ENVIRONMENTAL STATEMENT: 6.1 CHAPTER 9: HISTORIC ENVIRONMENT

DECARBONISATION

Cory Decarbonisation Project

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9. HISTORIC ENVIRONMENT

9.1. INTRODUCTION

9.1.1. This chapter reports the assessment of the likely significant environmental effects of the Proposed Scheme on the historic environment during construction and operation. The historic environment (also known as Cultural Heritage) comprises known or potential buried heritage assets (archaeological and palaeoenvironmental remains) and above ground heritage assets (structures and landscapes of heritage interest) within or immediately around the Proposed Scheme. It also includes, where appropriate, the setting of significant heritage assets and how they are understood and appreciated.

9.1.2. The chapter describes:

- relevant legislation, policy and guidance;
- consultation and engagement undertaken to date;
- the methodology for assessment;
- potential effects resulting from the construction phase (including enabling works); and
- potential effects resulting from the operation (completed development) phase.

9.1.3. This chapter is intended to be read alongside **Appendix 9-1: Historic Environment Desk-Based Assessment (Volume 3)**, which contains a full set of illustrations, including historical mapping.

9.2. POLICY, LEGISLATION, AND GUIDANCE

9.2.1. The policy, legislation, and guidance relevant to the assessment of the historic environment for the Proposed Scheme is detailed in **Table 9-1**.

Table 9-1: Historic Environment Summary of Key Policy, Legislation, and Guidance

Policy, Legislation or Guidance	Description
Policy	
Overarching National Policy Statement (NPS) for Energy EN-1 2024[1]	This Overarching National Policy Statement for Energy (EN-1) is part of a suite of NPS designated by the Secretary of State for DESNZ in January 2024. Section 5.9 relates to the historic environment and sets out policy in relation to harm to the significance of heritage assets. Its requirements relating to the historic environment are broadly similar to those in NPPF (see below):

Policy, Legislation or Guidance	Description
	• paragraph 5.9.1 - *"The construction, operation and decommissioning of energy infrastructure has the potential to result in adverse impacts on the historic environment*"; • paragraph 5.9.2 - *"The historic environment includes all aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, landscaped and planted or managed flora."*; • paragraph 5.9.12 - *"The applicant should ensure that the extent of the impact of the proposed development on the significance of any heritage assets affected can be adequately understood from the application and supporting documents."*; • paragraphs 5.9.19-20 - "*Where the loss of significance of any heritage asset has been justified by the applicant on the merits of the new development and the significance of the asset in question, the Secretary of State should consider:* – *imposing a requirement in the Development Consent Order* – *requiring the applicant to enter into an obligation* *That will prevent the loss occurring until the relevant part of the development has commenced, or it is reasonably certain that the relevant part of the development is to proceed*". • paragraph 5.9.24 - *"In considering the impact of a proposed development on any heritage assets, the Secretary of State should consider the particular nature of the significance of the heritage assets and the value that they hold for this and future generations."*; • paragraphs 5.8.29—30 - "*Substantial harm to or loss of significance of a grade II Listed Building or a grade II Registered Park or Garden should be exceptional.* *Substantial harm to or loss of significance of assets of the highest significance, including Scheduled Monuments; Protected Wreck Sites; Registered Battlefields; grade I*

Policy, Legislation or Guidance	Description
	and II Listed Buildings; grade I and II* Registered Parks and Gardens; and World Heritage Sites, should be wholly exceptional.*"; • paragraph 5.9.31 - "*Where the proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset the Secretary of State should refuse consent unless it can be demonstrated that the substantial harm to, or loss of, significance is necessary to achieve substantial public benefits that outweigh that harm or loss*"; and • paragraph 5.9.32 - "*Where the proposed development will lead to less than substantial harm to the significance of the designated heritage asset, this harm should be weighed against the public benefits of the proposal, including, where appropriate securing its optimum viable use.*"
National Planning Policy Framework (NPPF) 2023[2]	The NPPF sets out the Government's planning policies for England and how these should be applied by applicants and decision makers. The NPPF sets out the importance of assessing the significance of heritage assets that may be affected by a proposal. Paragraph 200 of the NPPF states that local planning authorities, when determining applications, should require the applicant to: *"describe the significance of any heritage assets affected, including any contribution made by their setting".* Paragraph 200 goes on to state that *"the level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance".* Heritage asset(s) are defined in Annex 2 of the NPPF as *"a building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the local planning authority (including local listing)*." Annex 2 also defines "significance" as "*the value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only*

Policy, Legislation or Guidance	Description
	from a heritage asset's physical presence, but also from its setting". "Setting of a heritage asset" is defined as "*the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral."* Paragraph 203 of the NPPF states that local planning authorities should consider the following when determining applications: • "*the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation*"; • "*the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality*"; and • "*the desirability of new development making a positive contribution to local character and distinctiveness*". Paragraphs 205 to 209 detail the notion that heritage assets can be harmed or lost through alterations, destruction, or from development within their setting. These paragraphs identify that this harm ranges from less than substantial to substantial. The emphasis should be on the conservation of designated heritage assets, regardless of whether any potential harm is considered to be substantial or less than substantial (paragraph 205). As a rule, the more important the heritage asset is, the greater the weight should be on its conservation. Substantial harm to or loss of assets of the highest significance (scheduled monuments, protected wreck sites, registered battlefields, Grade I and II* listed buildings, Grade I and II* registered parks and gardens, and World Heritage Sites (paragraph 206) should be wholly exceptional. Paragraph 207 of the NPPF goes on to state that "*where a proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or total loss*

Policy, Legislation or Guidance	Description
	is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply: *a) the nature of the heritage asset prevents all reasonable uses of the site; and* *b) no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and* *c) conservation by grant-funding or some form of not for profit, charitable or public ownership is demonstrably not possible; and* *d) the harm or loss is outweighed by the benefit of bringing the site back into use.*" With regard to applications concerning non-designated heritage assets *"a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset*" (paragraph 209).
The London Plan 2021[3]	The Spatial Development Strategy for Greater London sets out a framework for how London will develop over the next 20-25 years and the Mayor's vision for 'Good Growth'. Policy HC1 of the London Plan is the key policy specific to the historic environment within Greater London, which states that: *"A. Boroughs should, in consultation with Historic England, local communities and other statutory and relevant organisations, develop evidence that demonstrates a clear understanding of London's historic environment. This evidence should be used for identifying, understanding, conserving, and enhancing the historic environment and heritage assets, and improving access to, and interpretation of, the heritage assets, landscapes and archaeology within their area.* *B. Development Plans and strategies should demonstrate a clear understanding of the historic environment and the heritage values of sites or areas and their relationship with their surroundings. This knowledge should be used to inform the effective integration of London's heritage in regenerative change by:*

Policy, Legislation or Guidance	Description
	• *setting out a clear vision that recognises and embeds the role of heritage in place-making* • *utilising the heritage significance of a site or area in the planning and design process* • *integrating the conservation and enhancement of heritage assets and their settings with innovative and creative contextual architectural responses that contribute to their significance and sense of place* • *delivering positive benefits that conserve and enhance the historic environment, as well as contributing to the economic viability, accessibility and environmental quality of a place, and to social wellbeing.* *C. Development proposals affecting heritage assets, and their settings, should conserve their significance, by being sympathetic to the assets' significance and appreciation within their surroundings. The cumulative impacts of incremental change from development on heritage assets and their settings should also be actively managed. Development proposals should avoid harm and identify enhancement opportunities by integrating heritage considerations early on in the design process.* *D. Development proposals should identify assets of archaeological significance and use this information to avoid harm or minimise it through design and appropriate mitigation. Where applicable, development should make provision for the protection of significant archaeological assets and landscapes. The protection of undesignated heritage assets of archaeological interest equivalent to a scheduled monument should be given equivalent weight to designated heritage assets.* *E. Where heritage assets have been identified as being At Risk, boroughs should identify specific opportunities for them to contribute to regeneration and place-making, and they should set out strategies for their repair and reuse*" The London Plan also identifies Opportunity Areas (OA), including the Bexley Riverside OA within which the Site is situated. The Plan recognises Belvedere as having *"potential as a future District centre"*.

Policy, Legislation or Guidance	Description
The Bexley Local Plan 2023[4]	The Bexley Local Plan, adopted on 26th April 2023, positively plans for sustainable development across the borough. It is essential to the delivery of the Council's other key plans and strategies, including the Bexley Plan, the Growth Strategy and the Connected Communities Strategy. The following policies in the Local Plan are relevant to the historic environment: • Policy SP6: Managing Bexley's Heritage Assets states that "*The Council will manage its heritage and archaeological assets, whilst seeking opportunities to make the most of these assets; including adapting to and mitigating the effects of climate change. This will enhance the local sense of place and support the revitalisation and development of the borough, including promoting the visitor economy.*" In part, this will be achieved by "*promoting the borough's heritage assets, such as Lesnes Abbey, Danson Mansion, Hall Place and Gardens, Crossness Beam Engine House and Red House*" and "*reviewing the status of existing and identifying new heritage and archaeological assets*". • Policy DP14: Development affecting a heritage asset states that "*development proposals with the potential to directly or indirectly impact on a heritage asset or its setting should meet NPPF requirements to describe the significance of the asset and demonstrate how the proposal conserves or enhances the significance of the asset.*" With regard to archaeological evidence, the policy goes on to state that "*development proposals should be assessing the archaeological potential of sites and then retaining, in situ, archaeological evidence within sites, wherever possible. Where archaeological evidence cannot be retained, the appropriate levels of archaeological investigation and recording should be undertaken prior to the redevelopment of the site*."
London Environment Strategy 2018[5]	The London Environment Strategy seeks to ensure that London will become a *"zero carbon city by 2050"* by setting out policies and proposals in seven policy areas to address environmental challenges, including the transition to a low carbon circular economy. The Mayor wants to ensure "*London's businesses and workers are supported to be able*

Policy, Legislation or Guidance	Description
	to compete effectively in, and benefit from, this growing global market". The London Environment Strategy contains the following policies and proposals in relation to the historic environment: • Policy 5.1.2 Protect, conserve, and enhance the landscape and cultural value of London's green infrastructure. • Proposal 5.1.2.a states that "*the Mayor will ensure that opportunities for a complementary relationship between cultural heritage and green infrastructure are fully explored in the interests of good place-making.*"
South East Inshore Marine Plan 2021[6]	The South East Inshore Marine Plan area stretches from Felixstowe in Suffolk to west of Dover in Kent and incorporates the River Thames. The South East Inshore Marine Plan is intended to help to enhance and protect the marine environment and achieve sustainable economic growth while respecting local communities both within and adjacent to the marine plan area. Policy SE-HER-1 relates to the historic environment: • *"Proposals that demonstrate they will conserve and enhance the significance of heritage assets will be supported.* • *Where proposals may cause harm to the significance of heritage assets, proponents must demonstrate that they will, in order of preference:* – avoid – minimise – mitigate – any harm to the significance of heritage assets. • *If it is not possible to mitigate, then public benefits for proceeding with the proposal must outweigh the harm to the significance of heritage assets."*
London Borough of Bexley Archaeological Priority Areas Appraisal 2020[7]	Document produced by the Greater London Archaeology Advisory Service (GLAAS) which defines and reviews the Archaeological Priority Areas (APA) within the borough.

Policy, Legislation or Guidance	Description
Legislation	
The Infrastructure Planning (Decisions) Regulations 2010[8]	Sets out the legal requirements for the control of development and alterations which affected listed buildings, conservation areas and scheduled monuments (see Regulation 3).
The Planning (Listed Buildings and Conservation Areas) Act 1990	Sets out the legal requirements for the control of development and alterations under the Town and Country Planning Act 1990 which affect listed buildings or conservation areas (including buildings of heritage interest which lie within a conservation area). Grade I are buildings of exceptional interest. Grade II* are particularly significant buildings of more than special interest. Grade II are buildings of special interest.
Guidance	
National Planning Practice Guidance (2021)[9]	Explains the processes and tools that can be used through the planning system in England. This guidance includes advice on enhancing and conserving the historic environment.
Statement of Significance Note (Historic England, 2019)[10]	Historic England advice note which covers the EN-1[1] requirement for applicants for heritage and other consents to describe heritage significance to help local planning authorities to make decisions on the impact of proposals for change to heritage assets.
The Setting of Heritage Assets (Historic England, 2017)[11]	Sets out guidance in managing change within the settings of heritage assets, including archaeological remains and historic buildings, sites, areas and landscapes.
Greater London Archaeological Priority Area Guidelines (Historic England, 2016)[12]	Historic England guidance note which defines APAs and the 'tiered' system introduced to denote different levels of sensitivity to development.

Policy, Legislation or Guidance	Description
Standard and Guidance for Commissioning Work or Providing Consultancy Advice on Archaeology and the Historic Environment (CIfA, 2020)[13]	Provides special advice to commissioners of archaeological and other historic environment work to ensure sufficient understanding of ethical, legal and policy requirements.
Standard and Guidance for Historic Environment Desk-Based Assessment (CIfA, 2020)[14]	Guidance which seeks to define good practice for the execution and reporting of desk-based assessment in line with the regulations of Chartered Institute for Archaeologists (CIfA), in particular the Code of Conduct.
Deposit Modelling and Archaeology: Guidance for Mapping Buried Deposits (Historic England, 2020)[15]	Guidance produced to "*help archaeologists working within the context of development-led projects to understand what deposit models are and the benefits that can be gained by using them*".

9.3. CONSULTATION AND ENGAGEMENT

9.3.1. **Table 9-2** provides a summary of the consultation and engagement undertaken in support of the preparation of this assessment. The principal consultee is the Greater London Archaeological Advisory Service (GLAAS). GLAAS provides archaeological advice to most Greater London local planning authorities (LPA), including LBB. The LPA Conservation Officer for Bexley is responsible for providing development control with respect of the built environment.

9.3.2. The EIA Scoping Opinion[16] was received by the Applicant from the Planning Inspectorate on behalf of the Secretary of State on 26th May 2023. The responses from the Planning Inspectorate and statutory consultees, and how these requirements have or will be addressed by the Applicant, are set out in **Appendix 4-2: Scoping Opinion Responses (Volume 3)**.

9.3.3. **Table 9-3** provides a summary of the statutory consultation in relation to the historic environment.

Table 9-2: Historic Environment Consultation and Engagement Summary

Date and Method of Consultation	Consultee	Summary of Key Topics discussed and Key Outcomes
20th and 21st September 2023, Email	GLAAS	The Applicant's consultants, WSP, contacted GLAAS via email on 20th September 2023, setting out the proposed survey methodology and general mitigation strategy approach (in the absence of Site-based evaluation), as presented in the PEIR[17] (see **Section 9.9**). GLAAS responded on 21st September to confirm that it is in broad agreement of the approach. In summary, GLAAS: • stated an update to the geoarchaeological deposit model produced for the Riverside Energy Park Order 2020 by Quest Quaternary Scientific in 2022[18] will be required. The deposit model will need to be related to the proposed pile and pile cap plan and possible remediation areas to inform which parts of the Site would require further mitigation; • requested that the proposed intertidal foreshore survey should be carried out prior to the construction phase. Subsequent foreshore surveys will be required during the construction phase and up to six months after its completion; • stated that the impact from temporary works will also need to be considered, including those associated with anchor chains (see **Paragraph 9.4.3** for scoping of temporary effects). It is anticipated that a community engagement condition would be attached to planning consent, should this be granted (see **Paragraph 9.9.12**); • agreed that, should the Belvedere Power Station Jetty be demolished, a Historic England 'Level 2' historic building recording would be necessary to record the asset prior to its loss. Level 2 recording comprises a descriptive record where the structure will be seen, described and photographed. It includes a drawn record, photography and a written record; and • stated that the low potential for prehistoric period archaeological remains to occur as set out in the PEIR[17] and baseline would need to be tested against the buried deposits model.

Date and Method of Consultation	Consultee	Summary of Key Topics discussed and Key Outcomes
5th October 2023, Email	GLAAS	On 5th October, the Applicant's consultants, WSP, provided a response via email to GLAAS to request clarification on the likely timings of any surveys/mitigation with respect to pre and post application for development consent submission, and to provide further justification for the archaeological potential as set out in the PEIR[17]. WSP suggested that the proposed updated geoarchaeological deposit model is not used prior to submission to inform more extensive intrusive evaluation (e.g. trial trenching) for the purposes of informing design (i.e. through avoidance where significant archaeological remains are identified). Considering the nature of the likely effects (e.g. deep piles or localised shallow ditches), it would be neither feasible nor warranted to carry out such an evaluation (not least which would require very deep stepped/shored trenches). Instead, it was proposed that the deposit model is the final archaeological mitigation, used to map subsurface deposits and subsurface topography across the Site as a whole (including the marine and intertidal areas) for posterity. This post-determination model would update the existing model[18], which presents extensive information on buried sediments and maps the prehistoric terrain beneath superficial deposits of made ground and alluvium, including deeper channels and higher areas which may once have been occupied and vegetated prior to rising water levels. On 6th October, GLAAS agreed that the archaeological deposit model could be produced post-determination under a DCO requirement, once wider geotechnical investigations (GI) have been carried out. GLAAS also agreed that the marine geophysical surveys could be conducted post-determination as a DCO requirement. Once the foreshore survey and geotechnical data has been analysed, the requirements for further mitigation would need to be discussed and agreed.

Table 9-3: Summary of the Statutory Consultation Comments in relation to Historic Environment

Statutory Consultee Comment	Response
London Borough of Bexley	
"*Officers note that the Belvedere Power Station jetty (disused) which is located within the site has been identified as a non-designated heritage asset. The jetty is not locally listed. The heritage value of the disused jetty is outlined within paragraphs 9.6.5-9.6.9 of the PEIR report.* *It is noted further that the jetty may, or may not be demolished as part of the actual scheme. As an identified non-designated heritage asset, it would be preferred if the jetty could be retained and utilised (including any necessary upgrading works) as part of the forthcoming proposals.*"	The potential effects on the heritage significance (value) of the Belvedere Power Station Jetty (disused) resulting from the Proposed Scheme have been assessed in **Section 9.8** for both scenarios (retention and demolition). It is agreed that retention of the Belvedere Power Station Jetty (disused) (with modifications) would result in a lower magnitude of change and significance of historic environment effect to the heritage asset.
"*Impacts upon the setting of designated heritage assets will be required to be fully assessed against the submission scheme. The assessment of any impacts arising as a result of the submission scheme upon the setting the identified designated heritage assets should be undertaken in accordance with Section 66 of the Planning (Listed Buildings and Conservation Areas) Act 1990.*"	Impacts upon the setting of designated heritage assets resulting from the Proposed Scheme are fully assessed in **Section 9.8**.
"*Considerations of the effects at this stage are considered to be premature until the submission scheme has not been set and therefore formally assessed.*"	The assessment of likely effects presented in this ES chapter forms the final heritage assessment for the purposes of the DCO application. The assessment considers the preliminary assessment provided in the PEIR[17] and takes into account the design of the Proposed Scheme as described in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**. Since publication of the PEIR[17], further research and assessment has been carried out to prepare this

Statutory Consultee Comment	Response
	chapter of this ES, and where relevant, the assessment has been updated. As the mitigation strategy remains unchanged, this has not affected the conclusions in respect of the significance of residual effects.

9.4. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

9.4.1. The historic environment assessment of the Proposed Scheme has been undertaken in line with the legislation, policy and guidance described in **Section 9.2** of this chapter.

POTENTIAL SIGNIFICANT EFFECTS

9.4.2. As identified in the EIA Scoping Report[19], the effects arising from the following aspects of the Proposed Scheme are considered to be significant and therefore have been considered further in this assessment:

- Construction Phase:
  - *Demolition of non-designated above ground heritage assets within the Site during the construction phase (i.e. the Belvedere Power Station Jetty (disused), if removed as part of the Proposed Scheme). There are no designated above ground heritage assets present within the Site; and*
  - *Potential physical effects on unknown buried heritage assets within the Site (archaeological remains), including potential submerged remains within the Thames foreshore (marine) and palaeoenvironmental remains.*
- Operation Phase:
  - *Potential permanent effects on designated above ground heritage assets located beyond the Site Boundary and within the Study Area through changes to setting and how the significance of the assets is understood and appreciated; and*
  - *Potential indirect effects on unknown buried heritage assets within the Site (archaeological remains), including potential submerged remains within the Thames foreshore (marine), due to operational activities within the Thames channel and foreshore.*

MATTERS SCOPED OUT

9.4.3. The following effects are considered unlikely to be significant and therefore have not been considered further in this assessment:

- Construction Phase:
  - *Potential temporary, construction phase effects on designated above ground heritage assets located beyond the Site Boundary and within the Study Area. There are no such assets that have been identified within the Site or its immediate vicinity; and*
  - *Setting of non-designated above ground heritage assets not afforded protection in the Local Plan. In line with a proportionate assessment required by NPS EN-1[1] and the NPPF[2], the significance of such assets does not warrant individual settings assessment, particularly as any construction noise or light impact(s) will be temporary. However, assets which are afforded protection in the Local Plan ('locally listed buildings') have been assessed where significant effects are likely to occur.*

- Operation Phase:
  - *Setting of non-designated above ground heritage assets not afforded protection in the Local Plan located beyond the Site Boundary, for the reasons given above in respect of proportionality and heritage significance. However, assets which are afforded protection in the Local Plan ('locally listed buildings') have been assessed where significant effects are likely to occur.*

BASELINE DATA COLLECTION

9.4.4. The key sources of information used for characterising the baseline for the historic environment are:

- National Heritage List for England (NHLE)[20] for information on statutorily designated heritage assets, including scheduled monuments, listed buildings and protected wrecks. The Heritage at Risk register[21] has also been consulted;
- Historic England guidance on decision-taking in the historic environment and for information on APAs[22];
- Greater London Historic Environment Record (GLHER)[23] data for information on past investigations, local knowledge, find spots and documentary and cartographic sources;
- Previous assessments of the Site for information on its archaeological potential, including existing baseline reports for Riverside 1 and Riverside 2 (at the time of writing, construction works for Riverside 2 are being undertaken), archaeological evaluation[24, 25] and watching brief[26] reports and the geoarchaeological deposit model[18];
- National Marine Heritage Record (NMHR)[27] search for information on heritage assets that lie between Mean High Water (MHW) and the 200 nautical mile sea limit, as well as the tidal extent (at MHW spring tides) of rivers, estuaries and creeks;
- United Kingdom Hydrographic Office (UKHO)[28] marine wrecks and obstructions search for the foreshore to identify possible heritage assets, such as hulked marine vessels, within the proposed land reclamation areas;
- LBB's information on APAs, conservation areas and locally listed buildings[29];
- Bexley Local Studies and Archive Centre[30] for historic maps, published journals and local history;
- British Geological Survey (BGS)[31] for geological data;
- Portable Antiquities Scheme[32] for information on archaeological finds found by chance;
- Historic Ordnance Survey maps for information on past land use, assets of heritage interest, and the identification of activities that may have compromised archaeological survival; and
- The internet for web-published local history and the Archaeological Data Service[33].

Site Walkover

9.4.5. The collection of information to inform the baseline for the assessment also included a walkover to determine the topography of the Site and existing land use, and to provide further information on areas of possible past ground disturbance and general Historic environment potential. The walkover extended to selected designated heritage assets located beyond the Site Boundary, based on the digital ZTV and professional judgement, to consider potential impacts to them and their setting (e.g. visible changes to historic character and views). The walkover was undertaken on 3 March 2023.

9.4.6. Due to its location on a private road, the Grade II listed No. 4 Jetty and Approach at Dagenham Dock could not be accessed during the walkover. The Grade II listed No. 4 Jetty and Approach at Dagenham Dock is situated 750m to the northwest of the Site Boundary, on the opposite side of the River Thames to the Site. As a result, photographs of this heritage asset could only be taken from the opposite side of the River Thames. The view from this asset towards the Site could not be photographed.

9.4.7. The internal areas of Crossness Sewage Treatment Works were not accessed during the walkover as it was concluded that this was not necessary to assess the contribution of setting to baseline heritage value. The locally listed 'police box' style concrete structures located here were also not accessed.

9.4.8. The Site walkover did not extend to the intertidal foreshore due to health and safety constraints. The foreshore was viewed at low tide from the England Coast Path (FP3/NCN1).

9.4.9. Further information on the heritage assets visited and viewed during the Site walkover and others is available in **Section 9.6**.

ASSESSMENT METHODOLOGY

9.4.10. Following the characterisation of baseline conditions, and in line with the policy, legislation and guidance set out in **Table 9-1**, the methodology used to characterise the potential likely significant environmental effects on above ground heritage assets and potential buried and submerged heritage assets comprises:

- evaluating the heritage significance (value) of assets, based on existing designations and professional judgment where such resources have no formal designation;
- evaluating the contribution that setting makes to the overall heritage significance (value) of above ground heritage assets that are the subject of the assessment;
- predicting the magnitude of change (impact) upon the known or potential heritage significance (value) of assets and the likelihood and resulting significance of environmental effect;
- considering the mitigation measures that have been included within the Proposed Scheme and any additional mitigation that might be required to avoid, reduce or off-set any significant adverse effects; and

- quantifying any residual effects (those that might remain after the implementation of mitigation).

9.4.11. The assessment presented within this chapter considers potential impacts from the construction and operation of the Proposed Scheme alongside Riverside 1 and Riverside 2.

9.4.12. As set out **in Chapter 2: Site and Proposed Scheme Description (Volume 1)**, two options for the construction programme of the Proposed Scheme are being considered: Option 1 and Option 2. The estimated construction period is approximately 60 months (five years) for Option 1 and approximately 42 months (three and a half years) for Option 2. For the purposes of this assessment, there is considered to be no difference between the two options in terms of predicted effects on the historic environment arising from the Proposed Scheme, with the only difference being the time during which any impacts will occur.

9.4.13. As set out in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**, two options for the design of the Carbon Capture Facility are being considered. One option is for individual lines to be connected to the exhaust stacks for Riverside 1 and Riverside 2, with two individual Stack(s) for the Carbon Capture Facility. A second option is for the two lines from Riverside 1 and Riverside 2 to be combined into a single Stack at the Carbon Capture Facility. For the purposes of this assessment, there is considered to be no difference between the two options in terms of predicted effects on the arising from the Proposed Scheme.

9.4.14. As set out in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**, the choice between demolition or retention of the Belvedere Power Station Jetty (disused) is being considered. For the purposes of the assessment presented in this chapter, demolition of the Belvedere Power Station Jetty (disused) is considered to be the worst case scenario in terms of predicted impacts and effects on the historic environment arising from the Proposed Scheme. However, in the event that the Belvedere Power Station Jetty (disused) is retained, the assessment presented in this chapter also considers changes to historic setting once the Proposed Scheme has been constructed, effecting the heritage significance (value) of this asset.

SIGNIFICANCE CRITERIA

Value of Heritage Asset

9.4.15. Since publication of the PEIR, the terminology used for ‘heritage significance’ within this chapter has been changed. This is to align with the terminology as defined in the EN-1[1] and the NPPF[2] and to avoid confusion with EIA terminology for the ‘significance’ of environmental effect. Therefore, for the purposes of this chapter, heritage ‘value’ is referred to as ‘heritage significance (value)’ hereafter.

9.4.16. EN-1[1] (Paragraph 5.9.3) defines heritage assets as those elements of the Historic environment that hold heritage significance (value) to this and future generations because of their historic, archaeological, architectural or artistic interest. Heritage

significance (value) derives not only from a heritage asset's physical presence, but also from its setting.

9.4.17. Each asset is evaluated against the range of these criteria on a case-by-case basis. Unless the nature and exact extent of buried and submerged archaeological remains within any given area has been determined through prior investigation, heritage significance (value) is often uncertain.

9.4.18. In relation to heritage assets, the assessment considers the contribution that the historic character and setting makes to the overall heritage significance (value) of the asset.

9.4.19. **Table 9-4** below gives examples of the heritage significance (value) of designated and non-designated heritage assets.

Table 9-4: Heritage Significance (Value)

Significance (Value)	Heritage Asset Description
Very High	• World Heritage Sites.
High	• Scheduled Monuments; • Grade I Listed Buildings; • Grade II* Listed Buildings; • Grade II Listed Buildings (with exceptional qualities in fabric, historical association, and/or association/group value with heritage assets of high value); • Protected Wrecks; • Registered Battlefields; • Conservation Areas (containing very important Listed Buildings (Grade I / II*)); • Grade I and II* Registered Parks and Gardens; • Protected Heritage Landscapes (e.g., ancient woodland or historic hedgerows, heritage Sites of Special Scientific Interest); • Burial Grounds; and • Non-designated Heritage Assets ((above ground structures, landscape, townscape, buried and submerged remains, including hulked marine vessels) of national importance).
Medium	• Grade II Listed Buildings (which can be shown to have qualities in their fabric or historical association of regional importance only); • Conservation Areas (containing primarily Grade II listed or Locally Listed Buildings);

Significance (Value)	Heritage Asset Description
	• Grade II Registered Parks and Gardens; • Locally Listed Buildings (of exceptional quality); and • Non-designated Heritage Assets ((above ground structures, landscape, townscape, buried and submerged remains, including hulked marine vessels) of regional importance).
Low	• Non-designated Heritage Assets ((above ground structures, landscape, townscape, buried and submerged remains, including hulked marine vessels) of local importance); and • Locally Listed Buildings.
Negligible	• Items with no significant heritage value or interest.
Uncertain	• Heritage assets that have a clear potential, but for which current knowledge is insufficient to allow value to be determined.

Magnitude of Change

9.4.20. The determination of magnitude of change upon the heritage significance (value) of known or potential heritage assets is based on the severity of the likely impact, such as physical impacts on built heritage assets, or the permanent presence of new structures that result in impacts to the setting of heritage assets.

9.4.21. **Table 9-5** below presents the criteria to be used in this assessment to determine the magnitude of change.

Table 9-5: Historic Environment Magnitude of Change

Magnitude of Change	Description of Change
High	• Complete removal of asset; • Change to asset significance (value) resulting in a fundamental change in our ability to understand and appreciate the resource and its historical context, character and setting; • The transformation of an asset's setting in a way that fundamentally compromises its ability to be understood or appreciated; and • The scale of change would be such that it could result in a designated asset being undesignated or having its level of designation lowered.
Medium	• Change to asset significance (value) resulting in an appreciable change in our ability to understand and appreciate the asset and its historical context, character and setting; and

Magnitude of Change	Description of Change
	• Notable alterations to the setting of an asset that affect our appreciation of it and its significance (value); or the unrecorded loss of archaeological interest.
Low	• Change to asset significance (value) resulting in a small change in our ability to understand and appreciate the asset and its historical context, character and setting.
Negligible	• Negligible change or no material change to asset significance (value); and • No real change in our ability to understand and appreciate the asset and its historical context, character and setting.
Uncertain	• Level of survival/condition of resource in specific locations is not known, and magnitude of change is therefore not known.
No Change	• No change to asset significance (value).

Significance Criteria

9.4.22. The assessment of potential likely significant effects considers both the construction and operation phases of the Proposed Scheme. The significance level of each effect has been assessed based on the heritage significance (value) of the affected sensitive receptor (heritage asset) and the magnitude of change (impact) to the heritage significance (value) of the receptor due to the Proposed Scheme (outlined in **Table 9-6** below). The significance of effect terminology used in **Table 9-6** is consistent with the matrix for Determining Significance of Effect shown in **Chapter 4: EIA Methodology (Volume 1)**. However, 'heritage significance (value)' is used in place for 'sensitivity' in this chapter.

9.4.23. Effects may be either 'Adverse' or 'Beneficial' and are defined initially without additional mitigation; residual effects are then identified following the application of any appropriate additional mitigation. This table is a guide only, so that the process is transparent; the rationale for the effect scores is provided in the relevant sections. Where the resulting effect comprises two separate significance levels (i.e. 'Moderate or Minor' or 'Minor or Negligible') professional judgement has been applied to select the most appropriate significance of effect.

9.4.24. Where information is insufficient to be able to quantify either the asset heritage significance (value) or magnitude of change with any degree of certainty, the effect is given as 'Uncertain'. This might be the case for possible buried and submerged heritage assets, the presence, nature, date, extent and heritage significance (value) of which is uncertain due to the absence of any site-based investigation.

Table 9-6: Significance of Historic Environment Effect

		Heritage Asset (Receptor) Heritage Significance (Value)					
		Very High	High	Medium	Low	Negligible	Uncertain
Magnitude of Change (Impact)	High	Major	Major	Major or Moderate	Moderate or Minor	Negligible	Uncertain
	Medium	Major or Moderate	Major or Moderate	Major or Moderate	Minor	Negligible	Uncertain
	Low	Moderate or Minor	Moderate or Minor	Minor	Minor	Negligible	Uncertain
	Negligible	Minor or Negligible	Minor or Negligible	Negligible	Negligible	Negligible	Uncertain
	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain	Uncertain

9.4.25. The following terms have been used to define the significance of the effects identified:

- **Major Effect** – where the Proposed Scheme could be expected to have a considerable effect (either beneficial or adverse) on a heritage asset (receptor). For the historic environment, within EN-1[1] and NPPF[2], this generally (but does not always – this is considered separately as discussed below) equates to substantial harm to, or loss of, heritage significance (value) of an asset of very high, high or medium heritage significance (value), as a result of changes to its physical form or setting.
- **Moderate Effect** – where the Proposed Scheme could be expected to have a noticeable effect (either beneficial or adverse) on a heritage asset (receptor). For the historic environment this generally equates to less than substantial harm to the heritage significance (value) of an asset of very high, high or medium heritage significance (value), as a result of changes to its physical form or setting.
- **Minor Effect** – where the Proposed Scheme could be expected to result in a small, barely noticeable effect (either beneficial or adverse) on a heritage asset (receptor). For the historic environment this generally equates to less than substantial harm to the heritage significance (value) of an asset of very high, high or medium heritage significance (value), as a result of changes to its physical form or setting, or substantial harm to, or the loss of, heritage significance (value) of an asset of low significance.
- **Negligible** – where no discernible effect is expected as a result of the Proposed Scheme on heritage assets.

9.4.26. The Historic Environment Desk Based Assessment (HEBDA) (**Appendix 9-1 Historic Environment Desk-Based Assessment (Volume 3)**) includes an assessment of harm in accordance with NPS EN-1[1] (notably Paragraph 5.9.25 to 5.9.32) and NPPF[2].

9.4.27. Effects classified as Moderate or above are considered to be 'significant'. Effects classified as Minor or below are considered to be 'not significant' in EIA terms.

9.5. STUDY AREA

9.5.1. In order to determine the full historic environment potential within the Site, a broad range of standard documentary and cartographic sources, including results from any archaeological investigations within approximately 1km of the Site Boundary, have been examined. These sources have been used to determine the likely nature, extent, preservation and significance (value) of any known or possible buried and submerged heritage assets that may be present within, or adjacent to, the Site, including the foreshore and marine areas. Where appropriate, reference has been made to key heritage assets beyond the Study Areas.

9.5.2. The Study Areas for the above ground heritage asset settings assessment comprise:

- Designated above ground heritage assets up to 1km from the Site Boundary. This Study Area has been informed by a digital ZTV which indicates likely visibility of the Proposed Scheme within the surrounding area. Professional judgement has been applied when scoping designated heritage assets potentially affected through changes to setting. This is to ensure that the setting of designated heritage assets is taken into consideration. Details of the proposed digital ZTV are outlined in **Chapter 10: Townscape and Visual (Volume 1)**.
- Non-designated above ground heritage assets up to approximately 500m from the Site Boundary, specifically locally listed buildings. The nearest non-designated above ground heritage asset is an early 20th century concrete structure, similar in style to a police box, approximately 450m to the west of the Site Boundary, which is a locally listed building. Due to its nature and location, this asset has been scoped out of the settings assessment, as per the EIA Scoping Report[19].

9.5.3. The approximate 1km and 500m Study Areas are shown in **Figure 9-1: Historic Environment Study Area (Volume 2)**.

SENSITIVE RECEPTORS

9.5.4. The Site does not contain any statutorily designated (protected) heritage assets, such as scheduled monuments, listed buildings or registered parks and gardens. The Site does not lie within a conservation area. No locally listed buildings are situated within the Site Boundary.

9.5.5. Known and predicted sensitive receptors are set out in **Section 9.6**. Broadly, historic environment receptors relevant to the Proposed Scheme comprise of the following Study Areas:

- designated above ground heritage assets within approximately 1km of the Site Boundary;
- locally listed above ground heritage assets within approximately 500m of the Site Boundary;
- non-designated above ground heritage assets within the Site; and
- previously unrecorded non-designated below ground heritage assets (archaeological remains) within the Site (including within the marine/intertidal zone).

9.6. BASELINE CONDITIONS AND FUTURE BASELINE

BASELINE

9.6.1. The baseline, chronological background and historic mapping is set out in detail in **Appendix 9-1: Historic Environment Desk-Based Assessment (Volume 3)**. Heritage assets scoped out from further assessment are also discussed in **Appendix 9-1: Historic Environment Desk-Based Assessment (Volume 3)** for context. This section provides a brief chronological summary.

9.6.2. Heritage assets are referenced by their unique asset number (e.g. **A1**, **A2** etc.) as shown on **Figure 9-2: Historic Environment Features Map (Volume 2)**, which shows their location in relation to the Site. Historic environment features located within the Site have reference numbers starting with '**A1**' followed by a lower-case letter (**A1a**, **A1b** etc.).

9.6.3. A statement of heritage significance (value) is outlined in **Table 9-7** below in the context of the baseline.

Topography and Geology

9.6.4. The Site is located on the modern waterfront of the southern bank of the River Thames, within a former wide floodplain of the estuarine Thames. Formerly, the floodplain comprised localised areas of gravel highs interwoven by wetland, marsh and channels. As sea and river levels rose over the last ten thousand years, the floodplain would have been inundated with increasing frequency, infilling channels with alluvium and overtopping the islands from the prehistoric period onwards. Evidence for prehistoric and early historic human occupation is therefore most likely on areas of higher ground, and structures relating to channel management, fishing, fowling and environmental remains preserved in areas of lower ground. During the medieval period, wetlands were drained and reclaimed to be used as pasture.

9.6.5. Current ground level within the undeveloped part of the marsh, which is low-lying and prone to flooding, lies at around 1.0m Above Ordnance Datum (AOD). Riverside 1 lies at 1.2m to 2.0m AOD suggesting around 0.2–1.0m of ground raising (reflected in the distribution of modern made ground; see **Paragraph 9.6.7** below). The river wall is an artificial embankment at 6.0m AOD. Ditches within the Site are at around –1.0m AOD.

9.6.6. Current ground levels do not reflect the natural topography of the Thames floodplain. This is reflected in the levels of the underlying Gravel geology, which is deeply buried beneath successive layers of alluvial flood deposits and recent made ground in the northern part of the Site. The geoarchaeological deposit model produced by Quest in 2022 for Riverside 2 and surrounding area was based on nearly 150 geotechnical logs and ground investigation undertaken in the foreshore[18]. The subsurface topography of the Site is known from the deposit model to undulate between Gravel highs and deeper channels of a braided River Thames.

9.6.7. The Quest deposit model[18] provides a valuable insight into the subsurface topography and the nature of the deposits in the northern, terrestrial, part of the Site. There is currently insufficient borehole data to extend the model across the southern part of the Site. The nature of the deposits in the north comprise the following:

- Made ground is present in the northern part of the Site in the area of Riverside 1 and Riverside 2, and along the eastern part of the Site (in the Creekside, Munster Joinery and Gannon land parcels) where an electrical substation was previously located. The made ground is typically 1.0m thick. It is likely to be modern but in some areas the deposit may be of archaeological interest and associated with post-medieval industrial buildings in this part of the Site.
- The top of untruncated upper alluvium in the northern part of the Site (i.e. the Riverside 1, Riverside 2 and East Paddock land parcels) lies at 1.0m to –1.0m OD (up to 3.0mbgl in the area of the developed part of the Site).
- A layer of peat, representing the rotted vegetation of a former dry land surface (radiocarbon dated to the late Neolithic to Bronze Age) lies across the northern part of the Site and is thicker in the north-east. The top of the peat lies at –1.0m to –3.0m OD (2.0–5.0mbgl depending on whether modern made ground is present).
- The top of the untruncated Shepperton Gravel that defines the subsurface topography in the northern part of the Site lies at –6.0m to –10.0m OD (7.0m to 12.0mbgl depending on whether modern made ground is present). The deeper levels reflect a palaeochannel in the eastern part of the Site[18].

9.6.8. The higher areas, where peat is encountered, which might have been suitable for occupation and other activities in the prehistoric, are located in the northwestern (Riverside 2) and central (Borax North, Borax South and Norman Road Field land parcels) parts of the Site. The potential for the southern half would need to be clarified with an extension of the deposit model to this area.

9.6.9. Early prehistoric remains might potentially be encountered at the base of the alluvial sequence and cut into the underlying Gravel. Mesolithic to Bronze Age remains would be around the level that peat is recorded. During the Iron Age and Roman period, the Site was likely prone to regular inundation with rising water levels. Medieval and post-medieval remains, following drainage and reclamation of the marsh, would be at the upper part/cut into the top of the alluvial sequence.

Past Archaeological Investigations

9.6.10. An archaeological trial trench evaluation was undertaken within the northern part of the Site in 2007[25] (**A1a**). The nine trenches measured 4m by 4m and were shored to enable archaeological investigation to a depth of 5.0–6.0m. Mechanical excavation was subsequently undertaken to reach a depth of 9.0m. This revealed an alluvial sequence including a band of peat over Gravel and capped by modern made ground. Column and bulk samples were taken from each trench and the peat assessed as likely to be Early Neolithic to Iron Age in date.

9.6.11. A single unstratified rim sherd of a Roman greyware necked jar (pottery), dated to AD 60–160, was recovered from the top of the alluvial sequence and was likely deposited by water action[25]. No other archaeological remains were encountered. It was concluded that the lack of archaeological evidence predating the post-medieval period may indicate the Site's unsuitability for human occupation due to wet, marshy conditions, although it is noted here that the nine trenches represent a less than 1% sample of the current Site and may not be reflective of the potential for prehistoric and Roman remains. Made ground dating to the 19th and 20th centuries was encountered in all of the trenches, and elements likely relating to the former 20th century Borax Works were identified. These could not be investigated further due to contaminants within the made ground. No evidence of a medieval revetment or sea wall was encountered. Within the alluvial deposits, the remains of fallen trees suggest a probably Bronze Age alder carr landscape (waterlogged and wooded terrain).

9.6.12. In 2007, an archaeological evaluation was undertaken at three locations in and around Crossness Sewage Treatment Works to the west of the Site[24], and a single trench was excavated in the southwestern corner of the Site (**A1i**). A peat layer was identified at between –1.6m OD and –2.1m OD, and a lens of clayey silt was identified within this layer, potentially representing a short period of marine transgression. The peat layer was sealed by a darker layer of peat which contained small pieces of wood. A "*mid yellowish brown*" deposit overlay this and may relate to the medieval and post-medieval utilisation and drainage of the marshes. Overlying this was a topsoil layer. No evidence of human activity was encountered.

9.6.13. Groundworks subsequently undertaken at that location revealed several driven timber posts, which were archaeologically evaluated in 2010[26]. Of the nine posts which were unearthed, only one remained in-situ in a vertical position. The top of this post was located 0.6mbgl. The posts were generally in good condition. They had been squared off and tapered at their base to form a sharp point, although there was no evidence of prehistoric-type axe marks. The posts were arranged in a straight line on a north-northeast to southwest alignment, indicative of a fence line which likely continues beyond the excavated site. It was concluded that the posts are most likely to be of post-medieval origin.

Chronological Overview

9.6.14. In the early prehistoric, prior to rising water levels, higher parts of the floodplain may have been suitable for settlement and other activity, whilst the low-lying areas and braided channels were likely exploited for a broad range of wetland resources, now deeply buried and, where present, preserved within waterlogged alluvial deposits.

9.6.15. Throughout the Holocene period (the last 10,000 years) the Site would have lain within intertidal marshland on the broad Thames floodplain. Prior to rising water levels in the later prehistoric, the river would have been a braided channel flowing between higher islands on the floodplain that would have been suitable for dry land activities, possibly including temporary or permanent settlement. The low-lying marsh is likely to have been exploited for a broad range of economic resources during the late prehistoric and Roman periods, including salt (from evaporation), pottery (from alluvial clays), reeds (basketry and thatch) as well and providing a predictable source of water and food from fishing and hunting. As water levels rose, settlement and other activity would have moved off the floodplain onto the higher ground.

9.6.16. During the medieval period (AD 1066–1540), the Site would have lain within the manor of Lesnes. The Augustinian Abbey at Lesnes, the remains of which lie 1.6km to the southwest of the Site, was founded in the 12th century and, by the end of the 13th century, sea walls had been constructed and much of the marshland had been reclaimed in order to create suitable land for rearing animals and cultivating crops. The reclamation of the Erith Marshes likely took place in stages, with several sea walls being built successively. It is therefore probable that different parts of the Site were reclaimed at different times, with the northernmost terrestrial part of the Site potentially reclaimed in the late medieval or early post-medieval period.

9.6.17. A network of drainage ditches would have divided the marshland into individual parcels. Within these, activities such as arable cultivation and animal husbandry would have taken place. This landscape may also have been used for brick and pottery manufacture. However, the marshland was still regularly flooded, occasionally laying the pasture to waste.

9.6.18. Norman Road, which runs along the eastern part of the Site, was originally called Picardy Manorway, named after the former manor house of Picardy located 1km to the south of the Site. The trackway would have served both as a flood defence and also as a raised droveway, used for transporting livestock between the marshland and the higher ground to the south.

9.6.19. Lesnes Abbey, along with many other monasteries, was suppressed in 1524 and its land sold. Partially due to a lack of maintenance, the manmade embankments along this part of the River Thames repeatedly burst in the following years. A map of 1588 (not reproduced) shows the location of two breaches of the embankments which had occurred between Erith and Woolwich. The larger of the two, labelled "*the great Breache*" appears to have taken place in and around the Site and had not been repaired by this date. This is likely to have been referring to a flooding event in 1530 when the Thames breached the marsh walls at Plumstead, Lesnes and Erith. Repairs

were eventually made in the 17th century and a set-back wall was built around the hole which had been scoured out by tidal waters during the breach[34].

9.6.20. A "*Powder House*" is shown within the Site on the Andrews, Dury and Herbert 1769 map of Kent (Figure 8 in **Appendix 9-1: Historic Environment Desk-Based Assessment (Volume 3)**). The Erith tithe map of 1843 (Figure 10 in **Appendix 9-1: Historic Environment Desk-Based Assessment (Volume 3)**) shows a "*House & Garden*" and "*Magazine & Grounds"*) within the western corner of the Site. Industrial development took place in the northern part of the Site in the second half of the 19th century, including a manure works, the "*Thames Fish, Guano & Oil Works*, *Belvedere Mills"* and associated piers and jetties. These were all anti-social and/or dangerous activities located well away from any settlement centres. Borax Consolidated, a chemical manufacturer, took the site over in 1899, with borax being transported to the processing plant by river. A small number of houses are shown in the northern part of the Site during this time, likely for the workers.

9.6.21. Industrial activity within the Site continued into the mid-20th century, with "*Belvedere Mills"* expanding. A large electrical substation was constructed in the southern part of the Site, to the west of Norman Road. The Borax works closed in 1990 and the majority of the industrial buildings in the northern part of the Site were subsequently demolished. The electrical substation was demolished in 2010–11.

Factors Affecting Archaeological Survival

9.6.22. The waterlogged conditions of the intertidal part of the Site and the marshland within which much of the Site is located, particularly where alluvium is present, are conducive to high levels of preservation of organic materials, including any wooden structures. Prehistoric wooden trackways, for example, have been discovered in this part of the Thames estuary and where prehistoric remains are present, these could be buried at substantial depth, at the interface between peat and upper clay.

9.6.23. Archaeological survival is anticipated to be varied across the Site. It will be high in the undeveloped areas and variable in the developed areas (i.e. the Riverside 1, Riverside 2, Borax North, Borax South, Creekside, Munster Joinery and Gannon land parcels). Within the former, the lack of past development suggests the potential for undisturbed archaeological remains.

9.6.24. Archaeological survival in the northern terrestrial part of the Site, which has seen significant 19th and 20th century industrial and limited residential development, is expected to be low for near-surface remains due to the increased thickness of made ground. The same is expected to be true in the south-eastern part of the Site where the former electrical substation was situated[a]. Across the Site, the level of survival for earlier remains (i.e. palaeoenvironmental and/or prehistoric remains) will be high. The foundations of works buildings and tanks dating to the 20th century will have

[a] This is referring to the large substation situated here from the mid-20th century to 2010-11, rather than the existing small substation in the south-eastern corner of the Site.

compromised the survival of deeper, earlier, remains, within the footprint of concrete piled foundations; the severity of this impact is dependent on pile size and density, which is not currently known. Late 19th century and early 20th century buildings here may also have had very deep brick footings or timber pile foundations.

9.6.25. The primary impact from modern buildings derives from foundations, areas of hardstanding, and site preparation/historic demolition which would have partially truncated or removed potential shallow remains within the footprint of the works. The construction of roads, jetties, piers and pylons and the excavation of drains and for services would also likely have involved the truncation and/or removal of any near-surface archaeological remains in these locations. Archaeological survival of near-surface remains is also expected to be low for the Borax North and Borax South areas to the west of Norman Road, which were previously used as laydown areas and have recently been stripped of topsoil again. However, building foundations would have had minimal impact on potential archaeological remains preserved at substantial depths.

9.6.26. The southwestern part of the Site and the area to the west of the northern end of Norman Road appear to have remained largely free from modern disturbance. Archaeological survival of medieval/post-medieval remains that might be at the top of the alluvial sequence is therefore expected to be higher in these parts of the Site.

9.6.27. With respect to the intertidal foreshore and channel, archaeological survival is uncertain. Erosion in the Thames, both natural and resulting from activities such as propeller wash and anchoring, is likely to have impacted the archaeological resource within the intertidal and marine zones of the Site. Localised dredging for the Middleton Jetty in the form of injection dredging is known to have occurred within the Site but there are currently no records of large-scale capital dredging undertaken by the PLA in this area. Elsewhere, deposition may have occurred which would bury and thus preserve archaeological remains. The extent to which intertidal action has eroded/scoured out or buried possible archaeological remains is not currently known.

Above Ground Heritage Assets

9.6.28. This section includes details of the degree to which setting makes a contribution to the heritage significance (value) of above ground heritage assets, in line with Historic England's 2017 guidance on settings assessment[11].

9.6.29. Following Historic England guidance[11], assets have been scoped out where their heritage significance (value) would not be affected by the Proposed Scheme, in terms of material changes to their setting and how the asset is understood and appreciated (see **Section 7** of **Appendix 9-1: Historic Environment Desk Based Assessment (Volume 3)** for a full list of assets scoped out). This is based on the distance of the asset from the Site Boundary, the asset's location, scale and orientation, and the nature, extent and scale of intervening built form, vegetation and topography between asset and the Site. This includes the Lesnes Abbey scheduled monument and Grade II listed building (**A96**) 1.6km to the southwest of the Site Boundary.

Belvedere Power Station Jetty (disused)

9.6.30. There is one above ground heritage asset within the Site. This is the Belvedere Power Station Jetty (disused) (**A1g**), which is a non-designated heritage asset. This asset is not locally listed.

9.6.31. The Belvedere Power Station Jetty (disused) in the northeast of the Site first appears on the 1966–69 6": mile Ordnance Survey map (Figure 14 in **Appendix 9-1: Historic Environment Desk-Based Assessment (Volume 3)**) and was a fuelling jetty likely constructed between 1954 and 1960 at the same time as the rest of the power station to the immediate east of the Site. This Jetty is disused at the time of writing and may be demolished or retained as part of the Proposed Scheme, as described in **Chapter 2: Site and Proposed Scheme Description (Volume 1)**.

9.6.32. The heritage significance (value) of the Belvedere Power Station Jetty (disused) is derived from its historic interest as the last surviving element of the former Belvedere Power Station. It is a good example of a post-war industrial jetty, constructed of both concrete and timber. A two-storey brick-built structure sits on the centre of the Belvedere Power Station Jetty and a metal loading bridge with concrete supports connects it to the land. Two octagonal plan concrete and timber dolphins are situated off both ends of the Belvedere Power Station Jetty (disused). The Ordnance Survey 1:1,250 scale map of 1963–64 (not reproduced) shows that the dolphins were used to house navigation lights. Cranes and bollards are also labelled on the Belvedere Power Station Jetty (disused) on this map.

9.6.33. As a non-designated heritage asset of local importance, this Jetty is an asset of **Low** heritage significance (value).

9.6.34. The Belvedere Power Station Jetty (disused) is defined and experienced by its industrial location and its visual and functional relationship with the River Thames. The Belvedere Power Station Jetty (disused) is located on the southern foreshore of the River Thames, where it is visible from the north foreshore and the England Coast Path (FP3/NCN1) along the south bank. Although its historic setting has been diminished by the demolition of the associated Belvedere Power Station, this Jetty retains its relationship with the River Thames and the surrounding industrial landscape. The setting of the Belvedere Power Station Jetty (disused) makes a medium contribution to the asset's heritage significance (value).

Crossness Pumping Station

9.6.35. There are four separate designated heritage assets at Crossness Sewage Treatment Works, the closest of which is located approximately 780m to the west of the Site, comprising three listed buildings (**A2**–**4**) and the Crossness Conservation Area (**A6**). At Crossness Sewage Treatment Works, the sewage was pumped into the River Thames just after high tide and carried out into the North Sea. A large underground reservoir was constructed so the sewage could be stored until high tide. The Crossness Sewage Treatment Works were designed by Sir Joseph Bazalgette, the chief engineer of London's Metropolitan Board of Works, and architect Charles Henry Driver, in the 1860s in an attempt to solve London's sanitation problem. Bazalgette

was also responsible for the sewage works on the north side of the River Thames at Barking.

9.6.36. Originally the Crossness Sewage Treatment Works comprised the Grade I listed Victorian Romanesque style engine house and 6.5 acres of storage tanks. Other buildings at the works included workshops, outbuildings and houses for the workmen. A 63m tall chimney, in the form of a campanile, formerly stood within the Crossness Sewage Treatment Works. Sedimentation channels were introduced in 1887 to separate the solid sludge from the liquid effluent. Only the latter was discharged into the Thames thereafter. The modern sewage treatment plant began operation in 1963, making use of large reinforced concrete primary sludge digestion tanks[35].

Workshop Range to South East of Main Engine House (A2)

9.6.37. The Workshop Range to South East of Main Engine House at Crossness Pumping Station (**A2**) dates to the 1860s and was built by William Webster to the designs of Sir Joseph Bazalgette and Charles Henry Driver. The building is constructed of yellow brick in a Flemish bond.

9.6.38. The asset has historic and architectural interest as a component part of a Victorian pumping station, designed to improve the disposal of sewage required by the ever-growing population of London. Its historic interest is enhanced by its connection to Bazalgette. It was listed at Grade II in 1990 (NHLE ref: 1064216). As a Grade II listed building it is a heritage asset of **Medium** heritage significance (value), although it is associated with a Grade I listed building as described below (**A3**).

Crossness Pumping Station (A3)

9.6.39. Crossness Pumping Station (**A3**) dates to 1865 and was built to the designs of Sir Joseph Bazalgette. The building is of two storeys and constructed of yellow brick. It contains four beam engines by James Watt and Co, which were converted from single to twin cylinders in 1909-10[29]. The asset has high historic and architectural interest as an outstanding example of a Victorian pumping station, designed to improve the disposal of sewage and meet the needs of the ever-growing population of London. Its historic interest is enhanced by its connection to Bazalgette. It was listed at Grade I in 1970 (NHLE ref: 1064241). As a Grade I listed building it is a heritage asset of **High** heritage significance (value).

Workshop Range to South West of Main Engine House (A4)

9.6.40. Workshop Range to South West of Main Engine House at Crossness Pumping Station (**A4**) is a Grade II listed building dating to the 1860s and was built by William Webster to the designs of Sir Joseph Bazalgette and Charles Henry Driver. The building is constructed of yellow brick in a Flemish bond.

9.6.41. The asset has historic and architectural interest as a component part of a Victorian pumping station, designed to improve the disposal of sewage required by the ever-growing population of London. Its historic interest is enhanced by its connection to Bazalgette. It was listed at Grade II in 1990 (NHLE ref: 1250557). As a Grade II listed building it is a heritage asset of **Medium** heritage significance (value), although it is associated with a Grade I listed building as described above (**A3**).

Crossness Conservation Area (A6)

9.6.42. Crossness Conservation Area (**A6**) incorporates the Crossness Pumping Station heritage assets described above. Other heritage assets within the Conservation Area include the brick vaulted subterranean reservoir, the storm water pumping station, the centrifugal engine house and the precipitation engine house. The Conservation Area was designated in 1997 and is described by LBB as *"South East London's most important site for industrial archaeology"*[29].

9.6.43. The setting of the Crossness Conservation Area is defined by its relationship to the listed buildings at Crossness Sewage Works and by the relationship of these buildings to each other. The setting of the asset is also defined by its location on the Thames riverside and the surrounding remnants of the original rural landscape. The most significant views are outlined in the Conservation Area Appraisal and Management Plan, including those from the River Thames and the ECP/NCN1 towards the listed buildings; the view from Crossness Pumping Station to the south; the view from the open space to the west towards the conservation area; and the view to the northeast along the entrance driveway towards the listed buildings. However, the concrete river flood defence wall (which stands 2.5–3.0m AOD) to the north of the listed buildings obscures historic views of the River Thames. As stated in the Conservation Area Appraisal and Management Plan[29], this wall has *"partially severed"* the link between the buildings and the River Thames. Therefore, taken overall, the asset's setting makes a medium contribution to its heritage significance (value).

No. 4 Jetty and Approach

9.6.44. No. 4 Jetty and Approach (**A5**), formerly at Samuel Williams and Company, Dagenham Dock, was constructed between 1899 and 1903 to designs by L.G. Mouchel & Partners and extended in 1906-07. No. 4 Jetty, which is situated approximately 750m to the northwest of the Site Boundary, has historic interest as being among Britain's earliest surviving reinforced-concrete structures that uses Samuel Williams' patented system for the horizontal casting of reinforced-concrete piles. It was listed at Grade II in 2006 (NHLE ref: 1391706). As a Grade II listed building it is a heritage asset of **Medium** heritage significance (value).

9.6.45. The setting of No. 4 Jetty and Approach (**A5**) is experienced by its industrial location at Dagenham Dock on the north bank of the River Thames. The asset is defined by its relationship to the wider group of jetties, warehouses and other industrial buildings at Dagenham Dock. The setting of No. 4 Jetty makes a medium contribution to its heritage significance (value), as it retains its historical relationship to the River Thames to the south and the industrial landscape of Dagenham Dock to the north.

Below Ground Heritage Assets (Archaeological Remains)

9.6.46. **Table 9-7** below lists the known or possible buried heritage assets (sensitive receptors) that have been identified as having the potential for significant effects. The table includes those assets with unknown, moderate and high potential to be present within the Site. Archaeological remains that are not predicted to be present (i.e. low potential) are not included in **Table 9-7** and have not been assessed further, as described in **Section 9.4** above.

Table 9-7: Known or Predicted Heritage Assets and Likely Heritage Significance (Value)[b]

Known or Possible Buried Heritage Asset (sensitive receptor)		Heritage Significance (Value)
Palaeo-environmental Remains	There is a known potential for palaeoenvironmental remains to survive within the Site (including the foreshore and marine areas within the Site Boundary) based on previous investigations within the Site and surrounding area. It is likely that any environmental evidence within the lower part of the deposit sequence (e.g. within peat and the lower clay) would remain intact due to their depth. Alluvium (clay/silt) and peat deposits may contain well-preserved environmental remains. Minerogenic deposits such as alluvial silts and clays have potential for the preservation of diatoms, ostracods and molluscs, the assessment of which can provide information on the salt or freshwater nature of deposits. Peat deposits preserve pollen, seeds and plant fragments, and can also be dated by radiocarbon techniques, important for establishing the chronology for the depositional sequence. It is likely that environmental evidence is present within Holocene alluvium.	Due to the likelihood of organic preservation and peat, palaeo-environmental remains would be of **Medium** heritage significance (value). Such remains have evidential value for the past environment in which prehistoric and later people lived with heritage value deriving from archaeological interest.
Previously unrecorded	There is uncertain, possibly low to moderate, potential for prehistoric remains. During the early prehistoric parts	Evidence of early prehistoric occupation and

[b] Where relevant, the potential for possible marine remains within the River Thames and intertidal area is included within each period of Table 9-7.

Known or Possible Buried Heritage Asset (sensitive receptor)		Heritage Significance (Value)
prehistoric remains	of the Site would have been dry ground suitable for permanent occupation, as suggested by the presence of peat. By the Iron Age the Site would have been prone to flooding. The area would have been suitable for a variety of subsistence activities as the riverside location would have provided opportunities for the exploitation of natural resources. Such remains would be deeply buried at the base of the alluvial sequence (7.0—12.0mbgl). A trial trench evaluation in the northern part of the Site revealed no evidence of human activity, although this represents a small sample (less than 1%) of the overall current Site area and may not be reflective of the potential of the entire Site.[25]	early/later prehistoric utilisation of the marshes (timber trackways, hulked vessels, etc) would be of **High** heritage significance (value), if present.
Previously unrecorded Roman remains	There is uncertain, but possibly low to moderate, potential for Roman remains. During this period the Site would have been prone to flooding but suitable for a variety of subsistence activities, as during the prehistoric period. In some parts of the Lower Thames estuary production of salt (from evaporation), fish processing and pottery manufacture (using alluvial clay) was carried out in the intertidal marsh. Such remains would be deeply buried at the base of the alluvial sequence (7.0—12.0mbgl). A trial trench evaluation in the northern part of the Site revealed a single Roman pottery sherd, although this represents a small sample (less than 1%) of the overall current Site area and may not be reflective of the potential of the entire Site.	Evidence of Roman utilisation of the marshes and industrial processes (salt, pottery and fish) would be of **High** heritage significance (value), if present.
Previously unrecorded medieval remains	There is high potential for medieval remains associated with reclamation, drainage and water management. Norman Road is a flood defence embankment and drove road that is likely to have origins in this period.	Remains associated with medieval reclamation and water management would be of **Low** heritage significance (value). Structural remains

Known or Possible Buried Heritage Asset (sensitive receptor)		Heritage Significance (Value)
		associated with flood defences (timber revetments for example) might be of **Medium** heritage significance (value), if present.
Post-medieval and modern remains	There is a high potential for post-medieval and modern (20th century) remains to survive within the Site, in the form of foundations of an 18th century powder house (which exploded and survival is not known), along with 19th century and later anti-social and/or dangerous industrial activities. Elsewhere there is potential for evidence of reclamation, river and flood defences and water management including drainage ditches. Within the foreshore and channel, there is potential for camp sheds (barge beds), jetties, and possibly hulked vessels.	Post-medieval industrial remains associated with reclamation, flood and river defence, and water management would be of **Low** heritage significance (value).

FUTURE BASELINE

9.6.47. For the terrestrial part of the Site, including Riverside 2, the future baseline is expected to remain the same as the current baseline because it is a stable resource that will not change or deteriorate.

9.6.48. In terms of the intertidal foreshore area of the Site, ongoing erosion or deposition from the River Thames may affect the future archaeological baseline (e.g. deposits of archaeological interest on the foreshore might be eroded out by natural fluvial erosion/scour and waves caused by the passing of shipping). Modelling has been undertaken showing the predicted levels of accretion and deposition in the Site after a spring neap cycle (**Appendix 11-4: Coastal Modelling Studies (Volume 3)**). Under existing conditions, only small changes (± 10cm) in mudflat levels are predicted, mostly around the Belvedere Power Station Jetty (disused) and Middleton Jetty. No significant erosion of silt material is predicted. On this basis, the future baseline for the intertidal foreshore area of the Site is expected to remain the same as the current baseline.

9.7. EMBEDDED DESIGN, MITIGATION AND ENHANCEMENT MEASURES

9.7.1. This section sets out the embedded design, mitigation and enhancement measures relevant to the historic environment assessment. The **Design Principles and Design Code (Document Reference 5.7)** are commitments which will govern the design of the Proposed Scheme during the detailed design stage. The **Design Principles and Design Code (Document Reference 5.7)** are considered to be embedded mitigation for the purposes of the assessment presented in this chapter.

CONSTRUCTION PHASE

9.7.2. Potential temporary, construction phase effects on designated above ground heritage assets located beyond the Site Boundary and within the Study Area are scoped out, as a significant impact is unlikely (see **Paragraph 9.4.3**). As such, no embedded mitigation or enhancement measures in relation to built heritage setting are proposed during the construction phase.

9.7.3. There are no embedded design, mitigation or enhancement measures proposed in response to potential construction phase effects on archaeological remains.

9.7.4. Design adjustments to the piling layout are not considered necessary in response to the likely effects, as these would be appropriately delivered as an additional mitigation measure (described in **Paragraph 9.9.3** to **Paragraph 9.9.7**).

OPERATION PHASE

9.7.5. No embedded design, mitigation or enhancement measures are proposed during the operation phase. For above ground heritage assets, as no significant operation phase effects are predicted, and therefore no mitigation or enhancement measures are proposed.

9.7.6. For potential below ground heritage assets, any operation phase impacts resulting from the Proposed Scheme (i.e. indirect changes due to operational activities within the Thames channel and foreshore) would be mitigated by the additional measures proposed in response to the predicted construction phase impacts (set out in **Section 9.9**), and as such no mitigation and enhancement measures are considered necessary.

9.8. ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

9.8.1. This section details the assessment of impacts and effects on the historic environment arising from the Proposed Scheme during both its construction and operation phases.

CONSTRUCTION PHASE

Demolition of Non-designated Above Ground Heritage Assets within the Site during the Construction Phase

9.8.2. For the assessment of effects on the Belvedere Power Station Jetty (disused) (**A1g**), the heritage significance (value) of the non-designated heritage asset is **Low**, based on the asset's historic, archaeological and architectural interest. As stated above, the magnitude of change for demolition of the decommissioned Belvedere Power Station Jetty (disused) has been assessed as **High**. On a worst case basis, the Proposed Scheme would result in the total demolition and removal of the Belvedere Power Station Jetty (disused) resulting in a total loss of heritage significance (value). Prior to the implementation of additional mitigation measures, there would be a direct, permanent, long term, **Moderate Adverse** effect on the Belvedere Power Station Jetty (disused) **(Significant)**.

Potential Physical Effects on Unknown Buried Heritage Assets within the Site (archaeological remains), including Potential Submerged Remains within the Thames Foreshore (marine)

Palaeoenvironmental Remains

9.8.3. For the assessment of effects on known palaeoenvironmental remains, the heritage significance (value) of the asset is **Medium**, based on the archaeological interest of topographical/environmental information. The magnitude of change is **Low** deriving from the localised impact from the insertion of piled foundations and considering that this resource (palaeoenvironmental remains) is extensive across the Thames floodplain. Therefore, prior to the implementation of additional mitigation measures, there is likely to be a direct, permanent, long term, **Minor Adverse** effect on palaeoenvironmental remains **(Not Significant)**[c].

Potential Prehistoric Remains

9.8.4. For the assessment of effects on potential prehistoric remains (uncertain possibly low to moderate potential), the heritage significance (value) of such remains is likely **High**. The magnitude of change is **Medium** deriving from the insertion of piled foundations within the terrestrial zone. Prior to the implementation of additional mitigation measures, there is likely to be a direct, permanent, long term, **Moderate Adverse** effect on prehistoric remains **(Significant)**[d].

[c] Since the PEIR[17], the magnitude of change assigned to this impact has changed from Medium to Low and the significance of effect has changed from Moderate Adverse to Minor Adverse. The magnitude of change is considered to be Low based on a review of the indicative piling locations.

[d] Since the PEIR[17], the heritage significance (value) assigned to remains from this period has changed from Low or Medium to High and the significance of effect has changed from Minor Adverse to Moderate Adverse. The heritage significance (value) is considered to be High based on further research and the potential for evidence of prehistoric occupation.

Potential Roman Remains

9.8.5. For the assessment of effects on potential Roman remains (uncertain possibly low to moderate potential), the heritage significance (value) of such remains is likely **High**. The magnitude of change is **Medium** deriving from the insertion of piled foundations within the terrestrial zone. Prior to the implementation of additional mitigation measures, there is likely to be a direct, permanent, long term, **Moderate Adverse** effect on Roman remains **(Significant)**[e].

Potential Medieval Remains

9.8.6. For the assessment of effects on potential medieval reclamation and water management remains (high potential), the heritage significance (value) of such remains is likely **Low** or **Medium**. The magnitude of change is **Medium** deriving from the insertion of piled foundations within the terrestrial zone. Prior to the implementation of additional mitigation measures, there is likely to be a direct, permanent, long term, **Minor Adverse** effect on medieval remains **(Not Significant)**.

Post-medieval and Modern Remains

9.8.7. For the assessment of effects on remains of post-medieval and modern reclamation, water management, industrial activity, former jetties and possible camp sheds or such on the foreshore (a survey of the foreshore is proposed as mitigation) (high potential), the heritage significance (value) of the asset is **Low** based on the limited archaeological and historic interest of the remains. If such remains are present within the Site, the magnitude of change is potentially **Medium** deriving from the insertion of piled foundations and **High** as a result of the proposed capital dredge of the foreshore. Prior to the implementation of additional mitigation measures, there is likely to be a direct, permanent, long term, **Minor Adverse** effect on post-medieval and modern remains **(Not Significant)**.

OPERATION PHASE

Potential Permanent Effects on Non-designated Above Ground Heritage Assets located within the Site through Changes to Setting

9.8.8. In the event that the Belvedere Power Station Jetty (disused) (**A1g**) is retained as part of the Proposed Scheme, the setting of this heritage asset of **Low** heritage significance (value) would change as a result of the Proposed Scheme. The Proposed Jetty and parts of the Carbon Capture Facility would be visible in views out from and towards the asset. The access bridge connecting the Proposed Jetty to Riverside 1 would pass over the Belvedere Power Station Jetty (disused), as shown on the **Work Plans (Document Reference 2.3)**. The Proposed Scheme would introduce a new built form into the setting of this heritage asset which would affect its relationship with

[e] Since the PEIR[17], the heritage significance (value) assigned to remains from this period has changed from Low or Medium to High and the significance of effect has changed from Minor Adverse to Moderate Adverse. The heritage significance (value) is considered to be High based on further research and the potential for evidence of Roman occupation.

the River Thames. However, it would not impact its relationship to its riverside location or to the surrounding industrial landscape.

9.8.9. For the assessment of effects on the Belvedere Power Station Jetty (disused) in the event that it is not demolished as part of the Proposed Scheme, the heritage significance (value) of the non-designated heritage asset is **Low**. The magnitude of change is **Low**. Therefore, there is likely to be a direct, permanent **Minor Adverse** effect on the Belvedere Power Station Jetty **(Not Significant)**.

Potential Permanent Effects on Designated Above Ground Heritage Assets Located beyond the Site Boundary and within the Study Area through Changes to Setting

9.8.10. Since the PEIR[17](see paragraph 9.8.11), it has been confirmed that there will be no dredged arisings stockpiled on Site. Therefore, no setting impacts on above ground heritage assets as a result of stockpiles on Site are anticipated and are not considered further.

Crossness Pumping Station

Workshop Range to South East of Main Engine House (A2)

9.8.11. The Workshop Range to South East of Main Engine House (**A2**) is located approximately 780m to the west of the Site Boundary. As a Grade II listed building, the Workshop Range is a heritage asset of **Medium** heritage significance (value), deriving from architectural and historic interest.

9.8.12. Parts of the Proposed Scheme, including the Absorber Column(s) and Stack(s) and the Proposed Jetty, would be visible in the long views out from the asset towards the east. This view, which is interrupted by intervening industrial buildings and chimney stacks, does not make a significant contribution to the asset's heritage significance (value). The digital ZTV shows that, at ground level, the Absorber Column(s) and Stack(s) would be visible when glimpsed in views between the structures. Whilst it would not be visually prominent the Absorber Column(s) and Stack(s) and the wider Carbon Capture Facility would still constitute new built form in the wider landscape (see **Figure 10-3: Visual Assessment Plan (Volume 2)**). Photomontages showing what the Proposed Scheme would look like in views to the east from Crossness Pumping Station are also included in **Appendix 10-4: Photomontages (Volume 3)**.

9.8.13. For the assessment of effects on the Workshop Range, the heritage significance (value) of the Grade II listed building is **Medium**. The magnitude of change is **Low**. Therefore, there is likely to be a direct, permanent **Minor Adverse** effect on Workshop Range to South East of Main Engine House Crossness Pumping Station **(Not Significant)**.

Crossness Pumping Station (A3)

9.8.14. Crossness Pumping Station (**A3**) is located approximately 850m to the west of the Site Boundary. As a Grade I listed building, Crossness Pumping Station is a heritage asset of **High** heritage significance (value), deriving from architectural and historic interest.

9.8.15. Parts of the Proposed Scheme, including the Absorber Column(s) and Stack(s) and the Proposed Jetty, would be visible in the long views out from the asset towards the east. This view, which is interrupted by intervening industrial buildings and chimney stacks, does not contribute to the asset's heritage significance (value). The digital ZTV and photomontages prepared also show that the tallest feature of the Proposed Scheme, Absorber Column(s) and Stack(s), which would be a maximum of 113m in height, would not be visually intrusive in views out from the asset at ground level towards the Site.

9.8.16. For the assessment of effects on Crossness Pumping Station, the heritage significance (value) of the Grade I listed building is **High**. The magnitude of change is **Low**. Therefore, there is likely to be a direct, permanent, **Minor Adverse** effect on Crossness Pumping Station **(Not Significant)**.

Workshop Range to South West of Main Engine House (A4)

9.8.17. The Workshop Range to South West of Main Engine House Crossness Pumping Station (**A4**) is located 900m to the west of the Site Boundary. As a Grade II listed building, the Workshop Range is a heritage asset of **Medium** heritage significance (value), deriving from architectural and historic interest.

9.8.18. Parts of the Proposed Scheme, including the Absorber Column(s) and Stack(s) and the Proposed Jetty, would be visible in the long views out from the asset towards the east. This view, which is interrupted by intervening industrial buildings and chimney stacks, does not contribute to the asset's heritage significance (value). The digital ZTV and photomontages show that, at ground level, the Absorber Column(s) and Stack(s) would be visible when glimpsed in views between the structures. Whilst it would not be visually prominent, the Absorber Column(s) and Stack(s) and wider Carbon Capture Facility would still constitute new built form in the wider landscape.

9.8.19. For the assessment of effects on Workshop Range, the heritage significance (value) of the Grade II listed building is **Medium**. The magnitude of change is **Low**. Therefore, there is likely to be a direct, permanent, **Minor Adverse** effect on Workshop Range to South West of Main Engine House Crossness Pumping Station **(Not Significant)**.

Crossness Conservation Area (A6)

9.8.20. Crossness Conservation Area (**A6**) is situated approximately 700m to the west of the Site Boundary and is a heritage asset of **Medium** heritage significance (value), deriving from architectural and historic interest.

9.8.21. Parts of the Proposed Scheme, including the Absorber Column(s) and Stack(s) and the Proposed Jetty, would be visible in the long views out from the Conservation Area towards the east. This view, which is interrupted by intervening industrial buildings and chimney stacks, does not make a significant contribution to the asset's heritage significance (value). The digital ZTV and photomontages show the Absorber Column(s) and Stack(s) would be visible from much of the southern part of the Conservation Area at ground level, but less visible from the northern part where the listed buildings are. Whilst it would not be visually prominent, the Absorber Column(s) and Stack(s) and the wider Carbon Capture Facility would still constitute new built form in the wider landscape.

9.8.22. For the assessment of effects on Crossness Conservation Area, the heritage significance (value) of the Conservation Area is **Medium**. The magnitude of change is **Low**. Therefore, there is likely to be a direct, permanent **Minor Adverse** effect on the Crossness Conservation Area **(Not Significant)**.

No. 4 Jetty and Approach (A5)

9.8.23. No. 4 Jetty and Approach (**A5**) is situated approximately 750m to the northwest of the Site Boundary. As a Grade II listed building, No. 4 Jetty and Approach is a heritage asset of **Medium** heritage significance (value), which derives from its architectural and historic interest.

9.8.24. The Proposed Scheme would be visible in long views out from the asset towards the southeast. The digital ZTV shows that the Absorber Column(s) and Stack(s) would be visible from this asset at ground level. However, this view does not contribute to the asset's heritage significance (value).

9.8.25. For the assessment of effects on No. 4 Jetty and Approach, the heritage significance (value) of the Grade II listed building is **Medium**. The magnitude of change is **Low**. Therefore, there is likely to be a direct, permanent **Minor Adverse** effect on No. 4 Jetty and Approach (**not significant**).

Potential Indirect Effects on Unknown Buried Heritage Assets within the Site (archaeological remains), including Potential Submerged Remains within the Thames Foreshore (marine)

9.8.26. This assessment has considered the potential impact resulting from scour during the operation phase (see **Chapter 11: Water Environment and Flood Risk (Volume 1)**). Based on modelling undertaken showing the predicted levels of accretion and deposition in the Site after a spring neap cycle (**Appendix 11-4: Coastal Modelling Studies (Volume 3)**), the magnitude of change is considered to be **Low**. It is considered unlikely that archaeological and palaeoenvironmental remains would be impacted as a result of scour caused by the presence of the Proposed Jetty.

Palaeoenvironmental Remains

9.8.27. For the assessment of effects on known palaeoenvironmental remains, the heritage significance (value) of the asset is **Medium**, based on the archaeological interest of topographical/environmental information. The magnitude of change is **Low** when considering the extent of this resource as a whole. Prior to the implementation of additional mitigation measures, there is likely to be a direct, permanent, long term, **Minor Adverse** effect on Palaeoenvironmental remains **(Not Significant)**[f].

Potential Submerged Remains

9.8.28. For the assessment of effects on possible marine obstructions from all periods, including the remains of wrecks, former jetties and barge beds, the heritage significance (value) would depend on the date, nature and extent of the remains, which would be established by the proposed foreshore survey. Until foreshore and marine survey has been undertaken, the potential for, and heritage significance (value) of, any submerged remains is uncertain. The magnitude of change resulting from maintenance dredging is also uncertain, but potentially **Medium**. As the potential is unknown, the environmental effect is also **Uncertain**. However, any adverse effects would be mitigated by design adjustments to preserve in-situ (see **Paragraph 9.9.10**), where feasible and warranted, or targeted excavation/watching brief to achieve preservation by record.

9.9. ADDITIONAL DESIGN, MITIGATION AND ENHANCEMENT MEASURES

9.9.1. This section presents the additional mitigation and compensation measures that are relevant to the historic environment assessment.

CONSTRUCTION PHASE

Above Ground Heritage Assets

9.9.2. Should the Belvedere Power Station Jetty (disused) be demolished, an Historic England Level 2 Historic Building Recording will be undertaken prior to demolition. Level 2 recording comprises a descriptive record where the structure will be seen, described, and photographed. It will include a drawn record, photography and a written record. This will ensure that an accurate record of the Belvedere Power Station Jetty (disused) is archived with the Greater London Historic Environment Record and Archaeology Data Service for future research and understanding of heritage significance (value). The work will be carried out in accordance with Historic England's 2016 Guidance note 'Understanding Historic Buildings: a guide to good recording practice'[36].

[f] Since the PEIR[17], the magnitude of change assigned to this impact has changed from Medium to Low and the significance of effect has changed from Moderate Adverse to Minor Adverse. The magnitude of change is considered to be Low based on the likely depth of remains, following further investigation.

Buried Heritage Assets

9.9.3. All archaeological requirements in the form of additional surveys, where required, and final mitigation will be secured via a requirement in the **Draft DCO (Document Reference 3.1)**.

9.9.4. Within the terrestrial part of the Site, the adverse effects will be removed or offset through a programme of archaeological mitigation (to be outlined in an Archaeological Mitigation Strategy) post-DCO determination, to be approved by LBB in consultation with GLAAS. The scope and methodology for each phase of fieldwork presented below will be presented in a specific Written Scheme of Investigation (WSI). Each WSI would need to be prepared and approved by LBB in consultation with GLAAS prior to construction commencing.

9.9.5. The further work required is illustrated in the diagram shown as **Figure 9-1: Programme of Archaeological Mitigation** below.

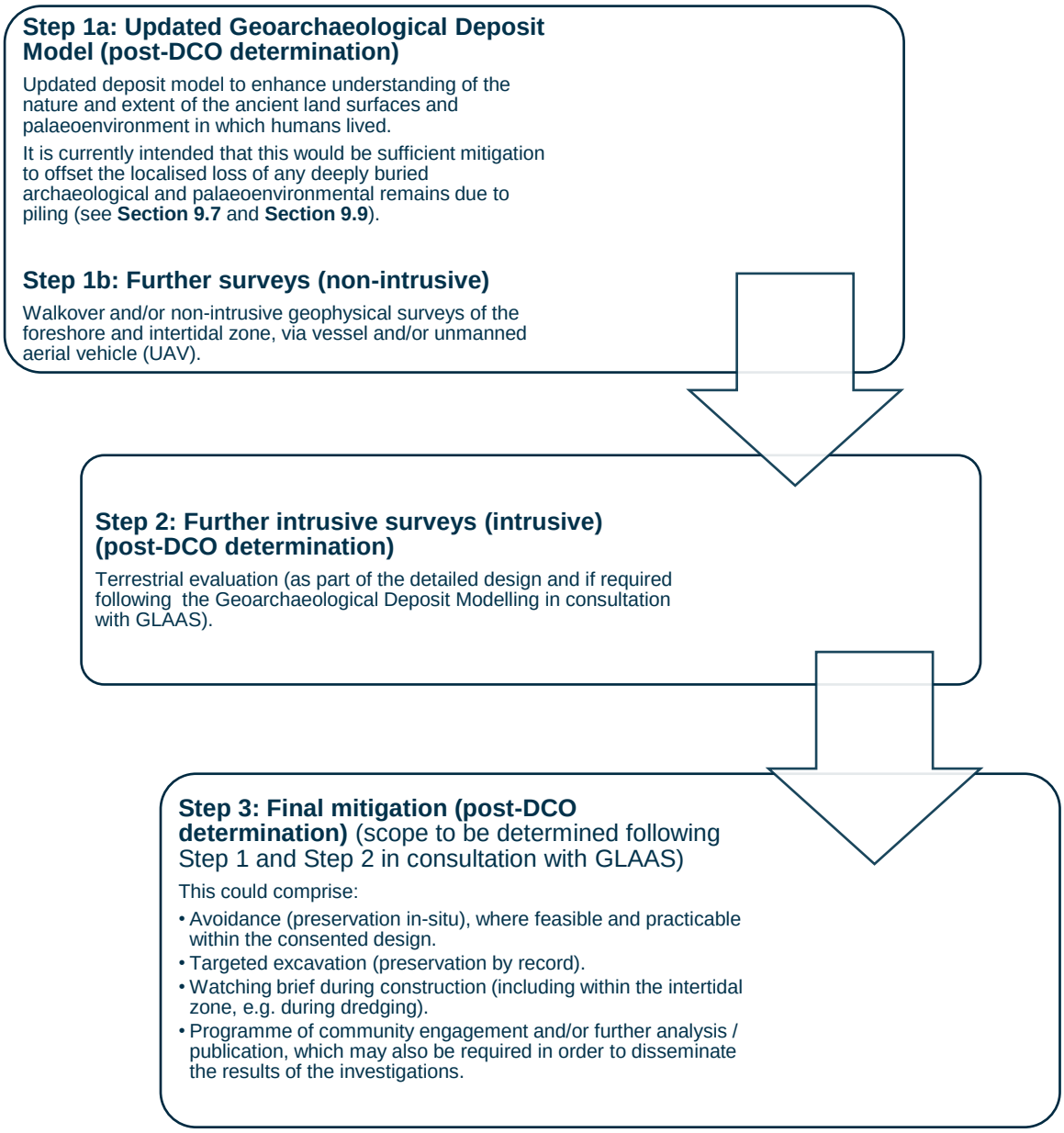

Figure 9-1: Programme of Archaeological Mitigation

9.9.6. The first stage would be an updated Geoarchaeological Deposit Model that would be extended from an existing model[18] for the northern part of the Site across the remainder of the Site (including the marine and intertidal areas within the Site). This would build on the existing information on buried sediments to map the subsurface topography in those parts of the Site not currently covered, providing an insight into the prehistoric terrain beneath any superficial deposits of made ground and alluvium along with information on hydrology, vegetation and past landscape.

9.9.7. The model would be used to inform further evaluation, should this be required, along with any additional mitigation measures. This could comprise avoidance in the unlikely event that nationally significant remains are identified, where this is warranted and feasible (considering consent will have been granted). It could also include targeted archaeological excavation and recording in advance of construction, where

significant remains are present, and/or an archaeological watching brief during preliminary groundworks, to form preservation by record. The scope and methodology for any evaluation and subsequent mitigation would need to be outlined in specific archaeological WSI, in agreement with the relevant stakeholders. This work and any additional mitigation measures may need to be completed prior to construction commencement. Any additional mitigation to be carried out during the construction phase itself, rather than pre-construction, would be included in the full CoCP that will be secured through a requirement of the DCO.

9.9.8. The presence, nature, date, extent and heritage significance (value) of any archaeological wrecks or other submerged features within the River Thames foreshore/channel will be clarified by further survey, to be outlined in the Archaeological Mitigation Strategy. The survey method agreed with GLAAS will take the form of aerial foreshore survey and/or high-resolution geophysical data for archaeological analysis, comprising:

- foreshore walkover at very low tide to identify archaeological features and/or an Unmanned Aerial Vehicle (UAV) survey of the foreshore;
- magnetometry data;
- multi beam echo sounder (MBES); and
- side scan sonar (SSS).

9.9.9. The results of the survey analysis will enable an appropriate mitigation strategy to be prepared for any significant archaeological remains that could be affected.

9.9.10. Although rare, in the unlikely event that archaeological remains of very high (National) heritage significance (value) are identified, there may be a requirement, where practicable in the consented design, for their preservation in-situ.

9.9.11. The scope and methodology for any evaluation and subsequent mitigation would need to be outlined in specific archaeological WSI, in agreement with the relevant stakeholders. This work and any additional mitigation measures may need to be completed prior to construction commencement. Any additional mitigation during the construction phase itself, rather than pre-construction, would be included in the full CoCP(s). Mitigation could take the form of targeted excavation (preservation by record) and for remains of known low heritage significance (value), an archaeological watching brief may be required (for instance during the capital dredge). This would ensure that archaeological remains were not removed without record.

9.9.12. As part of the Archaeological Mitigation Strategy, a programme of community engagement may also be required in order to disseminate the results of the investigations. This would depend on the results of the initial surveys and ongoing consultation with GLAAS.

OPERATION PHASE

9.9.13. In response to potential operation phase effects on palaeoenvironmental and submerged remains, no additional design, mitigation or enhancement measures are proposed as these will be delivered through the construction phase measures set out above (see **Paragraphs 9.9.7** to **9.9.9**). Moreover, given the maintenance dredging would be no deeper than the construction phase capital dredge, there would be no additional impact to submerged remains.

9.9.14. As no significant operation phase effects on above ground heritage assets beyond the Site Boundary are predicted, no further additional design, mitigation or enhancement measures are proposed for above ground heritage assets.

9.10. MONITORING

9.10.1. No monitoring of historic environment EIA effects is considered to be proportionate or to be required.

9.11. RESIDUAL EFFECTS

9.11.1. **Table 9-8** below summarises the significance of effect on the receptors assessed with only embedded mitigation, the additional design, mitigation and enhancement measures, and the residual effects associated with the Proposed Scheme after these additional measures have been taken into account.

Table 9-8: Historic Environment – Summary of Residual Effects

Description of the effect	Sensitive Receptor	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation, Enhancement measure	Residual effect
Construction Phase				
Demolition of non-designated above ground heritage assets within the Site during the construction phase.	Belvedere Power Station Jetty (disused) (A1g), if demolished as part of the Proposed Scheme	**Moderate Adverse (Significant)**	Should the Belvedere Power Station Jetty (disused) be demolished, an Historic England Level 2 Historic Building Recording will be required, undertaken prior to demolition to offset the predicted effects. This will ensure that an accurate record of the Jetty is produced prior to its loss, for future research and understanding of heritage significance (value).	**Minor Adverse (Not Significant)**
Potential physical effects on unknown buried heritage assets within the Site (archaeological remains), including potential submerged remains within the Thames foreshore (marine).	Palaeoenvironmental Remains	**Minor Adverse (Not Significant)**	Undertaking the programme of archaeological mitigation. Further evaluation and mitigation, if required (e.g. targeted excavation and watching brief).	**Minor Adverse (Not Significant)**
	Potential Prehistoric Remains	**Moderate Adverse (Significant)**	The updated Geoarchaeological Deposit Model may provide further information on prehistoric terrain (higher ground indicated by former vegetation surfaces).	**Minor Adverse (Not Significant)**

Description of the effect	Sensitive Receptor	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation, Enhancement measure	Residual effect
			Further evaluation and mitigation, if required (e.g. targeted excavation and watching brief).	
	Potential Roman Remains	**Moderate Adverse (Significant)**	The updated Geoarchaeological Deposit Model may provide further information on Roman period terrain (higher ground indicated by former vegetation surfaces). Further evaluation and mitigation, if required (e.g. targeted excavation and watching brief).	**Minor Adverse (Not Significant)**
	Potential Medieval Remains	**Minor Adverse (Not Significant)**	If required, terrestrial evaluation and mitigation (e.g. targeted excavation and watching brief).	**Minor Adverse (Not Significant)**
	Unrecorded Post-medieval and Modern Remains	**Minor Adverse (Not Significant)**	Further survey of the capital dredge area, followed by archaeological mitigation if required, i.e. targeted excavation/recording, watching brief or preservation in-situ. If required, terrestrial evaluation and mitigation (e.g. targeted excavation and watching brief).	**Minor Adverse (Not Significant)**
Operation Phase				

Description of the effect	Sensitive Receptor	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation, Enhancement measure	Residual effect
Potential permanent effects on non-designated above ground heritage assets located within the Site through changes to setting.	Belvedere Power Station Jetty (disused) (A1g), if retained as part of the Proposed Scheme	**Minor Adverse (Not Significant)**	Should the Belvedere Power Station Jetty (disused) be retained, no additional measures are proposed for this asset.	**Minor Adverse (Not Significant)**
Potential permanent effects on designated above ground heritage assets located beyond the Site Boundary and within the Study Area through changes to setting.	Crossness Pumping Station (A2-A4 and A6)	**Minor Adverse (Not Significant)**	No additional measures are proposed during the operation phase for above ground heritage assets.	**Minor Adverse (Not Significant)**
	No. 4 Jetty and Approach (A5)	**Minor Adverse (Not Significant)**		**Minor Adverse (Not Significant)**
Potential indirect effects on unknown buried heritage assets within the Site (archaeological remains), including potential submerged remains within the	Palaeoenvironmental Remains	**Minor Adverse (Not Significant)**	Production and publication of an updated Geoarchaeological Deposit Model, ideally following Site-wide geotechnical investigations, secured via a requirement in the DCO. Further survey of the capital dredge area, followed by mitigation if required.	**Minor Adverse (Not Significant)**

Description of the effect	Sensitive Receptor	Significance of Effect with Embedded Mitigation	Additional Design, Mitigation, Enhancement measure	Residual effect
Thames foreshore (marine).	Potential Submerged Remains	**Uncertain**	Further survey of the capital dredge area, followed by archaeological mitigation if required, i.e. targeted excavation/recording, watching brief or preservation in-situ.	**Uncertain**

9.12. LIMITATIONS AND ASSUMPTIONS

9.12.1. The following limitations and assumptions have been identified:

- Due to the nature of the archaeological resource, both buried and not visible, it can be difficult to predict accurately the presence and likely heritage significance (value) of buried assets, and consequently the potential impact upon them, based primarily on a desk-based sources. The principal source of information is the GLHER.

9.13. REFERENCES

[1] Department for Energy Security & Net Zero. (2024). 'Overarching National Policy Statement for Energy (EN-1)'. Available at: https://assets.publishing.service.gov.uk/media/655dc190d03a8d001207fe33/overarching-nps-for-energy-en1.pdf

[2] Department for Levelling Up, Housing and Communities. (2023). 'National Planning Policy Framework'. Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

[3] Greater London Authority. (2021). 'The London Plan'. Available at: https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

[4] London Borough of Bexley. (2023). 'The Bexley Local Plan 2023'. Available at: https://www.bexley.gov.uk/sites/default/files/2023-04/bexley-local-plan-adopted-26-april-2023.pdf

[5] Greater London Authority. (2018). 'London Environment Strategy'. Available at: https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

[6] Department for Environment, Food and Rural Affairs. (2021). 'South East Inshore Marine Plan 2021'. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004493/FINAL_South_East_Marine_Plan__1_.pdf

[7] Historic England. (2020). 'London Borough of Bexley Archaeological Priority Areas Appraisal'. Available at: https://www.bexley.gov.uk/sites/default/files/2021-05/London-borough-of-bexley-archaeological-priority-areas-appraisal-january-2020.pdf

[8] UK Gov. 2010. 'The Infrastructure Planning (Decisions) Regulations 2010'. Available at: The Infrastructure Planning (Decisions) Regulations 2010 (legislation.gov.uk)

[9] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government. (2021). 'National Planning Practice Guidance, Healthy and Safe Communities'. Available at: https://www.gov.uk/guidance/health-and-wellbeing

[10] Historic England. (2019). 'Historic England Advice Note 12, Statements of Heritage Significance: Analysing Significance in Heritage Assets'. Available at: https://historicengland.org.uk/images-books/publications/statements-heritage-significance-advice-note-12/heag279-statements-heritage-significance/

[11] Historic England. (2017). 'Historic Environment Good Practice Advice in Planning: 3 (2nd edition): The Setting of Heritage Assets'. Available at: https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/heag180-gpa3-setting-heritage-assets/

[12] Historic England. (2016). 'Greater London Archaeological Priority Area Guidelines'. Available at: https://historicengland.org.uk/images-books/publications/greater-london-archaeological-priority-area-guidelines/heag098-glaas-archaeological-priority-areas/

[13] Chartered Institute for Archaeologists. (CIfA) (2020a). 'Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment'. Available at: https://www.archaeologists.net/sites/default/files/CIfAS%26GCommissioning_2.pdf

[14] Chartered Institute for Archaeologists, (CIfA), (2020b). Standard and Guidance for historic environment desk based assessment. https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_4.pdf

[15] Historic England. (2020). 'Deposit Modelling and Archaeology: Guidance for Mapping Buried Deposits'. Available at: https://historicengland.org.uk/images-books/publications/deposit-modelling-and-archaeology/heag272-deposit-modelling-and-archaeology/

[16] Planning Inspectorate. (2023). 'Environmental Impact Assessment Scoping Opinion: Cory Decarbonisation Project.' Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010128/EN010128-000026-EN010128%20-%20Scoping%20Opinion.pdf

[17] Cory Environmental Holdings Limited. (2023). 'Preliminary Environmental Information Report: Cory Decarbonisation Project'. Available at: https://corydecarbonisation.co.uk/document-library/

[18] Quest Quaternary Scientific. (2022). 'Riverside Energy Park, London Borough of Bexley – Geoarchaeological & Palaeoenvironmental Analysis Report'.

[19] Cory Environmental Holdings Limited. (2023). 'Environmental Impact Assessment Scoping Report'. Available at: https://infrastructure.planninginspectorate.gov.uk/projects/south-east/cory-decarbonisation-project/?ipcsection=docs

[20] Historic England. (2023). 'National Heritage List for England'. Available at: https://historicengland.org.uk/listing/the-list/

[21] Historic England. (2023). 'Heritage at Risk Register'. Available at: https://historicengland.org.uk/advice/heritage-at-risk/search-register/

[22] Historic England (2016). 'Greater London Archaeological Priority Area Guidelines'. Available at: https://historicengland.org.uk/images-books/publications/greater-london-archaeological-priority-area-guidelines/heag098-glaas-archaeological-priority-areas/

[23] Historic England. (2023). 'Greater London Historic Environment Record'. Available at: https://historicengland.org.uk/services-skills/our-planning-services/greater-london-archaeology-advisory-service/greater-london-historic-environment-record/

[24] Pre-Construct Archaeology. (2007). 'An Archaeological Evaluation at Crossness Sewage Treatment Works, Thamesmead, London Borough of Bexley'.

[25] Pre-Construct Archaeology. (2008). 'Land at Norman Road (North), Belvedere, London Borough of Bexley – An Archaeological Evaluation'.

[26] Pre-construct Archaeology. (2010). 'Crossness Sewage Treatment Works, Thamesmead, London Borough of Bexley – Examination of Timbers'.

[27] Historic England. (2021). 'National Marine Heritage Record'. Available at: https://historicengland.org.uk/research/support-and-collaboration/heritage-information-access-simplified/national-marine-heritage-record/

[28] Admiralty Maritime Data Solutions. (2023). 'Marine Data Portal'. Available at: https://datahub.admiralty.co.uk/portal/apps/sites/#/marine-data-portal/items?tags=GlobalWrecks

[29] London Borough of Bexley. (2009). 'Crossness Conservation Area – Area Appraisal and Management Plan'. Available at: https://www.bexley.gov.uk/sites/default/files/2020-05/Crossness-Conservation-Area-Appraisal-and-Management-Plan.pdf

[30] London Borough of Bexley. (2023). 'Bexley Local Studies and Archive Centre'. Available at: https://arena.yourlondonlibrary.net/web/bexley/local-studies-and-archives#/

[31] British Geological Survey. (2023). 'Geology Viewer'. Available at: https://geologyviewer.bgs.ac.uk/

[32] The British Museum. (2023). 'Portable Antiquities Scheme'. Available at: https://finds.org.uk/

[33] Archaeology Data Service. (2023). 'The digital repository for archaeology and heritage'. Available at: https://archaeologydataservice.ac.uk/

[34] Galloway, J. A. (2010). 'Piteous and Grievous Sights: The Thames Marshes at the Close of the Middle Ages'. Tides and Floods: New Research on London and the Tidal Thames from the Middle Ages to the Twentieth Century.

[35] Cherry, B. and N. Pevsner. (1983). 'The Buildings of England – London 2: South'.

[36] Historic England. (2016). 'Understanding Historic Buildings, A Guide to Good Recording Practice'. Available at: https://historicengland.org.uk/images-books/publications/understanding-historic-buildings/heag099-understanding-historic-buildings/

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