Hatton and Peter Luke Hatton  
Rectory Farm  
Averham  
Newark  
Nottinghamshire

NG23 5QY

Land to the north of Cromwell North

George Antony Vere- Laurie  
Carlton Hall  
Carlton on Trent  
Newark  
Nottinghamshire

### **Land South West of Barton in Fabis**

As shown on the attached plan ref M/BartoninFabis/1 this is an area of open arable land located south west of Barton in Fabis village and due west of the A453. The site can be accessed off the parallel road with the dual carriageway known as Green Street.

CEMEX own the minerals underneath this site and are in advanced discussions with the surface owner to secure a lease to work the site. It is envisaged that the site contains circa. 2mt however further geological investigations involving drilling are due to take place this month and instructions for detailed assessment work for an Environmental Impact Assessment are due to be made. This will involve initial assessments on Ecology, Archaeology and Cultural Heritage, Flood Risk, Hydrogeology, Land and Soils Classification and a Landscape and Visual Impact. Further assessment work on noise, air quality and transport will take place later once the baseline line environmental information has been established and a working scheme and plant location has been devised.

At this early stage it is envisaged that a processing plant would be located as close to the eastern boundary and that the site would be worked at 250,000t per annum in a phased manner with progressive land-filling of inert waste so that the land taken out of arable production at one time can be minimised. There is a preference to restore the site back to agriculture although there are opportunities for increased public access and nature conservation improvements.

The site would supply the city of Nottingham, the surrounding Nottinghamshire county area, South Derbyshire (Ilkeston/Sandyacre areas) and along the M1 corridors junctions 23a to 26. Inert fill would be sourced from a similar market area.

### Landowner Details

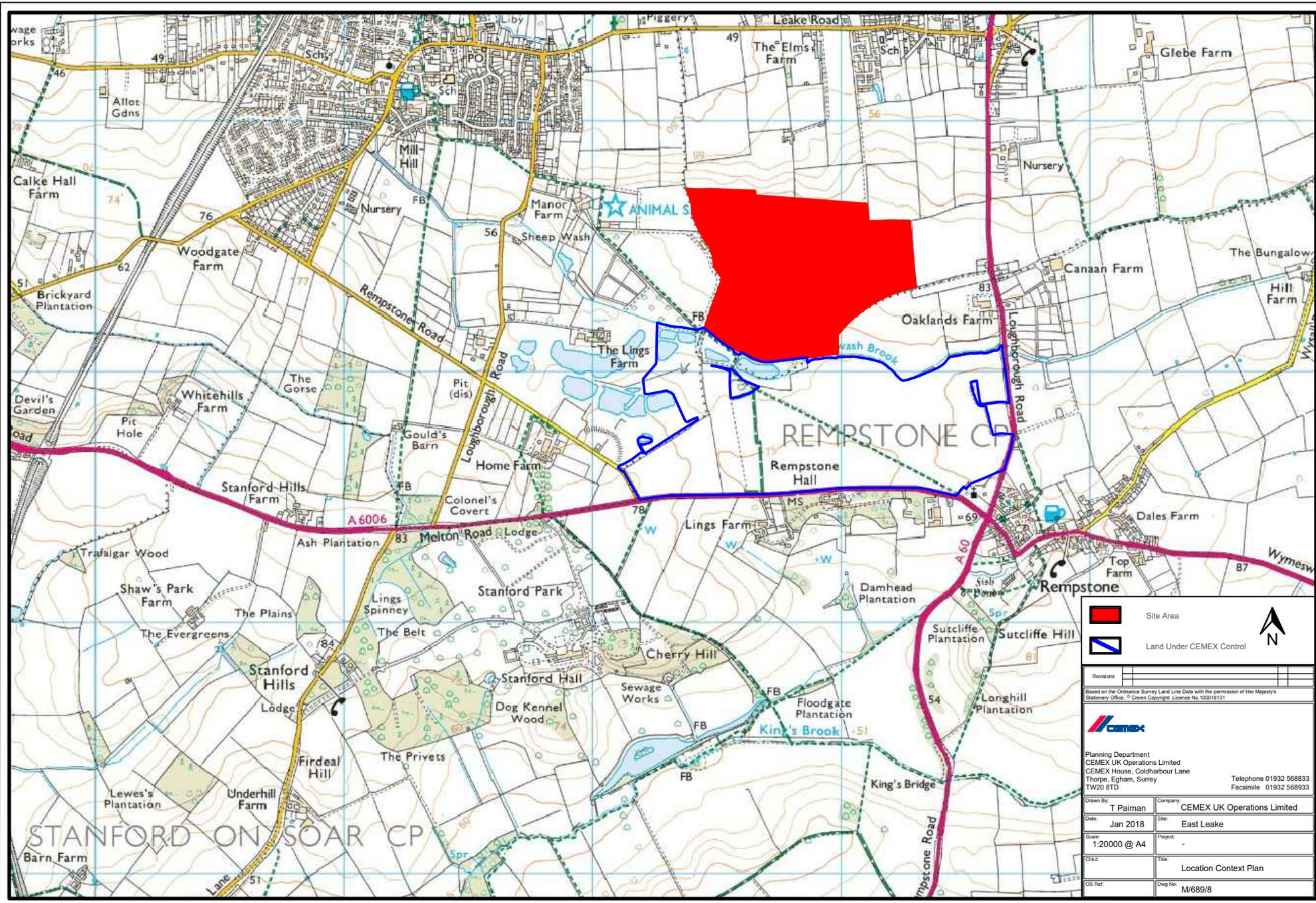
Keith Towers  
Manor Farm  
Church Lane  
Thrumpton  
Nottingham  
NG11 0AX

I trust that this information is helpful and would be grateful if you could keep me informed on the progress of the plan.

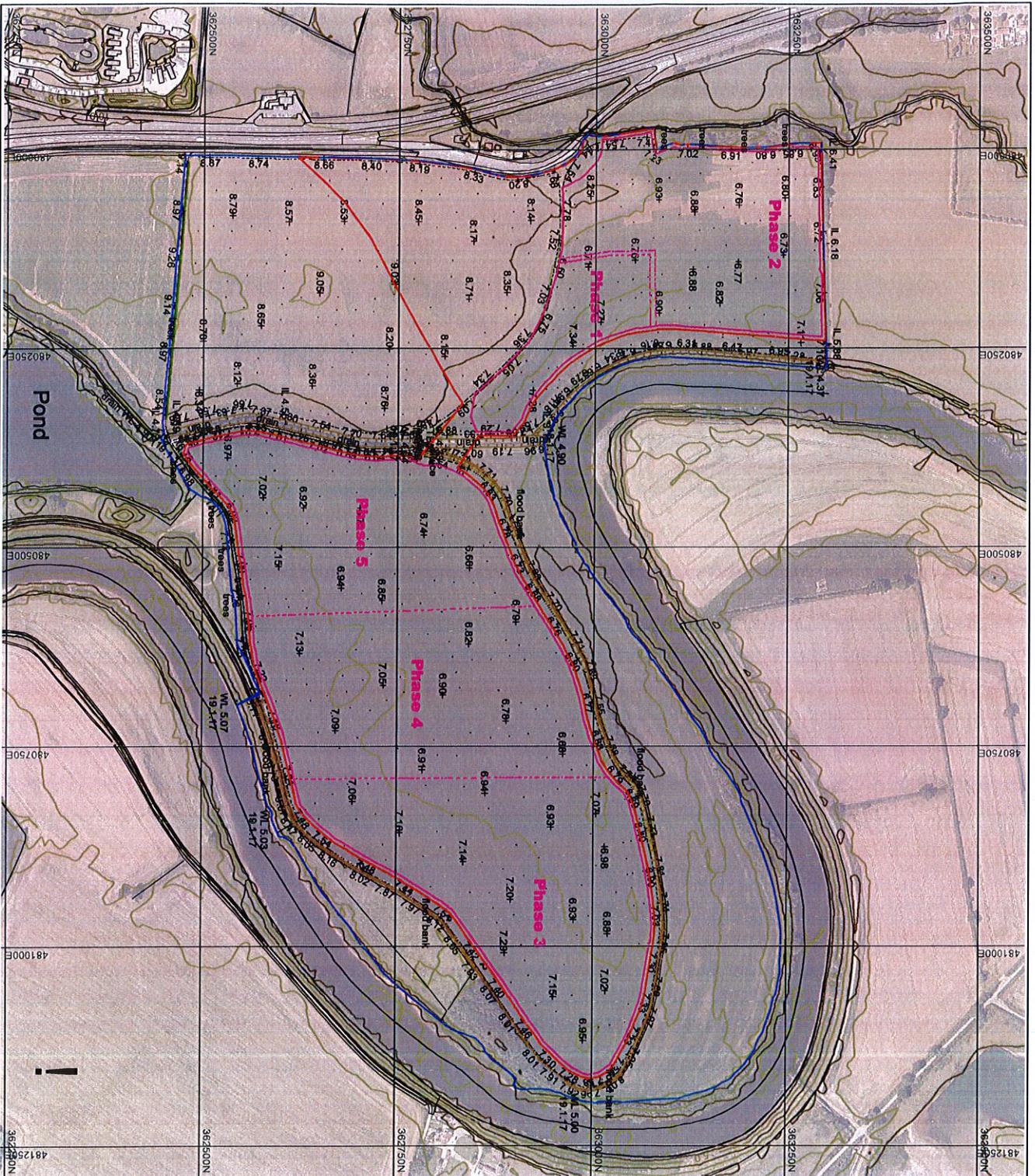
In due course as I receive relevant supporting environmental information on all these sites that verifies our commitment to their promotion within the Minerals Plan I will of course forward it to you.

Yours sincerely

Mark Kelly  
Planning Manager



	Site Area	
	Land Under CEMEX Control	
Revisions		
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Planning Department CEMEX UK Operations Limited CEMEX House, Coldharbour Lane Thorpe, Egham, Surrey TW20 8TD		
		Telephone 01932 568833 Facsimile 01932 568933
Drawn By:	T Paiman	Company:
Date:	Jan 2018	Site:
Scale:	1:20000 @ A4	Project:
Check:		Title:
OS Ref:		Dwg No:
		M/689/8



**Legend**

-  Land Under Applicant's Control
-  Planting Application Boundary
-  Excavation Boundary
-  Phase Boundary
-  Original Ground Surface
-  Plant Site and Stocking Area (Soils Removed)
-  Plant Location
-  Exposed Sand and Gravel (Overburden Stripped)
-  Temporary Tip / Bund
-  Restoration Landform (as per drawing no. 1 to 6)
-  Silt Lagoon
-  Clean Water Lagoon

**Models**

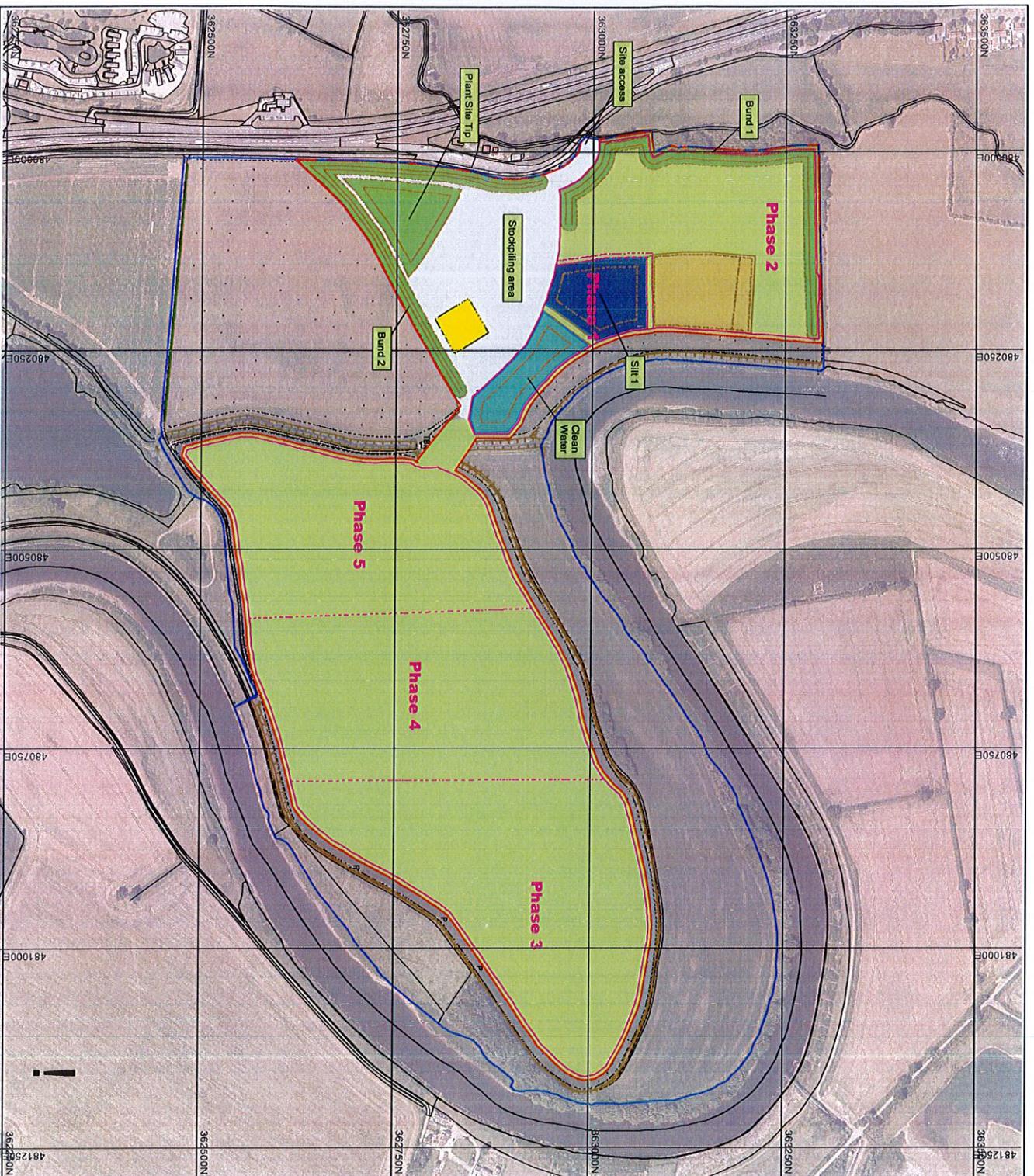
Ordered from: (A) SUR0171.SS  
 Order: 1, 2015.Aerial, PROS00007  
 Order: 2, SUR0171.SS  
 Order: 3

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 Rugby House, Evesux Way  
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Drawn by Steven Hopkins	Company CEMEX UK Materials Limited
Date 19 October 2017	Site Cromwell North Quarry
Scale(s) 1:5000 (A3)	Project Planting Application Quarry Working Scheme
Checked / Approved by -	Title Topographic Survey
OS Ref T00379	Drawing No. 1709-5235-CRN-D-000



**Legend**

- Land Under Applicant's Control
- Planning Application Boundary
- Excavation Boundary
- Phase Boundary
- Original Ground Surface
- Plant Site and Stocking Area (Soils Removed)
- Plant Location
- Exposed Sand and Gravel (Overburden Stripped)
- Temporary Tip / Bund
- Restoration Landform (as per drawing no. [1,b,c])
- Silt Lagoon
- Clean Water Lagoon

Project from: (01) 1705-5235-NETEX WORKS L155
Overlay 1: 2015 Aerial Photography
Overlay 2: SUR017155
Overlay 3:
Model:

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Drawn By: Steven Hopkins	Company: CEMEX UK Materials Limited
Date: 19 October 2017	Site: Cromwell North Quarry
Scale(s): 1:5000 (A3)	Project: Planning Application Query Working Scheme
Checked / Approved by:	Task: Phase 1: Initial Works
CD Ref: TC0379	Drawing No: 1705-S235-CRN-D-001



Site investigation at

## **Barton in Fabis**

Factual and interpretative report

Project No.: 1802-W050

Report Ref: 1802-W050\_BIF\_SI\_R01

April 2018

### **Report Summary:**

A site investigation comprising ten (10no.) windowless sampler boreholes, thirty one (31no.) cone penetration tests, laboratory testing and ground modeling has determined that a sand and gravel resource of approximately 1.4 million tonnes to be present in an area of land located south of Attenborough Quarry.

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## **APPENDICES**

Appendix 1 – Site Plans

Appendix 2 – Laboratory Testing Results

Appendix 3 – Borehole/CPT Logs

Appendix 4 – Drawings

Appendix 5 – Volume & Tonnage Summary

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## **1 INTRODUCTION**

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A geological investigation has been undertaken by CEMEX UK, National Reserves Department, at the site of a proposed new development to the south of Attenborough Quarry. The land, identified as 'Barton in Fabis' is owned by Keith Towers. Instructions were provided by Robert Hurst of Fisher German, his appointed land agent.

## **2 OBJECT AND SCOPE OF THE INVESTIGATION**

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The object of the investigation was to obtain information on the ground and groundwater conditions relating to the potential for the land to be underlain by a viable source of aggregate. The investigation comprised a geological desk study, windowless sampler boreholes, cone penetration testing, laboratory testing, deposit modeling, and reporting. An interpretation and evaluation of the resource has also been undertaken.

## **3 THE SITE**

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### **3.1 Location**

Barton in Fabis is located to the east of the town Long Eaton, Derbyshire. The national grid reference for the site centre is 451908E, 331881N. Drawing No. 1802-W050\_BIF\_SITELOC, contained in Appendix 1 shows the site location.

### **3.2 Description**

The site comprises one large piece of land, roughly square in shape, with a smaller parcel of land to the south, and covering an area of approximately 38.5 Hectares. It is generally flat, and given over to arable use in its entirety. An aerial photograph of the site, which identifies key boundaries and features, including

the proposed exploratory locations, (referenced Drawing Nos. BAR\_CPTLP & BAR\_TPLP) are included in Appendix 4. Trial pitting was originally planned at the site, and was substituted by windowless sampling in an attempt to gain samples from a greater depth.

### **3.3 Services**

Prior to any intrusive works being undertaken, a detailed search for the presence of any services which may affect the site was carried out. The work was completed by Dial-Before-You-Dig on CEMEX's behalf. The report found one (1no.) water main running approximately NE-SW through the centre of the site. The location of this service is illustrated in drawing 1802-W050\_BIF\_SERV, held in Appendix 1.

## **3 PROCEDURE**

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### **3.4 General**

The procedures followed in this site investigation are based on BS 5930 (1999) - Code of Practice for Site Investigations. The soils and rocks encountered have been described in accordance with Amendment 1 to BS5930, dated December 2007 and BS EN ISO 14688-1 (2002) and BS EN ISO 14689-1 (2003). The Borehole and cone penetration test records are included in Appendix 3, and their positions are shown on the Exploratory Hole Location Plan (1802-W050\_BIF\_BHLP) in Appendix . The Exploratory Hole locations were selected by CEMEX to provide comprehensive coverage of the site. The coordinates shown on the Exploratory Hole Records were obtained using full-RTK sub-centimetre handheld GPS device. Levels are related to Ordnance Datum. The depths quoted are in metres below ground level.

### 3.5 Exploratory Holes

Ten (10 No.) Boreholes (numbered BH01 to BH10) were drilled to a depth of approximately 8m below ground level using a windowless sampling drilling rig. Thirty one (31no.) cone penetration tests were also performed across the site (numbered CPT01 to CPT31) by a CPT-equipped tracked crawler to an approximate depth of 15m. The boreholes were drilled between the 24<sup>th</sup> January and the 30<sup>th</sup> January 2018 and the work was supervised on site by a geologist. The profiles of strata or other features were recorded as drilling/probing proceeded, and measurements were taken from ground level. Representative samples were taken, where appropriate, for laboratory examination and analysis. Groundwater observations are also included on the Borehole Records. Borehole records are held in Appendix 3.

## 4 LABORATORY TESTING

### 4.1 Aggregate testing

The laboratory testing schedule was formulated by CEMEX National Reserves Department in order to determine the suitability for use as aggregates. The tests conform to *BS EN 933:2012 Tests for geometrical properties of aggregates* and were carried out in Geotechnics Limited's UKAS accredited Laboratory (Testing No. 1365).

The tests undertaken can be summarised as follows:-

#### BS EN 933:2012

Test No.	Test Description
1 12 no.	BS EN 933-1 Particle Size Distribution, sieving method

The results of these tests are presented in Appendix 2 and show that all samples tested comprised gravel, with varying quantities of sand and silt.

## 5 DESK STUDY

### 5.1 General

Given that the land to the north and northwest of the site has been extensively quarried for sand and gravel, there is a significant amount of information and knowledge of the ground conditions of the area. Borehole records, surveys, and anecdotal evidence as described below were available:-

#### 5.1.1 Historic Borehole Records

No previous investigations have been undertaken by CEMEX at the site. However, site investigations have been undertaken on areas of land directly adjacent to the site.

These investigations include sixteen (16no.) CPT locations, probed in 2016 immediately to the northwest of the site. They indicate an average of 1.00m of overburden and an average mineral thickness of 4.28m. The results of these tests, along with analysis, can be found in a memo '1611-J262 Barton in Fabis CPT Memo'.

#### 5.1.2 Topographical Information

Previous surveys for the adjacent land have been reviewed.

### 5.2 Site History

The site has, based on local anecdotal evidence, only been used for agricultural purposes. Such a view is confirmed by historic maps which indicate the site has comprised fields from 1884-1995 (old-maps.co.uk, 2018).

### 5.3 Geology

Information published by the BGS on online resources, maps, geological memoirs, and other relevant literature was consulted. Where appropriate, previous exploratory hole records have been referred to, to give an indication

of the regional geology. For this site reference has been made to the following:-

- British Geological Survey GeolIndex Onshore (British Geological Survey 2018a)
- British Geological Survey Scanned Records (British Geological Survey 2018b)

### 5.3.1 Published Information

The geological mapping has been obtained from the Onshore GeolIndex (British Geological Survey, 2018a). The mapping indicates that the site is underlain by the following:

#### 5.3.1.1 Superficial Deposits

The superficial deposits are identified as the Hemington Member, comprising predominantly silt and gravel. It may have been worked on the opposite side of the River Trent, though the BGS records are inconclusive. It is described as (British Geological Survey, 2017c):

*'Gravels, sands and loams that underlie the Hemington Terrace. Forms a terrace typically c.0.5 to 1m above the modern floodplain in the type area, and often distinguishable from the latter by the presence of mediaeval ridge and furrow. Generally comprises a lower unit of planar cross-bedded (laterally accreted, meandering river) gravel (up to 5m) and an upper unit of overbank silt (up to 2m); may also include organic muds in channels at the base.'*

#### 5.3.1.2 Bedrock

The underlying bedrock comprises the Edwalton Member, which is described as (British Geological Survey, 2018c):

*'Mudstone and siltstone, red-brown and greenish grey, with beds of indurated, variably dolomitic siltstone and very fine-grained sandstone common in the lower half; finely disseminated gypsum common in upper half.'*

## 5.4 Hydrology

The site is bordered to the north and east by drainage ditches, and bisected by a further drainage ditch, all of which had water visible in them. Furthermore 2no. small ponds can be seen on OS mapping to the east and north of the site, apparently fed by the drainage ditch.

Most notably, the site lies within 200m of the River Trent, to the west of the site, and within 900m of the wetlands of the Attenborough Nature Centre.

## 5.5 Hydrogeology

Groundwater was encountered in the superficial strata during the drilling of all of the windowless sampling holes, and often during the digging of the buried service inspection pits. Groundwater was encountered at an average of approximately 0.5m bgl, however it should be noted that the sitework was undertaken during a period of heavy and sustained rainfall, resulting in standing water in northwestern areas of the site, and as such this may represent the water table being higher than ground level at times of high precipitation. Based on the conditions encountered during the site investigation it can be expected that groundwater will be encountered during excavation of the site.

In order to better understand the groundwater regime it is recommended that a number of water monitoring boreholes be installed.

Given that Attenborough Quarry on the opposite bank of the River Trent has been worked wet, it is suggested that this be considered for this site.

## 5.6 Environmental Issues

The historic arable farming of the site does not cause any environmental concerns.

Consultation of the 'DEFRA MAGIC' online resource reveals that the site is within the impact zone for the Attenborough Nature Centre SSSI.

## **6 INTERPRETATION**

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### **6.1 Ground Conditions**

The borehole logs are held within Appendix 3. On the basis of the expected geology discussed in Section 7.2 and the findings of the exploratory holes it has been possible to classify the various strata proved in the investigation into the following divisions:-

- Topsoil [Overburden]
- Fine Superficial Deposits [Overburden & Interburden]
- Coarse Superficial Deposits [Mineral]

Bedrock was not encountered during this investigation. The material descriptions outlined below are based on logs from trial/inspection pits, and from windowless sampler holes. As cone penetration testing does not yield samples, the data obtained from the CPT tests is indicative of the nature of the material in the area of investigation, and has been used to infer the base of mineral, but has not been used for material descriptions.

The divisions form the basis of the cross-sections drawn through the site, which illustrate the ground conditions across the site. These sections are included in Appendix 4, along with a section location plan. They are indicative only and reference should be made to the Exploratory Hole Records for detailed descriptions of the soils and the groundwater conditions encountered. In addition to the cross sections, the exploratory hole data has been used to create contours that show the base of overburden and base of mineral. These drawings, referenced 1802-W050\_BIF\_BOOBCON and 1802-W050\_BIF\_BOMCON are included Appendix 4. A plan of the site detailing thicknesses of overburden and mineral (referenced 1802-W050\_BIF\_BHSUM) is also contained within Appendix 4.

#### **6.1.1 Topsoil [Overburden]**

Material deemed to be representative of topsoil was encountered in the majority of the trial/inspection pits

across the site. Where it wasn't encountered, material of a similar nature (though not logged as topsoil) was encountered. One notable exception was encountered in the inspection pit for CPT08, where a thickness of 0.40m of Made Ground was encountered at surface. Topsoil was found to range from 0.20-0.50m thick.

#### **6.1.2 Fine Superficial Deposits [Overburden/Interburden]**

Fine superficial deposits were encountered beneath the topsoil in the majority of the exploratory hole locations. The material consisted of predominantly slightly sandy to sandy clay, but in a small number of holes consisted of a clayey to very clayey sand.

The thickness of these overburden layers is most reliably derived from the windowless sample holes, and from these it can be seen that the fine superficial deposits range in thickness from 0.60-1.50m. WS07, WS09, and WS10 only contained fine superficial deposits and are therefore considered barren areas.

#### **6.1.3 Coarse Superficial Deposits (Mineral)**

A coarse superficial deposit was encountered in WS01, WS02, WS03, WS04, WS05 and WS08. The deposits varied from fine to coarse sand, through to fine to coarse gravel. Gravel content of distinct units can be seen in the laboratory testwork results, held in Appendix 2, and the gradings of the deposit are explored further in Section 7.2.2.

### **6.2 Groundwater**

Detailed information on groundwater encountered during the Site Investigation can be found in the borehole logs, contained in Appendix 3. Groundwater was regularly encountered in the inspection pits, or very shortly after commencing borehole advancement. Water levels encountered during the excavation of inspection pits is not deemed reliable in this case due to the probably influence of surface water in the majority of cases (due to the prevailing wet weather conditions at the time of

the S.I.). Water strike data obtained during borehole advancement is considered more reliable, though it is recommended that a number of water monitoring boreholes be installed at the site in order to gain reliable data.

## 7 EVALUATION

### 7.1 Basis for Evaluation

Aggregates produced at Attenborough Quarry were primarily used for concrete production. As the site of this investigation is directly opposite the Attenborough quarry site, it can be assumed that the deposit is comprised of material of an equivalent nature. It can therefore be assumed (for the purposes of this report) that the material classed as 'Mineral' from this site investigation is also suitable for the production of concrete. Further testwork may be required to confirm the material suitability however.

### 7.2 Methodology

#### 7.2.1 General

To evaluate the potential quality and quantity of resource at the site, the following process has been adopted:

- i. Laboratory test results reviewed
- ii. Base models created for:
  - a. Topography
  - b. Base of overburden
  - c. Base of mineral
- iii. Constraints plan created
  - a. Identification of constraints
  - b. Standoff distances developed
  - c. Excavation boundary devised
- iv. Geotechnical Design Parameters selected
- v. Conceptual quarry design devised
- vi. Resource assessment undertaken

#### 7.2.2 Evaluation of gradings data

The results of particle size distribution (PSD) tests for samples taken from the site are contained in Appendix 2.

Section 5.2.1 of the report '10-026-R-SLH-001 (Cranfleet Farm Geo Desk Study)' indicates a weighted average gravel content of the Cranfleet Farm area of Attenborough Quarry to be 48.6% gravel, and 47.9% sand.

Lab testwork on samples obtained during the S.I. give a weighted average gravel content of the deposit of 48.05% Gravel.

Although the weighted average gravel content for this site was created from borehole data where the borehole did not necessarily intercept the base of mineral, the extreme similarity of the average grading for gravel between Attenborough and Barton in Fabis allows a confidence in the viability of the resource.

A plot of the weighted average gravel content of each borehole (where data is available) is held in Appendix 4, and titled 1802-W050\_BIF\_BHSUM.

#### 7.2.3 Creation of base models

The base models have been created using the exploratory holes, taking the reduced levels at the base of overburden and base of mineral/top of bedrock respectively. The levels have been imported into terrain modeling software and conceptual surfaces have been produced. In some cases, extrapolation has been required, which has been undertaken by an experienced geologist.

#### 7.2.4 Creation of Constraints Plan

A reasonable footprint for potential extraction has been devised based on the following constraints and standoffs:

Constraint	Standoff
Buildings	100m
Neighboring Fields	10m

### 7.2.5 Geotechnical Design Parameters

The design parameters for the excavation slope are:

- Overall gradient 1v:1.5h (33°)

### 7.2.6 Creation of Conceptual Quarry Design

A conceptual quarry design has been devised on the basis of the above parameters using 3D terrain modeling (McCarthy Taylor LSS). It is presented as a full excavation in Drawing No. 1802-W050\_BIF\_EXT which is included in Appendix 4. A basic phasing strategy has also been designed. These hypothetical phases are shown in Drawing No. 1802-W050\_BIF\_PHASES, also held in Appendix 4.

### 7.2.7 Resource assessment

An assessment of the volumes of soil, overburden and mineral, has been undertaken using the following terrain models:

- Ground level
- Base of overburden
- Base of mineral
- Concept excavation void

To convert the mineral volume to tonnes of saleable aggregate, a conversion factor of 1.60 has been applied, followed by a reduction of 10% to account for production losses, fines content, and basal sterilization.

The reporting approach is in general accordance with the PERC Reporting Standard (Pan European Reserves and Resources Reporting Committee, 2013)). The assessment will report a *measured resource*. A measured resource is likely to be affected by modifying factors such as environmental, planning, legal and operational issues.

## 7.3 Results

Tabulated calculations of the volume and tonnage of the deposit, broken down by the phasing plan outlined in section 7.2.6, are held in Appendix 5, along with an

estimate of gravel content per phase based is also contained in Appendix 5. From this table it can be seen that the deposit holds 955,972 m<sup>3</sup> gross volume of mineral, resulting in a *measured resource* of 1.377Mt, with approximately 577,600 m<sup>3</sup> of overburden, giving a stripping ratio of approximately 0.60:1.

## 8 SUMMARY

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A site investigation was undertaken at an area of land near Nottingham, known as 'Barton in Fabis', to determine the underlying ground conditions and estimate the resource contained. To this end intrusive investigations were carried out at 41no locations (10no windowless sampler locations, and 31no cone penetration test locations).

Testwork undertaken on selected samples of material from these boreholes reveals the material is approximately equivalent to that which was quarried locally in the nearby Attenborough Quarry.

Through creation of an ideal quarry design, the site is estimated to contain a *Measured Resource* of approximately 1.4Mt.

## 9 REFERENCES

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British Geological Society (2018a) *GeoIndex Onshore* [online] <http://mapapps2.bgs.ac.uk/geoindex/home> (accessed 19<sup>th</sup> March 2018)

British Geological Society (2018b) *Scanned Records* [online]<http://www.bgs.ac.uk/opengeoscience/scannedRecords.html?src=topNav> (accessed 19<sup>th</sup> March 2018)

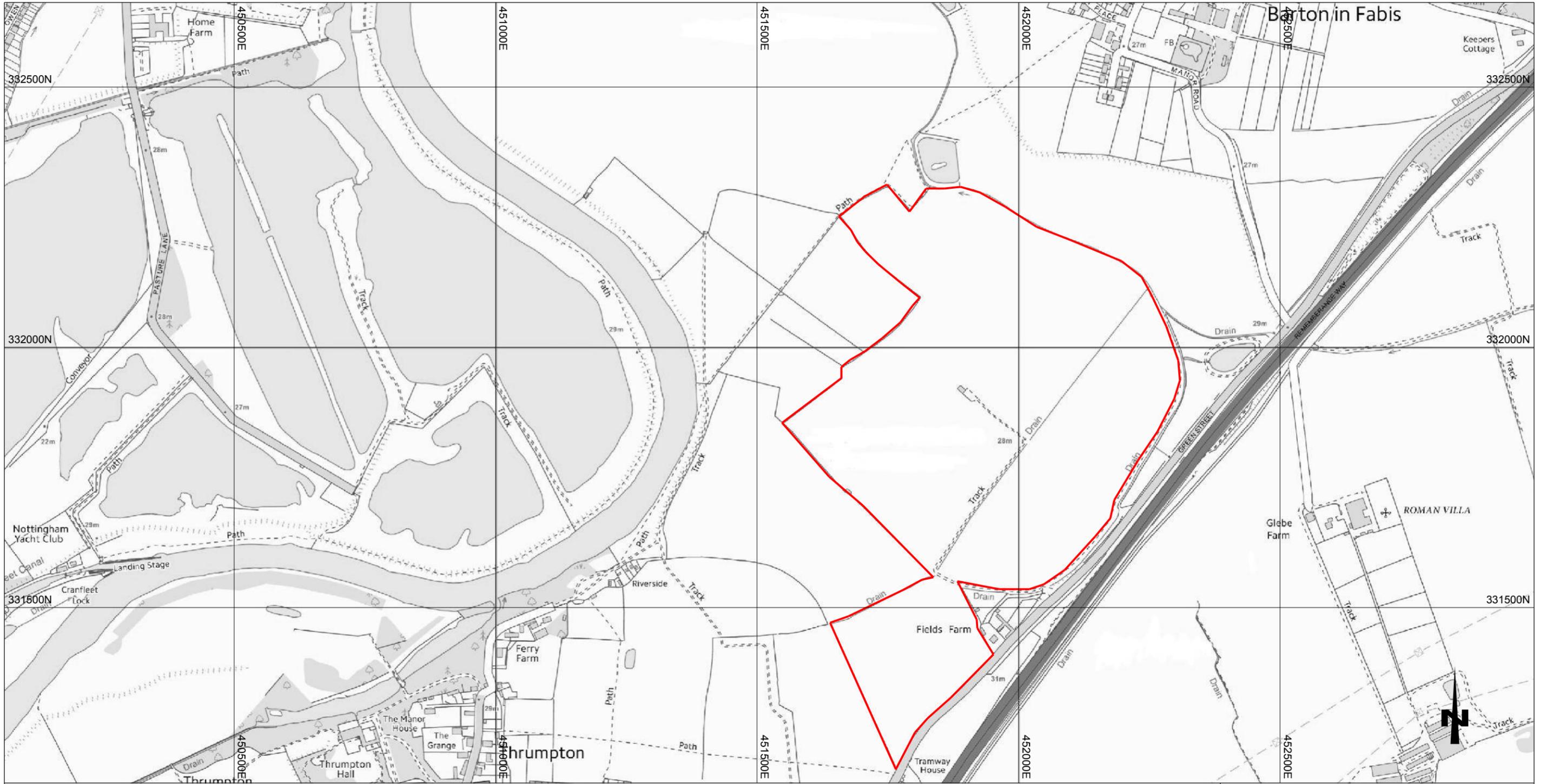
British Geological Society (2018c) *Lexicon of named rock units* [online] <http://www.bgs.ac.uk/lexicon> (accessed 19<sup>th</sup> March 2018)

Pan European Reserves and Resources Reporting Committee (2013) *PERC Reporting Standard for Reporting of Exploration Results, Mineral Resources and Reserves*. PERC, Brussels

[www.old-maps.co.uk](http://www.old-maps.co.uk) (accessed 19<sup>th</sup> March 2018)

[www.magic.cov.uk/magicmap.aspx](http://www.magic.cov.uk/magicmap.aspx) (accessed 19<sup>th</sup> March 2018)

## APPENDIX 1 – SITE PLANS



**Key**

— Site Boundary

Scale: 1:7500 (A3)  
 Date: 11/04/2018  
 Drawn by: Will Jones  
 Model: 00 SITE BOUNDARY.LSS



Site  
**Barton in Fabis**  
 Project  
**Site Investigation**  
 Drawing Title  
**Site Location**  
 Drawing Number  
**1802-W050\_BIF\_SITELOC**



**Key**

 Site Boundary

 Water Pipeline

Scale: 1:3000 (A3)

Date: 11/04/2018

Drawn by: Will Jones

Model: 1802-W050\_BIF\_SERV.LSS



Site  
**Barton in Fabis**

Project

**Site Investigation**

Drawing Title

**Buried Services**

Drawing Number

**1802-W050\_BIF\_SERV**

## APPENDIX 4 –DRAWINGS



451500E  
331000N

**Key :**

- X Proposed Cone Penetration Test Location
- Site Boundary

<b>Models</b>	Drawn from	00 SITE BOUNDARY.LSS
	Overlay 1	CPT GRID.LSS
	Overlay 2	
	Overlay 3	
	Overlay 4	
Based on Ordnance Survey Land Line data with the permission of Her Majesty's Stationery Office, © Crown copyright. Licence N° 100018131		
<p><b>National Reserves Department</b>  <b>CEMEX UK Operations Limited</b>          CEMEX House, Coldharbour Lane          Thorpe, Egham, Surrey. Telephone 01932 568883          TW20 8TD Facsimile 01932 568933</p>		
Drawn By	Company	
Will Jones	CEMEX UK Operations Ltd	
Date	Site	
27/11/2017	Barton in Fabis	
Scale(S)	Project	
1:3000 A2	Site Investigation	
Chkd/Model(s)	Title	
	Proposed CPT	
Site Ref.	Drawing No.	
BAR	BAR_CPTLP	



331000N

451500E

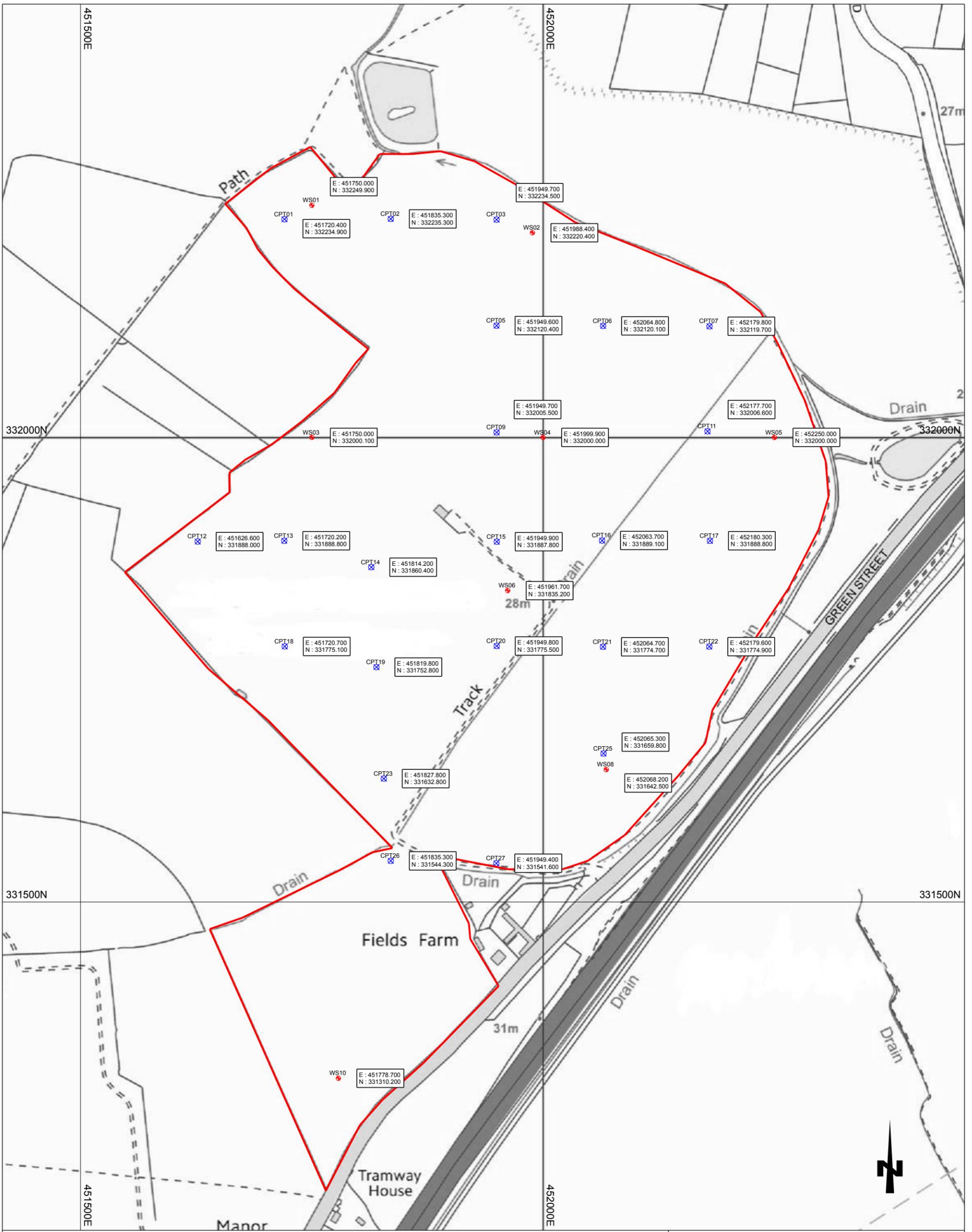
Key : TP Proposed Trial Pit Location  
 — Site Boundary

Models	Drawn from	00 SITE BOUNDARY.LSS
	Overlay 1	TRIAL PITS.LSS
	Overlay 2	
	Overlay 3	
	Overlay 4	

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National Reserves Department  
 CEMEX UK Operations Limited  
 CEMEX House, Coldharbour Lane  
 Thorpe, Egham, Surrey. Telephone 01932 568883  
 TW20 8TD Facsimile 01932 568933

Drawn By Will Jones	Company CEMEX UK Operations Ltd
Date 27/11/2017	Site Barton in Fabis
Scale(S) 1:3000 A2	Project Site Investigation
Chkd/Model(s)	Title Proposed TP
Site Ref. BAR	Drawing No. BAR_TPLP



- Key**
- Site Boundary
  - Windowless Sampler Borehole
  - ⊗ Cone Penetration Test

Scale: 1:4000 (A3)  
 Date: 11/04/2018  
 Drawn by: Will Jones  
 Model: 1802-W050\_BIF\_BHPLSS



Site  
**Barton in Fabis**  
 Project  
**Site Investigation**  
 Drawing Title  
**Borehole Location Plan**  
 Drawing Number  
**1802-W050\_BIF\_BHPL**



**Key**

- Line of Section (W-E)
- Proposed Excavation - Top of Bank
- Proposed Excavation - Bottom of Bank

Scale: 1:3000 (A3)

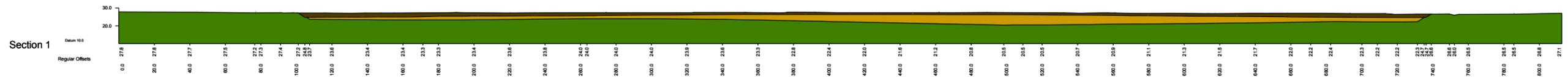
Date: 12/04/2018

Drawn by: Will Jones

Model: 1802-W050\_BIF\_SECTION LOCATIONS.LSS



Site  
**Barton in Fabis**  
 Project  
**Site Investigation**  
 Drawing Title  
**Section Location Plan**  
 Drawing Number  
**1802-W050\_BIF\_SLP**



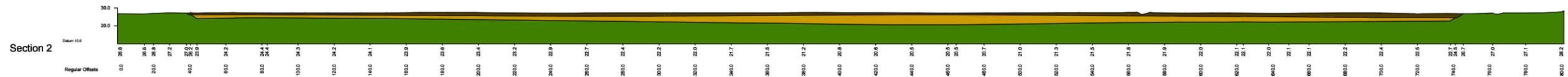
**Key**

-  Overburden Stripped
-  Mineral Extracted
-  Untouched Ground

Scale: 1:2500 (A3)  
 Date: 12/04/2018  
 Drawn by: Will Jones  
 Model: 1802-W050\_BIF\_SECS.LSS



Site  
**Barton in Fabis**  
 Project  
**Site Investigation**  
 Drawing Title  
**Cross Section**  
 Drawing Number  
**1802-W050\_BIF\_SEC\_01**



**Key**

-  Overburden Stripped
-  Mineral Extracted
-  Untouched Ground

Scale: 1:2500 (A3)  
 Date: 12/04/2018  
 Drawn by: Will Jones  
 Model: 1802-W050\_BIF\_SECS.LSS



Site  
**Barton in Fabis**  
 Project  
**Site Investigation**  
 Drawing Title  
**Cross Section**  
 Drawing Number  
**1802-W050\_BIF\_SEC\_02**



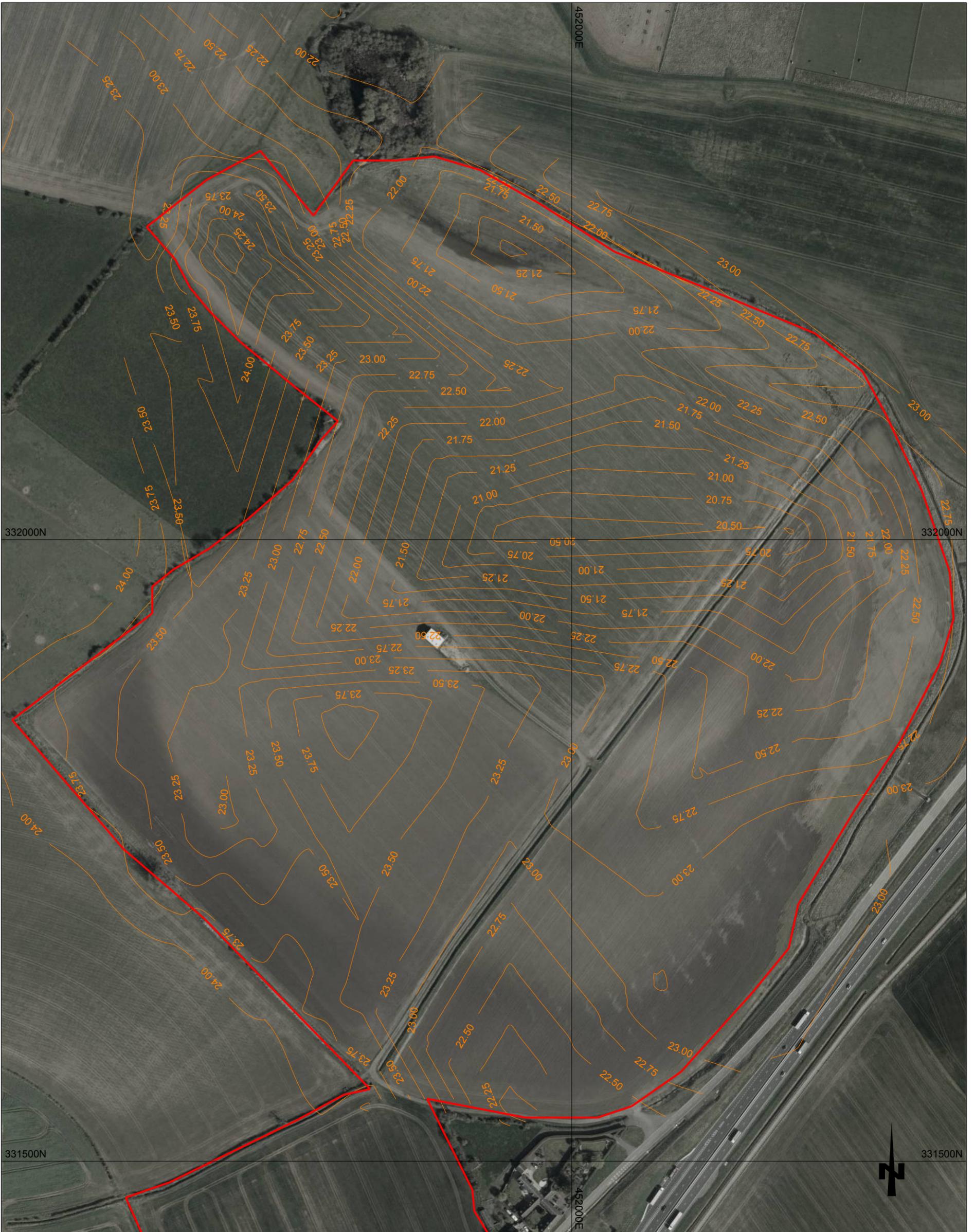
**Key**

 Site Boundary

Scale: 1:3000 (A3)  
 Date: 12/04/2018  
 Drawn by: Will Jones  
 Model: 2018 DRILLING BOOB.LSS



Site  
**Barton in Fabis**  
 Project  
**Site Investigation**  
 Drawing Title  
**Base of Overburden Contours**  
 Drawing Number  
**1802-W050\_BIF\_BOOBCONT**



**Key**  
— Site Boundary

Scale: 1:3000 (A3)  
 Date: 12/04/2018  
 Drawn by: Will Jones  
 Model: 2018 DRILLING BOM.LSS



Site  
**Barton in Fabis**  
 Project  
**Site Investigation**  
 Drawing Title  
**Base of Mineral Contours**  
 Drawing Number  
**1802-W050\_BIF\_BOMCONT**



**Key**

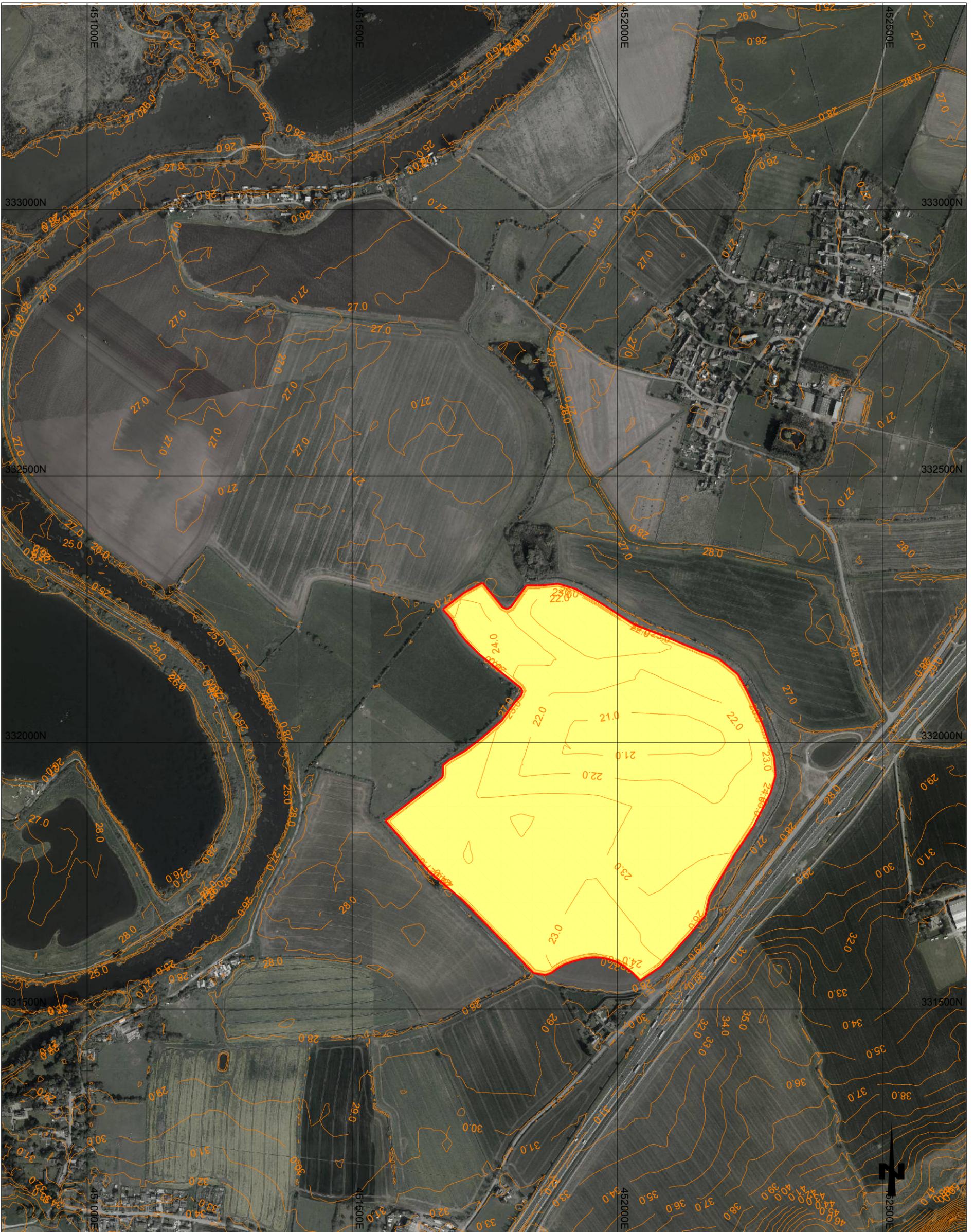
- Site Boundary
- + Windowless Sampler Borehole
- X Cone Penetration Test

N.B. Gravel percentage calculated as a weighted average from available data only and may not be representative of entire deposit. Boreholes considered 'barren' omitted.

Scale: 1:3000 (A3)  
 Date: 12/04/2018  
 Drawn by: Will Jones  
 Model: 1802-W050\_BIF\_THICK.LSS



Site  
**Barton in Fabis**  
 Project  
**Site Investigation**  
 Drawing Title  
**Borehole Summary**  
 Drawing Number  
**1802-W050\_BIF\_BHSUM**



**Key**

 Extraction Boundary

 Mineral Extraction

Scale: 1:7000 (A3)

Date: 12/04/2018

Drawn by: Will Jones

Model: 1802-W50\_BIF\_EXTRACTION WITH TOPO.LSS



Site  
**Barton in Fabis**

Project

**Site Investigation**

Drawing Title

**Proposed Extraction Geometry**

Drawing Number

**1802-W050\_BIF\_EXT**



**Key**

 Proposed Extraction Boundary

- |                                                                                             |                                                                                             |
|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|  Phase 1 |  Phase 5 |
|  Phase 2 |  Phase 6 |
|  Phase 3 |  Phase 7 |
|  Phase 4 |                                                                                             |

Scale: 1:4000 (A3)  
 Date: 12/04/2018  
 Drawn by: Will Jones  
 Model: 1802\_W050\_BIF\_PHASES.LSS



Site  
**Barton in Fabis**  
 Project  
**Site Investigation**  
 Drawing Title  
**Proposed Phasing**  
 Drawing Number  
**1802-W050\_BIF\_PHASES**

## APPENDIX 5 – VOLUME & TONNAGE SUMMARY

## Barton in Fabis: Measured Resource Estimation

### Overburden

FILL when survey 2 above survey 1

Survey 1 : 00 BARTON IN FABIS TOPO

Survey 2 : BIF\_OB\_STRIP

### Mineral

FILL when survey 2 above survey 1

Survey 1 : BIF\_OB\_STRIP

Survey 2 : BIF\_MIN\_EXT

OVERBURDEN			
Description	Workable area (sq.m)	Soils (m.cu)	Overburden (m.cu)
Phase 1	46,818	N/A	88,838
Phase 2	37,251	N/A	48,577
Phase 3	55,882	N/A	93,860
Phase 4	46,976	N/A	63,944
Phase 5	52,005	N/A	101,930
Phase 6	37,140	N/A	61,836
Phase 7	67,706	N/A	118,598
<b>TOTALS</b>	<b>343,779</b>	<b>N/A</b>	<b>577,583</b>

MINERAL				
Column5	Workable area (sq.m)	Volume (m.cu)	Tonnage (t)	Conversion
Phase 1	45,112	105,385	151,754	1.6t/m.cu
Phase 2	35,896	98,247	141,475	1.6t/m.cu
Phase 3	55,104	193,575	278,748	1.6t/m.cu
Phase 4	46,786	190,631	274,509	1.6t/m.cu
Phase 5	50,499	136,456	196,497	1.6t/m.cu
Phase 6	35,752	88,603	127,588	1.6t/m.cu
Phase 7	66,468	143,075	206,028	1.6t/m.cu
<b>TOTALS</b>	<b>335,618</b>	<b>955,972</b>	<b>1,376,599</b>	<b>1.6t/m.cu</b>

Figures calculated by:

Date: 13/04/2018

Will Jones BSc MSc MCSM FGS  
Senior Geologist

National Reserves & Development Dept  
CEMEX UK Operations Limited



## Barton in Fabis: Measured Resource Estimation

### Overburden

FILL when survey 2 above survey 1  
 Survey 1 : 00 BARTON IN FABIS TOPO  
 Survey 2 : BIF\_OB\_STRIP

### Mineral

FILL when survey 2 above survey 1  
 Survey 1 : BIF\_OB\_STRIP  
 Survey 2 : BIF\_MIN\_EXT

Phase	Mineral (t)	Gravel	Gravel (t)	Sand	Sand (t)
1	151,754	47%	71,324	53%	80,430
2	141,475	47%	66,493	53%	74,982
3	278,748	59%	164,461	41%	114,287
4	274,509	70%	192,156	30%	82,353
5	196,497	39%	76,634	61%	119,863
6	127,588	37%	47,207	63%	80,380
7*	206,028	50%	103,014	50%	103,014
<b>Total</b>	<b>1,376,599</b>		<b>721,291</b>		<b>655,308</b>

Figures calculated by:

Date: 13/04/2018

Will Jones BSc MSc MCSM FGS  
 Senior Geologist

National Reserves & Development Dept  
 CEMEX UK Operations Limited

\*Gravel percentage calculated from the average of neighbouring phases.