
West Burton C (Gas Fired Generating Station)

The West Burton C (Generating Station) Order

Land to the north of the West Burton B Power Station,
Nottinghamshire

Outline Written Scheme of Investigation



Applicant: EDF Energy (Thermal Generation) Limited
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GLOSSARY

ABBREVIATION	DESCRIPTION
AOD	Above Ordinance Datum – a spot height (an exact point on a map) with an elevation recorded beside it that represents its height above a given datum.
Applicant	EDF Energy (Thermal Generation) Limited.
BDC	Bassetlaw District Council – the local planning authority with jurisdiction over the area within which the West Burton Power Station site and Proposed Development Site (the Site) are situated.
CDM	Construction (Design and Management) Regulations 2015 – legal duties for safe operation of UK construction sites, including health and safety plans.
CIfA	Chartered Institute for Archaeologists – a professional organisation for archaeologists working in the United Kingdom.
CIRIA	Construction Industry Research and Information Association – a member-based research and information organisation dedicated to improvement in all aspects of the construction industry.
DCO	Development Consent Order - made by the relevant Secretary of State pursuant to The Planning Act 2008 to authorise a Nationally Significant Infrastructure Project. A DCO can incorporate or remove the need for a range of consents which would otherwise be required for a development. A DCO can also include rights of compulsory acquisition.
EH	English Heritage (now Historic England) – a non-departmental public body of the British Government responsible for heritage protection and management of a range of historic properties.
EIA	Environmental Impact Assessment – a term used for the statutory process that assesses environmental consequences (positive or negative) of a project prior to the decision to move forward with the proposed development. The EIA process concludes whether likely significant effects on the environment are expected.

ABBREVIATION	DESCRIPTION
ES	Environmental Statement – a report in which the process and results of an Environment Impact Assessment are documented.
Ground investigation	An intrusive investigation undertaken to collect information relating to the ground conditions, normally for geotechnical or land contamination purposes.
HE	Historic England – an executive non-departmental body of the British Government tasked with protecting the historical environment of England.
HER	Historic Environment Record – a record of all known archaeological finds and features and historic buildings and historic /landscape features, relating to all periods from the earliest human activity to the present day; maintained by each County and Unitary Authority in the United Kingdom.
OASIS	Online Access to the Index of archaeological investigations – the OASIS form is a data capture form through which archaeological and heritage practitioners can provide information about their investigations to local Historic Environment Records (HERs) and respective National Heritage Bodies.
OWSI	Outline Written Scheme of Investigation
PFA	Pulverised Fuel Ash – a by-product of pulverised fuel fired power stations.
RAMS	Risk Assessment and Method Statement – a 'Risk Assessment and Method Statement' (RAMS), is a safety management document required for activities where there a significant safety risks. A RAMS must be activity-specific and not generic.
WBA	West Burton A – the existing coal-fired power station within the West Burton Power Station Site, owned and operated by the Applicant.
WBB	West Burton B – the existing gas-fired power station, using Combined Cycle Gas Turbine (CCGT) technology, owned and operated by the Applicant.
WBC	West Burton C Power Station (the Proposed Development).
WLDC	West Lindsey District Council – the adjoining local planning authority to Bassetlaw District Council in which the West Burton Power Station Site and Proposed Development Site (the Site) are situated.
WSI	Written Scheme of Investigation – documents which set out the approach to undertaking archaeological monitoring of ground investigation works.

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Executive Summary

This Outline Written Scheme of Investigation (OWSI) describes the archaeological investigation and mitigation works to be carried out in association with the Proposed Development (which for this project, is a gas fired electricity generating station in Nottinghamshire). This document sets out the additional actions which will be undertaken to assess the impact of the Proposed Development on the archaeological potential of the Site and inform the development and refinement of appropriate mitigation measures. If required, the OWSI will be supplemented to mitigate impacts from the Proposed Development on archaeological assets, by further schedules of archaeological requirements or stage specific WSIs. This is proposed to be secured by a Requirement of the draft DCO (**Application Document 2.1**).

This document provides an overview of the Proposed Development and Site conditions. It outlines the initial investigation and methodology which will be adopted and describes how the fieldwork will be reported. It goes on to identify and establish responsibility for key components and describes how mitigation would be undertaken, if required. Additionally, it contains information about how unusual discoveries would be handled in accordance with the relevant regulations, and the health and safety requirements which would need to be considered when conducting fieldwork.

1. Introduction

1.1 Overview

- 1.1.1 This Outline Written Scheme of Investigation (OWSI) has been prepared on behalf of EDF Energy (Thermal Generation) Limited (hereafter referred to as the Applicant). It forms part of the application (the Application) for development consent that has been submitted to the Secretary of State pursuant to the Planning Act 2008 (2008 Act) (Ref 1).
- 1.1.2 The Applicant is seeking development consent for the construction, operation (including maintenance) and decommissioning of a new gas fired electricity generating station of up to 299 megawatts (MW) of gross electrical output including electrical, gas and utility connections, a construction laydown area and other associated works (the Proposed Development) on land to the north of the existing West Burton B (WBB) Power Station, in Nottinghamshire. The Proposed Development is described in **Chapter 4: The Proposed Development (Environmental Statement (ES) Volume I) (Application Document Ref. 5.2)**.
- 1.1.3 The Proposed Development falls within the definition of a '*Nationally Significant Infrastructure Project*' (NSIP) under Section 14(1)(a) and Sections 15(1) and (2) of the 2008 Act, as it is an onshore generating station in England that would have a generating capacity greater than 50MW electrical output (50MWe). As such, a DCO is required to authorise the Proposed Development in accordance with Section 31 of the 2008 Act.
- 1.1.4 The DCO, if made by the Secretary of State, would be known as the 'West Burton C (Gas Fired Generating Station) Order' (the Order).

1.2 The Applicant

- 1.2.1 As described above, the Applicant is EDF Energy (Thermal Generation) Limited which owns and operates the two existing power stations at the West Burton Power Station site; West Burton A (WBA) and West Burton B (WBB), as well as the nearby Cottam Power Station.
- 1.2.2 EDF Energy (Thermal Generation) Limited is part of EDF Energy which is the UK's largest producer of low-carbon electricity, the biggest supplier of electricity by volume in Great Britain and the largest supplier to British business.

1.3 The Site

- 1.3.1 The Site comprises land within the boundary of the existing West Burton Power Station site near Gainsborough, Nottinghamshire. The land is within the ownership of the Applicant. The Site is centred on national grid reference 480275, 386241 (the middle of the Proposed Power Plant Site) defined in **Chapter 3: Description of the Site and its Surroundings (ES Volume I) (Application Document Ref. 5.2)**.

- 1.3.2 The West Burton Power Station site is located approximately 3.5km to the south-west of the town of Gainsborough and 1km to the north-east of Sturton-le-Steeple and lies close to the junction of the A631/A620, being accessed by a C-class road (the C2), which joins the A620 at Bole Corner. The nearest settlement is the village of Bole located approximately 1km to the north-west of the Proposed Power Plant site.
- 1.3.3 The entire Site lies within the administrative boundary of Bassetlaw District Council (BDC), close to the border with West Lindsey District Council (WLDC) (defined by the River Trent to the east).
- 1.3.4 The West Burton Power Station site covers in excess of 200ha. WBA is a coal fired power station, which was commissioned in 1968. It comprises four coal fired units with two chimney stacks (each 198m high) and eight natural draught cooling towers (each 112m high), with cooling water sourced from the River Trent. It supplies up to 2,000MW to the National Grid.
- 1.3.5 Adjacent to the east of WBA Power Station is the WBB Power Station, a combined cycle gas turbine (CCGT) power station, which was commissioned in 2013. It comprises three units, each having a gas turbine, a heat recovery steam generator (HRSG) and an associated steam turbine, with a combined output capacity of 1332MW. The WBB Power Station connects to the National Grid electricity transmission system approximately 0.7km to the south of the WBB Power Station site via the existing WBA 400 kilovolt (kV) substation, located within the confines of the overall West Burton Power Station site. The WBB Power Station is also served by an underground gas pipeline connection entering the WBB Power Station site at its north-eastern boundary.
- 1.3.6 The Site occupies land to the north-east of WBB and lies within a site formerly used for the storage and disposal of Pulverised Fuel Ash (PFA) associated with WBA Power Station. The storage site has been subject to disposal of waste ash material from the late 1960s to the 1980s. Geotechnical information indicates the depth of the PFA to be between 8m and 13m across the Site. Alluvium underlie the PFA.

1.4 The Proposed Development

- 1.4.1 The Proposed Development would comprise a gas fired power station with gross electrical output capacity of up to 299MW with associated buildings, structures and plant defined in the draft DCO as Work No. 1 and shown on the Works Plans (**Application Document Ref. 3.2**) as **Work No. 1: Sheet 1 of 10** including:
- up to five open cycle gas turbine (OCGT) units and associated generators, potentially housed within building(s), with stack(s), transformer(s), air inlet filter(s) and exhaust gas diffuser(s);
 - associated switchgear and ancillary equipment; and
 - auxiliary closed loop cooling equipment/systems.

- 1.4.2 In an OCGT, natural gas fuel is mixed and combusted with air from the compressor section of the gas turbine and the hot gases are expanded through the power turbine section of the turbine, which drives a generator to produce electricity for export to the National Grid electricity transmission system.
- 1.4.3 Peaking plants, such as that proposed, are used to rapidly supply electricity to the network when required by the National Grid. These plants can be fired up at short notice to help cope with periods of high demand or low electricity supply nationally (for example when the wind is not blowing to enable sufficient output to be achieved from the wind farms in the UK), or when required to provide ancillary services to support the National Grid. This is expected to be weighted towards the winter period, usually for a few hours at a time. However, as the operation of the plant is driven by the dynamics of the energy market, the plant could run for longer periods, at any time of day, up to the maximum allowed under its Environmental Permit, which is anticipated to be 1,500 hours per year on a rolling five year average.
- 1.4.4 The Proposed Development is described in further detail in the Environmental Statement (ES) (Volume I) (**Application Document Ref. 5.2, Chapter 4: The Proposed Development**).

1.5 The Purpose of this Document

- 1.5.1 This document is an OWSI, describing the archaeological investigation and mitigation works to be carried out in association with the Proposed Development. It has been prepared in support of **Chapter 14: Cultural Heritage** (ES Volume I), and draws upon the ES assessment of impacts on cultural heritage and its baseline Appendix (**Appendix 14A: Desk Based Assessment** (ES Volume II) (**Application Document Ref. 5.2**). It has been prepared in consultation with Historic England and the Senior Archaeologist for Nottinghamshire County Council (NCC) who has confirmed, via engagement prior to submission of the Application in April 2019, that they are satisfied that the Historic Environment Officer for Bassetlaw District Council (BDC) will oversee the works through to completion.
- 1.5.2 This OWSI describes the iterative and staged approach to provide a suitable and proportionate assessment of archaeological potential of the Site and archaeological mitigation strategy, where this would be required to mitigate impacts from the Proposed Development. These are set out in **Sections 2, 3 and 4** of this document. Each required stage will be subject to a stage-specific WSI, describing the works for that stage, based on the results of previous stages. For the construction phase, impacts would be identified and where mitigation is required, a specific WSI will be produced.
- 1.5.3 The preparation of the stage-specific WSIs and revised Schedules of Archaeological Requirements will be subject to agreement with statutory consultees (specifically Historic England and the archaeological advisor for NCC administered by the Historic Environment Officer for BDC). It is proposed that this

would be secured by Requirement of the draft DCO (**Application Document Ref. 2.1**).

- 1.5.4 All archaeological works will be carried out in accordance with the methodology outlined within this OWSI and the subsequent stage-specific WSIs. Work will have regard to other relevant guidance, including the Standard and Guidance for an Archaeological Watching Brief (ClfA 2014a) (Ref 2), the ClfA Code of Conduct (ClfA 2014b) (Ref 3) and other current and relevant good practice and standards and guidance.

1.6 Site Conditions

Pulverised Fuel Ash

- 1.6.1 The Site occupies land to the north-east of WBB Power Station and lies in the vicinity of the Bole Ings Ash Disposal site used for the storage and disposal of PFA. The Site has been subject to disposal of waste ash material from the late 1960s to the 1980s beneath its current footprint.
- 1.6.2 Previous investigations into the ground conditions beneath the Site (see **Appendix 11A**) (**Application Document Ref. 5.2**) and the results of an initial site investigation for the Proposed Development undertaken in December 2017 (reported in **Appendix 11B**) (**Application Document Ref 5.2**) identified that made ground, including PFA, extends to depths between 8–12.5m bgl, which is consistent with the Site being previously used for PFA disposal. The termination depth of the PFA identified in six boreholes in the footprint of the Proposed Power Plant Site, and underlain by Mercia Mudstone, is as shown in **Table 1-1**.

Table 1-1: Generalised ground conditions beneath the Proposed Development Site

Site Area	Geological unit	Approximate Level at top of stratigraphic sequence (m bgl)	Approximate Strata Thickness (m) encountered	Summary Description
Beneath the Proposed main Power Plant Site	Made ground (PFA)	0.2 – 1.8	10.0m (average)	Silts with sand and some gravel
	Superficial deposits (alluvium)	8.0 – 13.2	1.15 – 4.9	Natural clays and silts
	Mercia Mudstone Group	11.0 – 15.2	Not proven	Very weathered to weathered mudstone (marl)

Site Area	Geological unit	Approximate Level at top of stratigraphic sequence (m bgl)	Approximate Strata Thickness (m) encountered	Summary Description
Wider Site outside of the main Proposed Power Plant Site	Made ground (PFA)	0 – 1.7	0.6 – 4.6	Silts with sand and some gravel
	Superficial deposits (alluvium)	0 – 6.3	0.5 – 5.6	Natural clays and silts
	River Terrace Deposits	9.7 – 10.0	2.1 – 3.2	Sands and gravels
	Mercia Mudstone Group	8.5 – 12.9	Not proven	Extremely weathered to weathered mudstone (clay/marl)

1.6.3 An initial conceptual deposit model using the most recent (2017) geotechnical investigation information has been prepared to accompany this OWSI. A plan illustrating the location of trial pits, window samples and boreholes installed in the 2017 investigation is provided, accompanied by illustrative geological cross-sections (section A-A'; B-B'; C-C'; and D-D') - **Figures 1a – 1d** in order to provide a visual illustration of the sequence beneath the Proposed Development.

1.7 Discussion

1.7.1 The extent to which the tipping operations of the PFA have truncated the naturally accumulated sequence of deposits at the Site is not known. However, the depth of PFA means that the only practicable method of assessing the archaeological potential of deposits below the PFA and the degree of truncation that has occurred is through a geo-archaeological investigation which should be proportionate with the level of impact expected by any piled foundations proposed, if required. This would be linked to the pre-construction Ground Investigation (GI) works to be carried out as part of the future Proposed Development programme, as proposed in a Requirement of the draft DCO (**Application Document Ref. 2.1**).

1.7.2 Prior to construction, Geotechnical Investigation (GI) Works shall be undertaken by a Geotechnical Contractor who will supply suitable plant, equipment and personnel. The Applicant will appoint an Archaeological Contractor with suitable geo-archaeological knowledge and experience to undertake the monitoring of the GI, alongside the GI Contractor and reporting on any findings and results.

- 1.7.3 The investigations would aim to inform the design of a suitable and proportionate archaeological mitigation strategy in relation to detailed foundation design for the Proposed Development, in advance of construction.
- 1.7.4 This OWSI for archaeological monitoring of the GI has been prepared by AECOM on behalf of the Applicant in accordance with guidance the Chartered Institute for Archaeologists (CIfA) (Ref 2) and Historic England (HE) (Ref 3) and Appendix A. The final WSI will be subject to agreement with the County Archaeologist for Nottinghamshire overseen by the Historic Environment Officer for BDC. This OWSI has been produced to support the ES (**Application Document Ref. 5.2**) for the DCO Application and will enable a suitably qualified Archaeological Contractor to develop a WSI that will contribute to the understanding of the archaeological deposit sequence at the Site, and the nature of the archaeological resource.

2. Archaeological and Historical Background

2.1 Sources of Information

- 2.1.1 The archaeological and historical background for the Site is detailed in the desk-based assessment contained within **Appendix 14A: Desk Based Assessment (ES Volume II) (Application Document Ref 5.2)**.
- 2.1.2 No previous archaeological interventions have been carried out within the Site, although previous archaeological monitoring and recording has been undertaken at the adjacent WBB Power Station site in September 2007 in advance of construction of WBB Power Station (Ref 4). This and other archaeological events within the 1km study area are discussed below.

2.2 Previous Archaeological Works

- 2.2.1 A watching brief was carried out at Crow Trees Farm in 1993 (Ref 5) for works to locate and modify a water pipeline, and the addition of a new pumping (booster) station. No archaeological features or deposits were identified.
- 2.2.2 National Power Archaeological Study, West Burton Power Station was carried out in connection with an application for BS77750 in 1994 (Ref 6).
- 2.2.3 An archaeological desk-based assessment of land at West Burton Power Station, Nottinghamshire was undertaken by Pre-Construct Archaeology (PCA) in 2005 (Ref 4).
- 2.2.4 An archaeological watching brief was carried out on Land at West Burton Power Station, District of Bassetlaw, Nottinghamshire, by Pre-Construct Archaeology (PCA) in 2007 (Ref 4). The watching brief was carried out in advance of the construction of a combined cycle gas turbine plant on land adjacent to the existing coal fired power station (WBA Power Station). The work monitored geotechnical investigations including ten test pits and two additional pits targeting the site of the former Cheese House that previously occupied part of the site. The test pits identified a build-up of up to 3.7m of fuel ash and no relic topsoil was reached. A possible grubbed out foundation trench for the Cheese House was recorded in one trench, with no other archaeological material present.
- 2.2.5 A topographic survey of the Deserted Village of West Burton, Nottinghamshire, was undertaken by Nottingham Community Archaeology, Nottingham County Council in 2008 and 2009 (Ref 7). The purpose of the survey was to establish the shape and nature of the earthworks, producing a contour and 3D plan and the creation of a 3D Digital Elevation Model to analyse the setting in a wider landscape. The survey also attempted dating and interpretation of features and measuring the condition of the earthwork and indicating its local importance.

2.2.6 On the basis of the above assessments, there is little information on which to base an assessment of the Site's archaeological potential. In the absence of other information, the ES baseline has therefore concluded that there is:

- a moderate potential for prehistoric or Roman archaeological deposits;
- a moderate potential for medieval deposits likely to relate to medieval agriculture; and
- a moderate potential for alluvial deposits that may contain palaeoenvironmental evidence.

2.2.7 The value of any such deposits, if present, is currently unknown. For the purposes of assessment in **Chapter 14: Cultural Heritage (ES Volume I) (Application Document Ref. 5.2)**, the value of these potential archaeological deposits has been assessed as being (at most) moderate, given current available information.

2.3 Summary of Potential Impacts to be mitigated through this OWSI

2.3.1 Foundations for the Proposed Development have the potential to impact on alluvial deposits with archaeological potential present below the PFA deposits, albeit that the buried land surface beneath the PFA is not likely to be significantly impacted upon by the Proposed Development. For the purposes of presenting a 'worst-case' assessment in this ES (refer to **Chapter 14: Cultural Heritage (Application Document Ref 5.2)**) the value of the archaeological asset could be medium, and the impact magnitude as a consequence of piling could be up to medium. This could result in a moderate adverse effect which would be permanent and significant. Mitigation is therefore proposed through this OWSI. By contrast, as a best-case, the value of the archaeological asset could be low, and the magnitude of impact from piling could be minimal. The significance of effect in this best-case scenario on archaeological assets would be negligible (not significant) and mitigation would not be required.

2.3.2 A new surface water drainage system, comprising pond(s) and/or a tank or similar is proposed and would require a surface water drainage pipeline connecting the Proposed Power Plant Site into the existing West Burton Power Station site purge line that runs approximately parallel with River Road from the WBA Power Station cooling towers to the River Trent and forms part of the drainage system.

2.3.3 One option is to connect to the purge line outfall prior to the sluice gate to the River Trent, near the existing sewage treatment works. This pipeline route (approximately 250m in length and referred to as the northern drainage connection corridor) would largely follow an existing access road that is used for access to the Severn Trent Water sewage treatment plant. An alternative southern drainage connection corridor has also been identified. This pipeline route (approximately 350m in length) would connect into the Site, to the south-east of the gas receiving facility for WBB Power Station, terminating in proximity to River Road, north of the abstraction pumping station and infrastructure associated with WBA Power Station. A third alternative is to connect into the existing WBB Power Station

drainage system, at a point within the existing WBB Power Station site and south of the Proposed Development. The availability of this option is dependent on the final plant design and associated volumes of surface water drainage. This third option may include the installation of an additional oily water separator to the south-east corner of the WBB Power Station site. Surface water drainage options under consideration are presented in the Outline Drainage Strategy (**Application Document Ref 7.8**) and described in **Chapter 4: The Proposed Development (Application Document Ref 5.2)**. Each of these options is assessed in the Environmental Impact Assessment (EIA).

- 2.3.4 The depth of impact from the drainage system would be up to approximately 4m below present ground level, where the connection into the existing WBA Power Station drainage system is proposed, and in these areas this could impact on deposits with the potential for the presence of archaeological remains. The width of the impact would be a corridor of around 4m, where the tie-in to the WBA Power Station drainage system is proposed and excavations down to the connection point are required. Based upon current available information, as a worst-case, the value of the archaeological asset could be medium and the impact magnitude no more than medium, given the relatively narrow width of the drainage system. The worst-case significance of effect would, in this scenario, be moderate adverse, permanent and significant. Mitigation is therefore proposed through this OWSI. As a best-case, the value of the archaeological asset could be low and the impact magnitude from the drainage system no more than medium, given the relatively narrow width of the drainage system. The significance of effect on archaeological assets in this best-case scenario would be permanent and minor adverse (not significant) and mitigation would not be required.

3. Initial investigation (Geoarchaeological Monitoring of GI interventions)

3.1 Objectives

- 3.1.1 The first stage of assessment of archaeological potential will be geoarchaeological monitoring of pre-construction geotechnical investigations, to inform foundation design. These may include a limited number of boreholes and window samples. All GI works intended to penetrate below the PFA will be monitored. Some borehole cores may require to be sent off-site for geotechnical testing and would therefore not be opened on-site. Such cores will not require archaeological monitoring and instead, the geotechnical logs will be provided to the geoarchaeologist for review.
- 3.1.2 The objectives of the geoarchaeological monitoring of the initial GI will be to:
- assess the degree to which deposits have been disturbed or truncated by the tipping of the PFA material;
 - assess and interpret the stratigraphic sequence at the Site and, where possible, establish a dating sequence for deposition;
 - identify deposits with the potential to preserve organic remains and palaeoenvironmental evidence; and
 - assess the potential for palaeochannels to be present at the Site.

3.2 Methodology

- 3.2.1 The Archaeological Contractor shall produce a WSI detailing the methodology to be used in compliance with that described below. The WSI will be submitted for agreement with the Senior Archaeologist for NCC (administered by the Historic Environment Officer for BDC) in consultation with the Historic England Regional Science Advisor.
- 3.2.2 The locations of the proposed GI interventions will be provided to the archaeological contractor prior to drafting of the WSI. It is acknowledged that the exact location of the interventions may have to be revised slightly at the time of investigation due to localised constraints; the final locations will be mapped by the GI contractor.
- 3.2.3 The archaeological contractor, who shall be professionally qualified and experienced with this type of archaeological work, and in describing and assessing geoarchaeological and palaeoenvironmental sequences, will prepare a report following completion of the GI fieldwork. The procedure for reporting is contained within **Section 7**.
- 3.2.4 In producing the report, the archaeological contractor shall also review available historic borehole information in the area, or the results of other archaeological investigations undertaken in the area. The archaeological contractor shall identify,

within the WSI, other records or information that is relevant to the GI monitoring works and understanding the deposit sequence and archaeological potential at the Site.

- 3.2.5 The GI contractor shall provide a suitable and safe position from which the archaeological contractor can effectively view the GI interventions. If archaeological remains are encountered, the machine excavation will pause to allow the remains to be assessed and described. The archaeological contractor will not enter the GI interventions. The archaeological contractor shall at all times obey the site rules of the GI contractor.
- 3.2.6 The GI contractor shall allow sufficient time for the archaeological contractor to inspect and record the GI interventions, including arisings. Provision shall be made for the archaeological contractor to recover samples from any open boreholes, window samples and trial pit arisings. In order to meet the objectives of the geoarchaeological monitoring, the archaeological contractor shall:
- recover samples for palaeo-environmental assessment, as appropriate;
 - make allowance for scientific dating of deposits, where deemed appropriate, to aid in interpreting the deposit sequence and the significance of deposits;
 - make a scaled drawn record of representative exposed trial pit sections, borehole and window sample cores, as far as is reasonably practicable;
 - take photographs of exposed deposits within the borehole and window sample cores with an appropriate scale, and sufficient further photographs to establish the setting of the groundworks undertaken; and
 - make a record of the datum (either Above Ordnance Datum (AOD) or m below ground level (bgl)) levels of the archaeological deposits.
- 3.2.7 The GI contractor shall allow the archaeologist a reasonable amount of time to undertake any inspection or recording as required.
- 3.2.8 The GI contractor shall provide information regarding the level (AOD) of the top of the ground surface at each location where archaeological monitoring is required.
- 3.2.9 The archaeological contractor shall record the date, time and duration of all archaeological monitoring site visits until the work is completed.
- 3.2.10 The archaeological contractor shall ensure that all Site records and finds are kept secure at all times, conserved and archived to the required standards.

4. Site Deposit Model

4.1 Requirement

- 4.1.1 On completion of the geoarchaeological monitoring of the GI, a site deposit model will be produced, assessing the stratigraphic sequence of the Site and the archaeological potential of each strata, their date and potential for preservation of organic and palaeo-environmental remains, where possible.
- 4.1.2 A revised assessment of impacts would be produced, if necessary, that assesses the requirement and method for any additional stages of evaluation or mitigation, as appropriate.

5. Potential Additional Investigation

5.1 Determining the Need for Additional Investigation(s)

- 5.1.1 In the light of the findings of the initial GI and resultant deposit model, additional stages of evaluation may be required to refine the deposit model, address specific impacts from construction or, where Site conditions reasonably practicably allow, enable trial trenching to be carried out.
- 5.1.2 The requirement or otherwise for additional stages of evaluation, stage-specific WSIs and revised Schedules of Archaeological Requirements will be agreed with statutory consultees (specifically Historic England and the archaeological advisor for NCC, administered through the Historic Environment Officer for BDC) and if required, will be undertaken in accordance with a Requirement of the draft DCO (**Application Document Ref. 2.1**).
- 5.1.3 Following any further stage of investigation, the deposit model would be refined, as necessary, and the assessment of impacts and further stages of evaluation or mitigation updated, where required.

6. Mitigation Options

6.1 Overview

6.1.1 Where mitigation is required, based on the conditions at the Site and the findings to date, this is envisaged to comprise either preservation in situ or recording of archaeological finds. These two options are presented below.

6.2 Mitigation Option 1: preservation in situ

6.2.1 Where the conservation of the whole or a material part of an archaeologically sensitive deposit is justified (i.e. for deposits of demonstrably equivalent significance to a designated heritage asset), and where reasonably practicably achievable, mitigation through preservation in situ would be considered. The decision as to where/whether preservation in situ should be undertaken would be made in agreement between the Applicant and statutory consultees, taking into account other environmental constraints and mitigation requirements. Assets identified for preservation in situ will require specific methods to ensure their protection (e.g. secure fencing, signage, monitoring of condition) which will be set out in a stage-specific WSI.

6.2.2 The proposals suggest that for the majority of the Proposed Power Plant Site, only piling, if required, would penetrate below the PFA and so impact on potential archaeological deposits is expected to be limited. Further information on likely impacts would be available as the detailed design develops.

6.3 Mitigation Option 2: archaeological investigation and recording

6.3.1 Each stage of the archaeological investigation will be specified in stage-specific WSIs, prepared in consultation with the Senior Archaeologist for NCC, administered by the Historic Environment Officer for BDC.

6.3.2 Where reasonably practicable, the mitigation works will retain coherence across multiple archaeological interventions. This is particularly the case in respect to palaeo-environmental sampling of archaeological and drift-geological deposits.

6.3.3 It is, therefore, essential that the evaluation WSIs and deposit model of the Site restate the importance of recovering samples for dating and palaeo-environmental samples. These will be considered prior to the preparation of stage-specific WSIs.

6.3.4 The results of the various evaluation and mitigation measures will be synthesised within a single document/report at the conclusion of the works. The scope of this would typically be defined in a post-excavation assessment report. Individual mitigation investigations should have respective post-excavation assessment reports prepared that are not executed until a project-wide updated WSI for Archaeological Post-Excavation Requirements is prepared.

6.3.5 Archaeological investigation and recording may take the form of one or more options (Options 2a, 2b or 2c) below, depending on the extent of impacts and methods that are reasonably practicable, taking into account Site conditions.

6.4 Mitigation Option 2a: Geoarchaeological and Palaeo-environmental Sampling

6.4.1 The most practical mitigation that can be carried out is the systematic sampling and recovering of deposits across areas of impact, in order to model the stratigraphic sequence of the deposits below the Site. This should include provision for scientific dating, recovery of palaeoenvironmental evidence and interpretation of the depositional environment, in order to place the Site in its wider archaeological and palaeo-environmental context, in particular in relation to West Burton deserted medieval village.

6.5 Mitigation Option 2b: Archaeological Supervision and Recording

6.5.1 An archaeological supervision and recording exercise is typically undertaken where there is a low expectation of the presence of archaeological remains, but where it cannot be ruled out. Alternatively, this approach is suitable for areas where the potential for archaeological survival is high, but the exact location of remains is unknown, such as through areas of peat.

6.5.2 This requires archaeological supervision of initial groundworks (such as topsoil stripping or localised excavations for services). If archaeological remains are exposed, they are temporarily secured for further investigation, in line with the excavation procedure.

6.6 Mitigation Option 2c: Formal Excavation

6.6.1 Where archaeological remains are likely to be destroyed by the Proposed Development activities, which are not sufficiently important to be preserved or preservation in situ is not reasonably practicable, and where health and safety constraints allow, then they may, where reasonably practicable, be preserved by excavation and recording, prior to construction.

6.6.2 Recorded remains, artefacts and samples would be subject to post-excavation analysis, and reporting (and publication where appropriate).

6.7 Summary of anticipated mitigation based on the impacts expected

6.7.1 It is considered for the main Proposed Power Plant Site, where piling of foundations may be required, the only feasible mitigation option is likely to be geoarchaeological and palaeo-environmental sampling (Option 2a) given the significant logistical and health and safety constraints related to the depths of PFA present. This would be subject to agreement, in consultation with NCC administered by the Historic Environment Officer for BDC, and would be

undertaken by the appointed geo-archaeological contractor in accordance with in **Sections 3** and **4** of this OWSI.

- 6.7.2 In relation to areas of potential impact where significant depths of PFA are not present, for example, if one of either the southern or northern drainage connection corridors is chosen as the preferred surface water drainage solution, other mitigation options provided in this section would be further considered. Option 2b – archaeological supervision and recording is considered to be likely to be most feasible option if one of the drainage connection corridors is selected for the Proposed Development given the shallower depth of PFA in the corridor locations.

7. Reporting

7.1 Requirements

7.1.1 A report on the GI fieldwork will be produced by the archaeological contractor and subsequently, reports will be produced for any subsequent investigation stage. Specific reporting requirements will be detailed in stage-specific WSIs, which will contain, but not be limited to:

- a non-technical summary;
- a site location drawing;
- a summary of archaeological and historical background;
- the methodology employed;
- the aims and objectives of the investigations;
- a location plan of the interventions, including original and relocated positions, accurately positioned on an Ordnance Survey base map (at an appropriate and recognised scale);
- a site deposit model illustrating the stratigraphic sequence, character and date of deposits;
- where appropriate, a list of all samples and finds recovered and recorded, along with the appropriate intervention numbers, context and date;
- where appropriate, an appendix containing specialist assessment reports (artefacts; palaeoenvironmental/geoarchaeological data);
- an assessment, conclusion and a statement of potential with recommendations for post-excavation analysis and publication, if appropriate;
- a statement of the significance of the results in their local, regional and national context cross-referenced, if appropriate, to research frameworks;
- recommendations for further stages of work, if appropriate;
- the proposed arrangements for long term conservation and archive storage (including details of the accredited repository), if appropriate; and
- colour photographic plates illustrating the Site setting, work in progress and archaeological discoveries.

7.1.2 Reports will be submitted to the Senior Archaeologist for NCC administered by the Historic Environment Officer for BDC, in paper and digital form.

7.1.3 Material copied or cited in reports will be duly acknowledged; all copyright conditions (such as those for Ordnance Survey maps or the National Grid) will be observed.

7.2 Online Access to the Index of archaeological investigations (OASIS)

- 7.2.1 An OASIS entry shall be completed at the end of the fieldwork, irrespective of whether a formal report is required. The archaeological contractor will complete the online form at (<http://ads.ahds.ac.uk/project/oasis/>) within one month following completion of the fieldwork. Archaeological contractors will be advised to contact OASIS (oasis@ads.ahds.ac.uk) for technical advice.

7.3 Archive Preparation and Deposition

- 7.3.1 All archaeological records, artefacts and reports generated will be prepared for deposition in accordance with advice provided in Archaeological Archives: A Guide to Best Practice in Creation, Compilation, Transfer and Curation (Brown 2007) (Ref 8), Historic England and ClfA guidance. This will be clearly specified in the stage-specific WSIs, describing the specific methodologies for fieldwork and post excavation activities.

8. Quality Assurance

8.1 General Requirement

- 8.1.1 The archaeological work will be undertaken by suitably qualified professionals operating to the highest professional standards.
- 8.1.2 Stage-specific WSIs for individual portions of work will be prepared in accordance with the relevant Historic England guidance and relevant ClfA standards and guidance. Stage-specific WSIs will be submitted in advance to the statutory consultees and not implemented until the programmes are approved.
- 8.1.3 The statutory consultees will be informed of the commencement of any fieldwork in advance.
- 8.1.4 The statutory consultees would be invited to monitor the archaeological programme by reviewing WSIs, attending meetings with the archaeological contractors and undertaking site visits.
- 8.1.5 Any perceived shortcomings in the archaeological works identified by the consultees will be identified to the Applicant and its archaeological contractor for immediate review of procedures and rectification where necessary.

9. Human Remains

9.1 General Requirement

- 9.1.1 In the event of the discovery of human remains, the archaeological contractor will notify the archaeological consultant who will contact H.M. Coroner. In this instance, the remains would be left in-situ and covered and the GI intrusive location would be re-located. The removal of human remains will only take place in accordance with a licence obtained from the Ministry of Justice and under the appropriate Environmental Health regulations and the Burial Act 1857 (Ref 9).

10. Treasure

10.1 General Requirement

- 10.1.1 Any artefacts which are recovered that fall within the scope of the Treasure Act 1996 (Ref 10) and Treasure (Designation) Order 2002 (Ref 11) will be reported to the archaeological consultant immediately. The archaeological consultant will contact H.M. Coroner, and will ensure that relevant legislation is enforced and that all the relevant parties are kept informed. A list of finds that have been collected that fall under the Treasure Act and related legislation will be included in the fieldwork report.

11. Health and Safety

11.1 Overview

- 11.1.1 The works shall be carried out under the Construction (Design & Management) (CDM) Regulations 2015 (Ref 12), with the Archaeological Contractor being part of a wider team under the GI Contractor (whilst on-site). Consequently, the GI contractor's Health & Safety Plan, Health & Safety Policies and Risk Assessments will be adhered to at all times.
- 11.1.2 The archaeological contractor will have their own Health and Safety Policy, as required under the Health and Safety at Work etc. Act 1974. A copy of the archaeological contractor's Health and Safety Policy will be submitted to the archaeological consultant, who will forward it on to the employer and the GI contractor.
- 11.1.3 The archaeological contractor shall prepare a Risk Assessment and Method Statement (RAMS), and a project-specific Health and Safety Plan and submit these to the archaeological consultant for approval prior to starting on site. If appropriate, a Method Statement would be prepared in association with the GI contractor, taking account of their Environmental Management Procedures and Health and Safety Plan(s).
- 11.1.4 The archaeological contractor shall follow the instructions of the GI contractor and will liaise closely with the GI contractor and comply with their site rules.
- 11.1.5 The GI contractor shall supply welfare facilities for the archaeologist(s) as required.

12. Fieldwork Resources and Limitations

12.1 General Requirement

- 12.1.1 The GI contractor shall provide the archaeological contractor with a timetable for the ground investigations prior to the start of the investigations, and shall provide sufficient notification of the start of each GI location to allow the archaeological contractor time to mobilise.
- 12.1.2 The on-site archaeologist will be a suitably qualified and experienced geoarchaeologist, with a minimum of two years field experience.
- 12.1.3 The GI contractor will provide all machinery necessary for the excavation of the GI interventions.
- 12.1.4 The GI contractor shall make arrangements to allow the archaeological contractor sufficient time to examine, record and sample, if necessary deposits recovered from the GI.

13. Confidentiality and Publicity

13.1 General Requirement

- 13.1.1 The archaeological works may attract the interest of the public and the press. All communication regarding this Project is to be directed through the Applicant.
- 13.1.2 The archaeological contractor will not disseminate information or images associated with the Project for publicity or information purposes without the prior written consent of the Applicant.

14. Access Arrangements

14.1 Overview

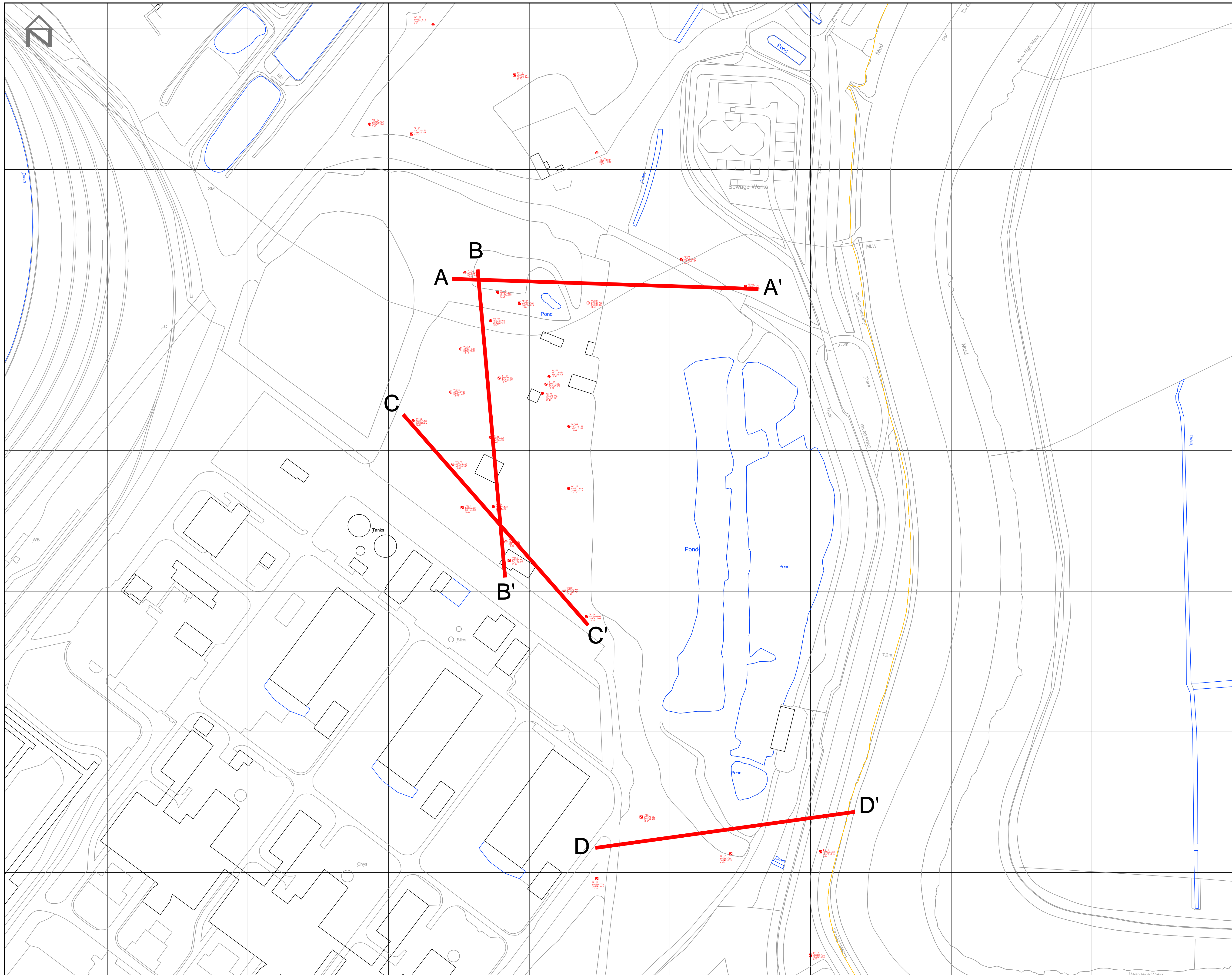
- 14.1.1 Access to the Site will be restricted to authorised personnel only. Access for the archaeological monitoring will be arranged and organised through the Applicant.
- 14.1.2 The location of welfare facilities, site offices and first aiders, will be communicated to the on-site archaeologist by the GI contractor on first arrival on-site, through site induction procedures.

15. References

- Ref 1 HM Government (2008). *The Planning Act 2008*.
- Ref 2 ClfA (2014) *Standard and guidance. Archaeological watching brief. Chartered Institute for Archaeologists*, Reading, December 2014
<http://www.archaeologists.net/sites/default/files/node-files/ClfAS&GWatchingbrief.pdf>
- Ref 3 English Heritage (2011) *Environmental Archaeology A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (second edition)*.
- Ref 4 Pre-Construct Archaeology Limited (2008) *An Archaeological Watching Brief on Land at West Burton Power Station, District of Bassetlaw, Nottinghamshire*.
- Ref 5 Arcus (1993) *National Power Archaeological Study, West Burton Power Station*.
- Ref 6 Clouston. R.P.S (1994) *National Power Archaeological Study, West Burton Power Station. Pre-Construct Archaeology (PCA) in 2005*.
- Ref 7 Gaunt, A. (2009) *A topographic survey of the Deserted Village of West Burton, Nottinghamshire. Nottinghamshire County Council unpublished report. Report number NCA-004*.
- Ref 8 Brown (2007) *A Guide to Best Practice in Creation, Compilation, Transfer and Curation*.
- Ref 9 HM Government (1857) *Burial Act 1857*.
- Ref 10 HM Government (1996) *Treasure Act 1996*.
- Ref 11 HM Government (2002) *Treasure (Designation) Order 2002*.
- Ref 12 Health and Safety Executive (2015) *The Construction (Design & Management) (CDM) Regulations 2015*.

FIGURES

Figure 1 Geotechnical Locations and Cross Sections



CONTROL & DATUM INFORMATION

Co-ordinates and levels are based upon OSG83 1936 National Grid (OSGB83) and Ordnance Survey Datum Newlyn (ODN).

They are derived using realtime on site GPS survey, that utilises the National Grid Transformation OSN15GB and the National Geoid Model OSGM15GB.

The data obtained for use in this drawing involved the use of realtime GPS survey and total station survey.

COORDINATES

Reference	East	North	Elevation	Description
BHT01	480314.024	386232.601	12.95	Dynamic Sample
BHT02	480272.229	386209.156	13.01	Dynamic Sample
BHT03	480278.514	386251.638	12.70	Dynamic Sample
BHT04	480328.157	386217.297	13.09	Dynamic Sample
BHT05	480217.436	386221.292	13.31	Dynamic Sample
BHT06	480274.502	386160.191	13.05	Dynamic Sample
BHT07	480311.894	386247.302	12.91	Dynamic Sample
BHT08	480307.208	386240.772	12.91	Dynamic Sample
TP102	480408.463	386336.138	4.47	Trial Pit
TP103	480453.609	386316.810	3.87	Trial Pit
TP104	480252.254	386189.355	13.09	Trial Pit
TP105	480265.706	386122.080	13.44	Trial Pit
TP106	480340.802	386089.009	13.10	Trial Pit
TP107	480379.494	385939.429	12.45	Trial Pit
TP108	480348.078	385995.449	12.16	Trial Pit
TP110	480443.501	385913.174	4.40	Trial Pit
TP111	480506.998	385914.615	4.80	Trial Pit
TP112	480499.866	385841.234	7.01	Trial Pit
TP113	480292.201	386304.894	13.01	Trial Pit
TP114	480277.305	386312.388	13.05	Trial Pit
TP115	480216.431	386425.199	9.12	Trial Pit
WBS101	480269.441	386487.146	13.35	Borehole
WBS102	480231.613	386503.027	8.12	Borehole
WBS103	480348.037	386411.836	7.29	Borehole
WBS104	480254.220	386326.593	13.22	Borehole
WBS105	480261.341	386272.330	13.13	Borehole
WBS106	480244.241	386241.683	13.20	Borehole
WBS107	480227.993	386173.119	13.16	Borehole
WBS108	480265.663	386190.345	13.48	Borehole
WBS109	480283.382	386135.144	13.38	Borehole
WBS110	480341.799	386305.044	11.58	Borehole
WBS111	480264.708	386100.220	13.41	Borehole
WBS112	480184.502	386432.185	9.42	Borehole

LEGEND TO SYMBOLS

- ⊕ Denotes Cable Tool Borehole Location
- ⊞ Denotes Trial Pit Location
- ⊗ Denotes Dynamic Sampling & Rotary Borehole Location

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Project: **WEST BURTON C/D POWER STATION**

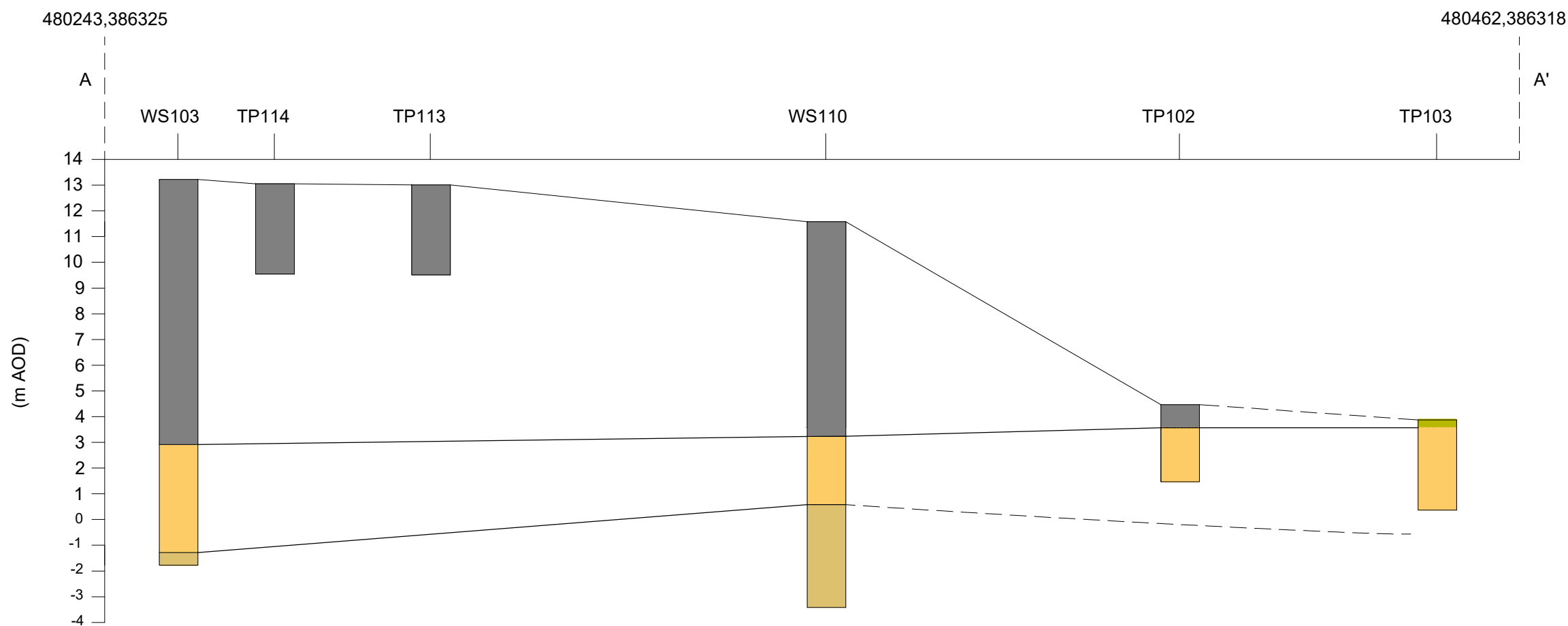
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Date: 05.01.18 Drawn By: AW Apprv. By: MJS

Sheet Size: A1 Scale: 1:1250 Project No: A7102-17

Drawing No: A2 Rev: 0

CROSS SECTION A (220m)



LEGEND

- TOPSOIL
- PULVERISED FUEL ASH
- ALLUVIUM
- MERCIA MUDSTONE

First Issue	DK SE	06.03.19	0	
Revision Details	By Check	Check Date	Suffix	

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Project Title
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Drawing Title
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Drawn DK	Checked SE	Approved KC	Date 06.03.19
AECOM Internal Project No. 60527350		Scale @ A3 N.T.S	

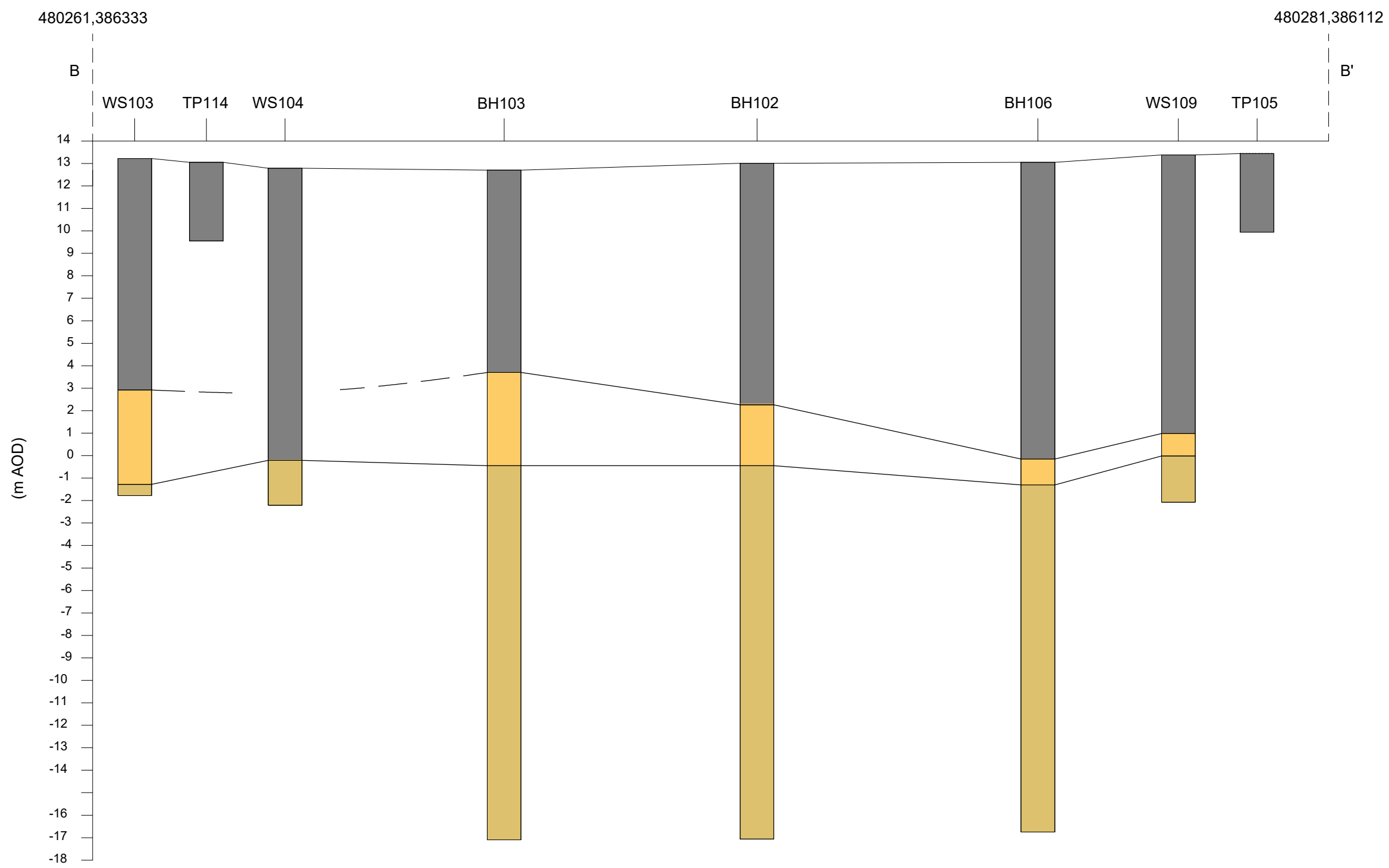
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CROSS SECTION B (220m)



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	ALLUVIUM
	MERCIA MUDSTONE

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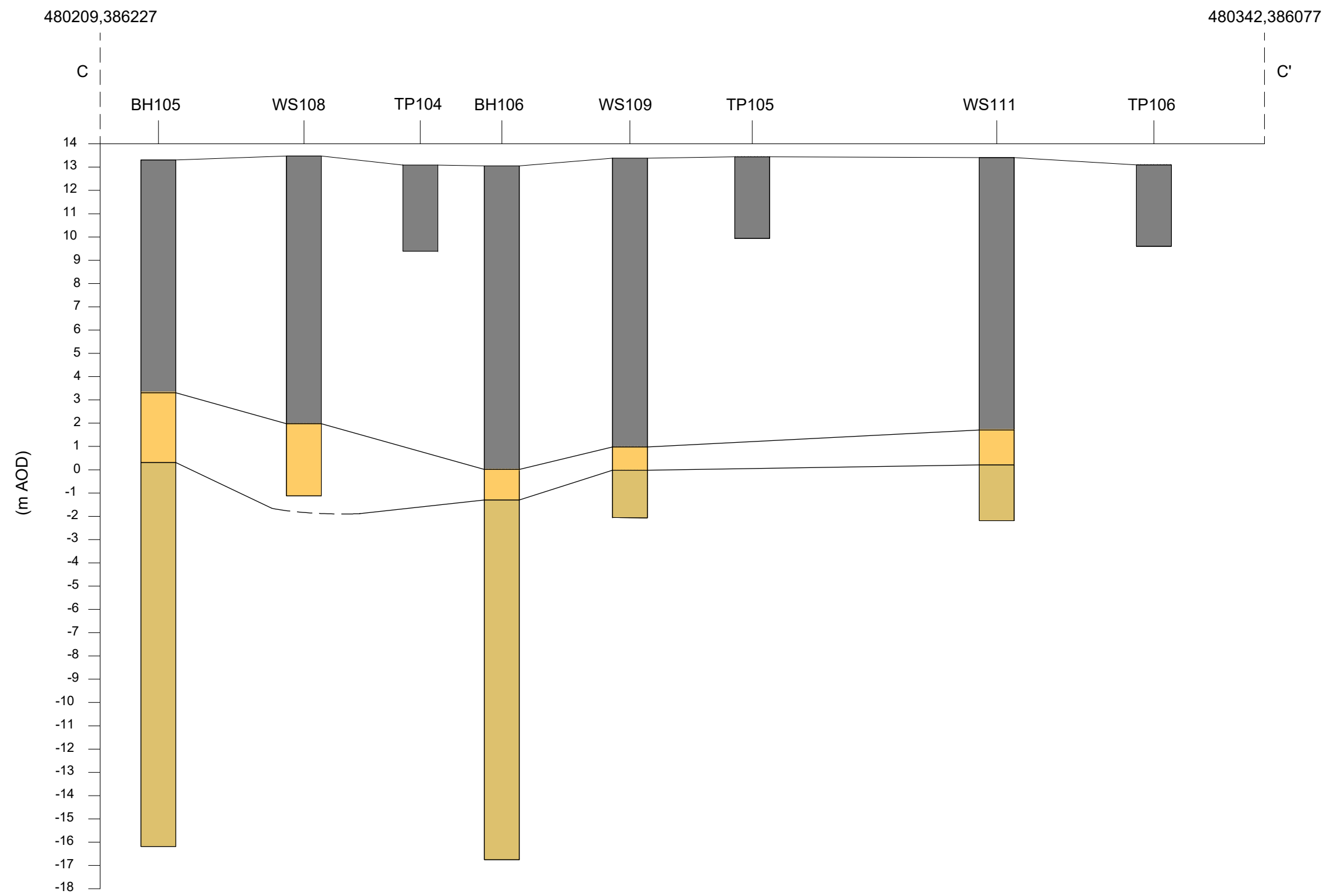
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CROSS SECTION C (200m)



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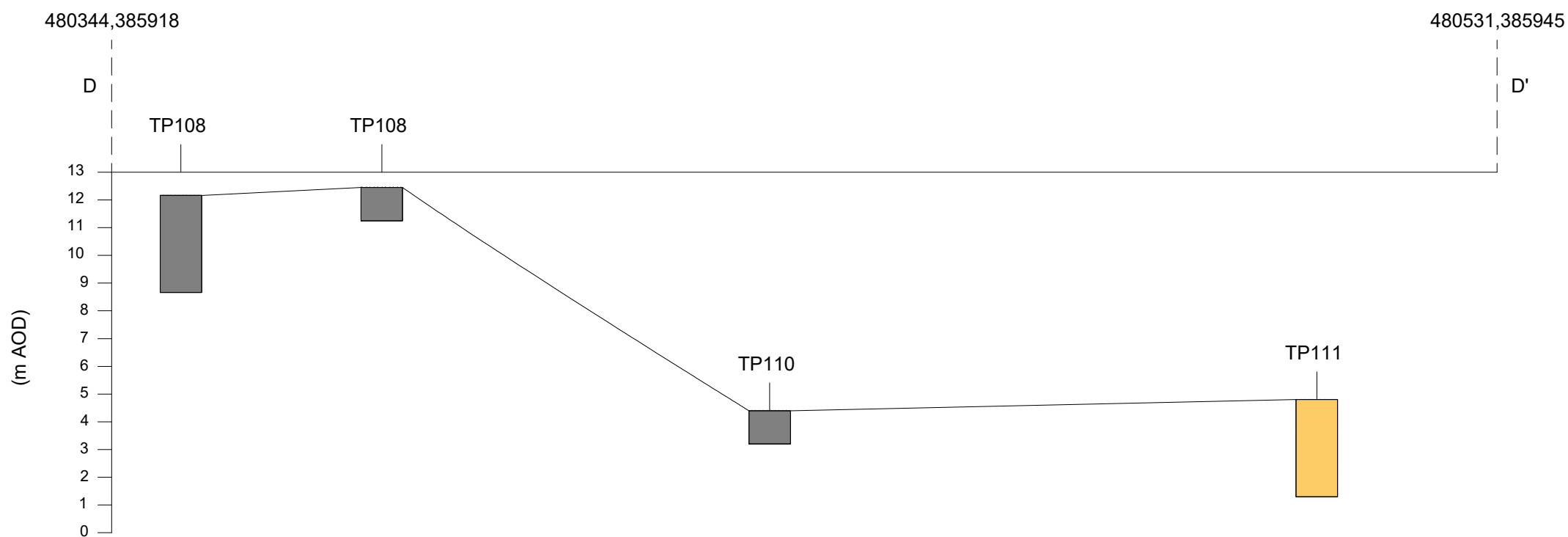
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CROSS SECTION D (200m)



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- MERCIA MUDSTONE

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Appendix A: Standards and Guidance

ADS 2011	Archaeology Data Service / Digital Antiquity Guides to Good Practice. Archaeology Data Service, University of York http://guides.archaeologydataservice.ac.uk/q2gp/Main
AML 1994	A Strategy for the Care and Investigation of Finds. Ancient Monuments Laboratory, English Heritage.
Brown 2007	A Guide to Best Practice in Creation, Compilation, Transfer and Curation.
CIfA 2014a	Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives. Chartered Institute for Archaeologists, Reading, December 2014 http://www.archaeologists.net/sites/default/files/node-files/CIFAS&GArchives_0.pdf
CIfA 2014b	Code of Conduct. Chartered Institute for Archaeologists, Reading, December 2014 http://www.archaeologists.net/sites/default/files/node-files/CodesofConduct.pdf
CIRIA 2015	Environmental good practice on site (fourth edition). CIRIA C741. Construction Industry Research and Information Association.
EH 2014	Our Portable Past: a statement of English Heritage policy and good practice for portable antiquities/surface collected material in the context of field archaeology and survey programmes (including the use of metal detectors). Second revision. English Heritage, Swindon https://www.historicengland.org.uk/images-books/publications/ourportablepast/
FAME 2006	Health and Safety in Field Archaeology Manual. Federation of Archaeological Managers and Employers.
HE 2015	Geoarchaeology Using Earth Sciences to Understand the Archaeological Record.
HE 2015	Historic Environment Good Practice Advice in Planning Note 2. Managing Significance in Decision Taking in the Historic Environment. English Heritage, Swindon http://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/
HE 2015	Management of Research Projects in the Historic Environment. The MoRPHE Project Manager's Guide. Historic England, Swindon https://www.historicengland.org.uk/images-books/publications/morphe-project-managers-guide/
HE 2016	Preserving Archaeological Remains Decision-taking for Sites under Development.
Murphy,	PL and Wiltshire, PEJ (1994) <i>A Guide to Sampling Archaeological Deposits for Environmental Analysis</i> . English Heritage, London.

- RCHME 2012 *MIDAS: the UK Historic Environment Data Standard Version 1.1. Best practice guidelines. Royal Commission on the Historical Monuments of England, Swindon* <https://www.historicengland.org.uk/images-books/publications/midas-heritage/>
- SGRP 1994 Guidelines for the Archiving of Roman Pottery. Study Group for Roman Pottery
<http://www.romanpotterystudy.org/SGRPPublications/GuidelinesArchivingRomanPot.pdf>
- UKIC 1983 Packaging and Storage of Freshly Excavated Artefacts from Archaeological Sites. (United Kingdom Institute for Conservation, Conservation Guidelines No 2).
- UKIC 1990 Guidance for Conservation Practice. United Kingdom Institute for Conservation.
- UKIC 2001 Excavated Artefacts and Conservation. (United Kingdom Institute for Conservation, Conservation Guidelines No 1, revised).
- Watkinson, DE and Neal, V 2001 First Aid for Finds. RESCUE/United Kingdom Institute for Conservation.
- Willis, S 1997 (ed) Research Frameworks for the Study of Roman Pottery. Study Group for Roman Pottery.
- Young C 1980 Guidelines for the Processing and Publication of Roman Pottery. Department of the Environment.