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- Appendix 17A: Cultural Heritage Desk-Based Assessment (DBA).

Rev: 0

17.0 CULTURAL HERITAGE

17.1 Introduction

17.1.1 This chapter of the Environmental Statement (ES) identifies the potential impacts and effects on cultural heritage that have been considered as part of the Environmental Impact Assessment (EIA) of the Proposed Development. The assessment has been undertaken in accordance with best practice guidance as set out in Section 17.2.

17.1.2 Cultural heritage comprises all aspects of the environment resulting from the interaction and relationships between people and places through time (Definition derived from Annex 2 of the National Planning Policy Framework (Department for Levelling Up, Housing and Communities (DLUHC), 2023) and the Council of Europe (CoE) Treaty No. 199 - Framework Convention on the Value of Cultural Heritage for Society (CoE, 2005). The above aspects are referred to as heritage assets, i.e. buildings, monuments, sites, places, areas or landscapes identified as having a degree of significance due to their heritage interest that merit consideration in planning decisions.

17.1.3 This chapter aims to:

- detail the requirements of key legislative and policy requirements and describe how the Proposed Development will consider them;
- explain how information on the existing and future environment has been collected (through desk-based studies, survey work and stakeholder consultation);
- describe the understanding of the existing and future baseline environment, based on the baseline information;
- explain any further information to be obtained through further consultation, desk-based studies, or surveys;
- describe the potential effects of the Proposed Development on cultural heritage; and
- describe potential mitigation measures, if required.

17.2 Legislation, Planning Policy and Guidance

Legislative Background

17.2.1 The following legislation is relevant to this cultural heritage assessment.

The Infrastructure Planning (Decisions) Regulations 2010

17.2.2 The Infrastructure Planning (Decisions) Regulations 2010 (HM Government, 2010) sets out the duties of the Secretary of State (SoS) in the Development Consent Order (DCO) process which includes having regard to the desirability of:

- preserving listed buildings, their setting or any features of special architectural or historic interest which they possess;

- preserving or enhancing the character or appearance of conservation areas; and
- preserving scheduled monuments and their settings.

The Planning (Listed Buildings and Conservation Areas) Act 1990

17.2.3 The Planning (Listed Buildings and Conservation Areas) Act 1990 (HM Government, 1990) sets out the principal statutory provisions concerning the listing of buildings and designation of conservation areas, and provisions that must be considered in the determination of any application affecting listed buildings or conservation areas.

17.2.4 It requires the SoS to hold a list of buildings of special architectural or historical interest, which are accorded statutory protection. In addition, it expects Local Planning Authorities (LPAs) to designate conservation areas which are parts of their area considered to be:

“of special architectural or historic interest, the character or appearance of which is desirable to preserve or enhance and design.”

17.2.5 Section 66 of the Act states that in considering whether to grant planning permission for development which affects a listed building or its setting, the LPA, or the SoS, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses. By virtue of section 1(5) of the Act a listed building includes any object or structure within its curtilage.

17.2.6 Section 72 of the Act establishes a general duty on a LPA or the SoS with respect to any buildings or other land in a conservation area to pay special attention to the desirability of preserving or enhancing the character or appearance of a conservation area.

The Ancient Monuments and Archaeological Areas Act 1979

17.2.7 The Ancient Monuments and Archaeological Areas Act 1979 (HM Government, 1979) states that sites assessed to be of national importance may be included within the Schedule of Monuments. These sites are afforded statutory protection and Scheduled Monument Consent is required before any works are carried out which would have the effect of demolishing, destroying, damaging, removing, repairing, altering, adding to, flooding or covering up a Scheduled Monument. This Act also provides for the designation of areas of archaeological interest in which statutory provisions for access to construction sites for the purpose of carrying out archaeological works apply.

The Hedgerow Regulations 1997

17.2.8 The Hedgerow Regulations 1997 (HM Government 1997), made under section 97 of the Environment Act 1995, sets out the requirements for the protection of 'important' hedgerows through legislative mechanisms of the NPPF (DLUHC, 2023) and local planning authorities. The Regulations define a hedgerow as 'important' if it has existed for at least 30 years and, for the purposes of this assessment, if it, or

the hedgerows with which it is a stretch, satisfies at least one other criterion identified in Schedule 1 Part II pertaining to archaeology and history. These criteria include the following:

- The hedgerow marks the boundary, or part of the boundary, of at least one historic parish or township predating 1850;
- The hedgerow incorporates an archaeological feature which is either under scheduled protection as per the 1979 Act already discussed, or which has been recorded as a historic monument prior to the Regulations taking effect on 27 March 1997;
- The hedgerow marks the boundary of a pre-1600 AD estate or manor recorded prior to 27 March 1997 or is visibly related to any building or other feature of such an estate or manor;
- The hedgerow is recorded in a document held at a Record Office on 27 March 1997 as an integral part of a field system pre-dating the Enclosure Acts; or
- The hedgerow is part of, or visibly related to, any building or other feature associated with such a system, and that system is either substantially complete or recorded as being a key landscape characteristic by the local planning authority prior to 27 March 1997.

17.2.9 Other criteria relating to wildlife and landscape are set out in Schedule 1 Part II of the Regulations, but these are not within the scope of this cultural heritage assessment.

Planning Policy Context

17.2.10 This assessment has been undertaken taking into account relevant national, regional and local planning policy, as summarised below.

National Planning Policy

Overarching National Policy Statement (NPS) for Energy (EN-1) (2023)

17.2.11 The Overarching National Policy Statements (NPSs) set out the Government's policy for delivery of major energy infrastructure (Department for Energy Security and Net Zero (DESNZ), 2023). The Overarching NPS for Energy (EN-1) published in 2023 and designated in January 2024, is of relevance to the cultural heritage assessment (refer to section 5.9 Historic Environment).

17.2.12 The NPS states the applicant should undertake an assessment of any likely significant heritage impacts of the proposed development as part of the EIA. The applicant should provide a description of the significance of heritage assets affected by the proposed development, including any contribution made by their setting, and the level of detail should be proportionate to the importance of the assets and sufficient to understand the potential impact on their significance. A desk-based assessment should be carried out and, where heritage interest needs to be assessed more fully, a field evaluation.

National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (2023)

17.2.13 Paragraph 2.13.17 of the NPS (EN-4) (DESNZ, 2023b) states:

“Dredging can also affect water quality and resources. Other potential impacts include chemical pollution, and morphological changes, exposure to contaminants and adverse effects on heritage assets.”

17.2.14 Additional dredging, particularly at Redcar Bulk Terminal (RBT) Quayside for delivery vessels and mooring arrangements is not anticipated to be required for the Proposed Development therefore this policy is not considered or applied further in the assessment.

NPS for Electricity Networks Infrastructure (EN-5) (2023)

17.2.15 Paragraph 2.2.10 of the NPS (EN-5) (DESNZ, 2023c) refers to obligations on transmission and distribution licence holders under section 9 of the Electricity Act 1989 (HM Government, 1989), in formulating proposals for new electricity networks infrastructure, to:

“have regard to the desirability of preserving... sites, buildings and objects of architectural, historic or archaeological interest; and ...do what [they] reasonably can to mitigate any effect on any such ...features, sites, buildings or objects.”

17.2.16 Paragraph 2.9.25 of the NPS states that where the undergrounding of electrical connections forms part of a proposed development, the disruptive effects to archaeological and heritage sites should be recognised.

National Planning Policy Framework (NPPF) (2023)

17.2.17 Although the NPPF (DLUHC, 2023) is not the principal policy against which the Proposed Development will be evaluated, due regard is given to this policy in the assessment of archaeological and cultural heritage effects.

17.2.18 Notably section 16: Conserving and Enhancing the Historic Environment of the NPPF sets out the Government’s planning policies for the historic environment. The NPPF sets out the importance of being able to assess the significance of heritage assets that may be affected by a development. Significance is defined in Annex 2 as being:

“the value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic.”

17.2.19 The significance of a heritage asset is not only derived from an asset’s physical presence, but also from its setting. The setting of a heritage asset is defined in Annex 2 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.”

17.2.20 Paragraph 200 of the NPPF states that in determining applications, LPAs should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. 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. Similarly, paragraph 195 includes a requirement on LPAs, having assessed the particular significance of any heritage asset that may be affected by a proposal, to take this into account when considering the impact of a proposal on a heritage asset.

- 17.2.21 Paragraphs 205 to 209 of the NPPF introduce the concept that heritage assets can be harmed or lost through alteration, destruction or development within their setting. This harm ranges from less than substantial to substantial. With regard to designated assets, paragraph 205 states that great weight should be placed on its conservation, irrespective of whether any potential harm is considered to be substantial or less than substantial or whether the asset would be lost. The paragraph goes further to say that the more important the asset, the greater the weight should be on its conservation. In paragraph 206, a distinction is made in respect of those assets the NPPF identifies as being of the highest significance (e.g. Scheduled Monuments, Grade I and Grade II* listed buildings) where substantial harm to or loss should be wholly exceptional.
- 17.2.22 With regard to non-designated assets, paragraph 209 states that the effect of the application on the significance of the asset should be taken into account in determining the application. A balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset.
- Planning Practice Guidance (PPG) for the Historic Environment (2019)*
- 17.2.23 The PPG for the historic environment (Ministry of Housing, Communities and Local Government (MHCLG), 2019) provides further advice and guidance that expands the policy outlined in the NPPF. It expands on terms such as 'significance' and its importance in decision making. The PPG clarifies that being able to properly assess the nature, extent and the importance of the significance of the heritage asset and the contribution of its setting, is crucial to understanding the potential impact and acceptability of development proposals (paragraph 007; Reference ID: 18a-007-20190723).
- 17.2.24 The PPG states that in relation to setting a thorough assessment of the impact on setting needs to take in to account, and be proportionate to, the significance of the heritage asset under consideration and the degree to which proposed changes enhance or detract from that significance and the ability to appreciate it (paragraph 013; Reference ID: 18a-013-20190723).
- 17.2.25 The PPG discusses how to assess if there is substantial harm. It states when assessing if a proposal causes substantial harm, it is the impact on the asset's heritage significance that is important (paragraph 018; Reference ID: 18a-018-20190723).
- 17.2.26 The NPPF indicates that any degree of harm should be considered alongside any public benefits that can be delivered by development. The PPG states that these benefits should flow from the proposed development and should be of a nature and scale to be of benefit to the public, and not just a private benefit, and would

include securing the optimum viable use of an asset in support of its long-term conservation (paragraph 020; Reference ID: 18a-020-20190723).

Local Planning Policy

Redcar and Cleveland Local Plan (2018) (RCBC, 2018a)

- 17.2.27 Policy HE1 of the Redcar and Cleveland Local Plan, adopted in 2018, relates to development affecting the setting of a conservation area and states that:

“development within or otherwise affecting the setting of a conservation area will only be permitted where it preserves or enhances the character or appearance of the conservation area.”

- 17.2.28 Policy HE2 of the Plan relates to heritage assets and requires development proposals to preserve or enhance the significance of designated heritage assets, including its setting. The policy states that development would only be permitted if it preserved or enhances the significance of a designated heritage asset; protects its immediate setting, including trees, hedges, walls and fencing, and retains historic plot boundaries. In relation to non-designated heritage assets, the policy states that in determining applications that would result in substantial harm to, or total loss of, a non-designated heritage asset or its setting:

“the applicant will be required to demonstrate that the benefits of the development would outweigh any harm or loss of the heritage asset, based on its significance.”

- 17.2.29 Policy HE3 aims to protect important archaeological sites from inappropriate development. The policy states that:

“development that may affect a known or possible archaeological site, whether designated or non-designated, will require the results of a desk-based assessment to be submitted as part of the planning application. An archaeological evaluation may also be required to identify the most appropriate course of action.”

South Tees Area Supplementary Planning Document (SPD) (2018) (RCBC, 2018b)

- 17.2.30 Development Principle STDC8 of the SPD states that the Council will, in consultation with the local community and key stakeholders, identify industrial heritage assets which are appropriate and viable to retain as part of the development of an industrial heritage trail. Proposals which would result in unacceptable harm to the significance of specific retained assets will not be supported. Proposals that will affect a designated or non-designated heritage asset or its setting, should be in accordance with the requirements of the Redcar and Cleveland Local Plan Policy HE2.

Stockton-on-Tees Local Plan (2019)

- 17.2.31 Policy HE2 of the Stockton-on-Tees Local Plan, adopted 2019, states that:

“proposals should conserve and enhance heritage assets, including their setting, in a manner appropriate to their significance. Where development will lead to harm to or loss of significance of a designated or non-designated heritage asset the

proposal will be considered in accordance with Policy SD8, other relevant Development Plan policies and prevailing national planning policy."

Hartlepool Local Plan (2018)

- 17.2.32 The Hartlepool Local Plan was adopted in 2018. Policy HE1 relates to heritage assets and states that any development proposals that has an impact on an asset and its setting is required to preserve or enhance its value, appropriate to its significance, be of a design that has a positive impact on the asset and ensure the sensitive and viable use of the asset. Policy HE2: Archaeology, states that an assessment will be required to support development proposals that may affect sites of archaeological interest, and that the assessment should inform potential mitigation strategies. Policy HE3: Conservation Areas states that development proposals need to demonstrate that they will conserve or positively enhance the character of a conservation area. Policy HE4: Listed Buildings and Structures states that the Borough Council will ensure harm is not caused to the significance of a listed buildings through inappropriate development within its setting. Policy HE5 which deals with local listed structures states that:

"where a proposal affects the significance of a non-designated heritage asset, a balanced judgment should be weighed between the scale or the harm or loss against the public benefits of the proposal."

Other Relevant and Guidance

- 17.2.33 The following guidance has been taken into account during the preparation of this cultural heritage assessment.

Historic England Guidance

- 17.2.34 Historic England has published a series of Good Practice Advice (GPA) of which those most relevant to this assessment are GPA2 - Managing Significance in Decision-Taking in the Historic Environment (Historic England, 2015), GPA3 - The Setting of Heritage Assets (Historic England, 2017), Advice Note 12: Statements of Heritage Significance (Historic England, 2019) and Advice Note 15: Commercial Renewable Energy Development and the Historic Environment (Historic England, 2021).
- 17.2.35 GPA2 (Historic England, 2015) emphasises the importance of having a knowledge and understanding of the significance of heritage assets likely to be affected by the development and that the:
- "first step for all applicants is to understand the significance of any affected heritage asset and, if relevant the contribution of its setting to its significance."*
- 17.2.36 GPA3 (Historic England, 2017) provides detail on the setting of heritage assets and provides general advice on understanding setting, and how it may contribute to the significance of heritage assets and allow that significance to be appreciated. The document provides advice on how views contribute to setting and provides a broad approach to assessing the impact of a proposed development on the setting of heritage assets, by outlining a series of steps that can be applied proportionately to the complexity of the case.
-

17.2.37 Advice Note 12 (Historic England, 2019) outlines a recommended approach to assessing the significance of heritage assets in line with the requirements of the NPPF. It includes a suggested reporting structure for a 'Statement of Heritage Significance', as well as guidance on creating a statement that is proportionate to the asset's significance (heritage value) and the potential degree of impact of a proposed development. The Advice Note also offers an interpretation of the various forms of heritage interest that an asset can possess i.e., its archaeological, architectural, artistic and historic interest, based on the terms provided in the NPPF Annex 2: Glossary (DLUHC, 2023) as follows:

- Archaeological Interest – there will be archaeological interest in a heritage asset if it holds, or has the potential to hold, evidence of past human activity worthy of expert investigation at some point.
- Architectural and Artistic Interest – these are interests in the design or general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skills, such as sculpture.
- Historic Interest – An interest in past lives and events (including pre-historic). Heritage assets can illustrate or be associated with them. Heritage assets with historic interest not only provide a material record of our nation's history but can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity.

17.2.38 Advice Note 15 explains how the historic environment should be taken fully into account during the planning and delivery of commercial renewable energy developments in line with national policy. It reiterates the content of other advice notes in terms of understanding the significance of assets and the contribution that their setting makes to significance in order to assess impact and consider ways to minimise harm. It encourages the use of photomontages to inform assessments of potential impact on the setting of heritage assets, but also notes how Landscape and Visual Impact Assessment is different from an assessment of setting. Although it does not offer advice specific to hydrogen production developments and distribution, the guidance highlights the potential for all renewable projects to impact to below ground archaeological assets and change the setting of heritage assets.

[Chartered Institute for Archaeologists Standard and Guidance for Historic Environment Desk-Based Assessment](#)

17.2.39 The baseline assessment set out in Appendix 17A: Cultural Heritage Desk-based Assessment (ES Volume III, EN070009/APP/6.4) has been undertaken in accordance with guidance published by the Chartered Institute for Archaeologists (CIfA), specifically the Standard and Guidance for Historic Environment Desk-Based Assessment (CIfA, 2020) and the CIfA Code of Conduct (CIfA, 2022).

Institute of Environmental Management and Assessment (IEMA) Principles of Cultural Heritage Impact Assessment in the UK

- 17.2.40 The Principles of Cultural Heritage Impact Assessment in the UK (IEMA, 2021) is a guide to good practice in cultural heritage impact assessment published jointly by IEMA, the Institute of Historic Building Conservation (IHBC) and ClfA. The document provides guidance on understanding cultural heritage assets and evaluating the consequences of change.
- 17.2.41 Understanding cultural heritage assets is split into three stages: Description, Significance and Importance. The description arrives at a factual statement that establishes the nature of the asset. The heritage values of the asset are then analysed (the guidance stresses that these include but are not limited to aesthetic, historic, scientific, social or spiritual values) and a statement of cultural significance given. Finally, the importance of the asset is assessed, and a conclusion drawn as to the level of protection that the asset merits in planning policy and cultural heritage legislation.
- 17.3 Assessment Methodology and Significance Criteria
- 17.3.1 This section presents the following:
- the approach to establishing the baseline assessment including the definition of appropriate study areas;
 - the methodology and terminology used in the assessment of effects; and
 - identification of the information sources that have been consulted throughout preparation of this chapter.

Study Area

- 17.3.2 The study areas have been defined to capture the historic environment baseline data correlating to the predicted impacts from the Proposed Development. The below study areas have been agreed in consultation with archaeological advisors and conservation officers for the LPAs.
- 17.3.3 The study area for capturing data relating to non-designated heritage assets (archaeological sites, findspots, locally listed and non-designated buildings) is a 1 km buffer from the Proposed Development Site (Figure 17-2: Location of Non-Designated Heritage Assets (ES Volume II, EN070009/APP/6.3)). This study area is assessed as proportionate and relevant for identifying cultural heritage assets that may be physically impacted by the Proposed Development, including buried assets outside of the Proposed Development Site that may extend into it. In addition, the data gathered from the study area includes detailed information relating to previous archaeological fieldwork events and studies that, collectively, provide a contextual baseline for the Proposed Development Site in line with the ClfA guidance (ClfA, 2020). In select cases, non-designated heritage assets outside of the study area have been included in order to further contextualise the baseline and provide additional insight on the potential archaeological resource.

17.3.4 The study area for capturing data relating to designated heritage assets (World Heritage Sites, Scheduled Monuments, listed buildings, conservation areas, registered parks and gardens, registered battlefields) is 5 km from the Proposed Development Site. The extent of this study area has been informed by an understanding of the area's topography and the nature of the Proposed Development. It is assessed to be appropriate for identifying assets whose setting may change because of the construction, operational, or decommissioning activities of the Proposed Development. This larger study area has been further informed by the Zone of Theoretical Visibility (ZTV) shown on Figure 16-5: Zone of Theoretical Visibility and Representative Viewpoint Locations (ES Volume II, EN070009/APP/6.3), accompanying Chapter 16: Landscape and Visual Amenity (ES Volume I, EN070009/APP/6.2), and from the results of the heritage site visit conducted in Spring 2023.

Significance Criteria

17.3.5 This section presents the methodology used for determining the magnitude of impact and significance of effect to heritage assets as a result of the construction, operation and decommissioning of the Proposed Development.

17.3.6 The principles of impact assessment methodology rest upon independently evaluating the value of heritage assets and the magnitude of impact upon that value. By combining the value of the heritage asset with the predicted magnitude of impact, the significance of the effect arising from the Proposed Development can be determined.

Assessing Heritage Value

17.3.7 The value of a heritage asset (its heritage significance or sensitivity) is guided by its designated status and its heritage interest.

17.3.8 Annex 2: Glossary of the NPPF (NPPF, 2023) defines value as "*the value of a heritage asset to this and future generations because of its heritage interest*", which comprises archaeological, architectural, artistic and historic interest. The value of a heritage asset can therefore be defined by the sum and understanding of its heritage interests. Each identified heritage asset can be assigned a value in accordance with the criteria set out in Table 17-1. The results of statutory consultation and engagement also contribute to the assessment of value. Regional variations, contribution to regional research agenda, and individual qualities of heritage assets are also taken into account.

17.3.9 Whilst it is recognised that all designated assets are considered to be of national importance, a distinction in value is made in Table 17-1 between Grade I and Grade II* graded assets and those at Grade II. This reflects the separation of the grades in paragraph 200 of the NPPF which makes a distinction between Grade II listed buildings and registered parks and gardens, and other heritage assets which it considers to be of "*the highest significance*", notably Scheduled Monuments, Grade I and Grade II* listed buildings, and Grade I and Grade II* registered parks and gardens.

Table 17-1: Criteria for Determining the Significance (Heritage Value) of Heritage Assets

VALUE	CRITERIA
High	<p>World Heritage Sites; Grade I and Grade II* Listed Buildings; Grade I and Grade II* Registered Parks and Gardens; Scheduled Monuments; Registered battlefields; Conservation areas (of demonstrable high value, i.e., high number of Grade I and II* buildings; diverse and high-quality buildings); Non-designated heritage assets that can be shown to have demonstrable national or international importance.</p>
Medium	<p>Grade II listed buildings; Conservation areas (majority Grade II buildings displaying regional and local characteristics and styles); Grade II Registered Parks and Gardens; Locally listed buildings as recorded on a local authority list; Non-designated heritage assets that can be shown to be of regional importance; Historic Townscapes with historic integrity in that the assets that constitute their make-up are clearly legible; Averagely well-preserved historic landscape character areas with reasonable coherence, time-depth or other critical factors.</p>
Low	<p>Non-designated buildings, monuments, sites or landscapes that can be shown to be of limited or local interest only; Assets whose values are compromised by poor preservation or survival of contextual associations to justify inclusion into a higher grade; Historic landscape character areas whose value is limited by poor preservation and/or poor survival of contextual associations.</p>
Very Low	<p>Assets whose values are entirely compromised by poor preservation, or survival, or that have little or no contextual associations to justify inclusion into a higher grade; Historic landscape with no or little surviving historic interest.</p>

Magnitude of Impact

17.3.10 Having identified the value of the heritage asset, the next stage in the assessment is to identify the level and degree of impact to an asset arising from the Proposed Development. Potential impacts to heritage assets may arise during construction, operation or decommissioning and can be temporary and reversible or permanent. An impact can occur to the physical fabric of a heritage asset or arise from changes

to its setting. If the impact harms the heritage interest(s) of an asset, then this is likely to affect its value (its heritage significance).

- 17.3.11 The level and degree of impact (impact rating) is assigned with reference to the criteria as set out in Table 17-2. The magnitude of impact arising from the Proposed Development takes into account embedded and good practice mitigation measures that have been developed as part of the design process (refer to Section 17.5).

Table 17-2: Criteria for Determining the Magnitude of Impact on Heritage Assets

MAGNITUDE OF IMPACT	IMPACT DESCRIPTION
High	Changes to the heritage interests of an asset such that the value of the asset is totally altered or destroyed; Comprehensive change to, or total loss of, elements of setting that would adversely affect the ability to understand and appreciate the asset, resulting in likely harm to its value.
Medium	Change such that the value of the asset is significantly altered or modified; Changes such that the setting of the asset is noticeably different, resulting in changes in our ability to understand and appreciate the value of the asset.
Low	Changes to heritage interests such that the value of the asset is slightly affected; Changes to setting that result in changes in the ability to understand and appreciate the value of the asset.
Very Low	Changes to the heritage interest(s) of an asset that hardly affect its value; Changes to the setting of an asset that have little change to the ability to understand and appreciate the value of the asset.
No Impact	No change to a heritage asset, including changes to its setting, and no change to its value.

Significance of Effect

- 17.3.12 An assessment to classify the cultural heritage effect, having taken into consideration any relevant embedded mitigation, is determined by cross-referencing between the significance (heritage value) of the asset (Table 17-1) and the magnitude of impact (Table 17-2). The resultant effect is determined using the matrix detailed in Table 17-3. Where the assessment indicates that there would be no impact to a heritage asset, this is classified as no effect.

Table 17-3: Criteria for Determining the Significance of Effect

VALUE OF HERITAGE ASSET	MAGNITUDE OF IMPACT				
	HIGH	MEDIUM	LOW	VERY LOW	NO IMPACT
High	Major	Major	Moderate	Minor	No Effect
Medium	Major	Moderate	Minor	Negligible	No Effect
Low	Moderate	Minor	Negligible	Negligible	No Effect
Very low	Minor	Negligible	Negligible	Negligible	No Effect

17.3.13 As outlined in Chapter 2: Assessment Methodology (ES Volume I, EN070009/APP/6.2), major and moderate (adverse or beneficial) effects are considered to be significant, whilst those that are minor (adverse or beneficial) or negligible are considered not significant.

17.3.14 Where significant effects are predicted, essential mitigation is required and therefore proposed, as set out in Section 17.7. Essential mitigation may offset the impact through recording, and therefore reduce the overall significance of the effect (for example from moderate to minor). These measures are separate from the embedded mitigation detailed in Section 17.5. Embedded measures are taken into account when determining the initial classification of an effect rating for a given impact identified in the assessment.

17.3.15 Within the NPS EN-1, section 5.9 paragraphs 5.9.25 to 5.9.33, and NPPF section 16 paragraphs 205 to 209, impacts affecting the value of heritage assets are considered in terms of harm, and there is a requirement to determine whether the level of harm amounts to 'substantial harm' or 'less than substantial harm'.

17.3.16 There is no direct correlation between the classification of effect as reported herein and the level of harm caused to heritage significance. The PPG, states that it is the degree of harm to the asset's significance rather than the scale of the development that is to be assessed.

Cumulative Heritage Effects

17.3.17 An assessment of cumulative effects on cultural heritage assets has been undertaken and is detailed within Chapter 23: Cumulative and Combined Effects (ES Volume I, EN070009/APP/6.2).

17.3.18 The assessment of cumulative effects follows the methodology described in Advice Note Seventeen (The Inspectorate, 2019), for more information refer to Chapter 23: Cumulative and Combined Effects (ES Volume I, EN070009/APP/6.2).

17.3.19 It is important to note that cumulative effects may vary from the effects of the Proposed Development considered in isolation. For example, it is possible for the Proposed Development to have greater effects cumulatively with other planned developments than if it is considered in isolation against the existing baseline reported in Section 17.4.

17.3.20 For a cumulative effect to arise as a result of a physical impact to a heritage asset during construction, a development would have to affect the same heritage asset as the Proposed Development. Cumulative effects during operation could arise where the operational components of a development, when viewed alongside or combined with those from the Proposed Development, could interrupt lines of inter-visibility or, for example, create an increase in massing within a view of historical importance.

Sources of Information/Data

17.3.21 The following data sources have been reviewed as part of the preparation of the DBA. This sets out the baseline conditions for heritage assets within the Proposed Development Site and study area and is presented in Appendix 17A: Cultural Heritage Desk-based Assessment (ES Volume III, EN070009/APP/6.4):

- Tees Archaeology Historic Environment Record (HER) for information relating to non-designated heritage assets, previous fieldwork events and reports, and historic landscape data (Tees Archaeology, 2023);
- Redcar and Cleveland HER for information relating to non-designated heritage assets, fieldwork events and historic landscape data Historic environment and heritage management (RCBC, 2023a);
- National Heritage List for England (NHLE) for designated heritage assets datasets (NHLE, 2023);
- existing heritage assessment reports undertaken within the 1 km study area for other development proposals, including those to support Net Zero Teesside DCO;
- Defence of Britain Database archive (Archaeology Data Service, 2023);
- Ordnance Survey (OS) historic mapping data (National Library of Scotland, 2023);
- National Collection of Aerial Photographs (National Collection of Aerial Photography, 2023);
- Cambridge Air Photos (University of Cambridge, 2023);
- the results of a limited programme of geophysical survey (Appendix 17A (ES Volume III, EN070009/APP/6.4));
- the results of previous geotechnical site investigations in and around the Proposed Development Site;
- conservation area appraisals and buildings on the local list accessed from LPA websites (RCBC, 2023b; HBC, 2023; Middlesborough Council, 2023; STBC, 2023);
- the UK Hydrographic Office (UKHO) Wrecks and Obstruction (2023);
- the Coastal and Intertidal Zone Archaeological Network (CITiZAN) coastal map (2023); and

- online sources including British Geological Survey (BGS) for geological data (BGS, 2023).

Consultation

Scoping Opinion

- 17.3.22 An EIA Scoping Opinion was requested from the Inspectorate on 6 April 2023. A response was received on 17 May 2023. For the Scoping Opinion and the Applicant's responses to them, refer to Appendix 1E (ES Volume III, EN070009/APP/6.4).
- 17.3.23 It is, however, worth highlighting that the Scoping Opinion confirmed agreement on scoping out direct impacts to marine heritage assets and those located in the River Tees as they are unlikely to experience significant effects but that an assessment of impacts on these assets as a result of changes to their setting should be included. The Scoping Opinion further confirmed that an assessment of the historic landscape should be included. These matters are discussed in Appendix 1E (ES Volume III, EN070009/APP/6.4).

Statutory Consultation

- 17.3.24 The PEI Report was published for statutory consultation on 14 September 2023 and the consultation period ended on 26 October 2023. A second statutory consultation was held between 13 December 2023 and 23 January 2024, and additional targeted consultation was held between 9 February 2024 and 10 March 2024. The matters raised have been reviewed and an explanation of how the Applicant has had regard to them is set out in the Consultation Report (EN070009/APP/5.1).
- 17.3.25 Refer to Table 17-4 for a detailed summary of the Statutory Consultation feedback relevant to this chapter from Statutory Environmental Bodies, and the Applicant's responses.

Table 17-4: Responses to the Statutory Consultation Feedback

CONSULTEE	DATE AND METHOD OF CONSULTATION	SUMMARY OF CONSULTEE COMMENTS	SUMMARY OF RESPONSE/HOW COMMENTS HAVE BEEN ADDRESSED
Historic England	26/10/23	<p>Having read the documentation provided at this stage, we consider that it is unlikely that the proposed development will have any significant impact on higher-grade heritage assets, which form the core of the work where Historic England can add value to discussions.</p> <p>As such, we do not propose to comment in detail on these proposals. However, particularly for historic environment issues outside the core of our work, others may wish to comment or provide advice on the wider historic environment. We consider that the people best placed to offer informed advice would be the specialist staff and consultants at the Local Authorities concerned.</p> <p>We would therefore advise, if this is not already in progress, that you request conservation and archaeological advice on this proposal as part of doubtless wider discussions with them.</p> <p>I hope that these comments at this early stage is helpful to you, should there be any amendments to the scheme which could result in different impacts to the historic environment then please let us know and we can provide further advice.</p>	<p>Comment noted.</p> <p>The archaeologists representing the relevant LPAs have been consulted in the preparation of Chapter 17: Cultural Heritage (ES Volume I, EN070009/APP/6.2).</p>

CONSULTEE	DATE AND METHOD OF CONSULTATION	SUMMARY OF CONSULTEE COMMENTS	SUMMARY OF RESPONSE/HOW COMMENTS HAVE BEEN ADDRESSED
Historic England	04/01/2024	<p>Having read the documentation provided at this stage, we consider that it is unlikely that the proposed development will have any significant impact on higher-grade heritage assets, which form the core of the work where Historic England can add value to discussions.</p> <p>Position</p> <p>As indicated in our letter dated 26 October 2023, Historic England are taking a limited involvement in this NSIP as there is no proposed harm to the higher value designated historic environment. It is our opinion that the Local Authority conservation and archaeological advisors are best placed to provide advice and comment on the potential impacts to the historic environment this change may bring. They have the local knowledge and expertise to provide the best advice in this circumstance and should be providing the necessary advice on these proposed changes.</p>	This comment is noted.

Assumptions and Limitations

- 17.3.26 To ensure a robust assessment of the likely significance of the environmental effects of the Proposed Development, the EIA is being undertaken adopting the principles of the 'Rochdale Envelope' approach where appropriate in line with The Inspectorate's guidance (The Inspectorate, 2018). This involves assessing the maximum (or where relevant, minimum)/realistic worst-case parameters for the elements where flexibility needs to be retained (building dimensions or operational modes for example).
- 17.3.27 As outlined in Chapter 4: Proposed Development (ES Volume I, EN070009/APP/6.2) only trenchless methods (such as Horizontal Directional Drilling (HDD) or Micro Bored Tunnelling (MBT)) are being considered for the Hydrogen Pipeline Corridor crossings of Greatham Creek and the River Tees. Apart from these crossings, the worst-case for cultural heritage derived from the installation of pipelines and cables assumes that open-cut trench construction would be used to construct some sections of the following:
- Natural Gas Connection Corridor Works (Work No. 2A);
 - Electrical Connection Works (Work No. 3);
 - Water Supply Connection Works (Work No. 4);
 - Wastewater Disposal Works (Work No. 5);
 - Hydrogen Pipeline Corridor (Work No. 6);
 - CO₂ Export Pipeline (Work No. 7); and
 - Oxygen and Nitrogen Gas Connections (Work No. 8B).
- 17.3.28 Open cut trench construction methods have the potential to physically remove buried heritage features, therefore, where this method of construction is proposed, it has the potential to result in the permanent loss of heritage assets within the construction footprints. An easement to allow the installation of these Connection Corridors is also planned which could result in the truncation and removal of archaeological remains. Where it is not specified by the individual components in Section 4.3 of Chapter 4: Proposed Development (ES Volume I, EN070009/APP/6.2), the design parameters in Section 4.6 indicate a worst-case scenario of a 12 m easement, extending 6 m on either side of the pipeline centre line. For further detail regarding the proposed construction methodologies, please refer to Chapter 4: Proposed Development (ES Volume I, EN070009/APP/6.2) and Chapter 5: Construction Programme and Management (ES Volume I, EN070009/APP/6.2).
- 17.3.29 The Rochdale Envelope further details a maximum height for the flare of 100 m above Ordnance Datum (aOD). All other structures on the Main Site will have a maximum height of 60 m aOD. Impacts derived from visual changes to setting assume these worst-case conditions.
- 17.3.30 The maximum construction duration represents the worst case for the length of temporary impacts arising from changes to the setting of heritage assets. The worst-case scenario is therefore represented by the sequential and continuous
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- construction of Phase 1, which is likely to last up to 36 months, followed by Phase 2 construction which will also last for up to 36 months. This worst-case scenario does not mean that all heritage assets would be impacted continuously for the maximum construction duration, but rather is a recognition that an impact to a heritage asset may occur, temporarily, during this period.
- 17.3.31 The reasonable worst-case operational scenario is measured by the level of permanent change to the setting of heritage assets. As such, the greatest magnitude of change to the setting of heritage assets is represented by the presence of the operational Proposed Development (both Phase 1 and Phase 2).
- 17.3.32 It is assumed there would be no additional permanent impacts to heritage assets during the Proposed Development decommissioning phase as all impacts of this nature would have occurred during the construction phase. Therefore, the reasonable worst-case decommissioning scenario is measured only by the level of change to the setting of assets, which is represented by temporary activities associated with the decommissioning of the Proposed Development and would likely be no greater than the temporary setting effects predicted during construction.
- 17.3.33 The baseline is drawn from the historic environment DBA produced for the Proposed Development (Appendix 17A: Heritage Desk Based Assessment (ES Volume III, EN070009/APP/6.4)). It is assumed that data therein provided by third parties is accurate at the time of reporting.
- 17.3.34 Given the above, this assessment presents a reasonable 'worst-case' approach.
- 17.3.35 Archaeological evaluation in the form of a geophysical (magnetometry) survey (Appendix 17A: Heritage Desk Based Assessment (ES Volume III, EN070009/APP/6.4)) of agricultural land within the Proposed Development has been undertaken, and the results have been incorporated into this assessment. The area planned to be surveyed totalled approximately 59 ha, but 8 ha were inaccessible due to being waterlogged or too overgrown to allow access to the survey equipment. However, given the paucity of result in the remainder of the survey areas, it is considered that a review of available aerial photographs and LiDAR imagery is sufficiently robust to inform the archaeological baseline in these areas. The programme of archaeological mitigation proposed in Section 17.7 acknowledges that additional evaluation and / or monitoring of intrusive works may be required in these fields nonetheless.
- 17.3.36 Lastly, some areas of the Proposed Development Site could not be accessed during the site walkovers due to lack of land access. While the Proposed Development Site is sufficiently well understood through desk-based research to assess the presence, absence and potential for significant remains, the survival of remains associated with the Redcar (SMR5711) and Coatham Iron Works (SMR5709) could not be ascertained where 20th century development may not have subsequently removed them. As a means to mitigate the risk of significant remains being impacted, the area identified as likely to hold such remains (Appendix 17A: Heritage Desk Based Assessment) (ES Volume III, EN070009/APP/6.4) has been removed from the

Proposed Development Site. No works will be undertaken in this area, and as such no impacts would occur on remains located therein.

17.4 Baseline Conditions

Existing Baseline

- 17.4.1 This section presents a summary of the existing baseline conditions for cultural heritage relevant to this assessment. Detailed baseline information, including the results of a site walkover survey of parts of the Proposed Development Site and a description of the setting of relevant assets, is set out in the DBA presented in Appendix 17A: Cultural Heritage Desk-based Assessment (ES Volume III, EN070009/APP/6.4). Reference should be made to Figures 17-1 to 17-4 (ES Volume II, EN070009/APP/6.3). Heritage assets and features from the HER and NHLE are identified in the baseline text by reference number.

Geology and Topography

- 17.4.2 The solid geology beneath the Proposed Development Site comprises Redcar Mudstone Formation, Penarth Mudstone, Mercia Mudstone and Sherwood Sandstone. The superficial geology beneath the Main Site comprises Blown Sand and Tidal Flat Deposits of sand and silt, Glaciolacustrine Deposits and Glacial Till (BGS 1:50,000 Digital Geological Map of Great Britain).
- 17.4.3 Large sections of the Proposed Development Site, particularly those between the A178 west of the River Tees and the line of the Darlington section of the North East Railway east of the River Tees, have been reclaimed from tidal flats from the mid-19th century onwards. While tidal flat deposits of Seal Sands and Bran Sands survive and overlie glacial deposits below the built up made ground, these are situated at substantial depth. The loose tidal sands and silts are recorded at depths of between 4 m and 6 m below the made ground, while glacial till is recorded between 8 m and 12 m depth.

Historic Landscape

- 17.4.4 The character of the landscape within the 1 km study area is dominated by the area's industrial heritage, particularly on the reclaimed land to the north and south of the River Tees. The saltmarshes which would have been exploited for resources throughout the history of human habitation in the area still form the boundary between agricultural land and the sea. Pockets of saltmarsh exist to the north of the Tees with fewer areas surviving on the river's south banks. The fields beyond the saltmarsh and industrial zones are indicative of post-World War II amalgamation of earlier, smaller fields into larger land parcels to accommodate more intensive farming practices, whilst small villages and farmsteads outside of settlement areas are indicative of the area's medieval agricultural heritage.
- 17.4.5 Whilst much of the Proposed Development has been extensively developed from the 19th century onwards, erasing many of the earlier features of the historic landscape, the area around Cowpen Bewley is unique in preserving a measure of medieval time depth. The village itself is of typical medieval layout and is surrounded by small fields which capture the original medieval agricultural field
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patterns. Many of these fields also hold remnants of earthworks formed by medieval ridge and furrow cultivation practices. A review of historic maps, aerial photographs and the results of the geophysical survey suggest that many of the field boundaries have been altered in the post-medieval period, likely as a result of enclosure acts, but it is clear that a number of modern boundaries remain aligned with the medieval ridge and furrow and may be of medieval origin.

- 17.4.6 Two hedgerows have been identified which are of greater than 30 years of age and which mark field boundaries likely to pre-date the enclosure acts of 1750 onwards. They were identified by reviewing the location of hedgerows identified in Chapter 12: Ecology and Nature Conservation (ES Volume I, EN070009/APP/6.2) against historic maps, aerial photographs, and the location of ridge and furrow recorded in the geophysical survey. These are likely to qualify as 'important' hedgerows and are shown on Figure 17-2. They include the southern part of Marsh Lane, south-east of Cowpen Bewley, and a short hedgerow just south of this lane. These boundaries are particularly important to the legibility of the vestigial medieval landscape around Cowpen Bewley.

Summary of Archaeological and Historical Background

Palaeolithic

- 17.4.7 Palaeolithic activity tends to be represented in the archaeological record by finds of flint tools and/or the waste flint associated with the production of such, either as individual pieces or larger scatters of material tool. These tools were used for hunting and processing animals, and the environment of the River Tees would have been a perfect environment for hunting. Recent land reclamation activities within the study area may well have destroyed much of the archaeological evidence of this period. However, it is possible that deeply buried deposits of this period do survive and have the potential to contain information about this period.

Mesolithic

- 17.4.8 During the Mesolithic period, the River Tees was occupied by extensive saltwater marsh and would have been a focal point for hunting and fishing activities (Daniels, 2014). Intertidal peat beds, a submerged Late Mesolithic forest, and evidence of occupation (Batchelor et al, 2012) have been recorded to the north of the River Tees at Hartlepool and Seaton Carew. Intertidal peat beds have also been recorded at Redcar (Carter, 2014). Mesolithic and Neolithic worked flints were recovered during fieldwalking of the fields between Kirkleatham and Yearby, on the edge of the 1 km study area and included a section of a blade and a transverse arrowhead (SMR 1701).

Neolithic and Bronze Age

- 17.4.9 Approximately 500 m north-east of the Main Site is the record for 'Coatham Man' (SMR 6798), consisting of fragments of human skull which were radiocarbon dated to the Early Neolithic period.
- 17.4.10 To the north-west, north of the River Tees, the Proposed Development Site crosses fields within Cowpen Marsh, where previous assessment reports have identified

evidence of Bronze Age midden deposits (SMR 1817) exposed during excavations at Fore Marsh, just outside of the Proposed Development Site, and medieval salt mounds. The salt marshes would have provided excellent hunting grounds for early prehistoric groups. The midden feature was preserved beneath estuarine clays and above a peat deposit dated to 4-5,000 years before present. The midden contained well-preserved horse, cattle and sheep bones, all containing butchery marks. The feature is indicative of Bronze Age groups using the marshes for temporary activities and suggests that more permanent settlement, evidence of which is rare in the archaeological record, may have been in the vicinity of the marsh. The only other non-designated asset of these periods within the 1 km study area comprises a fragment of Beaker pottery (SMR 240) found in a field to the south-west of Kirkleatham, approximately 590 m south of the Proposed Development Site.

- 17.4.11 Within the wider 5 km study area, Early Bronze Age settlement archaeology has been recorded at Eston Nab hillfort which is a scheduled monument (NHLE 1011273) and comprises a palisaded settlement. The Bronze Age is also represented in the archaeological record by funerary monuments, and a cluster of funerary monuments from this period the majority of which are scheduled monuments, are present on Eston Hills.

Iron Age

- 17.4.12 During the Iron Age this area of Britain was within the territory of the Brigantes tribe. Recent research in the Tees Valley has identified the Iron Age communities as a discrete cultural group within the larger Brigantes tribe, with a cultural identity that was distinctly different to the tribes to the north and south of the valley (Sherlock, 2012).
- 17.4.13 Cropmark evidence of Iron Age settlement in the 1 km study area includes a farmstead at Foxrush Farm in Dormanstown (SMR 159), located approximately 550 m east of the Proposed Development Site, and part of a beehive quern stone found at Kirkleatham (SMR 1043), located approximately 750 m south-east of the Proposed Development Site. This evidence demonstrates that the valley and floodplain of the River Tees continued to be used for settlement and crop growing.
- 17.4.14 There is no evidence recorded on the HER for Iron Age or Roman activity within the Proposed Development Site north of the Tees, but activity is recorded in Seaton Carew, approximately 3.4 km north-east of the Proposed Development Site. It is likely that the resources provided by the salt marsh environment would have been exploited during these periods but transient activities, such as hunting and fishing, do not generally leave trace archaeological evidence.

Roman

- 17.4.15 Approximately 2 km west of the Proposed Development Site is the site of a purported Roman road running from Billingham north-west to Sedgfield, where it possibly connected to Cade's Road (Mason, 2020). The road is purported due to an association with a possible military installation or port in the Billingham or Middlesbrough area (Mason, 2020).

17.4.16 Six records on the HER from the Roman period are located immediately west but outside of the Proposed Development Site, comprising SMR9068, 9437, 9438, 9439, 9502 and 9523. They are grouped together and located in an existing facility recently built to the west of the Proposed Development Site. These all relate to a Roman settlement site at Saltholme, discovered during a programme of archaeological works undertaken in 2019 (1470, 1468, 1498 and 1497). The work revealed a series of enclosures as well as pits, postholes and ditches. The settlement also included two stone-lined cist burials, the remains of three corn dries and finds including the base of a rotary quern, a trumpet brooch and pottery. The work demonstrated the presence of a large farmstead engaged in domestic and agricultural activities. The geophysical survey carried out in these same fields found evidence suggesting that some features extended northward for a short distance (GS Site 3).

Early Medieval to Medieval

17.4.17 The early medieval period is one of the least archaeologically visible across Britain, with evidence from this period restricted, almost exclusively, to burial and religious centres. It was during this period that new settlements and settlement patterns emerged, many churches and villages were established, field systems changed, and open-field agriculture was introduced.

17.4.18 The villages of Greatham and Cowpen Bewley are not mentioned in the Bolden Book. However, the Church of St. John the Baptist in Greatham, a Grade II* listed building (NHLE 1263522), has fragments of sculptured masonry, dating to the 8th and 12th centuries, built into its north aisle wall and late-12th century nave arcades which suggests a community was established at this place during the medieval period.

17.4.19 Medieval material culture, derived from the archaeological record, is generally sparse across the region. Documentary evidence records that large tracts of the countryside were devastated by Scottish raids during the 14th to the 16th centuries which, coupled with plague and famine, resulted in a decrease in population and tenure (Surtees, 1816) and the reduction in the area's population may be one of the reasons for the very small quantities of medieval pottery noted in the archaeological record. The decrease in population is articulated in the archaeological record by the site of the deserted medieval village of West Coatham (SMR355), which is located immediately next to the Proposed Development Site. However, despite population decrease and settlement contraction, small villages such as Greatham and Cowpen Bewley, remained part of the medieval landscape alongside individual farmsteads.

17.4.20 Agriculture would have been the principal means of subsistence, but other industry such as salt production is also documented in the archaeological record. The extraction of salt from seawater was a major industry in this area and numerous salt mounds, identified as earthworks, have been recorded from historical maps and aerial photographs around Coatham Marsh. The sites of several salt mounds within the Proposed Development Site (SMR3751, 3752, 3753, 3754, 5755, 3756, 3759,

3760, 3764 and 3767) are marked on early editions of OS maps as within the Proposed Development Site, but no remains of these survive today.

- 17.4.21 The layout of the village of Cowpen Bewley follows the traditional Norman form of two rows of properties on either side of a broad green. The earthwork remains of the village's medieval origins, including three tofts at the eastern end of the southern row of properties, are recorded as assets SMR604 and SMR624 whilst asset SMR3612, to the north of the village, appears to represent a raked midden to the rear of a property. A number of assets within and around Cowpen Bewley attest to the medieval origins of this village. The village is recorded initially as two-rows of cottages with a green, followed by infilling at the southern end of the green and a further planned row added to the north of the village (SMR602). Several medieval field systems, identified as remnants of ridge and furrow agriculture, are recorded in the vicinity of Cowpen Bewley and form part of the village's medieval hinterland. Five such fields are recorded in the HER within the Proposed Development Site, although only three survive today (SMR1513, 1519 and 6819) while the other two appear to have been entirely ploughed out or developed (SMR658 and 6821).
- 17.4.22 To the south of Cowpen Bewley are two medieval assets recorded in the HER as lying within the Proposed Development Site. The vestiges of the medieval moat of Belasis Manor (SMR5156) have been largely infilled but may survive in places, while a medieval fishpond (SMR6865) associated with the medieval grange of Billingham (SMR617) has appears to have been entirely built over by 20th century industrial works.
- 17.4.23 The medieval village of Kirkleatham is recorded as having a Church in the Domesday survey, and a Chancery with 12 priests was endowed in 1348, the site of which is currently not known. Assets (SMR489, 5134, 4807, 169, 1426, 1802 and 1801) relate to archaeological features associated with the medieval village (principally ridge and furrows and boundary ditches) along with find sites of pottery and worked stone. Medieval ridge and furrow extend south and west beyond Kirkleatham and towards the fields around Lazenby and Lackenby and contribute to the setting and value of the area. The small medieval village of Lackenby is recorded in Domesday as having a population of only one household. The remains of the medieval village survive as a small number of enclosure earthworks (SMR4478) with areas of associated ridge and furrow (SMR1082 and 372) within its hinterland.

Post-Medieval to Modern

- 17.4.24 The dissolution of the monasteries (1536) and enclosure of the land (1750 onwards) would have had large impacts on society during the early parts of the post-medieval period. There is little evidence for planned parliamentary enclosure within the study area, with only Marske (1756) and Kirkleatham (1850) receiving parliamentary awards (British History online, 2023) suggesting the enclosure of the land within the study area was likely undertaken by Private Act. Mapping appears to indicate that by 1811, the majority of the study area was enclosed (North Yorkshire County Council, n.d.), with common pasture and moorland only remaining around the edges of settlements at Coatham and at the foot of the Eston Hills. The enclosure of land greatly increased the region's agricultural output, which assisted

in supporting the burgeoning industrial development of the area and the associated increase in population. Maps from the late 1800s show a large increase in the number of farms and farmsteads in the region (such as Marsh Farmhouse and Cottage (NHLE 1160308), garden wall (NHLE 1139619) and stable and barn (NHLE 1139620)).

- 17.4.25 The discovery of iron ore in the Eston Hills in 1850 in relative proximity to the extensive North Yorkshire coalfields created an industrial boom, leading to the opening of large numbers of iron works in the area and attracting people into the region to work at the new foundries. Transport and communication (significantly rail and docks) underwent major development to support this industry. Many of the small medieval settlements in the study area saw significant growth, either as towns supporting this activity (such as Kirkleatham and Greatham), or as coastal tourist resorts (such as Redcar and Coatham). Hand in hand with this, the construction of reclamation walls and banks dried out former marshlands and mudflats, reclaiming land to be turned over to the region's industrial development and to increase its agricultural output, as well as making the River Tees more navigable and suitable for heavy shipping.
- 17.4.26 A number of post-medieval sea defences and land reclamation walls extend into the Proposed Development Site. These include the Cowpen Marsh and Saltholme sea defences (SMR8262), the Coatham land reclamation wall (SMR6046), the Normanby Jetty to South Gare reclamation wall (SMR5602) and the South Gare Breakwater (SMR5663), the latter of which was made obsolete by land reclamation and has since been removed in advance of extensive modern industrial developments.
- 17.4.27 To the west of the River Tees, SMR4172 represents the line of the Stockton and Hartlepool Railway – a branch line linking West Hartlepool to the main line of the Clarence Railway near Billingham. Construction began in 1839 (opening in 1841), with the purpose of moving passengers (often workers) and freight from Hartlepool to ports and industry along the River Tees. The line still operates a limited service today. A section of the railway line runs through part of the Proposed Development Site, along the western edge of the Main Site.
- 17.4.28 The railway also connected the Greatham Salt and Brine Company factory (1887) (SMR1222), which is located to the north of the Proposed Development Site. This factory became the Cerebros Saltworks in 1903 and ceased salt production in 1970, although it continued food production until 2007.
- 17.4.29 To the south of the Greatham Salt and Brine Company Factory, was the Allhuse Cowpen Saltworks (SMR4301) which lies within the Proposed Development Site. The saltworks were first opened with four boreholes in 1885 before expanding to ten by the turn of the century. However, most likely due to the extensive reclamation of the Seal Sands to the east, the saltworks ceased production shortly after and were abandoned by 1916. Today the asset survives as an area of hardstanding, although it is likely that the boreholes and other below ground remains survive to a greater extent.

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- 17.4.30 The Allhuse Cowpen Saltworks were connected to the rail network in the late 19th century via the North East Railway's Greatham Creek Branch (SMR8717) from the south. Although no longer in use today, the railway appears to survive well as an embankment retaining its sleeper and ties.
- 17.4.31 Several assets relating to the iron working industries of Redcar and Cleveland are situated within the Proposed Development Site east of the River Tees. These include the sites of the Coatham Ironworks (SMR5709), the Redcar Ironworks (SMR5711), and the Lackenby Ironworks (SMR5659). All three were erected in the second half of the 19th century, but all above ground traces of the latter two have been removed by 20th century industrial developments. Remains may survive below ground, but these would likely be truncated and consist of foundation remains only. Several elements of the Coatham Ironworks, however, appear to survive above ground, evidenced by the remains of railway sidings and potential furnace foundations visible in aerial photographs and LiDAR imagery.
- 17.4.32 These and the later Redcar Iron and Steel Works that replaced them, were supported by a network of railways (SMR5908), tramways (SMR5708 and 5712) and jetties (SMR5636), all of which are recorded within the Proposed Development Site. Of these, only the North Eastern Railway's Darlington section (SMR5908) survives in places, while the other remains have all been removed.
- 17.4.33 Other post-medieval remains recorded within the Proposed Development Site include a spoil heap (SMR5652) immediately north of Lackenby Ironworks likely to have been a slag heap, a brickyard (SMR5653) and later concrete works (SMR5654), an industrial reservoir (SMR5710) associated with Redcar Ironworks, duck decoy ponds (SMR3775) and a drainage channel marked as the 'Mill Race' (SMR5716) on historic maps. Of these, only the Mill Race may survive, although it has evidently been built over across much of its length.
- 17.4.34 Twentieth century industrial remains recorded on the HER are rarer as they have little archaeological and historical interest. Nevertheless, although long closed and all access shafts blocked, the deeply buried galleries of the early 20th century Billingham Anhydrite Mine (SMR6099) are known to survive and may extend below the Proposed Development Site. Two gas holders (SMR8312 and 8313) also survive in the former Redcar Iron and Steelworks site in which the Main Site is located but these will be demolished before the Proposed Development is constructed. Although both registered on the HER, neither the Anhydrite mine nor the gasholders have any archaeological and historic interest.
- 17.4.35 The industries of the North-East were strategic targets during the Second World War and the vast majority of the cultural heritage assets within the study area, which date to this period, relate to the Second World War, and include anti-aircraft batteries, anti-landing obstacles, search light batteries, pillboxes, section posts, mortar emplacements, air raid shelters, barracks, command posts, storage areas and bombing decoy sites. Bomb craters have been recorded across Cowpen Marsh resulting from attacks on the industries of the Tees area.
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17.4.36 Second World War remains recorded within the Proposed Development Site include anti-landing glider posts (SMR9532) and an air raid shelter (SMR5267) and anti-tank blocks near Warrenby (SMR4024), all of which survive well today. Other assets of this period reported within the Proposed Development Site have all since been removed. These include four pillboxes (SMR8251, 8252, 8260 and 8262), a weapons pit or trench (SMR8299), a minefield in Bran Sands (SMR8239), and a second set of anti-tank blocks near Warrenby (SMR8128).

Geophysical Survey Summary

17.4.37 A geophysical survey (detailed magnetometry) was conducted over 51 hectares of agricultural fields to the north, east and south-east of Cowpen Bewley where the proposed Hydrogen Pipeline Corridor is situated. Detailed results are presented in Appendix 17A (ES Volume III, EN070009/APP/6.4).

17.4.38 The magnetometry identified three sites of archaeological interest in the survey area. These comprise a possible enclosure and ring ditch (field 10, referred to as GS Site 1), a possible enclosure with associated boundary ditches (Field 18, referred to as GS Site 2) and a number of linear and rectilinear anomalies (Field 14, referred to as GS Site 3) which probably form a continuation of the Romano British settlement identified immediately to the south.

17.4.39 GS Site 1 lies outside of the Proposed Development boundary and as such will not be impacted and is not further discussed.

17.4.40 GS Site 2 is undated and its significance is yet to be established. It is situated in relative proximity to the ring ditch of likely prehistoric date to the north, a Romano-British farmstead to the south and the medieval settlement of Cowpen Bewley to the west. As such, it could conceivably date to any period from the prehistoric to the modern period. However, given its limited extent, it is likely to be of local or, at most, regional archaeological and historic interest. As such, it is considered of Medium heritage value.

17.4.41 Although not directly dated, GS Site 3 appears to be an extension of the Romano-British settlement recorded immediately south. This settlement is well understood, and features extending northward appear to have formed part of Phase 4 of occupation at the Site. These have been partially excavated already and have been sampled and remains analysed. The Romano-British settlement is considered of regional archaeological interest as do, by extension, the remains present within the Proposed Development Site as the area could conceivably contain further evidence of human burials.

17.4.42 The survey also confirmed the presence of extensive medieval ridge and furrow surrounding Cowpen Bewley, some of which was previously recorded in the HER (SMR 1513, 1519).

Summary

17.4.43 Table 17-5: presents a summary of assets identified in the DBA which have the potential to be impacted by the Proposed Development either directly or through changes to their setting. The heritage value of these assets is derived from their

significance as defined in the DBA in accordance with the methodology set out in Section 17.3. Impacts to these assets are assessed in Section 17.6.

Table 17-5: Summary of Heritage Assets Likely to be Impacted by the Proposed Development

REFERENCE (SMR/NHLE)	DESCRIPTION	HERITAGE VALUE
1011273 (Scheduled monument)	Eston Nab Hillfort	High
N/A	Kirkleatham Conservation Area	Medium
N/A	Coatham Conservation Area	Medium
N/A	Seaton Carew Conservation Area	Medium
N/A	Yearby Conservation Area	Medium
N/A	Cowpen Bewley Conservation Area	Medium
N/A	Greatham Conservation Area	Medium
1160308 (Grade II listed building)	Marsh farmhouse and Farm Cottage	Medium
1139619 (Grade II listed building)	Garden Wall South of Marsh Farmhouse	Medium
1139620 (Grade II listed building)	Barn and Stable Circa 10 Metres North West of Marsh Farmhouse	Medium
1159837 (Grade II listed building)	Westfield House	Medium
1310859 (Grade II listed building)	1-20, Dormans Crescent	Medium
1513, 1519, 6819	Field system (ridge and furrow)	Low
5156	Moat of Belasis Manor House	Low
8262	Cowpen Marsh and Saltholme sea defences	Low
4301	Allhuse, Cowpen Saltworks	Very Low

REFERENCE (SMR/NHLE)	DESCRIPTION	HERITAGE VALUE
4172	West Hartlepool – Billingham Junction Railway	Low
6046	Coatham land reclamation wall	Low
5602	Normanby Jetty to South Gare land reclamation wall	Low
5709	Coatham Ironworks	Low
5711	Redcar Ironworks	Low
3775	Decoy Ponds	Low
5908	North Eastern Railway (Darlington Section)	Medium
5716	Mill Race	Low
9532	Concrete anti landing glider posts	Low
5267	Nelson Avenue Air Raid Shelter	Low
4024	Warrenby Anti-tank blocks	Low
8717	North East Railway Greatham Creek Branch	Low
6099	Billingham Anhydrite Mine	Very Low
8312, 8313	Teesside Works gas holders	Very Low
GS Site 2	Undated enclosure and boundary ditches south-east of Cowpen Bewley	Medium
GS Site 3	Linear and rectilinear features likely associated with the Romano-British settlement south-east of Cowpen Bewley	Medium

Future Baseline

- 17.4.44 The overarching approach to defining future baseline is described in Chapter 2: Assessment Methodology (ES Volume I, EN070009/APP/6.2).
- 17.4.45 For buried archaeological remains within the Proposed Development Site, the future baseline is expected to be the same as the current baseline. Buried archaeological remains are a relatively static resource, which have reached equilibrium with their environment and do not change (e.g., decay or grow) unless their environment changes because of human or natural intervention. For above ground heritage assets, there may be some decay over time in the absence of the Proposed Development as they near the natural end of their design lifespan.
- 17.4.46 The only exception is that of two currently extant late 20th century gasholders (SMR8312 and 8313) located in the Main Site which will be removed by South Tees Development Corporation (STDC) prior to construction of the Proposed

Development. These will therefore be absent from the baseline regardless of the Proposed Development going forward. They have been included in the baseline as they are currently extant and included in the assessment, but it is assumed that they will no longer be present prior to construction.

17.5 Proposed Development Design and Impact Avoidance

17.5.1 The EIA process aims to avoid, prevent, reduce or offset potential environmental effects through design and/or management measures. These are measures that are inherent in the design and construction of the Proposed Development (also known as 'embedded mitigation').

17.5.2 The following impact avoidance measures have either been incorporated into the design or are standard construction or operational practices. These measures have, therefore, been taken into account during the impact assessment and will be secured through a Requirement of the Draft DCO (EN070009/APP/4.1).

Construction

17.5.3 The following design and impact avoidance measures are of relevance to the Proposed Development construction phase:

- temporary construction compounds to avoid impacted known heritage assets, including moving the main construction compound south to avoid impacts to the remains of Redcar Ironworks (SMR5711);
- refined the routing of connections, where practicable, to avoid known heritage assets;
- proposed use of existing pipeline infrastructure and established Connection Corridors, as far as is practicable in the design in order to avoid impacts to known and previously unrecorded heritage assets;
- siting as much of the Hydrogen Pipeline Corridor in an existing above ground, pipeline racking network, thereby avoiding impacts to potential buried archaeological remains or significant changes to the setting of assets;
- reinstatement of hedgerows and field boundaries post construction;
- proposed use of trenchless technologies, including Horizontal Directional Drilling (HDD) or Micro Bored Tunnel (MBT) for the connections (crossing of the River Tees and Greatham Creek as well as some other parts of the Connection Corridors See Figure 5-2 (ES Volume II, EN070009/APP/6.3) to avoid impacts to known and previously unrecorded heritage assets where possible. use of brownfield sites or existing hard standing areas, where practicable within the Proposed Development Site for temporary construction compounds; and
- lighting required during the construction stage of the Proposed Development designed, positioned, and directed to prevent or minimise light spill, as presented in the Indicative Lighting Strategy (Construction) (EN070009/APP/5.12).

17.5.4 The Framework Construction Environmental Management Plan (CEMP) (EN070009/APP/5.12) sets out the key measures to be employed during the construction of the Proposed Development, to control and minimise the impacts on the environment. This includes provision that the Final CEMP(s) will set out areas of exclusion, where no intrusive works are to take place to ensure preservation *in situ*, and measures to mitigate changes to the setting of assets derived from construction activities, such as controls on noise, dust, light, or visual intrusion. The Final CEMP(s) will also refer to the Essential Mitigation referred to below (Section 17.7), and the need to develop a Written Scheme of Investigation, which is secured separately through the DCO. The Final CEMP(s) will set out how impacts upon cultural heritage will be managed during construction. A Final CEMP(s) will be prepared by the Engineering, Procurement and Construction Contractor(s) in accordance with the Framework CEMP prior to construction. The submission, approval, and implementation of the Final CEMP(s) will be secured by a Requirement of the Draft DCO (EN070009/APP/4.1).

Operation

17.5.5 In line with the design and impact avoidance measures during the construction stage, lighting required during the operational stage of the Proposed Development has been designed, positioned, and directed to prevent or minimise light spill, presented in the Indicative Lighting Strategy (Operation) (EN070009/APP/5.8). There are no other embedded mitigation measures identified for cultural heritage assets applicable to the operational stage of the Proposed Development.

Decommissioning

17.5.6 A Decommissioning Environmental Management Plan (DEMP) would be produced pursuant to a Requirement of the Draft DCO (EN070009/APP/4.1). The DEMP would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated. This would include details of how archaeology should be managed during decommissioning and demolition.

17.5.7 No other mitigation measures have been identified for cultural heritage assets applicable to the Proposed Development decommissioning stage.

17.6 Impacts and Likely Significant Effects

17.6.1 This section presents the results of the assessment of cultural heritage effects taking into account the embedded and good practice mitigation measures as described in Section 17.5.

17.6.2 In undertaking this assessment, it is noted that a number of heritage assets have been scoped out of the assessment where the Applicant's site visit and discussions with Historic England and LPAs confirmed they would experience no change as a result of the Proposed Development. Assets which have been descoped are discussed in Appendix 17A: Cultural Heritage Desk-based Assessment (ES Volume III, EN070009/APP/6.4).

Construction

- 17.6.3 The construction of the Proposed Development may result in physical impacts to heritage assets, resulting in a permanent loss of heritage value, or may result in impacts to heritage assets through temporary change to their setting as a result of construction activities. The principal components of the Proposed Development and their potential impacts upon heritage assets during construction are discussed below.

Permanent Impacts

The Main Site (Work No. 1)

- 17.6.4 There are no designated heritage assets located within the Main Site.
- 17.6.5 The site of a former 19th century tramway (SMR5712) and jetty (SMR5636) extend into the Main Site. In addition, the site of South Gare Breakwater (SMR5663) and tramway which ran along its course (SMR5708), both dating to the late-19th century, extend partially into the northern section of the Main Site. These assets are also no longer extant and are recorded from historical map evidence only. Earthworks associated with the breakwater are visible to the north-west of the Main Site, but do not extend into it. The route of the tramway (SMR5708) is marked by a footpath to the north-west of the Main Site, but there is no evidence to suggest survival of the tramway within it. Similarly, a former land reclamation wall dating to the 19th century (SMR5602) is recorded along the former banks of the River Tees and lies partially within the Main Site. However, while remains of this reclamation wall may survive further south, it appears to have been removed by industrial developments in the Main Site.
- 17.6.6 The Main Site has been developed extensively since the late-19th century which is likely to have removed all trace of the breakwater, reclamation wall, jetty and tramway features that appear on 19th century map evidence. These features therefore survive only as documentary evidence on historical maps. They have a level of historic interest as features that are indicative of the area's industrial heritage, but as there are no surviving remains of the features within the Main Site, they have no archaeological interest. Construction of the Proposed Development will not affect their historic interest and will therefore result in no impact and no effect.
- 17.6.7 Modern assets in the Main Site include two Second World War pillboxes that have since been removed (SMR8252 and 8262) as well as two gasholders (SMR8312 and 8313) from the late 20th century. As they have been demolished, the pillboxes retain no archaeological interest while their historical interest is retained solely in cartographic and documentary evidence. The gasholders are of modern construction and have limited archaeological, architectural, or aesthetic interest. Despite being testaments of late 20th century efforts to modernise and maintain operations at the Redcar Iron and Steel Works, their historical interest is limited to the role they played in the development of the local ironworking industry. They do not fulfil any of the criteria from Historic England guidance (HE, 2019) to warrant ascribing them greater than local interest, and as such they are considered of Very

Low heritage value. Photographs of these assets are archived by Historic England (Job Reference 2K/29763, Volume VF000362, Series HEC01/025). The dismantling and removal of the gasholders will be undertaken by STDC and will occur prior to and form no part of the Proposed Development. As such, they will no longer be present once the Proposed Development construction phase begins and there will be no impacts to these assets.

- 17.6.8 The baseline information, presented in Appendix 17A: Cultural Heritage Desk-based Assessment (ES Volume III, EN070009/APP/6.4), indicates that the potential for previously unrecorded archaeological remains to be present within the Main Site is very low. The results of site investigations within the Main Site records made ground, principally consisting of slag-dominant material, with an average depth of between 4 m and 5 m across the site, up to a maximum of 7 m depth. The made ground overlies tidal flat deposits and underlying glacial deposits, but deposits with an organic content were not present. As such, any archaeological remains present within the Main Site are likely to be of low archaeological and historic interest and, given their depth, are unlikely to be impacted by the Proposed Development.

Natural Gas Connection Corridor (Work No. 2)

- 17.6.9 There are no designated heritage assets located within the Natural Gas Connection Corridor. There are three records on the HER located partially within the corridor, being the site of the 19th century Normanby Jetty to South Gare reclamation wall (SMR5602), the site of Coatham Ironworks (SMR3709), a former reservoir associated with these ironworks (SMR5710) and the site of a tramway which ran from the North Eastern Railway (Darlington section) to tip of former South Gare Breakwater (SMR5708).
- 17.6.10 Neither the sites of the reclamation wall nor the tramway are extant within the Proposed Development Site. These two assets survive only in documentary evidence and on historical maps. They hold a level of historic interest as part of the area's industrial heritage, but as there are no surviving remains, they have no archaeological interest. Construction of the Natural Gas Connection Corridor will not affect the assets' historic interest. The construction of the Natural Gas Connection Corridor is therefore assessed to result in no impact and no effect.
- 17.6.11 The site of Coatham Iron Works (SMR5709) and a former reservoir (SMR5710) of the ironworks are located in the eastern section of the Natural Gas Connection Corridor. Based on the desk-based evidence, the remains are assessed to be of local importance and Low value. The construction of the Natural Gas Connection Corridor has the potential to permanently remove a proportion of these remains but will not remove them entirely. This constitutes a Medium magnitude of impact, resulting in a Minor Adverse effect which is Not Significant.

Electrical Connection Corridor (Work No. 3)

- 17.6.12 The Electrical Connection Corridor is situated to the south and immediate east of the Main Site and would result in impacts to the reclamation wall (SMR5602), the site of Coatham Ironworks (SMR5709) and reservoir (SMR5710), and the site of a tramway (SMR5708). As previously discussed, the reclamation wall and tramway

have been largely removed from the archaeological record and would not be subject to any impacts or effects. The remains of Coatham Ironworks and former reservoir would be partially truncated by construction activities, which would result in a Medium magnitude of impact on assets of Low heritage value, resulting in a Minor Adverse effect, which is Not Significant.

- 17.6.13 In addition to these assets, the Electrical Connection Corridor also includes the site a second late 19th century tramway (SMR5712), which once connected Redcar Ironworks (SMR5711) and Coatham Ironworks (SMR5709) to Redcar Jetty (SMR5636). The asset has been entirely removed from the archaeological record, and while it holds historical interest due to the role it played in the development of ironworking it has no archaeological interest remaining. Given that all traces of the asset have been removed and that the Electrical Connection Corridor will not impact its historical significance, no impacts to this asset are expected, resulting in no effects.
- 17.6.14 The line of the North Eastern Railway (Darlington section) (SMR5908) also lies within the Electrical Connection Corridor. Originally the Stockton and Darlington Railway, the track was built in the early 1800s to connect the Coalfields of County Durham with the docks and ironworks of Tees, moving both passengers and freight. The railway underwent a number of renovations and re-routing and changed ownership (to North East Railways) in 1863. Remains of railways from the early 19th century have the potential to inform several regional research aims on industrialisation and the development of rail transport technology. Given that the railway remains in use today, the rails and ties visible today are modern and are not of historic interest. However, it is possible that earlier rails were simply buried as the tracks were improved and graded. Early 19th century railway remains have the potential to be of up to Medium heritage interest. The rail line has been removed from the Electrical Connection Corridor and survives only as an embankment, although it could contain buried remains of earlier phases of the railway. Intrusive works across the alignment of the former railway has the potential to locally truncate or remove sections of the railway. This would only result in a slight change in our ability to understand and appreciate the asset which survives to a much greater extent to the south of the Proposed Development Site. As such, the construction works would cause a Low magnitude of impact to this asset of Medium heritage value, resulting in a Minor Adverse effect, which is Not Significant.
- 17.6.15 The Site of two medieval saltworks, known as salterns, (SMR3753 and 3754) are also located within the Electrical Connection Corridor. These two assets have, however, been entirely removed and only survive in historical records and maps. As such, they retain no archaeological interest, and their historical interest will not be affected by the Electrical Connection Corridor. As a result, no impacts and no effects to either asset is anticipated.

Water and Wastewater Connection Corridors (Work Nos 4 and 5)

- 17.6.16 The two Water Connections Corridors largely overlap the Natural Gas Connection Corridor (Work No. 2) and the Electrical Connection Corridor (Work No. 3). There are no designated assets within this work area and impacts to non-designated from

construction will mirror those discussed above. In short, no impacts are expected to assets which have been previously removed and already discussed (SMR5602, 5708, and 5712), but a Medium magnitude of impact is expected on the former Coatham Ironworks (SMR5709) and reservoir (SMR5710) considered of Low heritage value, resulting in a Minor Adverse effect which is Not Significant.

- 17.6.17 The Water Connections Corridor also overlies several additional non-designated assets which may be impacted by the works. These include two sets of anti-tank blocks (SMR8128 and 4024), a 19th century duck decoy pond (SMR3775) and medieval saltern mounds (SMR3764 and 3767). The medieval salterns (SMR3764 and 3767) and one of the rows of anti-tank blocks (SMR8128) have been removed from the archaeological record. Their heritage value is therefore entirely derived from their historical interest which is retained in documentary and cartographic sources. The Water Connections Corridor will therefore cause no impacts, and no effects, to these three assets.
- 17.6.18 The 19th century duck decoy pond (SMR3775) is poorly preserved and has lost most of the distinctive layout evident in mid-19th century maps. It originally consisted of a large rectangular pond with at least four 'pipes' used for hunting ducks without the use of firearms. The use of the technique declined throughout the 19th and 20th centuries and few such ponds remain in use today. The remains are poorly preserved as the pond appears to have been altered and used for drainage in the 20th century. Although the 'pipes' are no longer extant, the original rectangular central pond is still partially visible today and holds a limited potential for archaeological or paleoenvironmental remains to survive within its fills. It is considered of Low heritage value. The Water Pipeline would cross the waterbody using the pipe bridge which is already present or be directionally drilled. The former duck decoy pond will therefore not be impacted by the construction work, resulting in no effects to the asset.
- 17.6.19 The Water Connections Corridor crosses the line of anti-tank blocks (SMR4024) installed to defend the critical industrial infrastructure from invasion during the Second World War. Although relatively common across England, such assets are often at risk from development and rapidly disappearing. The pipeline will be buried at this location but there is sufficient room within the Water Connections Corridor to ensure that the asset is avoided and not impacted by excavating the open-cut trench around the blocks. This construction methodology is secured in the Framework CEMP (EN070009/APP/5.12). In accordance with this mitigation, the asset will not be impacted by the Water Pipeline and would not be subject to any effects.

Hydrogen Pipeline Corridor and Replacement Land (Work Nos. 6 and 11)

- 17.6.20 The Hydrogen Pipeline Corridor extends across the Tees Valley with the construction type comprising a mixture of above and below ground trenches and trenchless technologies, such as HDD and MBT. The construction of below ground trenches, and the excavation of launch and receptor pits/shafts for HDD and MBT, has the potential to result in permanent impacts to buried archaeological remains that may

- be present. Above ground elements of the pipeline have the potential to introduce new visual elements to the setting of heritage assets and to the historic landscape.
- 17.6.21 At the eastern edge of the Hydrogen Pipeline Corridor and to the south-west of Coatham Marsh is a series of medieval salt mound features that relate to salt production. The extraction of salt from seawater was a major industry in the medieval period and numerous salt mounds, identified as earthworks, have been recorded from historical maps and aerial photographs around Coatham Marsh. The site of the salt mounds within the Hydrogen Pipeline Corridor (SMR3751, 3752, 3753, 3754, 5755, 3756, 3759, 3760, 3764, 3767) are marked on early editions of OS maps but there are no visible remains surviving within the Hydrogen Pipeline Corridor. Map evidence from the 20th century and aerial imagery shows that the area of the salt mounds has been developed significantly since the 1900s and is currently occupied by light industry and road networks. Furthermore, there is no evidence of the salterns from light detection and ranging (LiDAR) imagery. The salterns have the potential to be of regional importance, and therefore Medium heritage value, deriving from their archaeological and historical interest associated with salt production. However, due to the history of development and ground disturbance in this area, there is unlikely to be any subsurface remains associated with historical salt production. The documentary records have a level of historical interest, as indicators of the type of industry that supported communities during the medieval period, but there is unlikely to be any surviving archaeological interest. It is assessed therefore that the construction of the Hydrogen Pipeline Corridor will have no impact on the value of these assets resulting in no impact and no effect.
- 17.6.22 To the south and east of the site of the medieval salt mounds and located in proximity to the Hydrogen Pipeline Corridor is the site of the deserted medieval village of West Coatham (SMR355). The settlement is noted in documentary evidence from 1236, which records the village being engaged in salt production. Earthworks associated with the village are visible on the OS map dated 1884, but the site has been developed extensively through the late-19th and 20th centuries and surface features are no longer present.
- 17.6.23 Due to the extent of historical development and ground disturbance there is a low potential for deeply buried features associated with the village to be present, such as wells and waterholes. If they were present, the features would represent heavily truncated remains with few contextual associations and their heritage value is therefore assessed to be Very Low. The removal of any surviving remains on the periphery of the asset by the Hydrogen Pipeline Corridor would constitute a High impact, as it would represent total loss of any remaining archaeological interest. However, due to the likely low heritage value of the remains, this would result in a Minor Adverse effect, which is Not Significant.
- 17.6.24 The sites of other assets within the Hydrogen Pipeline Corridor south of the River Tees that have been recorded from 19th century historical map evidence, but are no longer present within the Hydrogen Pipeline Corridor, include:
- a section of 19th land reclamation wall which began at Normanby Jetty and extended to the South Gare (SMR5602);

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- a section of 19th century land reclamation wall along the eastern banks of the River Tees (SMR6046); and
 - a 19th century drainage channel known as the Mill Race (SMR5716).
- 17.6.25 All of these features are no longer present within the Hydrogen Pipeline Corridor and due to the history of development within the area, there is little potential for subsurface remains associated with the features to be present. Furthermore, the sites of these assets are located in an area of the Hydrogen Pipeline Corridor that will be housed above ground. All the assets have limited historic interest as map evidence records of the area's industrial, maritime and military defence heritage. Construction within the Hydrogen Pipeline Corridor will not affect the assets' historic interest and will therefore result in no impact and no effect.
- 17.6.26 To the north of the River Tees, the Hydrogen Pipeline Corridor passes through an area of reclaimed land that was formerly salt marsh, through the lands around Greatham Marsh, and extends as far as the fields around Cowpen Bewley and south of Greatham village.
- 17.6.27 Features recorded on the HER in the vicinity of Greatham Creek and within the Hydrogen Pipeline Corridor include World War II anti-landing glider posts (SMR9532). These posts are reported by the HER as surviving based on digital imagery viewed in 2021. The posts were associated with a generator house, command post and bombing decoy site to the south which are no longer extant. Anti-landing posts are generally ephemeral in nature and little beyond the anchoring concrete foundations typically survive. As remnants of surviving elements of poorly preserved World War II defences, the anti-landing posts are considered of local historical interest and archaeological interest and thus of Low heritage value. The Hydrogen Pipeline Corridor is situated in close proximity to this asset and is proposed to be installed by open-cut to the north and west and by direction drilling to the south-east to cross Greatham Creek. The open cut excavations and the starter/reception drill pit have the potential to truncate or remove isolated elements of the asset but would not entirely remove the whole asset. This would result in a Medium magnitude of impact, resulting in a Minor Adverse effect which is Not Significant.
- 17.6.28 A 19th century former harbour on the south side of Greatham Creek (SMR4683) is recorded in the area, but outside of the Proposed Development Site. The form of the harbour is still evident and appreciable from aerial imagery; it is formed from two sets of slag retaining walls which are still present within the site. The harbour is adjacent to Greatham Creek. The construction of the Hydrogen Pipeline Corridor in this section of the Proposed Development would utilise trenchless techniques and avoid impacting the harbour. The Proposed Development will therefore have no impact and no effect.
- 17.6.29 A section of the Greatham Creek Branch of the North Eastern Railway (8717) is located within the proposed Hydrogen Pipeline Corridor. The railway was still in use until the 21st century but has since been abandoned. The railway tracks and sleepers survive well on their embankment, but recent roadworks have tarmacked over the
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rails where they cross the Seal Sands industrial estate access road. Where it crosses the railway line, the Hydrogen Pipeline will be directionally drilled and installed within an open-cut trench to the east of the line of the railway. The asset will therefore not be physically impacted by the construction of the Proposed Development resulting in no impact and no effect.

- 17.6.30 The geophysical survey (Appendix 17A (ES Volume III, EN070009/APP/6.4)) identified a small possible rectilinear enclosure and a number of boundary ditches (GS Site 2) along the Hydrogen Pipeline Corridor south-east of Cowpen Bewley. The enclosure could date to any period from the prehistoric to the modern period but given the limited extent of the remains they are considered of, at most, Medium heritage value. The Hydrogen Pipeline and associated construction work easement would result in the localised truncation and removal of archaeological remains, but efforts would be made to microsite intrusive works away from the core of the enclosure. The construction of the Hydrogen Pipeline Corridor would therefore result in a Medium magnitude of impact, resulting in a Moderate Adverse effect, which is Significant.
- 17.6.31 The HER has entries for a cluster of records at the site of an operational energy plant, Saltholme Stratera, to the west of the A1185 and immediately west of the Hydrogen Pipeline Corridor. The records relate to evidence from archaeological evaluation and excavation of Romano-British settlement and comprise three Roman corn driers (SMR9439); a small assemblage of Roman pottery (SMR9523) dating between the 2nd and 4th centuries; two Roman stone-lined cist burials (SMR9437); ditches and enclosures (SMR9068); a 1st to 2nd century trumpet brooch (SMR9502) and the base of a rotary quern stone (SMR9438). The geophysical survey (Appendix 17A (ES Volume III, EN070009/APP/6.4)) identified a number of linear and rectilinear features (GS Site 3) which appear to directly correlate with the Phase 4 remains identified immediately to the South. In particular, these are likely to be extensions of the enclosures listed in the HER (SMR9068), but associated remains may extend beyond and could include burials similar to those identified in the Romano-British settlement. Archaeological settlement remains from this period have the potential to be of Low to Medium heritage value, depending on their complexity and preservation level. Their heritage value derives from their historical and archaeological interests because of the contribution their evidence could make to local and regional research agenda. The section of the Hydrogen Pipeline Corridor in the vicinity of the known settlement will be located underground and therefore its construction could result in the permanent loss of parts of the archaeological remains and therefore the permanent loss of heritage value. This would constitute a Medium magnitude of impact resulting in a Moderate Adverse effect, which is Significant.
- 17.6.32 The moat (SMR5156) that surrounded the medieval Manor House at Belasis is located within the Hydrogen Pipeline Corridor, approximately 1.3 km south-west of the Romano-British settlement. The moat is now backfilled and is a non-designated heritage asset. The asset derives its value, which is assessed to be Low, from its historical interest for its association with the medieval manor of Belasis (SMR613) to the north of the Hydrogen Pipeline Corridor. The backfilling of the feature is likely

- to have compromised the preservation of structural remains and waterlogged deposits, but the asset may have limited archaeological interest if deeply buried structural components and deposits survive beneath the backfill material. The asset is located within a section of the Hydrogen Pipeline Corridor that will be housed above ground in existing conduit along the line of existing above ground pipes. As such, there will be no impact to the site of the asset resulting in no effect.
- 17.6.33 Two records on the HER to the north of Cowpen Bewley comprise a find spot of a Roman silver denarius (SMR1458), and the site of the Cowpen Bewley Brick and Tile Yard. The coin, found by a metal detectorist, has been removed from this location and the brick and tile yard has been built over and its site is occupied largely by the A1185 carriageway. The Proposed Development will therefore have no impact on these records, and no effect.
- 17.6.34 The Hydrogen Pipeline Corridor crosses a number of fields containing evidence of medieval agriculture as ridge and furrow (SMR658, 6821 1513, 1519 and 6819). These are of historical interest in their association with and contribution to the significance of the medieval settlement of Cowpen Bewley and the former medieval manor of Belasis (SMR613 and 5156). Their extent and orientation are well recorded through aerial photographs and LiDAR imagery. Ridge and furrow features only survive in three of these fields where they have not been entirely ploughed out (SMR1513, 1519 and 6819) and these assets are considered of Low heritage value while the others retain no heritage value (SMR658 and 6821). The Hydrogen Pipeline Corridor will be installed via open-cut trench through two fields with surviving ridge and furrow features (SMR1513 and 1519) and above ground in a third (SMR6819). The construction will result in the localised removal of ridge and furrow features in all three fields, which will result in a Very Low magnitude of impact, resulting in a Negligible effect which is Not Significant.
- 17.6.35 Cowpen Bewley itself is a conservation area partially bisected by the Hydrogen Pipeline Corridor. The conservation area, although small and arranged in a linear layout, has an open, quiet and rural character due to the large central green which the houses face onto and through which Cowpen Lane passes. Views within the conservation area are framed by the linear layout of the buildings and views out towards the landscape beyond the village are only possible from the outer limits of the conservation area. The landscape outside the settlement core comprises fields, many of which display the characteristic pattern of ridge and furrow that provide a tangible link between the medieval landscape and the medieval origins of the village. Woodland immediately west of the conservation area and north of the fields to the north add to the rural character detached from the otherwise built up areas to the south. The setting has been somewhat degraded by the railway line that runs between the woodland and fields to the north-west of the village, but this only occasionally interrupts the tranquillity of the village. There are open views from either end of the village across the wide expanses of the Cowpen marshes to the east. The conservation area's heritage value is considered Medium, derived from its architectural and historical interest. In particular, the historical origins as a medieval settlement and its rural setting contribute to this appreciation and understanding. The conservation area also derives its value from its layout which is clearly legible

as medieval in origin, and from the architectural qualities of its buildings which demonstrate local distinctiveness and character. The Hydrogen Pipeline Corridor will be buried in the area around Cowpen Bewley Conservation Area, which will result in the localised truncation of medieval ridge and furrow associated with the village and surrounding hinterland as discussed above. It would also result in the temporary removal of small sections of 'important' hedgerows which mark the boundaries of medieval field systems. These sections of hedgerow would be reinstated following construction. The truncation of the ridge and furrow, field boundaries and 'important' hedgerows would result in a slight loss in the ability to understand and appreciate the historical significance of the conservation area through changes to its setting. This would result in a Low magnitude impact on this asset of Medium heritage value, resulting in a Minor Adverse effect, which is Not Significant.

- 17.6.36 The Hydrogen Pipeline Corridor is also situated in close proximity to an air raid shelter (SMR5267) dating to the Second World War south of Cowpen Bewley. While the Proposed Development Site avoids above ground elements of this air raid shelter, it is not known how far it extends below ground and it may reach the Hydrogen Pipeline Corridor. Nevertheless, the Hydrogen Pipeline at this location will be installed above ground and foundations will not reach the depth of the air raid shelter. There will therefore be no impacts to the significance of this asset as a result of the construction of the Proposed Development.
- 17.6.37 Similarly, the Hydrogen Pipeline Corridor overlies the potential deeply buried galleries of the 20th century Billingham Anhydrite Mine (SMR6099) and partially encroaches on an infilled medieval fishpond (SMR6865) associated with Billingham Grange (SMR617). The Pipeline will be installed above ground at both locations and will not impact either asset, and as such will have no impact and no effect on either.
- 17.6.38 Land currently in agricultural use on the northern side of the A1185, adjacent to Cowpen Bewley Woodland Park, would be used as replacement for woodland lost in Work No 6 (Replacement Land, Work No. 11). Although no known archaeological remains are present in this field, the works would involve woodland planting which could impact previously unrecorded archaeological remains.

CO₂ Export Corridor (Work No. 7)

- 17.6.39 The area covered by Work No. 7 lies within the footprint of the Electrical Connection Corridor (Work No. 3), the Water Connections Corridor (Work No. 4) and the Wastewater Connection Corridor (Work No. 5). As a worst-case scenario is assessed in each case, the same impacts and effects are considered above would apply to the CO₂ Export Corridor and High Pressure Compression Station.
- 17.6.40 This would comprise no impacts to assets which have been previously removed and already discussed (SMR5602, 5708, and 5712), but a Medium magnitude of impact on the former Coatham Ironworks (SMR5709) and reservoir (SMR5710) considered of Low heritage value, resulting in a Minor Adverse effect, which is Not Significant.

Oxygen and Nitrogen Gas Connection Corridor (Work No. 8)

17.6.41 The Oxygen and Nitrogen Gas Connection Corridor overlaps much of the previously discussed Work Nos. 1 through 7. Given that a worst-case scenario is assessed in each instance, the Oxygen and Nitrogen Gas Connection Corridor has the potential to cause the same impacts to known and potential heritage assets. This would comprise no impacts to assets which have been previously removed from the corridor (SMR1908, 5708, 5602 and 5908).

Temporary Construction Compounds (Temporary Construction and Laydown Areas, Work No. 9)

17.6.42 Temporary construction compounds have been designed and located to avoid intrusive works in so far as has been possible. This has resulted in the placement of the majority of the temporary construction compounds on areas of existing hardstanding or areas which have been extensively used for industrial activities in the 20th century. The majority of these works will therefore cause no permanent impacts to known or potential heritage assets.

17.6.43 The construction compound in the Main Site includes two known non-designated assets comprising a pillbox (SMR8262; no longer extant) and gasholder (SMR8312; still extant). Impacts to these assets have been assessed as part of the Main Site above and are not further discussed here.

17.6.44 The construction compound proposed to enable the installation of the buried Hydrogen Pipeline Corridor east and north of Cowpen Bewley is located over a field known to contain ploughed out ridge and furrow (SMR658). The field is also adjacent to the remains of a Romano-British settlement (SMR9439, 9523, 9437, 9068, 9437, 9068, 9502 and 9438) discussed in the Hydrogen Pipeline Corridor above. The compound is situated over the former carpark and construction compound used during the construction of the now operational energy plant, Saltholme Stratera immediately west of the field. Aerial photographs and LiDAR imagery indicate that the field has been previously stripped of topsoil. This work was subject to an archaeological watching brief which identified no further archaeological remains. Although the absence of recorded remains could be due to the limited depth of deposits removed from the area, the proposed new compounds would not reach greater depths and therefore are unlikely to disturb any archaeological remains. The geophysical survey (Appendix 17A (ES Volume III, EN070009/APP/6.4)) included the field east of the Cowpen Bewley Satellite Compound (Area 16) which was not previously investigated as part of the construction of the energy plant. The survey recorded high levels of ground disturbance and no anomalies of potential archaeological origins. No archaeological remains are therefore anticipated to be impacted as a result of the construction and operation of the Cowpen Bewley Satellite Compound.

Access and Highway Improvements (Work No. 10)

17.6.45 The majority of the work proposed as part of the Access and Highway Improvements is confined to the existing road network and will involve slight widening or re-alignments to accommodate construction and maintenance vehicles. These works cross a number of known assets, including an unnamed spoil

heap (SMR5652), Lackenby Iron Works (SMR5659), Annealed Concrete works (SMR5654), a brick yard (SMR5653), the Mill Race drainage channel (SMR5716), the North Eastern Railway (Darlington section) (SMR5908), Redcar Iron Works (SMR5711), Coatham Iron Works (SMR5709), Redcar Jetty (SMR5636) and medieval field systems containing remains of ridge and furrow (SMR658). Many of these do not survive in the archaeological record at all, but where they do, they will have been truncated and locally removed by the existing roads. There is little potential for further impacts to these assets derived from Access and Highway Improvements, but as a worst-case these impacts would be considered of a Low magnitude. All above listed assets are considered of, at most, Low heritage value, resulting in a Negligible effect, which is Not Significant.

Temporary Impacts

- 17.6.46 There are no heritage assets within or in the immediate vicinity to the Proposed Development Site, with the nearest assets being Marsh Farmhouse and cottage (NHLE 1160308), garden wall (NHLE 1139619) and stable and barn (NHLE 1139620), approximately 0.3 km to north-east of the Water and Wastewater Connection Corridors but 1.4 km east of the Main Site. These assets are fully screened from the Proposed Development by an existing earthen mound to the south and west of the assets. The nearest other assets are the grade II listed Westfield House (NHLE 1159837) and 1-20, Dormans Crescent (NHLE 1310859), situated just over 0.6 km east of the Hydrogen Pipeline Corridor and 1.4 km east of the Main Site. Construction within the Main Site or other elements of the Proposed Development would not introduce noticeable change within the setting of the building group and activities will be obscured by an intervening earthen bund and the urban landscape of Dormanstown. There will therefore be no impact to these buildings, resulting in no effect.
- 17.6.47 The location of Marsh House Farm and cottage is identified as a noise receptor (noise receptor H5) in Chapter 11: Noise and Vibration (ES Volume I, EN070009/APP/6.2) and is illustrated on Figure 11-1 (ES Volume II, EN070009/APP/6.3). The noise assessment in Chapter 11 predicts a negligible effect in noise levels at Marsh House Farm, when compared to baseline levels, as a result of construction activities (refer to Table 11-19). The change in noise levels would be imperceptible within the baseline setting and existing noise environment of Marsh House Farm and associated buildings and would constitute no impact to their heritage value and no effect.
- 17.6.48 The Hydrogen Pipeline Corridor is located to the north of Cowpen Bewley Conservation Area, falling partially within its boundaries and also taking in the ridge and furrow fields on the northern limits of the conservation area. The Proposed Development Site is located approximately 65 m from the settlement core, and it is possible that construction activities, noise and potentially dust may be visible and audible from within the core of the village. This may introduce a slight change within its setting that is incongruous to its quiet, rural character but would not affect the ability to appreciate the architectural qualities of its buildings and the historical relevance of its layout. Any changes to the field boundaries and hedgerows, which

contribute to the significance of the conservation area, would be reinstated following construction. The magnitude of impact is therefore assessed to be Low which would result in a temporary Minor Adverse effect, which is Not Significant.

- 17.6.49 The construction works are not considered likely to impact more distant assets through noise, dust or visual intrusion from the operation of machinery and vehicular traffic. The construction phase would result in no impacts to the scheduled remains of Eston Nab Hillfort (NHLE 1011273), Kirkleatham Conservation Area, Coatham Conservation Area, Seaton Carew Conservation Area, Yearby Conservation Area or Greatham Conservation Area.

Operation

- 17.6.50 There will be no additional physical impacts to buried heritage assets during the Proposed Development's operational stage, as any potential impacts will have occurred during the construction phase. As such, the assessment of impact during the operation of the Proposed Development focuses on the magnitude of change to a heritage asset's setting as a result of the physical presence of the Proposed Development, including components of the operational development that may result in aural intrusion into setting.
- 17.6.51 The pipelines will either be constructed below-ground or mounted on existing above ground racking. During the operational phase, therefore, the pipelines will either not be visible or represent no change to the character of an area or to the setting of a heritage asset. The most visually prominent components of the operational development will be the Hydrogen Production Facility, located on the Main Site. The Main Site is located on the edge of a heavily industrial area of Teesside; an area that has been occupied by industrial structures since the 19th century and which has also seen multiple changes as industries and technologies adapted and advanced. The presence of structures within the Main Site will represent a new building amongst the cluster of existing industrial buildings in this part of the Tees Valley. Its presence will represent a change in views of this area, but the change will not be incongruous with the area's existing character.
- 17.6.52 The Main Site will be designed to operate 24 hours a day, seven days a week and external lighting will be used at the facility to provide safe working conditions during its operation. Lighting would be designed, positioned and directed to prevent or minimise light disturbance to sensitive receptors and low-energy fittings would be used where possible, as presented in the Indicative Lighting Strategy (Operation) (EN070009/APP/5.8) and secured by DCO Requirement.
- 17.6.53 Marsh Farmhouse and cottage (NHLE 1160308), garden wall (NHLE 1139619) and stable and barn (NHLE 1139620) are located approximately 1.4 km east of the Main Site. The buildings are all Grade II listed and their heritage value, which is Medium in accordance with the criteria in Table 17-1, derives from their historical and architectural interest. The building group, as an example of the type of dispersed farmstead that was characteristic of the area in the late-18th and 19th centuries, also contributes to their heritage value.

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- 17.6.54 The farmhouse, which dates to the mid-18th century, with 19th and 20th century additions, occupies an area at the head of Coatham Marshes, a space between the arable landscape of the south, heavy industry to the west, and the sea to the north. Its historic interest derives, in part, from its relationship with both the land and the sea. The main architectural interest of the farmhouse, barn and stable is as a relatively cohesive example of vernacular buildings constructed on a local scale, using local materials and built in a local style. The addition of a later cottage on the eastern side of the farmhouse buildings demonstrates that the building use has seen adaptation and represents change throughout its life.
- 17.6.55 The barn and stable represent the functional setting of the farmhouse and the walled garden provides its aesthetic and domestic setting. Historically, the agricultural landscape to the south of the building group would have represented the principal setting of the buildings. However, the landscape around the buildings has been much altered and is no longer in agricultural use so no longer contributes to, or helps articulate, the buildings' heritage interests. An appreciation of the buildings' historical relationship with the sea has also been lost, or at least eroded significantly, by the presence of the railway line, building and structures to the north of the farmhouse which detract from its setting. The presence of industrial buildings and infrastructure to the west of the asset group, within the Proposed Development Site, is partially obscured by the presence of an earthen bund, but noise from these existing industrial activities is noticeable from the building group and, even though a quiet noise environment is not critical to appreciate the function of the building group, the invasive noises further detract from its setting. The principal setting of the building group which makes an appreciable positive contribution to its value is therefore the associative relationships of the buildings with each another.
- 17.6.56 The wider landscape does not make a positive contribution to the above assets' setting and does not add to an appreciation of the assets' function. Historically, the Redcar Iron and Steel Works which occupied the Main Site included several tall structures, including a blast furnace, power station and a number of chimney stacks. Although these have recently been demolished, restoring some visual amenity to the area, the large earthen bund to the south and west entirely screens these assets from the industrial area and these tall buildings did not historically intrude on any views to and from the assets. The construction of the proposed flare stack (see Chapter 4: Proposed Development (ES Volume I, EN070009/APP/6.2)) with a maximum height of 100 m would similarly not be visible to and from the group of assets and as such would not further alter or deteriorate their setting and thus would not harm their heritage value. It is therefore considered that the presence of the Proposed Development in the landscape would result in no impact to the heritage value of the group of buildings of Marsh Farm. As such, the presence of the Proposed Development in the landscape during the Operation phase and once complete would result in no effects to these assets.
- 17.6.57 Chapter 11: Noise and Vibration (ES Volume I, EN070009/APP/6.2) reports a Negligible Adverse effect on Marsh Farmhouse (NSR H5) during the daytime and a Minor Adverse (Not Significant) effect during the night-time derived from operational noise of the Production Facility (Table 11-40). Tranquillity and seclusion
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- are not aspects of the asset's setting which contribute significantly to its heritage value, given its current use as a house in an industrial yard and as such the small increase in noise would constitute no impact to their heritage value and no effect.
- 17.6.58 Westfield House (NHLE 1159837) is located approximately 2.2 km east of the Main Site. It is contemporaneous with Marsh Farm and was originally one of several dispersed farmstead working the marginal Coatham Marshland prior to the rapid 19th century industrialisation of the area. The building is Grade II listed and its heritage value, which is Medium in accordance with the criteria in Table 17-1, derives from its historical and architectural interest. The farm was incorporated into and forms part of the core of Dormanstown, a bedroom community built in the 1930s to house workers of the Redcar Iron and Steel Works. The building was extended substantially in the 20th century and has since lost the original farm layout. The connection to its former farmland has also been lost, and thus its setting has been largely eroded and contributes little to nothing to the asset's significance. Despite the potential for views of the upper reaches of the proposed flare stack of up to 100 m height, this would result in no changes to our ability to understand and appreciate the asset. Westfield House would therefore be subject to no impacts from the presence of the Main Site during construction or once completed, and thus no effects.
- 17.6.59 The terraced houses of 1-20, Dormans Crescent (NHLE 1310859) are also grade II listed and located approximately 2.1 km from the Main Site. Opened in 1931, the buildings are of limited architectural value and their historical interest is entirely derived from being the first local authority aged persons' cottages in England. Their setting constitutes the settlement of Dormanstown and, to a lesser extent, the ironworking industries that employed the workers of the town. The presence of the Main Site in the landscape will not alter our ability to understand and appreciate the asset in any way, and as such would result in no impacts to the asset's heritage value. No effects to the asset are anticipated.
- 17.6.60 Kirkleatham Conservation Area is located approximately 4 km south-east of the Main Site. The experience of the conservation area is intimate and enclosed, due to the prominence of mature woodland and planting along its edges, which creates a secluded feeling and emphasises the importance of internal views. This experience is an important component of the area's setting and contributes to its heritage value.
- 17.6.61 The intimate and enclosed setting of the conservation area will likely preclude any experience of the Proposed Development from within the area. Views towards the Main Site are not possible from either within the conservation area or from its northern edge, due to the mature treelined boundary along Kirkleatham Lane. There will be no change to the character or setting of the area as a result of the operational Proposed Development resulting in no impact and no effect.
- 17.6.62 Coatham Conservation Area is located approximately 2.6 km east of the Main Site. The heritage value of the conservation area is assessed as being of Medium heritage value derived from the architectural and historical interest of its individual buildings and settlement form. The experience of the conservation area is articulated by the

two-storey Victorian and Edwardian houses which dominate the area's character and which frame views within and out of the area. Views from the western edge of the area, away from the conservation area, will include views of the Hydrogen Production Facility in the Main Site in the background. The introduction of the Hydrogen Production Facility into this view will not be incongruous with the area's existing character which takes in the remaining components associated with the site's former blast furnace. This change will not affect the ability to appreciate the architectural character of the conservation area, which is experienced from within the conservation area, and will not affect any key views. It is assessed therefore that there will be no impact to the value of the conservation area from the presence of the operational Proposed Development in the landscape, resulting in no effect.

- 17.6.63 Seaton Carew Conservation Area is located approximately 4.8 km north-west of the Main Site. The central part of the conservation area comprises two-storey buildings on either side of The Front with shops at ground level. Views here are dominated by the colourful buildings on both sides, many of which are in neutral tones but several are coloured in bright blues and pinks, and which evoke the spirit of the seaside holiday destination. The northern and southern parts of the conservation area are made up of coherent rows of two and three-storey buildings, some with open views of the sea, and of designed public spaces. These areas provide extensive views across the North Sea, of the Headland to the north and the Cleveland Hills to the south.
- 17.6.64 The value of the conservation area, which is assessed to be Medium, derives from the historic interest of its development from a fishing village into a seaside resort, and from the architectural interest of its buildings which, while of varied design, are unified by their restricted scale and range of materials. However, many of the buildings appear to be in a poor state of repair which does detract from the experience of the area. On a clear day, the Hydrogen Production Facility at the Main Site will be visible, seen against the backdrop of the existing industrial structures within the Wilton International Complex. The introduction of the Hydrogen Production Facility into this view will not represent a noticeable change and will not affect the character or heritage significance of the conservation area. It is assessed therefore that there will be no impact from the operational Proposed Development, resulting in no effect.
- 17.6.65 Yearby Conservation Area is located approximately 5.2 km south of the Main Site. The layout of Yearby is based on a typical medieval form; comprising two rows of houses arranged either side of a principal through road. The buildings within the village consist of single and two-storey 18th century cottages and farm buildings. The setting of Yearby is defined by the arable landscape it sits within, however the landscape has changed significantly and the former medieval layout of burgage plots and small strip fields has been replaced by large, enclosed fields as a consequence of 18th and 19th century enclosure and modern farming practices. Views within the conservation area are framed by the linear layout of the buildings, although long-range views out over the surrounding fields and the Eston Hills beyond are possible to the south, from the southern edge of the area. Views to the north and north-east, towards the Main Site, are precluded by mature planting

- which frames the northern edges of the village. The conservation area derives its value, which is Medium, from the historical legibility of its planned form, and from the architectural interest of its buildings which demonstrate local distinctiveness and character.
- 17.6.66 The mature planting along the northern edge of the conservation area will likely preclude views of the Hydrogen Production Facility and the distance from the Main Site will preclude any changes to the character and setting of the conservation area arising from any aural intrusion. It is assessed therefore that there will be no impact to the conservation area, and no effect.
- 17.6.67 Greatham Conservation Area is located approximately 2 km from the Hydrogen Pipeline Corridor, which represents the closest component of the Proposed Development. The conservation area is separated from the Proposed Development by later housing on the outskirts of the village, fields, intervening hedgerows and a railway. The intervening settlement is likely to preclude any intrusion from the Proposed Development into the appreciation of the conservation area, including visual, noise and dust intrusion. Due to the distance involved it is assessed there will be no impact to the conservation area during operation of the Proposed Development and therefore no effect.
- 17.6.68 A single AGI is proposed in proximity to Cowpen Bewley Conservation Area in the woodlands 280 m at the north-west of the Proposed Development Site, which has already been described and defined above. The AGI will be adjacent to existing power infrastructure and will be screened to and from the conservation area by retained woodland. As such, the operation of the Proposed Development would result in no impacts on this asset of Medium heritage value.
- 17.6.69 Kirkleatham Conservation Area, to the south of the River Tees, is located approximately 263 m from the edge of the Hydrogen Pipeline Corridor, this section of which will be housed above ground. The value of the conservation area derives from the history, quality and diversity of its buildings' architectural styles which date to the 17th and 18th centuries and range from Queen Anne through Baroque, Rococo and Palladian to Gothic. The high number of highly graded listed buildings, comprising five Grade I, six Grade II* and 12 Grade II listed buildings, also contribute to its heritage value which is assessed to be High. The experience of the conservation area is intimate and enclosed, due to the prominence of mature woodland and planting along its edges, which creates a secluded feeling and emphasises the importance of internal views. This experience is an important component of the area's setting and contributes to its heritage value.
- 17.6.70 The intimate and enclosed setting of the conservation area will likely preclude any experience of the construction of the Hydrogen Pipeline Corridor from within the area. Construction activities may be appreciable when entering and leaving the conservation area to the south-west, but these activities will be viewed within the context of the existing Wilton Complex and will not therefore be out of place with the current setting. It is assessed therefore that there will be no impact to the conservation area's heritage value during operation and no effect.

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- 17.6.71 The historic landscape in which the Main Site is situated is largely characterised by 19th and 20th century industrial developments along the banks of the Tees. The presence of the Proposed Development would not alter this landscape and therefore result in no changes to the historic landscape character of the area.
- 17.6.72 No marine assets are situated within the Proposed Development Site and the Proposed Development Site does not contribute to the significance of any marine or underwater assets situated in the River Tees. The pipeline crossing the River Tees will be drilled below the river and above ground installations on the shores will not alter the setting of any assets. As such, the Proposed Development will not result in any impacts to marine or underwater assets through changes to setting.

Decommissioning

- 17.6.73 The Proposed Development will have an assumed design life of 25 years. However, the operational life could be longer subject to market conditions and plant condition, and this ES does not assume that the facilities will be removed after 25 years. At the end of its operational life, the most likely scenario would be that the Proposed Development would be decommissioned, with all above ground structures on the Main Site, hydrogen pipeline and utility connections removed, and the ground remediated as required by the Environmental Permit to facilitate future re-use.
- 17.6.74 Decommissioning impacts from associated activities will be temporary and are assumed to be similar to construction impacts (movement of traffic and machinery, potential for noise and dust). The impacts will not be greater than those reported during construction. Once completed, the removal of above ground structures may enhance the setting of heritage assets which would be beneficial.
- 17.6.75 Decommissioning will be undertaken within the same footprint used during construction and therefore any impact to buried cultural heritage remains that could have occurred will have occurred during construction and will have been mitigated as required.
- 17.6.76 No impacts or effects are anticipated to cultural heritage during decommissioning. Nevertheless, should the work involve intrusive activities beyond the footprint of ground disturbance caused by the Proposed Development, any essential mitigation would be agreed in a Decommissioning Plan which would include a Decommissioning Environmental Management Plan (DEMP) secured by a Requirement of the Draft DCO (EN070009/APP/4.1), if granted. The DEMP would consider in detail all potential environmental risks on the Proposed Development Site and contain guidance on how risks can be removed or mitigated.

17.7 Essential Mitigation and Enhancement Measures

Construction

- 17.7.1 Known heritage assets have been avoided by design (embedded mitigation). Where it is not practicable to avoid archaeological heritage assets, or confirm that this is possible at this stage, essential mitigation will be secured through a programme of archaeological evaluation and mitigation, consisting of excavation and recording,

which will be carried out prior to construction. Where possible, this will enable micro-siting to avoid impacts, if practicable. This strategy will be suitable for previously unrecorded archaeological remains within the Proposed Development Site, such as Romano-British settlement archaeology that may be present within a section of the Hydrogen Pipeline Corridor that will be located underground or the open space replacement land north-west of Cowpen Bewley.

- 17.7.2 All programmes of archaeological investigation will be carried out in accordance with a Written Scheme of Investigation (WSI) to be agreed with the relevant archaeology officer/s and approved in writing by the relevant LPAs. The need for a WSI is referred to in the Framework CEMP (EN070009/APP/5.12) and secured by a Requirement of the Draft DCO (EN070009/APP/4.1).
- 17.7.3 Some parts of the Proposed Development Site are not suitable for traditional archaeological evaluation measures due to the nature of the ground conditions. For example, the Main Site is located on made ground comprising slag-dominant material which would preclude archaeological geophysical survey. The depths of the made ground, which average 4.7 m deep, would also preclude safe archaeological trial trenching. Waterlogged and high-moisture content deposits, which represent the soil environment in the vicinity of Greatham Creek, would also not be suitable ground conditions for geophysical survey or trial trenching. Therefore, it is recommended that a protocol is adopted to mitigate potential impacts to previously unknown archaeological assets that may be encountered during construction. The protocol is included in the Framework CEMP (EN070009/APP/5.12) and includes procedures for the reporting, protection and management of unexpected archaeological discoveries. The following wording is included:
- Any archaeological remains not previously identified which are revealed when carrying out the consented development must be retained *in situ* and reported to the relevant LPA, as soon as reasonably practicable from the date they are identified.
 - No construction operations are to take place within 10 m of the remains referred to in subsection (i) for a period of 14 days from the date of any notice served under subsection (i) unless otherwise agreed in writing by the relevant LPA in consultation with any other relevant heritage stakeholders as required.
 - If the relevant LPA determines in writing that the archaeological remains referred to in subsection (i) require further investigation or mitigation, no construction operations are to take place within 10 m of the remains until provision has been made for such mitigation or the further investigation and recording of the remains in accordance with details to be submitted in writing to, and approved in writing by, the relevant LPA in consultation with any other relevant body as required.
- 17.7.4 The adoption of this protocol will ensure the safeguarding during construction of unexpected archaeological remains.

Operation

- 17.7.5 No significant adverse heritage effects have been identified for the operation phase of the Proposed Development and as such there is no need for essential mitigation measures during this phase.

Decommissioning

- 17.7.6 It is assumed for the purpose of this assessment that there will be no additional impacts to buried cultural heritage assets during decommissioning activities. Decommissioning will be undertaken within the same footprint used during construction and therefore any impact to buried heritage assets would have occurred, and have been mitigated, at the construction phase. As such, there is no need for essential mitigation measures for the Proposed Development decommissioning stage.

17.8 Residual Effects and Conclusions

- 17.8.1 Based upon the worst-case scenario prior to essential mitigation, a Moderate Adverse (Significant) effect has been identified on archaeological remains of an undated enclosure (GS Site 2) and those associated with Romano-British settlement (GS Site 3) within the Hydrogen Pipeline Corridor (Work No. 6).
- 17.8.2 The mitigation measures described in Section 17.7, comprising a programme of archaeological evaluation and excavation in advance of construction, will ensure that the significant effect is offset to minimise residual significant effects that may occur, such that they would not be significant. The details of the evaluation and mitigation will be agreed with LPA archaeologists and the implementation secured through a WSI and Framework CEMP (EN070009/APP/5.12) as part of a DCO requirement. No other significant adverse heritage effects are anticipated as a result of the Proposed Development.
- 17.8.3 A summary of residual effects on Cultural Heritage and their significance is provided in Table 17-6.

Table 17-6: Summary of Residual Effects

DESCRIPTION OF EFFECT	HERITAGE VALUE	MAGNITUDE OF IMPACT	INITIAL CLASSIFICATION OF EFFECT	ESSENTIAL MITIGATION MEASURES	RESIDUAL EFFECT SIGNIFICANCE
Construction					
Localised removal and/or truncation of 19 th and early 20 th century industrial remains of Coatham Ironworks (SMR5709) and reservoir (SMR5710)	Low	Medium	Minor Adverse	Programme of archaeological investigations prior to or during construction	Minor Adverse
Localised removal and/or truncation of 19 th and early 20 th century industrial remains of Redcar Ironworks (SMR5711)	Low	Low	Negligible	Programme of archaeological investigations prior to or during construction	Negligible
Localised removal and/or truncation of 19 th and early 20 th century remains of the North Eastern Railway (Darlington Section) (SMR5908)	Medium	Low	Minor Adverse	Programme of archaeological investigations prior to or during construction	Minor Adverse
Localised loss or removal of remains of deserted medieval village of West Coatham (SMR355)	Low	High	Minor Adverse	Programme of archaeological investigations prior to or during construction	Minor Adverse
Localised removal of World War II anti-landing glider posts (SMR9532)	Low	Medium	Minor Adverse	Programme of archaeological investigations prior to or during construction	Minor Adverse

DESCRIPTION OF EFFECT	HERITAGE VALUE	MAGNITUDE OF IMPACT	INITIAL CLASSIFICATION OF EFFECT	ESSENTIAL MITIGATION MEASURES	RESIDUAL EFFECT SIGNIFICANCE
Medieval ridge and furrow (SMR1513, 1519 and SMR6819)	Low	Very Low	Negligible	None	Negligible
Truncation of medieval ridge and furrow degrading setting of Cowpen Bewley Conservation Area	Medium	Low	Minor Adverse	None	Minor Adverse
Loss or truncation of undated enclosure and boundary ditches south-east of Cowpen Bewley (GS Site 2)	Medium	Medium	Moderate Adverse	Programme of archaeological investigations prior to or during construction	Minor Adverse
Loss or truncation of linear and rectilinear features likely associated with the Romano-British settlement south-east of Cowpen Bewley (GS Site 3)	Medium	Medium	Moderate Adverse	Programme of archaeological investigations prior to or during construction	Minor Adverse

17.9 References

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