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8 Cultural Heritage

8.1 Introduction

8.1.1 This chapter presents the Preliminary Environmental Information (PEI) in relation to the cultural heritage assessment. It documents the baseline environmental conditions and outlines mitigation measures that may be required to mitigate potential effects on heritage resources. Potential environmental opportunities relating to the cultural heritage resources will also be identified where appropriate.

8.1.2 In the *Design Manual for Roads and Bridges (DMRB) LA 106 Cultural Heritage Assessment (DMRB LA 106)* (Highways England, 2020)[1], heritage resources are defined as buildings, monuments, sites, places, areas or landscapes identified as having a degree of significance meriting consideration in planning decisions, because of their heritage interest.

8.1.3 There may be interrelationships related to the potential effects on cultural heritage and other disciplines. Therefore, please also refer to the following chapters:

- Chapter 9: Geology and Soils
- Chapter 10: Landscape and Visual Effects
- Chapter 12: Noise and Vibration.

8.1.4 During the course of the preparation of this PEI Report technical stakeholder consultation has taken place with Historic England and the Planning Archaeologists at Durham County Council, Cumbria County Council and North Yorkshire County Council.

8.2 Legislative and Policy Framework

Legislation

8.2.1 The following key legislation is relevant to this assessment:

- Ancient Monuments and Archaeological Areas Act 1979
- Planning (Listed Buildings and Conservation Areas) Act 1990

National policy statement for national networks

8.2.2 The primary policy basis for deciding whether or not to grant a Development Consent Order (DCO) is the *National Policy Statement for National Networks (NPSNN)* (Department for Transport, 2014)[2], which, sets out policies to guide how DCO applications will be decided and how the effects of national networks infrastructure should be considered by the relevant decision maker. The policies for the conservation of the historic environment include statements that:

"*Those elements of the historic environment that hold value to this and future generations because of their historic, archaeological, architectural or artistic interest are called 'heritage assets'. Heritage assets may be buildings, monuments, sites, places, areas or landscapes. The sum of the heritage interests that a heritage asset*

[1] Highways England (2020) Design Manual for Roads and Bridges LA 106 Cultural Heritage Assessment, available at: https://www.standardsforhighways.co.uk/prod/attachments/8c51c51b-579b-405b-b583-9b584e996c80?inline=true [accessed 6 September 2021]
[2] Department for Transport (2014) National Policy Statement for National Networks, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387222/npsnn-print.pdf accessed 06/09/21 [accessed 2 September 2021]

holds, or its value, is referred to as its significance. Significance derives not only from a heritage asset's physical presence, but also from its setting…Non-designated heritage assets of archaeological interest that are demonstrably of equivalent significance to Scheduled Monuments, should be considered subject to the policies for designated heritage assets. The absence of designation for such heritage assets does not indicate lower significance." (NPSNN paragraphs 5.122 and 5.124)

8.2.3 The *NPSNN* also advises:

"the Secretary of State should also consider the impacts on other non-designated heritage assets (as identified either through the development plan process by local authorities, including 'local listing', or through the nationally significant infrastructure project examination and decision-making process) on the basis of clear evidence that the assets have a significance that merit consideration in that process, even though those assets are of lesser value than designated heritage assets." (NPSNN paragraph 5.125)

8.2.4 Table 8-1: Relevant NPSNN policies for the cultural heritage assessment identifies the *NPSNN* policies relevant to the cultural heritage assessment and then specifies where in the Chapter information is provided to address the policy.

Table 8-1: Relevant NPSNN policies for the cultural heritage assessment

Relevant NPSNN paragraph reference	Requirement of the NPSNN (paraphrase)
5.124	Non-designated assets of archaeological interest that are demonstrably of equivalent significance to Scheduled Monuments should be considered subject to the policies for designated heritage assets.
5.126	Where the development is subject to Environmental Impact Assessment (EIA) the applicant should undertake an assessment of any likely significant heritage impacts of the proposed as part of the EIA and describe these in the Environmental Statement (ES).
5.127	The applicant should describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the asset's importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant Historic Environment Record (HER) should have been consulted and the heritage assets assessed using appropriate expertise. Where a site on which development is proposed includes or has the potential to include heritage assets with archaeological interest, the applicant should include an appropriate desk-based assessment and, where necessary, a field evaluation.
5.129	In considering the impact of a proposed development on any heritage assets, the Secretary of State should take into account the particular nature of the significance of the heritage asset and the value they hold for this and future generations. This understanding should be used to avoid or minimise conflict between their conservation and any aspect of the proposal.
5.131	When considering the impact of a proposed development on the significance of a designated heritage asset, the Secretary of State should give great weight to the asset's conservation. The more important the asset, the greater the weight should be.

Relevant NPSNN paragraph reference	Requirement of the NPSNN (paraphrase)
5.142	Where there is a high probability that a development site may include as yet undiscovered heritage assets with archaeological interest, the Secretary of State should consider requirements to ensure that appropriate procedures are in place for the identification and treatment of such assets discovered during construction.
5.144-5.146	The applicant should undertake an assessment of any likely significant landscape and visual impacts in the EIA. The applicant's assessment should include significant effects during construction of the project and/or its operation on landscape components and landscape character (including historic landscape characterisation). The assessment should include the visibility and conspicuousness of the project during construction and of the presence and operation of the project and potential impacts on views and visual amenity.

National planning policy framework (NPPF)

8.2.1 The *NPPF* (Ministry of Housing Communities & Local Government, 2021)[3] originally published in March 2012 and most recently updated in July 2021, sets out the government's planning policies for England and provides a framework within which locally prepared plans can be produced. The *NPPF* is *"an important and relevant matter to be considered in decision making for NSIP"*.

Local planning policy

8.2.2 The following local planning policies are relevant to this assessment:

- *Eden Local Plan 2014-2032* (Eden District Council, 2018)[4]: Policy ENV10
- *County Durham Development Plan* (Durham County Council, 2020)[5] Policy 44: The Historic Environment
- *Richmondshire Local Plan 2012-2028* (Richmondshire District Council, 2014)[6]: Core Policy 12 Conserving and Enhancing Environmental and Historic Assets.

Standards and guidance

8.2.3 In addition to compliance with the *NPSNN* and *NPPF*, this assessment has been compiled in accordance with professional standards and guidance. The standards and guidance which relate to this assessment are:

[3] Ministry of Housing Communities & Local Government (2021) National Planning Policy Framework, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf [accessed 10 August 2021]
[4] Eden District Council (2018) Eden Local Plan 2014-2032, available at: https://www.eden.gov.uk/media/5032/edenlocalplan2014-2032finalwithoutforeword.pdf [accessed 6 September 2021]
[5] Durham County Council (2020) County Durham Plan
[6] Richmondshire District Council (2014) Richmondshire Local Plan 2012-2028, available at: https://www.richmondshire.gov.uk/media/9616/core-strategy-2012-28.pdf [accessed 6 September 2021].

- Chartered Institute for Archaeologists (CIfA), 2017, *Standard and Guidance for Historic Environment Desk-Based Assessment* (Charted Institute for Archaeologists, 2017)[7]
- CIfA, 2014, *Code of Conduct* (Charted Institute for Archaeologists, 2014)[8]
- Highways England, 2019, *DMRB Volume 11 LA 106 Cultural heritage assessment*
- Historic England, 2015, Good Practice Advice in Planning (GPA2) *Managing Significance in Decision - Taking in the Historic Environment* (Historic England, 2015)[9]- this advice note provides information to support the NPPF and PPG, such as aiding in assessing the significance of heritage assets
- Historic England, 2017, Good Practice Advice in Planning Note 3 (Second Edition) *The Setting of Heritage Assets* (Historic England, 2017)[10] - this advice note sets out a staged approach for assessing the impact of a proposed development on the heritage significance of assets, due to changes in their setting
- English Heritage, 2008, Conservation Principles, *Policies and Guidance for the Sustainable Management of the Historic Environment* (English Heritage, 2008)[11] this document sets out the approach to making decisions and offering guidance about all aspects of England's historic environment
- Ministry for Housing, Communities and Local Government, 2014 (updated 2019), *Planning Practice Guidance: Historic Environment*[12]

8.3 Assessment Methodology

8.3.1 The methodology used follows the requirements of DMRB *LA 106* and the Chartered Institute of Archaeologists' (CIfA's) *Standard and Guidance for Historic Environment Desk-Based Assessment* (Chartered Institute for Archaeologists, 2020)[13].

8.3.2 Both of those documents establish that the significance of heritage assets is the sum of their archaeological, architectural, historic and artistic interest. They recommend that desk-based assessments (DBAs) should take appropriate consideration of the settings of heritage assets and the contribution they make to the significance of those

[7] Charted Institute for Archaeologists (2017) Standard and Guidance for Historic Environment Desk-Based Assessment, available at: https://www.archaeologists.net/sites/default/files/CIfAS&GDBA_2.pdf [accessed 9 September 2021]
[8] Charted Institute for Archaeologists (2014) Code of Conduct, available at: https://www.archaeologists.net/sites/default/files/Code%20of%20conduct.pdf [accessed 9 September 2021]
[9] Historic England (2015) Managing Significance in Decision - Taking in the Historic Environment, available at: https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/gpa2/ [accessed 9 September 2021]
[10] Historic England (2017) Good Practice Advice in Planning Note 3 (Second Edition) The Setting of Heritage Assets, available at: https://historicengland.org.uk/images-books/publications/gpa3-setting-of-heritage-assets/ [accessed 9 September 2021]
[11] English Heritage (2008) Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment, available at: https://historicengland.org.uk/images-books/publications/conservation-principles-sustainable-management-historic-environment/ [accessed 9 September 2021]
[12] Ministry for Housing, Communities and Local Government (2014), Planning Practice Guidance: Historic Environment, available at: https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment [accessed 9 September 2021]
[13] Chartered Institute of Archaeologists (2020) Standard and Guidance for Historic Environment Desk-Based Assessment

assets which should be judged in a local, regional, national or international context as appropriate.

Baseline conditions

8.3.3 DMRB recommends establishing a study area for cultural heritage resources once alternative route alignments have been identified. Due to the density of scheduled monuments and associated non-designated archaeological remains along the route of the scheme, the study area encompasses a corridor extending 1km either side of the draft DCO boundary for designated heritage assets and 300m either side of the draft DCO boundary for non-designated heritage assets. This allows for potentially significant impacts to the setting of designated and non-designated heritage assets to be identified.

8.3.4 The key sources of data used to identify baseline conditions are:

- *National Heritage List for England (NHLE)* (Historic England, 2021)[14] - compiled and maintained by Historic England, it contains information on all of the protected sites and buildings in England.
- *Cumbria County Council Historic Environment Record (CHER)* (Cumbira County Council)[15] - lists all sites of archaeological or historical interest within Cumbria (excluding Lake District National Park).
- *Durham County Council Historic Environment Record (DHER)* (Durham County Council)[16] - lists all sites of archaeological or historical interest within Durham.
- *North Yorkshire Council Historic Environment Record (NYHER*) (North Yorkshire Council Council)[17] - lists all sites of archaeological or historical interest within North Yorkshire.
- Conservation area data for Eden District Council and Durham County Council.

8.3.5 In addition a non-intrusive geophysical survey has been undertaken. The spatial scope of the survey was defined by an earlier construction boundary plus a buffer of 25m. This resulted in a survey which falls largely within the current proposed engineering boundary (less where options have been presented at at Kirkby Thore, Warcop and Cross Lanes where no surveywas done). The results have informed the development of this chapter and will be included in full in the Environmental Statement (ES). A second phase of geophysical survey will be undertaken to expand the coverage, the results of which will also be included in the ES.

8.3.6 A study and analysis of aerial photographic (AP) and Light Detection and Ranging (LiDAR) archives was also undertaken to inform the assessment. This includes searches of the following sources:

[14] Historic England (2021), National Heritage List for England, available at: https://historicengland.org.uk/listing/the-list/ [accessed 9 September 2021]
[15] Cumbria County Council (n.d.), Historic Environment Record, available at: https://www.heritagegateway.org.uk/gateway/chr/herdetail.aspx?crit=&ctid=90&id=4719 [accessed 10 September 2021]
[16] Durham County Council (n.d.), Historic Environment Record, available at: https://www.heritagegateway.org.uk/gateway/chr/herdetail.aspx?crit=&ctid=91&id=4724 [accessed 10 September 2021]
[17] North Yorkshire County Council (n.d.), Historic Environment Record, available at: https://www.heritagegateway.org.uk/gateway/chr/herdetail.aspx?crit=&ctid=92&id=4733 [accessed 10 September 2021]

- Environment Agency LiDAR data (Environment Agency, 2021)[18] at the highest available resolution
- Historic England Archive, Swindon
- The Cambridge University Collection of Aerial Photography (CUCAP) Aerial Photography Library (Cambridge University, 2021)[19]
- Satellite imagery such as Google Earth and Bing
- National Mapping Programme (if available)
- Ortho-rectified images from an appropriate recent year(s) when conditions have been known to be favourable for aerial photography.

Assessment of value

8.3.7 The methodology for assessing effects is based on the principle that the environmental effects of the project, in relation to a single heritage resource (asset), should be determined by identifying the resource's value, assessing the magnitude of change the project would have on the resource's significance (where significance is defined as the attributes that give the resource its value) and then combining these two elements to identify the significance of effect. The following Tables provide further detail on the process for assessing effects.

8.3.8 The value (or importance) of each heritage resource within the study area was determined according to the DMRB criteria set out in *DMRB LA 104 Environmental Assessment and Monitoring* (Highways England, 2020)[20]. Table 3.2N. Table 8-2: Value (importance) criteria for heritage resources, below, is a factor-specific adaptation which has been designed to clarify the generic terms of *DMRB LA 104.* Table 3.2N.

8.3.9 Non-designated assets of archaeological interest that are demonstrably of equivalent value to scheduled monuments will be identified as such and subject to the policies for designated heritage assets.

Table 8-2: Value (importance) criteria for heritage resources

Value	Typical descriptors
Very high	Very high importance and rarity, international scale and very limited potential for substitution. Includes World Heritage Sites and nominated sites.
High	High importance and rarity, national scale, and limited potential for substitution. Includes scheduled monuments, listed buildings (all grades), Grade I registered parks and gardens, conservation areas containing very important buildings, undesignated structures of clear national importance, undesignated resources of schedulable quality and importance.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution. Includes conservation areas containing buildings that contribute

[18] Environment Agency (2021), National LiDAR Programme, available at: https://data.gov.uk/dataset/f0db0249-f17b-4036-9e65-309148c97ce4/national-lidar-programme [accessed 10 September 2021]
[19] Cambridge University (2021) Collection of Aerial Photography, available at: https://www.cambridgeairphotos.com/ [accessed 10 September 2021]
[20] Highways England (2020) Design Manual for Roads and Bridges LA 104 Environmental Assessment and Monitoring, available at: https://www.standardsforhighways.co.uk/prod/attachments/0f6e0b6a-d08e-4673-8691-cab564d4a60a?inline=true [accessed 6 September 2021]

Value	Typical descriptors
	significantly to historic character, Grade II registered parks and gardens, and non-designated archaeological remains.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

Magnitude of impacts

8.3.10 The approach used to assess magnitude of impacts on heritage resources considers the change upon the receptor. This takes into account the severity of impact of the project, together with the vulnerability of the receptor to change. The approach used is based on professional judgment and experience. It also reflects guidance on 'substantial harm' and 'less than substantial harm' in the *NPPF* and established methodologies in the DMRB.

8.3.11 The types of impact and magnitude used in the assessment have been adapted from *DMRB LA 104* Table 3.4N and are shown in Table 8-3: Broad criteria for assessing the magnitude of change/impact below. This table is a factor-specific adaptation which has been designed to mitigate against the generic terms of *DMRB LA 104* Table 3.4N.

Table 8-3: Broad criteria for assessing the magnitude of change/impact

Magnitude of impact (change)		Description and nature of change/impact
Major	Adverse	Loss of heritage resource and/or quality and integrity of heritage resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of heritage resource quality; extensive restoration; major improvement of attribute quality.
Moderate	Adverse	Loss of heritage resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Significance of effect

8.3.12 By combining the magnitude of impact (or change) and the value (or importance) of each heritage resource, an assessment has been made of the significance of effect, taking into account the possibility and nature of mitigation. The resultant effects may be either negative (adverse) or positive (beneficial) or neutral, depending on the nature of the impact.

8.3.13 Significance of effect upon heritage resources is assessed in accordance with *DMRB LA 104* Table 3.8.1 Significance Matrix.

8.3.14 Where the matrix suggests more than one likely outcome, for instance slight or moderate, professional judgement has been used in conjunction with the descriptors to arrive at a robust conclusion.

8.3.15 Table 8-4: Assessment criteria, below is based upon *DMRB LA 104* Table 3.7, with factor-specific examples of effect replacing the generic statement contained in *DMRB LA 104* Table 3.7.

8.3.16 Effects are defined on a nine-point scale (very large beneficial, large beneficial, moderate beneficial, slight beneficial, neutral, slight adverse, moderate adverse, large adverse or very large adverse).

Table 8-4: Assessment criteria

Significance of effect	Descriptor
Very large adverse	Partial or total loss of a resource of the highest value. Effects at this level are material in the decision-making process. Potentially be in conflict with national policies for the protection of the heritage resource.
Large adverse	Result in the total, or almost total, loss of heritage resources. Be highly intrusive and would seriously damage the setting of the heritage resource such that its significance is totally or almost totally degraded. Potentially be in conflict with national policies for the protection of the heritage resource. Effects at this level are likely to be material in the decision-making process.
Moderate adverse	Be highly intrusive in the setting and as a result adversely affect the significance of the resource. Result in loss of features such that the integrity of the heritage resource is compromised, but not destroyed. Effects at this level can be considered to be material decision-making factors.
Slight adverse	Have a detrimental impact on the setting of a heritage resource such that its significance is diminished. Effects at this level are not material in the decision-making process.
Neutral	Maintain existing historic features in the townscape. Have no appreciable impacts either beneficial or adverse on any known or potential heritage resources. Result of a balance of beneficial and adverse impacts.

Significance of effect	Descriptor
	Not result in severance or loss of integrity context or understanding within a historic landscape. Not be in conflict with and do not contribute to policies for the protection or enhancement of the heritage. No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
Slight beneficial	Restore or enhance the sense of place of a heritage feature through good design and mitigation. Remove or mitigate visual intrusion (or other indirect impacts) into the setting of heritage features such as that appreciation and understanding of them is improved. Marginally enhance the integrity understanding and sense of place of a site or group of sites. Effects at this level are not material in the decision-making process.
Moderate beneficial	Provide potential for significant restoration of characteristic features or their setting through the removal, relocation or mitigation of existing damaging or discordant impacts on the heritage resource. Contribute to regional or local policies for the protection or enhancement of the heritage resource. Enhance the integrity, understanding and sense of place of a site or group. Effects at this level can be considered to be material decision-making factors.
Large beneficial	Result in the removal, relocation or substantial mitigation of very damaging or discordant existing impacts (direct or indirect) on the heritage. Result in extensive restoration or enhancement of characteristic features or their setting. Form a major contribution to government policies for the protection or enhancement of the heritage resource. Remove or successfully mitigate existing visual intrusion such as that the integrity, understanding and sense of place of a site or group of sites is re-established. Effects at this level are likely to be material in the decision-making process.
Very large beneficial	As ‘large beneficial’ where the effect would be upon a site of Very High Importance. Effects at this level are material in the decision-making process.

Stakeholder engagement

8.3.17 Consultation is being undertaken with Historic England and the Archaeological Officers in Cumbria, Durham and North Yorkshire to inform the project design. Engagement is ongoing and will be documented in a Statement of Common Ground which is intended to accompany the DCO application.

8.3.18 Consultation has also taken place with the Roman Roads Research Association, the Milestone Society and the Churches Conservation Trust.

8.4 Assessment Assumptions and Limitations

8.4.1 It has not yet been possible to access all areas identified within the draft DCO boundary for survey pending land access agreements. It is expected that agreement to access the necessary land will be agreed in time to complete surveys in time for the results to inform the ES. As a consequence preliminary cultural heritage information is in some locations based upon limited or incomplete data. The data currently unavailable includes:

- Geophysical survey data for areas not accessible at the time of survey.
- Data from intrusive investigation - trial trenching results not available at the time of writing.
- Detailed setting assessment data for buildings and monuments within the study area in the Temple Sowerby to Appleby Scheme have not been undertaken pending ongoing consideration of alternative alignment routes.
- Data on non-designated buildings of historic interest where these have not been captured in the relevant county Historic Environment Record.
- Data requiring physical access to aerial photographic libraries, archives and historic environment records has not been collected as a result of Covid-19 restrictions.

8.4.2 Further geophysical survey, detailed setting assessments, archive research and trial trenching will be undertaken to inform the ES.

8.4.3 The PEI Report has been based in prelminary Zone of Visual Influence (ZVI) modelling and as a result cross-scheme interactions have not been assessed. This will be addressed, where relevant, in the ES.

8.4.4 The information gathered to date is considered sufficient to provide the basis for the preliminary assessment set out in this chapter. All assessed effects in this chapter are preliminary and will be updated in the ES in light of data available at that time.

8.5 Study Area

Route wide

8.5.1 The study area is defined according to the sensitivity of the receiving environment and the potential impacts of the project.

Designated resources

8.5.2 The study area considered in this PEI Report comprises a buffer that extends 1km from the draft DCO boundary. This buffer was selected on the basis of professional judgement and experience. This reflects that, by their nature, linear road schemes would sit within a landscape, and are likely to be visible for short stretches of their overall length; as such they are highly unlikely to alter the setting of heritage resources to a degree that would result in either a significant adverse or beneficial

effect beyond 1km. The design of the project was reviewed, and it was concluded that it shared these characteristics, and therefore fitted within the expectations of professional judgement.

8.5.3 All designated resources within this study area are considered within the assessment. In addition, where designated resources, such as registered park and gardens (RPG), straddle the limit of the study area, any designated heritage resources that are associated within them that could experience effects are also included in the assessment.

8.5.4 The noise model and Zone of Theoretical Visibility (ZTV) model have been reviewed against known designated heritage resources of very high and high value (see Table 8-2: Value (importance) criteria for heritage resources) in order to identify any such resources up to 2km from the scheme where visual or noise changes may result in a significant effect on their heritage significance as a result of their greater sensitivity to change.

Non-designated resources

8.5.5 The assessment presented in this PEI Report considers non-designated heritage resources within 300m of the draft DCO boundary. This study area is based upon professional judgement that non-designated resources are less likely to experience significant adverse effects as a result of changes to their settings beyond this distance, following the reasoning described above. This does not preclude non-designated resources being of greater than local importance.

Historic landscape character

8.5.6 A 2km study area buffered from the draft DCO boundary has been used for the Historic Landscape Character Assessment. A 2km study area has been used as it allows an appropriately large area to be considered at a landscape scale.

8.6 Baseline Conditions

8.6.1 The baseline conditions for each scheme are discussed below. For more detailed discussion of geological conditions refer to Chapter 9: Geology and Soils.

8.6.2 A consolidated route wide Historic Landscape Character Assessment can be found at Appendix 8.1: Consolidated Historic Landscape Character Assessment.

8.6.3 Maps showing heritage resources and Historic Landscape Character Areas can be found at Figures 8.1: Designated Assets within 1km to Figure 8.3: Historic Landscape Character Areas.

8.6.4 The periods and date ranges used in the discussion of the baseline conditions are set out in Table 8-5: Definition of archaeological time periods. This table is derived from data provided by the Forum on Information Standards in Heritage (FISH) (Historic England, 2015))[21].

Table 8-5: Definition of archaeological time periods

Period name	Date range
Palaeolithic	500,000 to 0,000BC
Mesolithic	10,000 to 4,000BC
Neolithic	4,000 to 2,200BC

[21] Historic Enland (2015) Period List, available at: http://heritage-standards.org.uk/wp-content/uploads/2015/08/Periods-List-HE-FISH-WP.pdf [accessed 6 September 2021]

Period name	Date range
Bronze Age	2,200 to 700BC
Iron Age	800BC to AD43
Romano-British	AD43 to 410
Early Medieval (Anglo-Saxon)	410 to 1066
Medieval	1066 to 1540
Post-Medieval	1540 to 1901
20th century	1901 to 2000

Survey

8.6.5 Surveys are being undertaken to enhance understanding of the historic environment and to inform the assessment of archaeological potential.

8.6.6 The surveys are being conducted in accordance with an Evidence and Survey Strategy, agreed with the Technical Working Group, which comprises the following elements:

- Desk based assessment
- Geophysical survey
- Remote sensing (aerial photographs and LiDAR)
- Geoarchaeological modelling
- Setting assessment
- Building assessment
- Trenching
- Research framework

8.6.7 Initial results of these activities, where undertaken, have been presented to the Technical Working Group and contributed to this PEI Report. The full results will be presented in the ES.

Geophysical survey

8.6.8 An initial programme of geophysical survey was undertaken between October 2020 and November 2020. A second phase of survey will commence in Autumn 2021. This survey will investigate the area within the draft DCO boundary including those areas where multiple alternative route alignments are being assessed.

Aerial photography and LiDAR

8.6.9 A programme of aerial photography and LiDAR interpretation has been undertaken across the project. The results have been interpreted and this new information has been incorporated into the baseline presented in this PEI Report.

Setting assessment

8.6.10 Setting assessment has been undertaken at locations along the route where the potential for substantive changes to the setting of heritage resources has been identified. If these changes are likely to contribute to a likely significant effect they are reported on in this PEI Report.

Building assessment

8.6.11 One building assessment has been undertaken to date. An assessment of significance has been undertaken at the non-designated historic building known as

The Old Rectory at Rokeby. The report and any others which are prepared as a result of design development will be presented in support of the ES.

Archaeological and historical background

Introduction

8.6.12 The northern Pennines have been the site of human activity since the re-occupation of the British land mass at the end of the last Ice Age. The land form, climate and ecology of the area have influenced how the area has been settled and utilised. This has led to distinctive themes in the archaeological and historic record.

8.6.13 The most striking, and perhaps in terms of the A66 Northern Trans-Pennine (NTP) project most relevant, theme is the function of Stainmore and its approaches as an east-west transit route. Commencing in the prehistoric period with trade in stone tools and their raw material it became formalised in the landscape with the establishment of the Roman road network. This network long survived the end of the Romans and formed the basis of the turnpike roads of the eighteenth century and to a substantial degree forms the basis of the existing trunk road system. A variation on the theme arrived in the nineteenth century with the building of the railways.

8.6.14 A second major theme is the militarised nature of the landscape. Although notably devoid of major prehistoric defensive sites (assuming the circuit at Stanwick to be more of a status symbol than credible defense work) a key element of the Roman impact on the area is the establishment of a series of forts which, with some variation, remained in use for much of the period of the Roman presence. The sites of these forts maintained a military purpose throughout much of the medieval period as the area lay within the zone of Anglo-Scottish conflict. The pacifying effect of the union of the crowns de-escalated conflict in the border region and the militarised landscape declined to insignificance in the post-medieval period before re-emerging in a small way with the widescale militarisation of the British Isles during the conflicts of the twentieth century.

Prehistoric (700,000BC – AD43)

8.6.15 Early prehistoric evidence for the Pennines is scarce; this may under-represent the true level of past human activity and instead reflect the relative intensity of archaeological fieldwork across the region although there is potential for seasonal movements in the region, possibly across the Stainmore Pass (Higham, N., 1986)[22].

8.6.16 The Mesolithic period is better attested within Cumbria with numerous lithic artefacts found through fieldwalking and through survey along the western coast and throughout Eden Valley[23].

8.6.17 On a regional scale, evidence for Late Neolithic (2,900BC to 2,200BC) and Early Bronze Age (2,200BC to 1,600BC) settlement or activity can be split into two broad topographic areas: uplands and lowlands. Upland areas, such as the study area, tend to provide evidence in the form of upstanding monuments while in lowland areas archaeological remains more often survive as cropmarks or are recovered as artefact deposits[24].

[22] Higham, N., (1986) The Northern Counties to AD 1000 (Regional History of England), p.23
[23] Eden District Council Museum's 'Living Among the Monuments' community fieldwalking programme has been ongoing since its first fieldwalking season in 2006, with results and findspots of prehistoric flints regularly added to the HER.
[24] Petts and Gerrard, (2006) Shared Visions: The North-East Regional Research Framework for the Historic Environment, p.21

8.6.18 Cumbria is well known for distinctive Neolithic polished axeheads that originated from the Langdale area in the Lake District, that have subsequently been discovered throughout Britain and Ireland (Higham, N., 1986). Research on the Langdale 'axe factories' has largely focused on the national importance and the context of axe production while circulation within the local region is still little understood (Evans, I., 2005)[25]. Although artefact groupings may indicate strong connections along the Stainmore Pass (Higham, N., 1986).

8.6.19 The Penrith henges including Mayburgh, King Arthur's Round Table and Little Round Table are all likely to be of Late Neolithic or Early Bronze Age dates. Collectively they form an extensive monumental complex within the area of the confluence of the rivers Lowther and Eamont, along with the standing stone at Skirsgill (Brennand, M (ed), 2006)[26]. The distribution of Cumbrian henge sites on a regional scale has often been seen as significant as many are situated close to the natural routeways thought to be utilised for the transportation of stone axes from the central fells to the world beyond (Evans, I., 2005).

8.6.20 Stanwick, a short distance north-west of Scotch Corner, was the site of a vast Iron Age settlement, where massive earthworks enclosed an area of c.300 hectares and with further associated settlement outside this perimeter (Mason, D, 2021)[27]. This is considered to be a power centre of the Brigantes which continued to be occupied into the Roman period, with evidence of high quality Roman goods.

8.6.21 The Scheduled Monument at Carkin Moor includes both the Roman Fort and a prehistoric enclosed settlement visible on aerial photographs and provisionally dated to the Iron Age with additional prehistoric features and cropmarks identified by the AP and LiDAR survey undertaken in 2020.

Romano-British

8.6.22 The Roman army landed in Kent in the summer of AD43 and quickly established direct control or rule via client kingdoms using treaty relationships; for the North of England, the Romans had to deal with a single tribe or confederation of tribes known as the Brigantes, whose territory covered the area stretching from Derbyshire to the Scottish Lowlands. The leader of the Brigantes at the time of the Roman invasion, Cartimandua, was based at Stanwick, and high status individuals at Stanwick clearly benefitted from the relationship with Rome indicated by a range of Roman imports including an obsidian cup and pottery types rarely found across all of north-western Europe.

8.6.23 Excavations between 2013 and 2017 in conjunction with the upgrading of the A1 to motorway status between Leeming and Barton (A1L2B) have identified a further extensive settlement originating in the late Iron Age but continuing in use into the Roman period, with the appearance of exotic goods such as Samian ware, glass vessels and amphorae for wine and olive oil, similar to the developments at Stanwick.

8.6.24 The client kingdom was annexed in the AD70s possibly as a result of internal instability which negated its value in protecting the northern border of the Roman province. Evidence for the campaigns which followed is provided by the large temporary marching camps discovered at Rokeby, Rey Cross and Crackenthorpe.

[25] Evans, I., (2005) Prehistoric Landscapes of Cumbria: unpublished DPhil thesis (University of Sheffield), p.19
[26] Brennand, M (ed), (2006) The Archaeology of North West England: An archaeology research framework for North West England. Volume 1: Resource Assessment, p.39
[27] Mason, D, (2021) Roman County Durham: The Eastern Hinterland of Hadrian's Wall, p.23

8.6.25 Construction of the roads needed for the rapid movement of troops and supplies rapidly followed. The Street was one of the region's main west-east routes, a strategically important route between York (*Eboracum*) and Carlisle (*Luguvalium*), and is largely preserved in the route of the A66. Breaking westward from Dere Street at Scotch Corner, The Street passes through Carkin Moor, Rokeby and Bowes, continuing through the Stainmore Pass and into the Eden Valley beyond (Petts and Gerrard, 2006). A link road between Bowes and Barnard Castle (approximately 5km north-east of the Bowes scheme) has also been identified. Evidence for river crossings, such as the bridge at Greta Bridge and a possible fording point on the River Tees at Barnard Castle (outside of the study area to the north), have also been identified.

8.6.26 Permanent forts were constructed alongside the route of The Street at Carkin Moor, Greta Bridge, Bowes, Brough, Kirkby Thore and Brougham. Smaller fortlets and camps are known at Castrigg and Warcop. Civilian settlements grew up outside of the permanent forts. Activity within the forts and their civilian settlements appears to have been broadly linked to the fluctuating location of the northern frontier of the province which stabilised on the line of Hadrian's Wall in the latter half of the second century.

8.6.27 Throughout the period agricultural settlements identical in form to their Iron Age counterparts continued in use sometimes in close proximity to the more Romanised settlements associated with the military infrastructure.

Early medieval

8.6.28 During the sixth century, County Durham (and Northumberland) were part of the Kingdom of Bernicia. The Kingdom of Bernicia stretched from the River Tees in the south to the Firth of Forth (now in Scotland) to the north (Rollason, 2003)[28]. South of the River Tees lay the Kingdom of Deira and, between them, both Bernicia and Deira held overlordship over several smaller quasi-independent kingdoms scattered throughout the north of England and modern southern Scotland. Bernicia and Deira were often in conflict. The political heartlands of Bernicia were divided by the Pennines, with centres to the east present in the areas around Bamburgh and Lindisfarne, Monkwearmouth and Jarrow, and around Carlisle to the west.

8.6.29 From the seventh century to the mid-ninth century the Kingdom of Northumbria was one of the most powerful and influential, as well as geographically the largest, of the seven kingdoms of Early Medieval Britain (known as the heptarchy). The waning of Northumbria's power and influence is linked with the commencement of the Viking raids, the first of which was at Lindisfarne in AD793. By AD878, the kingdom had been split in two by the creation of the Danelaw, which included the study area. The Vikings gave the area many of its distinctive place names. Streams are termed becks, from the Norse 'bekr'; waterfalls are forces from the Norse 'foss'; a hamlet or village often included the word 'thorpe'; fell derives from "fjall" which is the Norse word for hill; small lakes are termed tarns which derives from 'tjorn'; 'thwaite' means clearing; and 'saeter' refers to summer pastures.

8.6.30 By AD954 Northumbria finally ceased to exist entirely following its annexation to the Kingdom of England, which was established by Æthelstan in July of AD927, following the unification of the Danelaw and the surviving kingdoms of the heptarchy.

8.6.31 Archaeological evidence, including evidence for rural settlement, from the early medieval period is incredibly variable throughout the north, with such evidence being particularly scarce in County Durham (Petts and Gerrard, 2006). The settlement site

[28] Rollason, (2003) Northumbria, 500-1100: Creation and Destruction of a Kingdom

at Fremington near Penrith is a notable exception. Although the current structure dates from the 17th century, St Ninian's church, Brougham, is situated on an original early medieval ecclesiastical site.

Medieval

8.6.32 In the early part of this period the study area, along with much of the Stainmore Pass, is recorded as being under the control of the castlery of Count Alan of Brittany. The study area may also have suffered as a result of the Harrying of the North, conducted between AD1069 and AD1070, which is thought to have caused extensive damage to the manorial economy of the region (Hull Domesday Project, 2021)[29].

8.6.33 Settlement of the north-east region during the Medieval period is predominantly rural with a dominance of pastural agriculture in the uplands. Extensive areas of common land for pasture, and the use of shielings, supported a dominance in the rearing of cattle and sheep (Winchester, 2000)[30] over arable landuse. Evidence for agricultural activty can be seen through the survival of relict terraces, areas of ridge and furrow, and recovered environmental deposits (Petts and Gerrard, 2006).

8.6.34 Bowes Castle was the first of the three sites to be fortified (Bowes, Brough and Brougham) between 1171 and 1187. All three of the castles were built close to a river or a beck, along the route of the Roman Road and within or close to the ruins of Roman forts. Although originally focussed on the control of the local populace following the Norman conquest, the proximity of the border with Scotland and the strategic importance of the Stainmore Pass, make Bowes and the other castles militarily important, in much the same way as it was during the Romano-British period. The area was subject to dispute between the kingdoms of Scotland and England, with control of the region changing hands before being settled in the favour of English control via the Treaty of York in 1237.

8.6.35 The later Medieval period saw this form of fortification gave way to moated houses, such as that at Eastfield Sike which had an associated fishpond and adjacent woodbanks and ditches at Burtergill Wood and Kiln Hill. Other site types of medieval date include the large deer park at Whinfield Park.

8.6.36 The timber and stone churches of the Anglo-Saxons were rebuilt by the new Norman landowners, obliterating most of the original Saxon features, such as the scheduled sites at St Ninian's, east of Penrith, and St Michael's near Rokeby.

8.6.37 Great religious institutions were established, including those of the Augustinians (e.g. Cartmel and Conishead), Benedictines (e.g. St. Bees and Weatherall), Cistercians (e.g. Calder and Furness, originally Sauvignac) and Dominicans (e.g. Blackfriars, Carlisle), often becoming wealthy and powerful landowners in their own right.The sole example of a major religious house within the study area is the Premonstratensian Abbey of St Mary and St John the Baptist at Egglestone, founded between 1195 and 1198.

Post-medieval

8.6.38 Substantial changes in farming and agricultural practice took place throughout the post-medieval period. By the late seventeenth century *"the practice of seasonal transhumance came to an end. Many shielings ceased to be used, though in some*

[29] Hull Domesday Project (2021) Land of Count Alan, available at: http://www.domesdaybook.net/domesday-book/data-terminology/administrative-units/land-of-count-alan [accessed 6 September 2021]
[30] Winchester (2000) The harvest of the hills: rural life in northern England and the Scottish Borders, 1400-1700

cases temporary shielings were transformed into farms, and there was a move towards more permanent settlement in the uplands" (Petts and Gerrard, 2006). During the seventeenth and eighteenth centuries, land tenure of the uplands moved away from the long-established Customary Tenure to the more structured Leashold Tenure. This led to the formation of larger farms and, ultimately, the division of common land; initially by private agreement between landowners and then, from 1773 until the mid-nineteenth century, through the Enclosure Acts.

8.6.39 The mid-eighteenth century saw a decline in the extent of the region's agricultural villages, those where the predominant form of employment was farm work, and a rapid increase in industrial villages. Often more specilised with the majority of inhabitants working within the same industry, the predominant type of industrial villages within County Durham were associated with coal mining or, particularly in the Pennines, lead mining (which reached its peak in the eighteenth and early nineteenth centuries before rapidly decining during the 1880s).

8.6.40 The quarrying of stone was also prevalent throughout the region. Small quarries local to villages or farmsteads were established for use as building material and, in the case of limestone quarries, the production of quicklime which was used to reduce the acidity of the soil, making it more acceptable for crops. During the nineteenth century, the need for increased amounts of stone suitable for road building was met by the quarries of the North Pennines. Unlike the smaller local quarries which supplied building material and limestone, these quarries were often large enterprises that were connected to the rapidly growing railways.

8.6.41 The growth of industrial mines and quarries also led to the development of railway infrastructure to better transport goods and materials. Railways were founded in, and grew from, the north-east of England.

8.6.42 By the nineteenth century social provisions such as health and education were increasingly being assumed by the state, both locally and nationally. These movements were driven in no small part by the rise of the new social (and often philanthropic) elite and another substantial shift in religious dynamics: the rise of Non-Conformity. Established during the eighteenth century, the Methodist movement grew from John Wesley's Anglican reform movement and, in 1810, split into two groups: Primitive Methodists and Congregationalists. Both groups, along with other non-conformist movements (such as the Presbyterians or the Quakers, who had a strong presence in the North Pennines) were attractive to the working classes of the north-east and north-west regions. Originally a largely working class phenomenon, non-conformity eventually spread through all levels of nineteenth century society.

Twentieth century

8.6.43 The development and expansion of the railways during the nineteenth century was fundamental to the industrial growth of the north-east of England during the post-medieval period. For much of the twentieth century, however, the railways of the north experienced a gradual decline which, along with the rest of the country, crescendoed with *"the 'Beeching Axe"* in 1963 (Petts and Gerrard, 2006). Often, the only surviving elements of the original, expansive branch and local lines which once connected the villages of the region with its collieries, mainlines and cities are the cuttings, embankments, bridges and viaducts along which the railways once ran, such as the Settle to Carlisle Railway Conservation Area.

8.6.44 The twentieth century witnessed two World Wars, the heritage legacy of which can be seen most obviously in the remains and sites of defensive structures, such as pillboxes and local war memorials.

Scheme specific

8.6.45 The following sections set out the heritage baseline scheme by scheme. Where resources are further discussed and assessed below in section 8.9 their value is identified in the context of that assessment.The resources discussed are shown in Figures 8.1: Designated Assets within 1km and Figure 8.2: Non-designated assets within 300m.

M6 Junction 40 to Kemplay Bank

Geological summary

8.6.46 The bedrock beneath the M6 Junction 40 to Kemplay Bank scheme is formed of sedimentary rocks of the Stainmore Formation and Penrith Sandstone Formation aligned in bands orientated north-northwest to south-southeast. At the western end of this scheme, just west of M6 Junction 40, the bedrock is comprised of bands of limestone interspersed with the Alston Formation of siltstones, mudstones and sandstones, both part of the Yoredale Group. Moving eastwards, the bedrock is also part of the Yoredale Group, and is comprised of the Stainmore Formation of mudstones, siltstones and sandstones. The east and north of the study area are on the Penrith Sandstone Formation.

8.6.47 The superficial geology is predominantly till deposits formed by the action of glaciers and meltwaters in the last glacial era (Devensian period), approximately 70,000 to 10,000years ago. Till, also known as boulder clay or diamicton, was formed when the area was covered in thick, glacial ice. It has no geoarchaeological potential. The soil formed above the till is a freely draining, slightly acidic, loamy soil, suitable for both arable and pastoral farming, although its fertility is relatively low.

8.6.48 The rivers Eamont and Lowther are associated with deposits of alluvium. Pockets of glaciofluvial deposits of sand and gravel, and river terrace gravels are also associated with these rivers.

Topographical summary

8.6.49 The scheme is located on an area of relatively flat land just north of the Rivers Eamont and Lowther. The A66 road surface in the west of the area within the draft DCO boundary, lies at 138m AOD and the land slopes gently downwards towards the rivers to the south, with a level of 124m AOD recorded on Skirsgill Lane, 200m south-east of the draft DCO boundary.

Historic landscape character assessment

8.6.50 Appendix 8.1: Consolidated Historic Landscape Character Assessment contains a detailed analysis of the HLCA identified in the area surrounding the project. The majority of the study area is located in the western part of the Eden Valley Historic Landscape Character Area (A66_HLCA_001[31]), with the very eastern end crossing into the Lazonby Ridge HLCA (A66_HLCA_002)(see Figure 8.3: Historic Landscape Character Areas for HLCA mapping). The Eden Valley is a large, wide valley characterised by a mixture of post-medieval enclosed fields and areas of former common arable with late medieval or early post-medieval field layouts fossilised within later enclosure boundaries. There are a number of nucleated settlements in the valley, the largest of which is Penrith, which is immediately to the north of the proposed route. Lazonby Ridge is an area of post-medieval enclosed fields north of

[31] For detailed commentary on all Historic Landscape Character Areas (HLCA_001 to HLCA_008) see Appendix 8.1

Penrith, part of which was formerly part of the medieval deer park of Whinfell Park, although there is limited survival of historic landscape elements pre-dating the later post-medieval period.

Identified heritage resources

Table 8-6: Heritage resources in M6 J40 to Kemplay Bank study area

Resource Type	Quantity
Listed Buildings	126
Scheduled Monuments	10[32]
Conservation Areas	1
Non-designated historic buildings	8
Non-designated archaeological resources	36

Resource summary

8.6.51 Scheduled prehistoric remains within the study area comprise three henges (Mayburgh Henge, King Arthurs Round Table Henge and Little Round Table Henge) and a standing stone at Skirsgill.

8.6.52 Although finds of Neolithic and Bronze Age date have been made in the study area no evidence for settlement or activity of Iron Age date has yet been identified.

8.6.53 During the occupation of the northern areas of England in the Flavian period from c. AD72, a network of roads and forts was established. Penrith lay at the junction of two of these routes. High Street (Margary. I.D., 1957)[33] connecting Ambleside to Penrith runs just west of Yanwath. The second road[34] running east from Penrith, largely followed by the route of the A66, connects Penrith with Dere Street at Scotch Corner via Stainmore.

8.6.54 Archaeological evidence of early medieval date comprises two scheduled monuments, The Giant's Grave and the Giant's Thumb which are located in St Andrews Churchyard, Penrith. Both are made of re-purposed elements of earlier monuments. The Giant's Thumb has been dated to AD920.

8.6.55 In the eleventh century the River Eamont marked the border between Scotland and England (and remained the border between the old counties of Westmorland and Cumberland until the creation of modern Cumbria in 1974). Eamont Bridge dates to the fifteenth century.

8.6.56 Penrith Castle and Yanwath Hall are both examples of medieval defended residences having their origins in pele towers erected in the fourteenth century. The former was further fortified by Lord Neville at the end of the fourteenth century. Yanwath Hall was extended as a residence in the fifteenth century by the addition of a two and three story hall.

8.6.57 The Parish Church of St Andrews, Penrith, includes a red sandstone rubble tower of twelfth/ thirteenth century date. The remainder of the church was rebuilt in a classical style in 1720.

[32] Noting that Penrith Castle and Eamont Bridge are both listed buildings and scheduled monuments
[33] Margary I.D. (1957) Roman Roads in Britain:II North of the Foss Way-Bristol Channel Roman road RR74
[34] Ibid Roman road RR82 noting that the alignment of the Roman road diverges from the modern A66 in the vicinity of Brougham

8.6.58 Non-designated heritage resources of medieval date within the study area include an extensive lynchet system related to the shrunken settlement of Skirsgill which covers an area of roughly 30 acres.

8.6.59 The majority of designated heritage resources within the study area are post-medieval in date and are concentrated in the town of Penrith, the historic centre of which is a conservation area. In addition there are high status country houses at Carleton Hall, Skirsgill and Lowther Lodge.

8.6.60 The non-designated heritage assets of post medieval date within the study area include the site an icehouse, Low Mill corn and snuff mill complex, a workhouse, and two weirs. Two mid-nineteenth century railway lines fall within the study area- the Cockermouth, Keswick and Penrith Railway and the Lancaster and Carlisle Railway.

8.6.61 There are four designated heritage resources of twentieth century date within the study area: Eamont Lodge, a K6 Telephone Kiosk and two Boer war memorials. The former ice house at Carleton Hall is the only non designated heritage resource of similar date.

Penrith to Temple Sowerby

Geological summary

8.6.62 The bedrock beneath the study area of the Penrith to Temple Sowerby scheme is formed of the Penrith Sandstone formation. This is overlain by superficial deposits of glacial till, glaciofluvial deposits, river terrace gravels and alluvium. Glacial till, also known as boulder clay or diamicton, is present across the majority of the study area. This was formed by the action of glaciers and meltwaters in the last glacial era (Devensian period), between around 70,000 to 10,000 years ago. There is a small area immediately north of the draft DCO boundary, to the east of the Light Water and north of the A66, where glaciofluvial deposits of sand and gravel are present. These glaciofluvial deposits were formed from material washed out in meltwater from the glaciers. Glacial till and glaciofluvial deposits have no geoarchaeological potential.

8.6.63 There are several watercourses, tributaries of the River Eamont to the north, which the A66 crosses within the study area. Alluvium is present along each of these watercourses. Alluvium, which is material deposited by rivers or streams, typically consists of silts, clays, sands and gravel and may contain anaerobically preserved organic material. This material may contain palaeoenvironmental remains which are of archaeological interest for their potential to aid in the reconstruction of past environments. River terrace gravel deposits are present on the southern bank of the River Eamont, c175m north of the draft DCO boundary at Barrackbank Wood. These terrace gravel deposits may contain evidence which may be of palaeoenvironmental and archaeological interest.

Topographical summary

8.6.64 The Penrith to Temple Sowerby scheme is located in a relatively flat lowland landscape within the Eden Valley, rising slightly from the western end of the scheme which lies at c124m AOD to 136m AOD at the western end.

Historic landscape character assessment

8.6.65 Appendix 8.1: Consolidated Historic Landscape Character Assessment contains a detailed analysis of the Historic Landscape Character Area identified in the area surrounding the project. The scheme is located in the southern part of the Lazonby Ridge HLCA (A66_HLCA_002)(see Figure 8.3: Historic Landscape Character Areas for HLCA mapping). Lazonby Ridge is an area of post-medieval enclosed fields north

of Penrith. It covers an area of low fell which was enclosed in the nineteenth century. The southern part of the HLCA was formerly part of the medieval deer park of Whinfell Park, although there is limited survival of historic landscape elements pre-dating the later post-medieval period.

Identified heritage resources

Table 8-7: Heritage resources in Penrith to Temple Sowerby study area

Resource Type	Quantity
Listed Buildings	13
Scheduled Monuments	7[35]
Conservation Areas	0
Non-designated historic buildings	2
Non-designated archaeological resources	138[36]

Resource summary

8.6.66 Regional evidence suggest that the wider landscape surrounding the study area was an important routeway for prehistoric people, comprised of open moorland leading to the Stainmoor Pass. Two possible Neolithic enclosures are situated within the study area. However, the majority of the non-designated heritage resources that date to the Palaeolithic to Neolithic period are findspots of struck lithics found during the 'Living Amongst the Monuments Eden Valley Field Project'. One find may derive from long blade production of late Upper Palaeolithic date.

8.6.67 An early Bronze Age barbed and tanged arrowhead has also been found during fieldwalking. A cist was discovered while quarrying for sand in the nineteenth century near Barn Owl Cottage. Inside the cist was a contracted skeleton associated with a Beaker and a food vessel. There is no evidence of Iron Age activity within the study area.

8.6.68 There are five scheduled sites dating to the Romano-British period within the study area; and 15 non-designated heritage resources dating to the Romano-British period within the study area.

8.6.69 The marching camp 410m northeast of Brougham fort is known from cropmarks and is presumed to predate the establishment of the permanent fort at Brougham, identified as *Brocavum* (Rivet, A.L.F. and Smith, C., 1979)[37]. Brougham fort was constructed on the south bank of the River Eamont near its confluence with the River Lowther possibly as early as AD78-84. It continued in use until the end of the fourth century.

8.6.70 A substantial settlement developed to the east and north of the fort which thrived into the third century. Burials associated with the fort and settlement have been found from a point close to the fort at least as far as a small hill 600m to the east of the fort. In 1966 and 1967 part of the cemetery located on the low hill east of the fort, was excavated ahead of road works. The excavation remains the largest to be undertaken on a Romano-British cemetery site in the north of England with close to 300 funerary related deposits identified. The full extent of the cemetery is not known although its eastern extent probably lay at or close to the limit of the 1966/7 excavations.

[35] Noting that The Countess Pillar is both a listed building and scheduled monument.
[36] Whinfell Park medieval deer park also falls partly within the study area for Temple Sowerby to Appleby.
[37] Rivet, A.L.F. and Smith, C. (1979) The Place Names of Roman Britain

8.6.71 A settlement identified 90m southeast of Sceugh Farm is one of a distinctive north British type of native settlement dating to the Romano-British period.

8.6.72 The buried remains of St Ninians early medieval monastic site are located on the floodplain of the River Eamont north of the A66. The monastic site lies to the east of the St Ninian's Church and is seen from aerial photographs to include an elliptical enclosure containing a number of structures. This form of monastic settlement typified by the circular enclosure suggests Irish influence. This type of site is rare nationally.

8.6.73 Archaeological works in advance of pipeline construction identified traces of three early medieval sunken floor buildings south of the A66 at Fremington. The settlement provided evidence of small scale blacksmithing and probable textile manufacture. The majority of finds dated to the seventh and eighth centuries. A site of this type and date was at the time of excavation unique in the north-west of England.

8.6.74 Brougham Castle was built between 1203 and 1214 by Robert de Vieuxpont. A three-storey keep with a large forebuilding to the east giving access to the first floor of the keep was built together with a structure, possibly a hall, to the east, and the castle was enclosed within a defensive earthwork topped by a timber palisade. The castle was probably entered from the Roman fort to the south which may have provided a ready-made outer bailey.

8.6.75 The deserted medieval village of Brougham surrounds the early monastic site of St Ninian's and is included in the same scheduling. The settlement is seen from aerial photographs to include a series of linear features interpreted as field boundaries, enclosures and pits covering a wide area on all sides of the church.

8.6.76 The exact location of a second deserted medieval village at Woodside cannot be precisely determined although the broad ridge and furrow noted in the AP and LiDAR assessment north of Lower Woodside may indicate its general location.

8.6.77 Whinfell Park deer park is mentioned in 1258 and extends over an area of 14km^2. The northern boundary of the park lay along the Roman Road which underlies the modern A66.

8.6.78 By the mid-seventeenth century the church at St Ninian's was dilapidated and derelict and the settlement deserted. The medieval church was demolished, and the present church built on the same site in 1660 by Lady Anne Clifford.The church is 'an eminently interesting example of Gothic Survival' (Pevsner, N., 1967)[38] with its seventeenth century furnishings almost intact. Lady Anne Clifford is also linked to The Countess Pillar. The pillar was erected to commemorate the last parting of Lady Anne Clifford and her mother. The adjacent stone block, known as the Dolestone, is an alms table upon which the Lady Anne Clifford laid an annual offering to the poor in memory of her mother.

8.6.79 Post-medieval resources within the study area also include Hornby Hall, Brougham mill (saw and corn mill now disused) and Brougham rifle range.

Temple Sowerby to Appleby

Geological summary

8.6.80 The bedrock geology of the study area consists primarily of a Penrith Sandstone formation. This sedimentary bedrock formed approximatly 272 to 299 million years ago during the Permian period in an environments dominated by wind blown deposits of medium to fine grained material. The land to the north of the scheme comprises

[38] Pevsner, N. (1967) The Buildings of England: Cumberland and Westmorland

bands of Eden Shale and A – bed Evaporite, Gypsum stone, both sedimentary bedrocks laid down in the Permian Period in areas dominated by lakes and lagons.

8.6.81 Overlying the bedrock the superficial geology is predominantly glacial tills deposited by glaciers and glacial meltwaters during the Devensial period between 70,000 – 10,000 years ago. The glacial till does not have archaeological potential. Bands and pockets of alluvial clays, silts and sands are also present across the study area, these deposits date from around the Quaternary period and would have been laid down by rivers. These deposits would have no potential for archaeologal materials.

8.6.82 Soils across the study area are loamy clays of low to moderate fertility, suitable for woodlands, grasslands and arable in areas.

Topographical sumary

8.6.83 The study area is predominantly flat agicultural land with fence and hedge boundaries to the north of the River Eden. The land has pockets of hard and soft woodlands across it as well as dried-up ox bow lakes. The western extent of the scheme at Temple Sowerby the ground level lies at 117m AOD rising to 145m AOD at Crakenthorpe.

Historic landscape character asssesment

8.6.84 Appendix 8.1: Consolidated Historic Landscape Character Assessment contains a detailed analysis of the HLCA identified in the area surrounding the project. The scheme is located in the Eden Valley HLCA (A66_HLCA_001)(see Figure 8.3: Historic Landscape Character Areas for HLCA mapping). The Eden Valley is a large, wide valley characterised by a mixture of post-medieval enclosed fields and areas of former common arable with late medieval or early post-medieval field layouts fossilised within later enclosure boundaries. Kirkby Thore, to the south of the scheme, is one of several nucleated settlements in the valley. The western part of the scheme is in an area where there is considerable survival of former common arable and the gently curving field boundaries created by the enclosure of medieval fields can be observed around the village. The eastern part of the scheme runs along an area of slightly higher ground, which has regular post-medieval fields, possibly enclosed from former areas of common pasture.

Identified heritage resources

Table 8-8: Heritage resources in the Temple Sowerby to Appleby study area

Resource Type	Quantity		
	Blue Alternative	Red Alterative	Orange Alternative
Listed Buildings	208	204	176
Scheduled Monuments	7	7	5
Registered Park & Garden	1	1	1
Conservation Areas	3	3	3
Non-designated historic buildings	22	23	27
Non-designated archaeological resources	175	181	199

Resource summary

8.6.85 The following baseline is presented to cover all resources across all alternatives presented within the PEI Report. The resources affected by specific alternatives are shown in Figures 8.1: Designated Assets within 1km and 8.2: Non-designated Assets

within 300m. Section 8.9: Assessment of Likely Significant Effects assesses impacts against each resource.

8.6.86 A small quantity of Late Mesolithic/early Neolithic flints and Bronze Age pottery was recovered during construction of the Temple Sowerby bypass (Hughes V & Gajos H, 2005)[39]. To date these finds remain the only evidence for early prehistoric activity in the Temple Sowerby to Appleby study area.

8.6.87 More evidence has been uncovered for later prehistoric activity. The scheduled Iron Age/Romano-British enclosed farmstead at Redlands Bank being the most prominent example. This native settlement sits 850m from a temporary Roman camp and is believed to be broadly contemporary. Investigations prior to development of a site at Kirkby Thore revealed a single pit with finds of an uncertain but possible Iron Age date (ASUD, 2019)[40]. Southeast of Kirkby Thore a sub-circular enclosure (approximately 50-60m in diameter) and linear parchmarks may represent a farmstead with an associated field system of Iron Age or Romano-British date.

8.6.88 Three Roman roads intersect at Kirkby Thore: The Street (Margary, 1957), in part overlain by the course of the modern A66 (except where recently bypassed), Maiden Way[41] running to the north and the Low Borrowbridge to Kirkby Thore Roman road[42] running to the south. However, the exact junction between these roads and their relationships with the fort and settlement at Kirkby Thore are unknown.

8.6.89 Four Roman military sites are located within the study area. The earliest of these are probably the two temporary camps at Eden View and east of Redlands Bank (Crackenthorpe). The latter covers an area of approximately 9.3ha with a bank surviving up to 1m high in places and is sited parallel to and on the south west side of the Roman road between Kirkby Thore and Brough. It is one of a series of camps, including the recently discovered example at Rokeby, which are thought to have been constructed in the first phase of the Roman occupation of the north of England. The second, smaller, camp at Eden View has been identified from aerial photographs and lies on the north bank of the River Eden a short distance south of The Street.

8.6.90 The permanent fort, identified as *Bravoniacum* (Rivet, A.L.F. and Smith, C., 1979), is considerably smaller in size than the temporary camp and seems to have been in use between the first and fourth century AD (Bidwell P. & Hodgson N., 2009)[43]. The fort rampart remains visible as a low but distinct terrace within the modern village of Kirkby Thore. Extensive remains of the associated civil settlement lie to the north, east and south of the fort.

8.6.91 Two hundred metres south-southeast of Castrigg, located on a slight rise adjacent to the northern side of the course of the former Roman road from Scotch Corner to Brougham, is a fortlet. The sub-square enclosure approximately 0.5ha in size survives as a cropmark and in places as a very slight earthwork. In the north east corner of the interior is a double ring ditch which has been interpreted as the remains of a Roman signal station. Additional earthwork features have been identified by LiDAR in the vicinity of this fortlet.

[39] Hughes V & Gajos H, (2005) A66 Temple Sowerby Bypass and Improvements at Winderwath: Topographic survey, Evaluation and Watching brief report. Oxford Archaeology North, unpublished client report
[40] ASUD (2019) Land at Kirkby Thore, An Archaeological Evaluation
[41] Ibid Roman Road RR84
[42] Ibid Roman Road RR7d
[43] Bidwell P. & Hodgson N., (2009) The Roman Army in Northern England

8.6.92 Other Roman structures in the area include a scheduled mile stone located on the parish boundary between Temple Sowerby and Kirkby Thore near Spitals Farm. A possible settlement site of Romano-British date, comprising two rectilinear enclosures, field enclosures, and a possible routeway, has been has identified between Kirkby Thore and Long Marton.

8.6.93 The nave walls and south doorway tympanum of the Church of St Margaret and St James, Long Marton are of pre-Conquest date (Pevsner, N., 1967). No other evidence for settlement or activity of early medieval date has been identified within the study area.

8.6.94 The churches of St Margaret and St James, Long Marton; St Lawrence, Appleby and St Michael, Kirkby Thore are largely medieval in date. At Long Marton the pre-Conquest church was expanded to include a tower and extended chancel.

8.6.95 The settlements of Temple Sowerby, Kirkby Thore, Long Marton and Crackenthorpe have medieval origins. At Temple Sowerby many of the properties and gardens are still situated on traditional burgage plots facing the once wide village green in the centre of the settlement. The solar wing at Kirkby Thore Hall was built in the fourteenth century. The modern settlement of Crackenthorpe is the shrunken remnant of a medieval village.

8.6.96 Earthwork traces of medieval farming practices in the form of ridge and furrow and lynchets can be found throughout the study area demonstrating the extensive and long-term agricultural use of the area.

8.6.97 The eastern portion of the deer park at Whinfell (see paragraph 8.6.43 above) falls within the study area.

8.6.98 The vast majority of the listed buildings within the study area date to the post-medieval. Notable examples include Crakenthorpe Hall, a seventeenth century rebuild of an older house with associated ancillary buildings.

8.6.99 Industrial activity is evidenced by quarries, gravel pits and associated spoil heaps found across the area. Two railway lines cross the study area. The now dismantled Eden Valley Railway line was built in 1862 and was in operation for approximately 118 years. A number of stations were built along its 22mile route, including those at Kirkby Thore and Temple Sowerby. The Settle to Carlisle railway line was constructed in 1870 and continues to be in use with the route protected as a conservation area because of its notable engineering, unique design and characteristic station buildings.

8.6.100 Twentieth century sites in the study area include the turbine house south of Crackenthorpe Hall and a Second World War pillbox located near the River Eden east of Crackenthorpe.

Appleby to Brough

Geological summary

8.6.101 The bedrock geology of the Appleby to Brough scheme is formed of the Penrith Sandstone Formation, which runs along the Eden Valley in the south and central part of the study area.

8.6.102 In the north and east of the study area there are beds of shales, sandstones and limestone. This includes the Eden Shale Formation, which lies to the north and east of the existent route of the A66 and across much of the study area, and the Stainmore Formation of mudstone and sandstone, the Great Limestone Member and the Alston

Formation limestone, siltstone and mudstone which lie immediately north of the route A66 at the Brough end of the scheme.

8.6.103 The superficial geology is predominantly till deposits, which were formed by the action of glaciers and meltwaters in the last glacial era (Devensian period), between around 70,000 to 10,000 years ago. Till does not have geoarchaeological potential. However, there are also watercourses, tributaries of the River Eden, which are associated with bands of alluvium which the proposed route crosses in several places. Alluvium, which is material deposited by rivers or streams, typically consists of silts, clays, sands and gravel and may contain anaerobically preserved organic material. This material may contain palaeoenvironmental remains which are of archaeological interest for their potential to aid in the reconstruction of past environments. At the western end of the scheme, south of the proposed route, there are also small areas of peat.

8.6.104 There are small areas within the study area where glaciofluvial deposits of sand and gravel are present, which were formed by the melting of the glaciers. There is also an area in Brough, in the study area at the eastern end of the Appleby to Brough scheme, where river terrace gravels have been laid down. River terrace gravels can be of archaeological interest as they were deposited during interglacial periods and in-situ Palaeolithic remains have occasionally been found within them.

Topographical summary

8.6.105 The project runs from Appleby-in-Westmoreland to Brough and, while still within the lowlands on the west of the Pennines, the land is notably more rugged as the A66 rises towards the Stainmore Pass to the east. At the western end of the scheme the ground level is at c136m AOD, at Ketland Moor and the road progressively rises to c180m AOD at Brough. The northern part of the study area is part of the Pennine foothills, with smaller hills peaking at c250m AOD before the higher fells begin to the north-east.

Historic landscape character assessment

8.6.106 Appendix 8.1: Consolidated Historic Landscape Character Assessment contains a detailed analysis of the HLCA identified in the area surrounding the project. The western part of the scheme runs along the edge of the Pennines HLCA (A66_HLCA_004), while the eastern part is mostly within the Stainmore HLCA (A66_HLCA_003). In places, the draft DCO boundary crosses into the Eden Valley HLCA (A66_HLCA_001)(see Figure 8.3: Historic Landscape Character Areas for HLCA mapping). The Eden Valley is a large, wide valley characterised by a mixture of post-medieval enclosed fields and areas of former common arable with late medieval or early post-medieval field layouts fossilised within later enclosure boundaries. The scheme is located at the eastern end of the valley where the landscape begins to transition into the higher ground on the edge of the Pennines. The Stainmore HLCA is an area on the western edge of the Pennines where there is considerable survival of ancient enclosed fields, with a marked absence of the former common arable notable in the Eden Valley to the west. This reflects a historic landuse of stock rearing rather than crop growing, with settlement dating almost entirely to the later post-medieval and modern period. The western part of the scheme crosses into the very edge of the Pennines HLCA, in an area where post-medieval enclosures cover former areas of moorland on the edge of the fells. The HLCA is an extensive upland area of open moorland and planned enclosures. The A66 follows the line of a Roman road, which crosses the fells at the Stainmore Pass. The Pass has been significant for many centuries as a crossing place over the Pennines.

Identified heritage resources

Table 8-9: Heritage resources in the Appleby to Brough study area

Resource Type	Quantity		
	Black Route	Blue Alternative	Orange Alternative
Listed Buildings	62	59	62
Scheduled Monuments	6	6	6
Conservation Areas	1	1	1
Non-designated historic buildings	7	6	8
Non-designated archaeological resources	67	70	71

Resource summary

8.6.107 With the exception of residual lithics of possible late Neolithic date the earliest evidence for prehistoric activity in the study area comprises two groups of Bronze Age barrows. One group of three round barrows is located on Brackenber Moor at the western end of the study area. Three further barrows are recorded at Sanford Moor although no traces of these now survive. Documentary evidence records the site of a ring cairn at Sandford approximately 200m to the north-northwest of the barrows. The AP/LiDAR survey undertaken for the project records a pair of linear banks between the barrow cluster and the ring cairn, and a small ring ditch which may represent a badly eroded barrow.

8.6.108 The Druidical Judgement Seat is a D-shaped enclosure, comprising an outer bank and inner ditch, with a single entrance on the northwest side. Archaeological evaluation of the site indicates that it was occcupied during the Iron Age (Railton, M.D., 2012)[44].

8.6.109 The alignment of the Roman road between Penrith and Scotch Corner broadly follows that of the current A66 through the study area. In the central area north of Warcop, where the A66 moves northwards the Roman road continues straight across what are now fields and is clearly visible in the AP/LiDAR survey. Evidence of a further 200m length of the Roman road is recorded on the southern side of the scheduled site of the Warcop Roman camp. Here the road survives as a slight terrace on the hillslope to the south of the camp and north of the modern road. The AP/LiDAR survey suggests that the remains of the road extend beyond the east and west of the scheduled area. The multiple alignments of the road at this location may reflect changing crossing points of the Cringle Beck.

8.6.110 Warcop Roman camp is located on northern side of the current A66. It is visible as crop marks on an aerial photograph. Also visible are faint traces of a possible smaller and earlier camp partly underlying the larger camp's south western corner.

8.6.111 The Roman fort at Brough, identified as Verteris (Rivet, A.L.F. and Smith, C., 1979), and its associated civil settlement is located at the eastern end of the study area.The occupation of the fort possibly dates from AD78 to AD84 and lasted until the end of the fourth century. An associated civilian settlement site developed in the third century AD to the east of the fort. An associated cemetery is also located to the east of the settlement.

[44] Railton, M.D. (2012) 'The Druidical Judgement Seat: Archaeological Investigation of an Iron Age Enclosure on Brackenber Moor, Appleby-in-Westmorland, Cumbria', in Transactions of the Cumberland & Westmorland Antiquarian & Archaeological Society, Vol 12

8.6.112 Brough Castle was built on the site of the Roman fort and civil settlement during or immediately after William Rufus' campaign which resulted in his seizure of Cumbria in 1092. The keep is located in the south-west corner of the castle. The inner range of buildings at the south-east corner include the hall range which contained a great hall above more modest rooms such as storerooms, basements and offices. The castle is surrounded by a moat which remains up to 8.5m deep in places.

8.6.113 The twelfth century Church of St Michael is located south east of the castle and to the north lies Market Brough which was granted a charter to hold a weekly market in the 1330s.

8.6.114 Warcop village has its origins in the Medieval period. Three medieval structures can be found in the village: St Columba's Parish Church, the associated remains of a cross and Warcop Hall. To the south of Warcop lies Warcop Old Bridge crossing the River Eden. To the north is the site of a moated enclosure. A further moated site lies to the northeast adjacent to Eastfield Sike.

8.6.115 Earthwork remains of house platforms, dykes, fields boundaries at Flitholme indicate the location of a shrunken or former settlement site.

8.6.116 At the western end of the study area, the scheduled remains of a medieval motte survive at the northwest of Coupland Beck farmhouse.

8.6.117 The AP and LiDAR survey records evidence for medieval agricultural land usage around the settlements of Church Brough, Market Brough, Flitholme and Warcop in the form of field systems, ridge and furrow and lynchets.

8.6.118 The majority of listed buildings of post-medieval date are located in the settlements of Church Brough, Market Brough and Warcop. The continued agricultural nature of the area in the post-medieval period is evidenced by the number of historic farm buildings, field boundaries and associated structures.

8.6.119 The current A66 incorporates the Walk Mill High Bridge, which spans the Hayber Gill waterway to the south of the Warcop Walk Mill. Traces of the mill building and mill race mill lie on the northern side of the A66. The mill race is fed by the Moor Beck.

8.6.120 Historic evidence of quarrying is apparent in the western end of the study area at the former Sandford Mire gravel pit immediately adjacent to the Eden Valley Branch of the North and Eastern Railway. Opened in 1862 the line was intented as a connection between the coal fields in the north-east and the iron ore of West Cumbria, but also served to link the settlements of the Eden Valley.

8.6.121 Another suviving element of transport infrastructure from the post-medieval period is the Gatehouse Toll house. The toll house represents the most easterly toll house of the former Brough to Eamont Bridge turnpike, which was set up though an Act of Parliament in 1755.

8.6.122 The Grade II listed Warcop War Memorial dates to 1920.

Bowes Bypass

Geological summary

8.6.123 The bedrock geology of the study area is made up of a variety of rocks within the Yoredale Group. To the west of Bowes, the rocks are predominantly part of the Stainmore Formation, with beds of sandstone, mudstone and siltstone. To the north there is a long band of Crag Limestone. East of Bowes are beds of limestone from the Great Limestone Member and the Four Fathom Limestone Member, which is

interspersed with rocks of the Alston Formation, which include limestones, sandstones, siltstones and mudstones.

8.6.124 Overlaying the bedrock, the superficial geology is predominantly glacial till deposits, which were formed by the action of glaciers and meltwaters in the Devensian period, between around 70,000 to 10,000 years ago. Till does not have geoarchaeological potential. To the south of the study area there are also deposits of alluvium and River Terrace gravels along the course of the River Greta, and areas of glaciofluvial deposits. In the uplands to the north and west there are also areas of peat.

8.6.125 The soils vary from clayey wet soils to the west of Bowes, best suited for pasture and seasonally wet loamey and clayey soils east of Bowes, which can support arable crops with drainage (Cranfield Soil and Agrifood Institute, 2021)[45].

Topographical summary

8.6.126 The scheme is located at the upper part of the Greta Valley, where the steep narrow valley opens up into a much flatter agricultural landscape. At the western end of the scheme the ground level lies at c.298m AOD, falling to c.280m AOD in Bowes, and to c.267m AOD at Bowes Cross Farm, at the eastern end of the scheme.

Historic landscape character assessment

8.6.127 Appendix 8.1: Consolidated Historic Landscape Character Assessment contains a detailed analysis of the HLCA identified in the area surrounding the project. The scheme is at the western edge of a large area of enclosed fields along the Greta and Upper Tees valleys which have traces of medieval strip fields fossilised within later boundaries (A66_HLCA_006)(see Figure 8.3: Historic Landscape Character Areas for HLCA mapping). Bowes, which is a conservation area, is one of several medieval settlements located in this landscape. The medieval community who lived there would have farmed the fertile land along the valley-bottom. Several communication routes bisect the study area. These include the A66, which follows the line of the Roman Road, The Street, and a length of the dismantled railway near Bowes Railway Station. The landscape to the west, on the eastern slopes of the Pennines, is characterised by larger, stone-walled post-medieval fields which represent the expansion of agricultural land in the eighteenth and nineteenth centuries (A66_HLCA_005). Beyond this is the open moorland of the Pennines (A66_HLCA_004).

Identified heritage resources

Table 8-10: Heritage resources in the Bowes Bypass study area

Resource Type	Quantity
Listed Buildings	28
Scheduled Monuments	3
Conservation Areas	1
Non-designated historic buildings	8
Non-designated archaeological resources	37

Resource summary

8.6.128 The earliest evidence for prehistoric activity in the study area comprises funerary monuments of Bronze Age date. A group of four barrows lie at the western edge of the village of Bowes. In addition to this barrow group a stone burial cist was found in

[45] Cranfield Soil and Agrifood Institute (2021) Soilscapes, available at: http://www.landis.org.uk/soilscapes/ [accessed 6 September 2021]

a field adjacent to Priory Farm a short distance north of the draft DCO boundary. Unlike the barrows, the cist appears to have been destroyed by ploughing.

8.6.129 While no evidence for settlement or activity of Iron Age date has been identified within the study area, beyond it to the south-west groups of Late Iron Age and early Romano-British settlement sites are known. Located within the ZVI, the settlement site at East Mellwaters Farmhouse is typical of such sites found throughout the north of England.

8.6.130 The Roman fort at Bowes, known as *Lavatris* (Rivet, A.L.F. and Smith, C., 1979), was originally established during the Flavian period. An annex lay to the north of the fort. Following a period of abandonment the fort was re-occupied in the second century AD and a civil settlement grew up outside its walls. Following its reoccupation, the fort remained in use into the fourth century AD (Bidwell and Hodgson, 2009). Considerable archaeological evidence of Romano-British date has been recovered throughout the village of Bowes.

8.6.131 Multiple known and possible major and minor Roman Roads, as well as probable trackways, converge at Bowes. The most prominent of these is The Street. Recent evidence suggests that the proposed likely route of The Street is mirrored in the landscape by the route of the A66, although there are several known and probable but unconfirmed diversions. The latest research suggests that the alignment along the main street at Bowes is a later diversion and that the road originally ran through the fort. The Bowes to Binchester via Barnard Castle road also falls within the study area (Margary, 1957). The alignment of this route was thought to follow the route of the A67, however, new evidence suggests that the roads actually meet 1km east of the fort in the vicinity of Stone Bridge Farmhouse. Roads connecting Eggleston North to Stanhope Roman road (Margary, 1957) and Bowes to Bainbridge (Haken, 2021)[46] may also run through the study area[47].

8.6.132 The first documentary evidence for a medieval settlement at Bowes – recorded as 'Bogas' – can be found in the Yorkshire Charters of 1148. Bowes Castle was a posession of the crown for much of its history. Strengthened between 1171 and 1173 it was besieged in 1173 to 1174 by King William the Lion of Scotland. The Church of St. Giles lies a short distance east of the castle. Although considerably restored during the nineteenth century, the medieval nave, transepts and chancel survive. The remains of a village cross survive in the garden of a property opposite the church and castle. A possible medieval long house has been identified as a cropmark approximately 160m west of Bowes Castle and recently identified earthwork remains suggest that a possible shrunken village may also survive within the study area.

8.6.133 Several farmsteads with post-medieval origins have been identfied within the study area. The former farmstead at Hulands Cottage is the earliest of these and is seventeenth century in origin as is Bowes Hall. While the street-facing main view and entrance of The Ancient Unicorn Hotel was built during the mid-eighteenth century, its rear wing comprises two much-altered, and themselves re-fronted, seventeenth century buildings. The majority of listed buildings within the village of Bowes date to the eighteenth or early nineteenth century.

8.6.134 Turnpike roads were a dominant feature of the transport network until the arrival of the railways in the mid-nineteenth century.The Middleton Tyas Lane to Greta Bridge

[46] Haken (2021) Notes on Roman Roads potentially impacted by the A66 NTP project
[47] The authors are indebted to the Roman Roads Research Association for providing access the their research results in respect of the Roman roads in the vicinity of Bowes and elsewhere along the route.

and Bowes Turnpike Trust established in 1744 managed the route of The Street from Scotch Corner to the western boundary of Bowes parish. In 1748 the road from Bowes to Sunderland Bridge via Barnard Castle was also turnpiked and managed by the Bowes and Sunderland Bridge Turnpike Trust (Rosevar, 2017)[48]; the approximate route of the A67 and A688 today.

8.6.135 Bowes Railway Station was built and opened in 1861 as part of the South Durham & Lancashire Union Railway Company (SD&LUR) – a subsiduary of the Stockton and Darlington Railway Company (SDR). The railway was established with the objective of transporting iron ore from Barry in Lancashire, west of the Pennines, to Teesdale for processing.

Throughout the post-medieval period the economy of the area remained predominantly agricultural. However, several quarries were in operation providing building stone, material for road construction and the raw material for quicklime.

Cross Lanes to Rokeby

Geological summary

8.6.136 The bedrock geology of the study area is made up of a variety of rocks within the Yoredale Group. To the north, the rocks are predominantly part of the Stainmore Formation, with beds of sandstone, mudstone and siltstone. The A66 runs along a band of limestone, the Great Limestone Member, with successive beds of limestones and Alston Formation sandstone, siltstone and mudstone to the south.

8.6.137 Overlaying the bedrock, the superficial geology is predominantly glacial till deposits, which were formed by the action of glaciers and meltwaters in the Devensian period, between 70,000 to 10,000 years ago. Till does not have geoarchaeological potential. Along the course of the River Greta and River Tees there are also large glaciofluvial deposits and river terrace gravels. Glaciofluvial deposits were formed from material washed out in meltwater from the glaciers and does not have any geoarchaeological potential. It is found across the northern part of Rokeby Park and on the eastern side of the River Greta south-west of Greta Bridge. Due to the conditions they were formed within, glaciofluvial deposits do not have geoarchaeological potential.

8.6.138 River terrace gravels, conversely, can be of archaeological interest as they were deposited during interglacial periods and in situ Palaeolithic remains have occasionally been found within them. Within the study area these are found along the River Greta and River Tees. There is also alluvium present in these areas. Alluvium, which is material deposited by rivers or streams, typically consists of silts, clays, sands and gravel and may contain anaerobically preserved organic material. This material may contain palaeoenvironmental remains which are of archaeological interest for their potential to aid in the reconstruction of past environments (Historic England, 2015)[49]. The soil is a freely draining, slightly acidic, loamy soil, suitable for both arable and pastoral farming, although its fertility is relatively low (Cranfield Soil and Agrifood Institute, 2021).

Topographical summary

8.6.139 The scheme is located on a section of the A66 which crosses the River Greta at its eastern end and then climbs gradually towards the higher ground at Bowes and the Stainmore Pass beyond. At Greta Bridge the ground level is at c.129m AOD. The

[48] Rosevar (2017) Turnpike Roads in England and Wales
[49] Historic England (2015) Geoarchaeology. Using Earth Sciences to Understand the Archaeological Record

scheme then follows the A66 along the northern part of the Greta valley, with ground levels rising to c.210m AOD at Cross Lanes.

Historic landscape character assessment

8.6.140 Appendix 8.1: Consolidated Historic Landscape Character Assessment contains a detailed analysis of the HLCA identified in the area surrounding the project. The majority of the scheme and the study area are in the eastern part of a large area of enclosed fields along the Greta and Tees valleys which have traces of medieval strip fields fossilised within later boundaries (A66_HLCA_006)(see Figure 8.3: Historic Landscape Character Areas for HLCA mapping). Rokeby Park, which lies immediately to the north of the scheme, forms part of this wider landscape area and, while the parkland is post-medieval, there are also traces of medieval landuse within it. To the east of the scheme the smaller strip fields give way to much larger post-medieval fields which spread out towards the Vale of Mowbray and the Tees Lowlands to the east (A66_HLCA_008). The A66 runs through the study area, following the line of the Roman Road, The Street. The Street historically formed the southern boundary of Rokeby Park but, in the late twentieth century, the A66 was altered to bypass the village of Greta Bridge and now cuts through the southern part of the park. The original line of The Street still runs through Greta Bridge where it is presumed that there would have been a Roman river crossing over the River Greta.

Identified heritage resources

Table 8-11: Heritage resources in the Cross Lanes to Rokeby study area

Resource Type	Quantity[50]
Listed Buildings	53
Scheduled Monuments	1
Registered Park & Garden	1
Conservation Areas	1
Non-designated historic buildings	3
Non-designated archaeological resources	24

Resource summary

8.6.141 The only feature of prehistoric date from the study area is a ring identified in the AP and LiDAR study 120m north-east of Poundergill.

8.6.142 A recent survey of Rokeby Park revealed the presence of a possible temporary marching camp similar in size and form to those known at Rey Cross and Crackenthorpe. Located south-west of the confluence of the River Greta and the River Tees the camp almost certainly preceded the construction of The Street (Haken, 2021).

8.6.143 The precise date for the establishment and construction of the Roman fort at Greta Bridge is unknown. The available evidence suggests that its earliest construction date could be during the first century AD, however, it could have been established as late as the late second or early third century AD. Almost all of its ramparts and ditches survive as upstanding earthworks although the defences are best preserved on the south of the fort.

[50] A further conservation area and 15 designated heritage resources, which may experience an impact because of the scheme, have been identified within the ZVI of the scheme. It is not expected that any resource outside the 1km study will experience significant effects, and as such are not assessed in Section 8.9.

8.6.144 The associated civil settlement is located immediately north of the fort to which it is connected by a link road. Remains of The Street and the civil settlement were partially excavated between 1972 to 1974 as part of the A66 realignment works which resulted in the bypassing of the village of Greta Bridge (Casey and Hoffman, 1998)[51]. The evidence obtained from these excavations suggests that occupation of the vicus dated from the mid-Antonine period at the earliest. The buildings appear to have been rebuilt in stone during the late third century. There is evidence for occupation of the civil settlement into the first quarter of the fourth century - an unusually late date for for such a settlement in northern Britain (Bidwell and Hodgson, 2009). Evidence of small-scale iron working was recovered from a part of the settlement. The area immediately east of the iron working site produced evidence of cremation burials suggesting that the eastern limit of the vicus lies in this area. The extant of the possible cremation cemetery is currently unknown and may extend beyond the limits of the current scheduled area. The western limit of the settlement is unknown.

8.6.145 Elements of the Roman river crossing at Greta may have survived until relatively recent times. In 1587 the antiquary John Leland describes a bridge '*of two or three arches'* (Page, 1914)[52].

8.6.146 During the medieval period Rokeby (situated within the northern-most boundary of Rokeby Park) and neighbouring Mortham, situated in the area of Mortham Tower were the principal settlements in the study area. Unusually for settlements positioned so close to one another, both appear to have been Manors and, from 1286/1287 onward, were both held by the Rokeby family and descended together (Page, 1914). Both settlements are recorded in the Domesday Book and may have their origins in the early medieval period.

8.6.147 Like much of the region, the settlements of Rokeby and Mortham were subjected to continued attacks by raiders from Scotland during the political and military unrest of the fourteenth century. While Rokeby was continually rebuilt and survived as a settlement until the early seventeenth century, Mortham was abandoned after a particularly fierce attack in 1346. The last remnants of any upstanding remains at Rokeby were removed when, in 1735, Sir Thomas Robinson rebuilt Rokeby Hall and began to alter the surrounding parkland. Part of the former settlement does, however, still survive as below ground remains close to the site of St Michael's Church.

8.6.148 Although the settlement at Mortham was abandoned during the fourteenth century, the fortified Manor House of Mortham Tower survives in situ. Positioned to the south of the River Tees near its confluence with the River Greta, Mortham Tower was built by Thomas Rokeby in response to the raids that destroyed the settlement and ravaged near-by Rokeby.

8.6.149 Located close to the River Tees along the northern-most edge of the study area, the Premonstratensian Abbey of St Mary and St John the Baptist at Egglestone was founded between 1195 and 1198.

8.6.150 Rokeby Park covers approximately 48ha, is located immediately north of the village of Greta Bridge and is bounded by the course of the River Greta to the east and the River Tees to the north. The principal building is Rokeby Hall built by Sir Thomas Robinson between 1725 and 1731 in the palladian style. At the same time the parkland was enclosed (1725) and the woodland planting increased (1730 to 1737).

[51] Casey and Hoffman (1998) 'Rescue excavations in the Vicus of the fort at Greta Bridge, Co. Durham, 1972-4' in Britannia Vol 29
[52] Page (1914) A History of the County of York North Riding: Volume 1

8.6.151 Lawns on the east and west sides of Rokeby Hall are accented by the display of multiple antiquities and artistic pieces - a line of eight eighteenth century urns along the west side of the hall and five Roman altars are positioned on raised platform also to the west. Estate maps from the eighteenth-century show Rokeby Park sheltered by belts of trees with axial rides cut through the woodland in order to provide views of the estate and its grounds.

8.6.152 The Church of St Mary at Rokeby was begun in 1740. The church was probably designed by Sir Thomas Robinson and is noted as being similar in design to another church he designed at Glynde in Sussex. Connected to Rokeby Park by what may have originally been a dedicated tree-lined walkway, the church is known to have been unfinished 1769. John Carr of York (who was also awarded the commission for rebuilding Greta Bridge and to undertake work at Rokeby Hall) was commissioned to complete the work. St Mary's was finally consecrated in 1778.

8.6.153 Rokeby Rectory (also known as The Old Rectory) was constructed opposite the Church of St Mary (on the south side of the A66) in the late eighteenth century. It forms part of a group of buildings that includes a former schoolhouse and the schoolmaster's house located on the north side of the A66, east of the church.

8.6.154 As noted elsewhere the post-medieval period saw improvements to the road network as a result of theTurnpike Act of 1773 and several private Acts of Parliament which sought to manage the nation's growing network of toll roads, known as turnpikes. As noted above the Middleton Tyas Lane to Greta Bridge and Bowes Turnpike Trust managed the route of The Street from Scotch Corner to the western parish boundary of Bowes including the Rokeby area. Two milestones mark the route of the turnpike road through the study area. Because of its position on the main west-east route across the Pennines, the village of Greta Bridge blossomed as a coaching stop during this time.

8.6.155 Several farmhouse complexes of post-medieval date can be found in in the study area. These include Castle Farmhouse, Dent House Farmhouse and Cross Lanes Farmhouse. The farmhouses and their yards, ranges and barns of the study area are built in the local vernacular style.

8.6.156 Charles Dickens is one of several notable persons who visited and drew inspiration from the study area during the eighteenth century. Dickens and Hablot K. Browne stayed at the New Inn on 31 January 1838 while Sir Walter Scott was a visitor to Rokeby Hall and Rokeby Park multiple times between 1809 and 1828. Robert Southey stayed at Rokeby in 1812 and 1829 and John Ruskin in 1876 when visiting the scenes of Turner's paintings (Page, 1914). Turner had visited the area in 1797 as part of his tour of the Richmondshire and did so again in 1816. J.S. Cotman visited in 1805 and painted scenes at both Rokeby Park and of the Greta Bridge which had been rebuilt in 1773.

Stephen Bank to Carkin Moor

Geological summary

8.6.157 The bedrock geology of the study area is made up of a variety of rocks within the Yoredale Group which lie in beds orientated north-west to south-east. The A66 roughly follows the line of one of these beds, the Alston Formation sandstone, with beds of limestone, mudstone and siltstone to the north and south.

8.6.158 Overlaying the bedrock, the superficial geology is predominantly glacial till deposits, which were formed by the action of glaciers and meltwaters in the Devensian period

between 70,000 to 10,000 years ago. There are glaciofluvial deposits which are present just to the south-west of the A66, north of Ravensworth, and further glaciofluvial deposits at the northern end of the study area at Smallways. Glaciofluvial deposits were formed from material washed out in meltwater from the glaciers and neither it, or the till deposits, have any geoarchaeological potential. There is alluvium, which can be of palaeoenvironmental interest, in the northern part of the study area at Smallways, but it is outside of the draft DCO boundary.

8.6.159 The soils in the northern part of the study area are freely draining, slightly acidic, loamy soils, suitable for both arable and pastoral farming; although its fertility is relatively low. South of Ravensworth the soils become seasonally wet, loamey and clayey. These are better suited for pasture, although arable farming is possible (Cranfield Soil and Agrifood Institute, 2021).

Topographical summary

8.6.160 The A66 runs along the edge of a large flat plain which extends to the north and east, with lower-lying land to the south and west, following the course of the Harforth Beck and several other small watercourses which run along the valleys at the base of the Pennines. At the northern end of the scheme , the ground level at the A66 is c.159m AOD, falling slightly towards Ravensworth but rising to c.151m AOD at its south-eastern end.

Historic landscape character assessment

8.6.161 Appendix 8.1: Consolidated Historic Landscape Character Assessment contains a detailed analysis of the HLCA identified in the area surrounding the project. The scheme runs along the western edge of an expansive area of lowland fields, characterised by very large post-medieval and modern fields, many of which have hawthorne hedge boundaries (A66_HLCA_008). This is an intensively farmed landscape. To the south-west of the A66 there is a mixed, transitional landscape along the Pennine fringe (A66_HLCA_007)(see Figure 8.3: Historic Landscape Character Areas for HLCA mapping). Unlike the area to the north and east where there are many large agglomerated fields, to the south-west there are a higher proportion of irregular field layouts reflecting piecemeal enclosure in the early post-medieval period. This area of irregular fields along the Pennine fringe is a mixture of land enclosed as part of the large-scale programme of Parliamentary enclosure on the higher ground and fields created through informal processes on the lower-lying ground closer to the scheme. This is piecemeal enclosure, where individual farms or communities enclosed a group of fields, with more being added later.

Identified heritage resources

Table 8-12: Heritage resources in the Stephen Bank to Carkin Moor study area

Resource Type	Quantity[53]
Listed Buildings	33
Scheduled Monuments	3
Conservation Areas	4
Non-designated historic buildings	4
Non-designated archaeological resources	84

[53] A further four designated heritage resources, which may experience an impact because of the scheme, have been identified within the ZVI. It is not expected that any resource outside the 1km study will experience significant effects, and as such are not assessed in Section 8.9.

Resource summary

8.6.162 The only example of possible Bronze Age activity within the study area is a series of ring ditches located approximately 65m south of the Roman fort at Carkin. Whether these represent settlement activity or remains of funerary or ritual monuments is uncertain.

8.6.163 The remains of a settlement site at Carkin Moor were identified through aerial photographs. The site comprises a rectangular enclosure some 100m by 75m in size and, although recorded as 'prehistoric', is thought to be of Iron Age date based on evidence provided by similar enclosures identified in other parts of north-eastern England (Historic England)[54]. Traces of internal features and a probable smaller, parallel enclosure have been noted at Carkin Moor. A second, smaller rectilinear enclosure is located approximately 42m to the north-west. The AP and LiDAR survey conducted for the project identified evidence for a probable prehistoric field system near-by. Whether these features are contemporary and what their relationship with the Roman fort might be has yet to be tested.

8.6.164 The Roman fort at Carkin Moor is located just four miles from Scotch Corner where The Street connects with Dere Street.The fort is set upon the summit of a small flat-topped hill. Rectangular in shape, the fort measures 150m north-east to south-west by 132m north-west to south-east. Clearly visible as earthworks, the north-eastern corner is the most well preserved and survives as a raised platform that extends up to 2m high in places. Other defensive features, such as a ditch, have been identified on the northern edge of the fort and are thought to survive as below-ground remains to its south, where the degree of upstanding earthwork remains is limited. The fort straddles the line of The Street – possibly indicative of an early foundation date.

8.6.165 Excavations within the fort in 2013 failed to provide firm evidence for the dating of the fort. In 2015 archaeological excavations at Mainsgill Farm, approximately 125m west of the fort on the south side of the A66 uncovered remains of The Street and a previously unknown Romano-British roadside settlement. A pottery kiln was amongst the features recorded. A final (mis)firing of the kiln, dated to the 4th century AD, resulted in the recovery of near complete vessels (Highways England, 2019)[55].

8.6.166 Evidence for medieval settlement within the study area can be seen in isolated features like the possible lynchets in the AP and LiDAR survey undertaken for the project, and as surviving elements of built heritage resources. Examples of which include the motte and bailey castle, water defence features, park pale and shrunken medieval village at Ravensworth and the two moated sites north of the Old Hall at East Layton.

8.6.167 Almost all of the post-medieval buildings of historic interest identified within the study area can be found within or on the periphery of the settlements of Hartforth, Newsham, Ravensworth and East Layton, all of which are conservation areas. Individual strutures of note outwith the settlements include the packhorse-style Whashton Bridge (which carries Comfort Lane over Hartforth Beck in the south-eastern part of the study area), the Guide Post from 1774 now located opposite Smallways Inn, and Ravensworth Lodge, located next to the A66 at its junction with Waitlands Lane.

[54] Historic England (n. d.) Roman fort and prehistoric enclosed settlement 400m west of Carkin Moor Farm
[55] Highways England (2019) A66 Northern Trans-Pennine Project Roman Fort at Carkin Moor High Level Information Paper

8.6.168 The Street at Carkin (which was part of the historic parish of Forcett until 2015) was turnpiked in 1744 as part of the Middleton Tyas Lane to Greta Bridge and Bowes Turnpike Trust. Besides the route of the road itself, the only surviving remains of the original post-medieval road network found within the study area are two milestones: one located beside the A66 close to Carkin Moor Roman Fort while the second can be found to the north-west of Fox Hall cottage.

8.6.169 Historic Ordnance Survey maps show multiple quarry sites active in the area during the mid-nineteenth century many of these site have been confirmed by the AP and LiDAR survey undertaken for the project. For the most part the quarries appear to be concerned with the extraction of limestone for agricultural use, rather than for construction. The limestone was burnt in nearby kilns, such as the one located to the east of Browson Bank to create quicklime.

A1(M) Junction 53 Scotch Corner

Geological summary

8.6.170 The bedrock geology of the study area is formed by the Four Fathom Limestone Member. This is overlain by glacial till, also known as boulder clay or diamicton, which was formed by the action of glaciers and meltwaters in the Devensian period between 70,000 to 10,000 years ago. Glacial till has no geoarchaeological potential.

Topographical summary

8.6.171 The scheme is focused on Scotch Corner, a very large roundabout junction between the A1, the A66, the A6108 and Middleton Tyas Lane. It is located on a low ridge which rises above the valleys of the Kirk Beck and Gilling Beck to the east and west. Ground level lies between c.140 to 150m AOD.

Historic landscape character assessment

8.6.172 Appendix 8.1: Consolidated Historic Landscape Character Assessment contains a detailed analysis of the HLCA identified in the area surrounding the project. The scheme is located within an expansive area of lowland fields, characterised by very large post-medieval and modern fields, many of which have hawthorne hedge boundaries (A66_HLCA_008)(see Figure 8.3: Historic Landscape Character Areas for HLCA mapping). This is an intensively farmed landscape. The A1 and the A66 are major communication routes through the historic landscape, and both follow the lines of the Roman Roads Dere Street and The Street, which is reflected in the way that later field boundaries respect the road in their layout.

Identified heritage resources

Table 8-13: Heritage resources in the A1(M) J53 study area

Resource Type	Quantity
Listed Buildings	12
Scheduled Monuments	0
Conservation Areas	1
Non-designated historic buildings	0
Non-designated archaeological resources	5

Resource summary

8.6.173 No evidence for settlement or activity preceeding the Iron Age has been identified within the study area.

8.6.174 Archaeological investigations on the western side of Scotch Corner along the A66 and A1 produced evidence for a large-scale settlement that originated in the mid Iron Age but particularly intensified during the late Iron Age. Most notable was evidence for copper metalworking and potential coin manufacture dating to the first century BC onward in the form of pellet moulding workshops, which may have created items used locally as currency or exported for minting elsewhere. This is significant as it is the first time such evidence has been found outside previously known coin-using regions.

8.6.175 Though some level of occupation existed at Scotch Corner prior to this, the advent of the metalworking industry and trade with other foci such as Stanwick led to a rapid period of expansion and development. Identified features associated with the growing settlement include a number of roundhouses, posthole structures, hearths, field systems and ovens/kilns, all contained within a system of trackways and enclosures (Brown, 2008)[56] (Fell, 2020)[57]. Results from these investigations indicate that Scotch Corner was likely part of a wider agricultural and domestic landscape, which continued to be occupied from the Iron Age in to the Romano-British period. Indeed, the eastern and southernmost extents of this settlement were not identified during the course of the archaeological investigations.

8.6.176 Archaeological evidence from the northwestern side of Scotch Corner indicated that the pre-Roman settlement there flourished and expanded following increased interaction with the Romans as they advanced northward. The Romano-British settlement was occupied for approximately 20 to 30 years. The settlement was abandoned by AD150.

8.6.177 As in the present-day, Scotch Corner would have been located at the divergence of two major roads during the Romano-British period: Dere Street which connected York with Piercebridge; and another road that branched off to the west, which roughly followed the present day A66 northwestward toward Bowes (Margary, 1957). Archaeological evidence for these roads suggest that they had been constructed by AD85.

8.6.178 Traces of ridge and furrow and other earthworks indicate that the village of Middleton Tyas is medieval in origin. The village expanded during the post-medieval period, possibly in conjuction with the growth of the nearby copper mining industry nearby . The majority of buildings of historic interest in the village date to the eighteenth or early nineteenth centuries. Two buildings within the study area, Village Farmhouse and Inglenook House and the Cottage, are seventeenth century in date.

8.7 Potential Impacts

8.7.1 Prior to implementation of the mitigation, the project has the potential to affect cultural heritage resources either beneficially or adversely, both during construction and once in operation.

8.7.2 For the purposes of the cultural heritage assessment, the construction phase is defined as the temporary activities involved in building the project, and the subsequent permanent presence of the project once constructed. The operational phase comprises the situation when the project is being used by traffic.

[56] Brown (2008) A66 (Package A) Road Improvement Scheme, Greta Bridge to Scotch Corner.
[57] Fell (2020) Archaeological Post – Excavation Assessment Contact, Concord and Conquest: Britons and Romans at Scotch Corner

8.7.3 As listed below, physical impacts upon resources would only occur during the construction phase; impacts upon resources' setting would arise during both the construction and operation phases. Impacts upon setting may be either beneficial or adverse.

8.7.4 All preliminary effects are reported *as* being either significant or not significant after an assessment of the effectiveness of the design and mitigation measures (the residual effect).

Construction

8.7.5 Construction of the project has potential for benefits to cultural heritage resources, such as improvements to the settings of heritage resources and improved access to heritage sites and opportunites for enhanced interpretation.

8.7.6 Where the project is contained within the existing A66 corridor and alongside areas of prior disturbance, the potential for the presence of as-yet unknown archaeological remains would have been previously removed. However, where the project requires excavation below the existing ground surface within areas of fields, including compound areas, archaeological remains may exist.

8.7.7 Construction of the project has the potential for adverse impacts upon cultural heritage resources, including:

- partial or total removal of heritage resources, including archaeological remains, within the project footprint
- compaction of archaeological deposits by construction traffic and structures
- temporary impacts upon the settings of heritage resources
- permanent impacts upon the setting of heritage resources
- changes to key views and sight lines
- impacts to palaeoenvironmental deposits as a result of hydrological changes[58].

8.7.8 Views from heritage resources towards permanent works such as new roads, cuttings, embankments and other structures are considered to be permanent construction impacts for the purposes of the assessment. Likewise, removal of elements of the existing A66, such as lighting of junctions, are considered to be construction effects.

8.7.9 Construction activity, including movements of plant, temporary lighting and temporary compounds, would take place within the setting of listed buildings, conservation areas and upstanding non-designated heritage resources within the study area. These works would be temporary, of limited duration and reversible. Consequently, such activities are considered to not result in a significant effect on any designated resource.

Operation

8.7.10 The operational phase of the project has the potential to result in both beneficial and adverse impacts on the setting of cultural heritage resources due to traffic noise and the visibility of moving vehicles on the road. Impacts could include changes to the settings of monuments or changes to key views and sightlines.

8.7.11 There would be no physical impacts on below-ground archaeology during operation, as these would have occurred during the construction phase.

[58] At the time of writing no deposits have been identified which are likely to be subject to ground water changes as a result of the project.

8.8 Design, Mitigation and Enhancement Measures

Route wide

Construction mitigation

8.8.1 Essential mitigation of construction impacts would take the form of measures to reduce direct impacts (physical damage), and indirect impacts (changes to setting that affect the significance of the resources).

8.8.2 Mitigation of direct impacts on archaeological remains would take the form of 'preservation by record', that is, the investigation of archaeological remains prior to construction, and the analysis of artefacts and publication of results following the construction of the project.

8.8.3 Preservation by record can involve a number of levels of detail, commensurate with the significance of the resources being impacted directly by the project. These may include detailed archaeological excavation of high value buried archaeological remains, strip-map-sample where archaeological remains are expected to be present dispersed over a wide area, or archaeological watching brief in areas of lower archaeological potential. The type and location of mitigation required will be agreed with the Cumbria, County Durham and North Yorkshire Archaeological Officers by means of an Overarching Written Scheme of Investigation (WSI), to be submitted as part of the Environmental Management Plan (EMP) with the ES.

8.8.4 Any specifics such as relocation or building recording are mentioned below under the scheme to which they are relevant.

8.8.5 The design of the project will continue to evolve in response to information arising from surveys and modelling, and in response to the statutory consultation.Where significant effects have been identified on designated assets, including listed buildings, scheduled monuments and registered parks and gardens as a result of *permanent changes* to their settings during construction, options for mitigation will be further considered in the design process and will be reported in the ES.

Operational mitigation

8.8.6 Enhancement measures for specific resources identified as part of the PEI Report are noted below. In addition improvements to public rights of way would enable greater permeability within the landscape. This would allow greater access to heritage resources by members of the public.

Penrith to Temple Sowerby

8.8.7 In the Penrith to Temple Sowerby scheme two enhancement measures are proposed: Improved public access to The Countess Pillar and Alms Table through provision of a parking area to the east; and improved public access to St Ninian's Church through enhanced parking provision.

Appleby to Brough

8.8.8 In the Appleby to Brough scheme the Boundary Stone to North of Bullistone Cottage falls within the engineering boundary for the new section of road. In order to mitigate the major adverse effect which would result the boundary stone will be temporarily removed during construction works and then reinstated at its original location or as close as possible after the construction of the new route has been completed.

Cross Lanes to Rokeby

8.8.9 In the Cross Lanes to Rokeby scheme two listed milestones would be recorded before being removed under archaeological supervision and stored in a safe location off-site. Once the work is complete they would be relocated to the closest point to their current location possible within the completed road landscape design.

Stephen Bank to Carkin Moor

8.8.10 In the Stephen Bank to Carkin Moor scheme one non-designated milestone will be recorded before being removed under archaeological supervision and stored in a safe location off-site. Once the work is complete it would be relocated to the closest point to its current location possible within the completed road landscape design.

8.9 Assessment of the Likely Significant Effects

Route wide

8.9.1 A small number of assets are common to more than one scheme study area. No significant effects are expected to result from impacts derived from multiple schemes.

M6 Junction 40 to Kemplay Bank

8.9.2 The Grade II* listed Carleton Hall (high value), now the Cumbria Police Headquarters, and the associated non-designated group of buildings is directly adjacent to the draft DCO boundary. The proposed widening of the existing A66 to the north and northwest, the construction of a pond to the east, a temporary access route to the south of the resources, and the use of land to the east as a compound/storage area will result in temporary moderate adverse impacts during the construction phase, including associated noise, lighting and traffic. The permanent and operational effects are anticipated to be comparable to that of the present baseline.

8.9.3 The Grade II Toll Bar Cottage (high value) is located immediately adjacent to the draft DCO boundary. A compound/storage area is proposed to the west. The construction work will result in moderate adverse impacts via visual intrusion, noise, lighting and construction traffic. However, these will all be temporary impacts limited to the duration of the construction phase. Whilst the project will move the A66 alignment slightly closer to the cottage, the permanent and operational effects are anticipated to be comparable to that of the present baseline.

8.9.4 Table 8-14: M6 Junction 40 to Kemplay Bank likely significant effects (Cultural Heritage) summarises the likely significant effects for M6 Junction 40 to Kemplay Bank.

Table 8-14: M6 Junction 40 to Kemplay Bank likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Carleton Hall	Moderate adverse (temporary)	No change	The temporary effect will be of short duration and it is therefore not proposed to put in place any mitigation.	No

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Toll Bar Cottage	Moderate adverse (temporary)	No change	The temporary effect will be of short duration and it is therefore not proposed to put in place any mitigation.	No

Penrith to Temple Sowerby

8.9.5 Physical impacts will occur at two scheduled monuments at the western end of this scheme - the settlement 540m east-north-east of Brougham Castle and the site of Brougham Roman fort, civil settlement and castle. Whilst earlier works associated with the A66 are likely to have removed archaeological remains in some areas there is a potential for archaeological evidence including human remains to survive in previously undisturbed areas. These monuments are of high value. Construction of an overbridge and associated trackways will result in a moderate adverse impact. Without mitigation a moderate adverse effect will result.

8.9.6 Surveys undertaken for the project indicate that archaeological remains associated with the monuments extend beyond the scheduled area and fall within the draft DCO boundary. These remains are of medium value. Construction and mitigation works (where the latter involve intrusive works) will result in the remains suffering partial loss to key characteristics leading to a moderate adverse impact. Without mitigation a moderate adverse effect will result.

8.9.7 An area of uncharacterised cropmarks (low value) near Whinfell Park are entirely within the engineering boundary. Any groundworks in this area are liable to result in a major adverse impact upon any associated archaeological remains leading to a moderate adverse effect prior to mitigation.

8.9.8 Ring ditches at Brougham (medium value) are visible on aerial photos and associated with a site where prehistoric pottery has been recovered. This site falls within the project's engineering boundary. Any groundworks in this area are liable to result in a major adverse impact and a large adverse effect prior to mitigation.

8.9.9 Cropmarks indicate the site of a potential enclosure at Brougham (low value) the southern area of which falls within the project's engineering boundary. Any groundworks in this area will result in a moderate adverse impact and a moderate adverse effect prior to mitigation.

8.9.10 The site of the Hartshorn Tree and associated cropmarks noted in the AP and LiDAR survey (medium value) fall partly within the project's engineering boundary. Any groundworks in this area which include ground disturbance will result in a major adverse impact and a large adverse effect prior to mitigation.

8.9.11 Surveys conducted for the project identified the site of a former blacksmith's workshop (low value), which falls entirely within the project's engineering boundary. Any groundworks in this area are liable to result in a major adverse impact and a moderate adverse effect prior to mitigation.

8.9.12 Table 8-15: Penrith to Temple Sowerby - likely significant effects (Cultural Heritage) summarises the likely significant effects for Penrith to Temple Sowerby.

Table 8-15: Penrith to Temple Sowerby - likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Brougham Roman fort (Brocavum) and civil settlement and Brougham Castle	Moderate adverse	N/A	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Settlement 1/3 mile (540m) east-north-east of Brougham Castle	Moderate adverse	N/A	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Non-designated archaeological remains of medium value related to the vicus and associated cemetery at Brocavum	Moderate adverse	N/A	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Cropmarks near Whinfell	Major adverse	N/A	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Ring ditches at Brougham	Major adverse	N/A	Preservation by record in accordance with	Yes

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
			a programme of archaeological works laid out in an Archaeological Mitigation Strategy	
Cropmark enclosure at Brougham	Moderate adverse	N/A	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Site of the Hartshorn Tree and associated cropmarks	Major adverse	N/A	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	Yes
Site of former blacksmith's workshop	Major adverse	N/A	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No

Temple Sowerby to Appleby

Blue alternative

8.9.13 There is potential for a physical impact on the Kirkby Thore Roman Fort and Associated Vicus scheduled monument (high value). An area of environmental mitigation, including habitat creation of a wetland complex is located directly adjacent to a section of the eastern edge of the scheduled monument. Works with below

ground impacts may result in the removal of archaeological deposits, resulting in a moderate adverse impact. Without mitigation a moderate adverse effect will result.

8.9.14 There will be a physical impact on the Roman Camp east of Redlands Bank, a site of high value. The proposed works include works along the existing A66 which passes through the site, with the engineering boundary extending beyond this into the scheduled area. Works also include the construction of a new offline section of road immediately adjacent to the current northern boundary of the scheduled monument, in an area where archaeology associated with the scheduled monument has been identified through LiDAR survey; these remains must be treated as undesignated archaeological assets of schedulable quality and importance. The creation of the new offline section of road would result in the removal of archaeological deposits to foundation levels, resulting in a major adverse impact. Without mitigation a large adverse effect will result. The proposed works also include an environmental mitigation area of habitat enhancement and mitigation which covers the northern part of the scheduled area. However, this is anticipated to be amended to exclude the scheduled area as the design develops so would not introduce an adverse impact.

8.9.15 There will be a physical impact on the Sleastonhow Lane Enclosure and Dyke near Kirkby Thore (low value). The proposed works include the construction of a new offline section of road over the area of the cropmarks, resulting in a major adverse impact and a moderate adverse effect.

8.9.16 There will be a physical impact on the Keld Sike Enclosure near Kirkby Thore (low value). The proposed works include the construction of flood storage over the area of the enclosure cropmarks. This will result in a major adverse impact and a moderate adverse effect.

8.9.17 There will be a physical impact upon the site of a dyke of unknown date at Crackenthorpe, a feature of low value. The majority of the site falls within the draft DCO boundary. Proposed works include the construction of a new offline section of road and a pond. Mitigation works are also proposed. Where groundworks occur they will result in the loss of associated physical evidence to formation levels, and the severance of that which remains, resulting in a major adverse impact. Without mitigation a moderate adverse effect will result.

8.9.18 Table 8-16: Temple Sowerby to Appleby Blue alternative - likely significant effects summarises the likely significant effects for Temple Sowerby to Appleby Blue Alternative

Table 8-16: Temple Sowerby to Appleby Blue alternative - likely significant effects

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Kirkby Thore Roman Fort and Associated Vicus	Moderate adverse	Slight beneficial	Options for mitigation will be considered as part of the continuing design process and will be reported in the ES.	No
Roman Camp, 350m east of	Major adverse	Slight beneficial	Options for mitigation will be considered as part the continuing	Yes

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Redlands Bank			design process and will be reported in the ES.	
Sleastonhow Lane Enclosure and Dyke	Major adverse	No change	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Keld Sike Enclosure	Major adverse	No change	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Crackenthorpe Dyke	Major adverse	No change	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No

Red alternative

8.9.19 There will be a physical impact on the Sleastonhow Lane Enclosure and Dyke near Kirkby Thore (low value). The proposed works include the construction of a new offline section of road over the area of the cropmarks, resulting in a major adverse impact and a moderate adverse effect.

8.9.20 There will be a physical impact on the Long Marton Mound enclosure (low value). The proposed works include the construction of a new offline section of road over the area of the enclosure, resulting in a major adverse impact and moderate adverse effect.

8.9.21 There will be a physical impact on the Troutbeck Earthworks near Long Marton (low value) and the Brandcrook Hill Sub-Circular Enclosure, Long Marton (medium value). The proposed works include an area of environmental mitigation across the earthworks, which if requiring groundworks will result in a major adverse impact and moderate adverse effect.

8.9.22 Table 8-17: Temple Sowerby to Appleby Red alternative - likely significant effects (Cultural Heritage) summarises the likely significant effects for Temple Sowerby to Appleby Red Alternative.

Table 8-17: Temple Sowerby to Appleby Red alternative - likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Sleastonhow Lane Enclosure and Dyke	Major adverse	No change	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Long Marton Mound enclosure	Major adverse	No change	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Troutbeck earthworks and Brandcrook Enclosure	Major adverse	No change	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No

Orange alternative

8.9.23 The proposed realignment of the A66 passes through the southern area of Kirkby Thore Roman Fort and the associated Vicus, a site of high value, with the engineering boundary covering almost the entirety of the scheduled area to the south of the existent A66, and extending slightly to the north of it. The mitigation boundary extends further south still, and covers an area where LiDAR suggests there may also be evidence associated with the fort and vicus. Ground works associated with the project will remove any archaeological evidence associated with the site to formation levels, resulting in a major adverse impact. Without mitigation a large adverse effect will result.

8.9.24 There will be a physical impact on the Roman Camp east of Redlands Bank, a site of high value. The proposed works include works along the existing A66 which passes through the site, with the engineering boundary extending beyond this into the scheduled area. Works also include the construction of a new offline section of road immediately adjacent to the current northern boundary of the scheduled monument, in an area where archaeology associated with the scheduled monument has been identified through LiDAR survey; these remains must be treated as undesignated archaeological assets of schedulable quality and importance. The creation of the new offline section of road would result in the removal of archaeological deposits to foundation levels, resulting in a major adverse impact. Without mitigation a large adverse effect will result. The proposed works also include an environmental mitigation area of habitat enhancement and mitigation which covers the northern part

of the scheduled area. However, this is anticipated to be amended to exclude the scheduled area as the design develops so will not introduce an adverse impact.

8.9.25 There will be a physical impact upon the site of a site of a dyke of unknown date at Crackenthorpe, a feature of low value. The majority of the site falls within the DCO draft boundary. Proposed works include the construction of a new offline section of road and a pond. Mitigation works are also proposed. Where groundworks occur they will result in the loss of associated physical evidence to formation levels, and the severance of that which remains, resulting in a major adverse impact. Without mitigation a moderate adverse effect will result.

8.9.26 There will be a physical impact upon the alignment of the Roman Road which broadly follows the alignment of the existent A66, a feature of medium value. Much of the recorded alignment falls within the draft DCO boundary, where engineering works or mitigation works are proposed. Whilst there may be limited survival of evidence within the existing road corridor, where evidence of the Roman road, and associated features, adjacent to the existent road survive within the draft DCO boundary it will be removed by groundworks to formation levels, resulting in a moderate adverse impact. Without mitigation a moderate adverse effect will result.

8.9.27 Sections of two other Roman Roads, the Maiden Way and the road from Low Borrowbridge to Kirkby Thore are crossed by the draft DCO boundary, with works including the new off-route road alignments. Both are of medium value. Where groundworks occur they will remove any surviving archaeological evidence to formation levels, resulting in a moderate adverse impact. Without mitigation a moderate adverse effect will result.

8.9.28 The site of the former St Giles Chapel and chapel well, a low value asset, survive as faint earthworks within the environmental mitigation boundary. Any works with below ground impact will remove any surviving archaeological evidence to formation levels, resulting in a major adverse impact. Without mitigation a moderate adverse effect will result.

8.9.29 The site of the former Kirkby Thore Railway Station falls entirely within the draft DCO boundary for engineering works. Though the building has been demolished traces of it were detected by the AP/LiDAR survey. Should any foundations or associated buried remains of this low value site exist they will be removed by groundworks resulting in a potentially major adverse impact. Without mitigation a moderate adverse effect will result.

8.9.30 Cropmarks within the environmental mitigation boundary may relate to a Romano-British cemetery, associated with a previously excavated cemetery building (HER Ref 3907). The potential extent of the cemetery is uncertain. Any groundworks in this area are liable to impact upon any associated archaeological remains which will be of medium value, resulting in a major adverse impact. Without mitigation a moderate adverse effect will result.

8.9.31 Table 8-18: Temple Sowerby to Appleby Orange alternative - likely significant effects (Cultural Heritage) summarises the likely significant effects for Temple Sowerby to Appleby Orange Alternative.

Table 8-18: Temple Sowerby to Appleby Orange alternative - likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Kirkby Thore Roman Fort and the associated Vicus	Major adverse	Slight adverse	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	Yes
Roman Camp east of Redlands Bank	Major adverse	Slight adverse	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	Yes
Crackenthorpe Dyke	Major adverse	No change	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Roman roads – The Street, Maiden Way and Low Borrowbridge to Kirkby Thore	Moderate adverse	No change	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
St Giles Chapel	Moderate adverse	No change	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Kirkby Thore Station (site of)	Major adverse	No change	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy	No
Possible Romano-British cemetery site	Major adverse	No change	Preservation by record in accordance with a programme of archaeological works laid	No

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
			out in an Archaeological Mitigation Strategy	

Appleby to Brough

Black-Black-Black route

8.9.32 There will be a physical impact on the Warcop Roman Camp And Length Of Roman Road, 285m South West Of Moor House. This monument has high value. The proposed works include the construction of a new section of road within the current boundary of the scheduled monument. Construction and mitigation works (where the latter involve intrusive works) will result in the remains suffering loss to key characteristics leading to a major adverse impact. Without mitigation a very large adverse effect will result.

8.9.33 There will be a physical impact on the Sandford Moor Barrows and Sandford Ring Cairn Site. These prehistoric features are of medium value.The proposed works include the widening of the A66 involving the construction of a new offline section of road will result in the remains suffering loss to key characteristics leading to a moderate adverse impact. Without mitigation this would result in a moderate adverse effect.

8.9.34 There will be a physical impact on the Boundary Stone to North of Bullistone Cottage. This resource has high value. The proposed works include the construction of a new offline section of road connecting to the current A66 at the boundary stone's present location. This would remove the boundary stone from its boundary location and result in a major adverse effect on the listed boundary stone. Mitigation required would include the temporary removal of the boundary stone during construction works, and the reinstatement of the boundary stone at its original location or as close as possible after the construction of the new offline route is completed. This would result in no change if the boundary stone can be returned to its original position or a slight adverse effect if it can only be reinstated in close proximity to its original location.

8.9.35 Table 8-19: Appleby to Brough (Warcop) Black-Black-Black route - likely significant effects (Cultural Heritage) summarises the likely significant effects for Appleby to Brough (Warcop) Black-Black-Black route.

Table 8-19: Appleby to Brough (Warcop) Black-Black-Black route - likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Warcop Roman Camp And Length Of Roman Road, 285m	Major adverse	Slight adverse	Options for mitigation will be considered in the design process and will be reported in the ES.	Yes

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
South West Of Moor House				
Sandford Moor Barrows and Ring Cairn	Major adverse	No change	Mitigation in the form of archaeological investigation prior to construction in order to advance understanding is recommended.	No
Boundary Stone To North Of Bullistone Cottage	Major adverse	No change	Mitigation required would include the temporary removal of the boundary stone during construction works, and reinstatement of the boundary stone at its original location or as close as possible after the construction of the new offline route is completed.	No

Blue alternative (central section)

8.9.36 In addition to the effects noted above resulting from the Black-Black-Black route an additional feature will affected by the Blue alternative. This feature, platform earthworks, was identified within the draft DCO boundary during surveys and is of low value. Groundworks will remove archaeological remains associated with this feature leading to a major adverse impact. Without mitigation this would result in a moderate adverse effect.Table 8-20: Appleby to Brough (Warcop) Blue alternative - likely significant effects (Cultural Heritage) summarises the likely significant effects for Appleby to Brough (Warcop) Blue alternative (central section).

Table 8-20: Appleby to Brough (Warcop) Blue alternative - likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Platform earthworks	Moderate adverse	No change	Mitigation in the form of archaeological investigation prior to construction in order to advance understanding is recommended.	No

Orange alternative (eastern section)

8.9.37 No likely significant effects additional to those noted above resulting from the Black-Black-Black route will result from the Orange alternative (eastern section).

Bowes Bypass

8.9.38 A group of three listed buildings (high value), Stone Bridge Farmhouse, Loose boxes, five metres east of Stone Bridge Farmhouse and linked farm buildings and gin-gan attached to south of Stonebridge Farmhouse, will be subject to changes to their setting during the construction period. Construction of the Mid Low Fields Farm Access and Proposed East Bowes Accommodation Access Overpass would result in the current access track in front of the buildings becoming a slip road into the overbridge, with an embankment built to the immediate east of the group. Construction works will result in temporary moderate adverse impacts during the construction phase, including associated noise, lighting and traffic resulting in a moderate adverse effect. The permanent and operational effects are anticipated to be comparable to that of the present baseline.

8.9.39 The former railway station at Bowes is a derelict, partially ruined structure of low value, located just north of the current road corridor. Construction would involve the complete demolition of the structure, resulting in the removal of its resource value, a major adverse magnitude of impact leading to a moderate adverse effect on the resource. Archaeological building recording would be carried out prior to construction (preservation by record). As the structure would be demolished, it is only possible to partially mitigate this impact through recording. As a result, the likely effect following mitigation would be slight adverse, which is not significant for EIA purposes.

8.9.40 Table 8-21: Bowes Bypass (A66/A67) - likely significant effects (Cultural Heritage) sumarises the likely significant effects for Bowes Bypass (A66/A67).

Table 8-21: Bowes Bypass (A66/A67) - likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Stone Bridge Farmhouse and associated listed structures	Moderate adverse (temporary)	No change	The temporary effect will be of short duration and it is therefore not proposed to put in place any mitigation.	No
Remains of Bowes Railway Station	Major adverse	No change	Archaeological building recording	No

Cross Lanes to Rokeby

Black + Black route (evolved version of the Preferred Route announced in Spring 2020)

8.9.41 The high value resources of Rokeby Park and attached stables, and associated large landscaped park are located to the north-west of the draft DCO boundary. The park's

setting can, reasonably, be suggested to extend to the whole area of landscape visible from its boundary, or from high points within it, and the area from which the park is visible. This, therefore, includes much of the surrounding landscape of the Greta and Tees valleys, the village of Greta Bridge, the nearby farmhouses and the A66 road. In a worst case scenario the new offline section of the A66 to the south of the existing road would be visible in views looking south and west from the house and the widened road would potentially allow a greater number of high-sided vehicles to be visible in views from the house. This noticeable change to the setting would potentially constitute a moderate adverse magnitude of impact, resulting in a moderate adverse significance of effect. Options for mitigation will be considered as part of the ongoing design process and will be reported in the ES.

8.9.42 Rokeby Park is a Grade II* registered park and garden (high value) consisting of the eighteenth and nineteenth century gardens associated with Rokeby Park. It is located within the angle formed by the meeting of the River Greta and the River Tees and the rivers have carved a dramatic landscape which have been highly valued for their picturesque qualities. Beyond the pleasure gardens is parkland of open pasture and woodland, set within a wider agricultural landscape. The southern boundary of the park was originally formed by the Street, the historic course of the Roman road which has been in continous use as a road into the modern period. The A66 bypass of Greta Bridge now cuts across the southern part of the parkland, severing an area of the designated park from the main area north of the road. While the project has been redesigned to minimise impacts on Rokeby Park, in a worst case scenario there would still be views of the new offline section of the A66 from many areas within the park, potentially intruding into some key views across the landscape. This would result in a moderate adverse impact and a moderate adverse effect. Options for mitigation will be considered as part of the ongoing design process and will be reported in the ES.

8.9.43 The Church of St Mary (high value) was built in the eighteenth century as a parish church associated with the Rokeby Park estate. It is linked to the landscape park by a narrow band of woodland. On the southern side of the A66 is the Old Rectory, a medium value asset which is now in use as a private house but built to serve the church and is part of a group with it. While a detailed setting assessment has yet to be undertaken, the church is positioned to face south towards the current road corridor and would, as a result, have clear views of the new offline section of road to the south and to the south and west where the Rokeby Junction underpass would be located. The church's relationship with the Rectory would not be adversely impacted by the construction of the new offline carriageway; the road between them will be detrunked, leading to a substantial decrease in traffic flow. The detrunking of the carriageway will restore the historic ability to cross easily between the church and rectory, due to the reduced flow of traffic. Whilst the church has always had a roadside setting, the new offline section and junction to the west will alter the character of the landscape surrounding the resources, through the introduction of a new industrial element, with views to the south and west, leading to a moderate adverse impact, resulting in a moderate adverse significance of effect for both the church and the rectory. Options for mitigation will be considered as part of the ongoing design process and will be reported in the ES.

8.9.44 There are two milestones of high value located on the side of the A66, within the draft DCO boundary. The construction of the project would require their removal which would constitute a major adverse impact, resulting in a large adverse effect. This impact would be mitigated by the recording, careful removal and storage of the milestones followed by their reinstallation at an appropriate new roadside location

once construction is complete. This would reduce the magnitude of impact as while moved from their original location, their new location would be characteristically similar and they would retain their roadside context and legibility. This would result in a slight adverse following mitigation, which is not signficant.

8.9.45 Cross Lanes Farmhouse, an asset of high value, with adjacent outbuildings on west, is a mid-eigtheenth century farmhouse which faces onto the A66. The setting of the asset has always included the road to the south, meaning that changes within the existing road corridor, provided it remains in use as a transport corridor, would not adversely impact the value of the farmhouse. The building's setting also includes the triangle of pasture to the north of the building and, although less visible, the resource can be assumed to have a cognitive association with the wider landscape of agricultural land to the north and south. The road to the immediate south of the farmhouse would be widened and a new junction built to the east. This would include the stopping up of the exising Moorhouse Lane (B6277) intersection with the A66, which lies to the west of the farmhouse, and the construction of a new overbridge with Moorhouse Lane realigned to connect to the north-east of the farmhouse. The existing woodland band to the north-east of the building would be retained, which would partially screen the development although views to the east and south-east would be considerably altered. The setting of the farmhouse has always included the road (A66), which it faces directly onto and the widening of the road would not make a significant change. However, the increased sense of enclosure created by the new overbridge, in addition to the significant alteration of views, would result in a moderate adverse impact and a moderate adverse effect.

8.9.46 A group of three structures of high value lies immediately south of the current A66 road corridor, east of the Mortham Lane. The group comprises of Rokeby Grove, a nineteenth century house, its stables to the west and a sundial to the south. The A66 Greta Bridge Bypass runs immediately north of the house in a cutting screened by trees. The current road forms part of the group's setting and has historically run close to the house. The project would detrunk the current road to the west of Rokeby Grove, constructing a new offline section south of the current carriageway, bringing the road mariginally closer to the structures, at this point. It is not yet clear whether the landscaping implications around Rokeby Grove would constitute a large enough alteration to the setting of the house, however a worst case scenario could result in a moderate adverse impact and moderate adverse effect for Rokeby Grove. The there will be no significant effect on the stables and sundial, as their setting and resulting value is more closely linked to their associations with Rokeby Grove and the group value of the surviving resource cluster. Options for mitigation will be considered as part of the ongoing design process and will be reported in the ES.

8.9.47 Table 8-22: Cross Lanes to Rokeby Black + Black route - likely significant effects (Cultural Heritage) summarises the likely significant effects for Cross Lanes to Rokeby Black + Black route.

Table 8-22: Cross Lanes to Rokeby Black + Black route - likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Rokeby Park and	Moderate adverse	Negligible adverse	Options for mitigation will be considered as part of the	No

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
attached stables			ongoing design process and will be reported in the ES.	
Rokeby Park (RPG)	Moderate adverse	Negligible adverse	Options for mitigation will be considered as part of the ongoing design process and will be reported in the ES.	No
Church of St Mary	Moderate adverse	Negligible beneficial	Options for mitigation will be considered as part of the ongoing design process and will be reported in the ES.	No
Milestones	Major adverse	Minor adverse	The milestones would be recorded before being removed under archaeological supervision and stored in a safe location off-site. Once the work is complete it would be relocated to the closest point to its current location possible within the completed road landscape design.	No
Cross Lanes Farmhouse	Moderate adverse	Minor adverse	Options for mitigation will be considered as part of the ongoing design process and will be reported in the ES.	No
Rokeby Grove	Moderate adverse	Minor adverse	Options for mitigation will be considered as part of the ongoing design process and will be reported in the ES.	No

Blue (Cross Lanes) alternative

8.9.48 If the Blue (Cross Lanes) alternative junction is included in the route instead of the Black Cross Lanes junction, it will result in the same likely significant effects as the Black + Black route on the following resources:

- Rokeby Park and attached stables
- Rokeby Park RPG
- The Church of St Mary
- Milestones
- Rokeby Grove.

8.9.49 In addition the setting of Dent House Farmhouse, a resource of high value, located c.75m to the south of the current route of the A66 will be subject to change. The immediate setting of the resource is currently that of an open, agricultural landscape

characterised by regular enclosed fields. The construction of the new overbridge, embankments and carriageway at the Cross Lanes Junction would introduce a new, upstanding industrial element into the landscape to the north of the farmhouse. This would noticeably change elements of the the setting of the resource from which it derives its value resulting in a moderate adverse impact and moderate adverse effect. Options for mitigation will be considered in the design process and will be reported in the ES.

8.9.50 A Ring Ditch, 120m north-east of Poundergill, of medium value will also be removed by construction works related to the new Cross Lane junction. This will result in a major adverse impact producing a large adverse effect. The implementation of an appropriate scheme of archaeological recording of the resource, resulting in preservation by record may reduce this to a moderate adverse effect.

8.9.51 Table 8-23: Cross Lanes to Rokeby Blue (Cross Lanes) alternative - likely significant effects (Cultural Heritage) summarises the likely significant effects for Cross Lanes to Rokeby if the Blue (Cross Lanes) alternative junction is included in the route instead of the Black junction at Cross Lanes.

Table 8-23: Cross Lanes to Rokeby Blue (Cross Lanes) alternative - likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Dent House Farmhouse	Moderate adverse	Minor adverse	Options for mitigation will be considered as part of the ongoing design process and will be reported in the ES.	No
Ring Ditch, 120m north-east of Poundergill	Major adverse	No change	Mitigation in the form of archaeological investigation prior to construction in order to advance understanding is recommended.	Yes

Red (Rokeby Junction) alternative

8.9.52 If the Red (Rokeby) alternative junction is included in the route instead of the Black Rokeby junction, it will result in the same likely significant effects as the Black + Black route on the following resources:

- Rokeby Park and attached stables

- Milestones
- Rokeby Grove
- Cross Lanes Farm.

8.9.53 Construction of the off-line carriageway to the south of the Church of St Mary would introduce a new element in its setting which would constitute a minor adverse impact and a slight adverse effect. The relationship between the Church and the Rectory would not be adversely impacted by the construction of the new offline carriageway and the road between them will be detrunked. The detrunking of the carriageway will restore the historic ability to cross easily between the church and rectory, due to the reduced flow of traffic; the majority of traffic to Barnard Castle which will now be directed to the new junction to the east limiting the use of the detrunked section to local traffic only. During Operation this will lead to a negligible beneficial impact and a slight beneficial effect.

8.9.54 Rokeby Park is a Grade II* registered park and garden (high value) consisting of the eighteenth and nineteenth century gardens associated with the Grade I listed Rokeby Park (listed building). It is located within the angle formed by the meeting of the River Greta and the River Tees and the rivers have carved a dramatic landscape which have been highly valued for their picturesque qualities. Beyond the pleasure gardens is parkland of open pasture and woodland, set within a wider agricultural landscape. The southern boundary of the park was originally formed by the Street, the historic course of the Roman road which has been in continous use as a road into the modern period. The A66 bypass of Greta Bridge now cuts across the southern part of the parkland, severing an area of the designated park and garden from the main area north of the road. The construction of the cutting for Red alternative (Rokeby Junction) would physically impact the dog-leg of the park which extends to the west, parallel to the A66, to encompass the area surrounding St. Mary's Church and the historic 'Church Walk' from the main estate to the church. The cutting would create a new break in the landscape, placing a new carriageway between the park and the church, severing this historic walkway. In addition to these physical impacts, the construction of Rokeby Junction and new offline road section would noticeably alter the baseline setting of the resource of Rokeby Park. This would result in a major adverse impact and a large adverse effect.

8.9.55 Table 8-24: Cross Lanes to Rokeby Red (Rokeby) alternative - likely significant effects (Cultural Heritage) summarises the likely significant effects for Cross Lanes to Rokeby if the Red (Rokeby) alternative junction is included in the route instead of the Black junction at Rokeby.

Table 8-24: Cross Lanes to Rokeby Red (Rokeby) alternative - likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Rokeby Park	Major adverse	Negligible adverse	Options for mitigation will be considered as part of the ongoing design process and will be reported in the ES.	Yes
Church of St Mary	Minor adverse	Negligible beneficial	None proposed	No

Stephen Bank to Carkin Moor

8.9.56 The Roman Fort and Prehistoric enclosed settlement 400m west of Carkin Moor Farm (high value) is bisected by the course of the A66 which runs in cutting through the centre of the Roman fort, following the aproximate line of the Roman road. The draft DCO boundary includes a small area of the fort on either side of the current road. The scheme design is still evolving, with alternative alignments being explored which would exclude physical impact to archaeological remains by working within the current cutting embankment. Worst-case there may be a small amount of excavation required within the scheduled area, potentially between the area of the enclosure and fort where there may not be archaeological remains; it is also unclear to what extent previous phases of construction and maintence of the A66 have impacted the resource. The worst-case scenario, without mitigation, would result in moderate adverse impacts on the resource.

8.9.57 The project would also alter the setting of the scheduled monument: the road would be widened as it passes through the scheduled area, with a new, offline section curving north immediately to the west. The scheduled monument is intrinsically linked to the course of the A66; a road of at least Roman date which passed directly through the Roman fort. The retention of the road as it passes through the fort enables that historic connection to continue. The new offline section would alter the setting of the fort and change the course of the road as the primary route through the landscape surrounding the resource, a position it has maintained since its construction. The original line of the road to the west will be retained as a local access road maintaining the legibility of this historic transport corridor.

8.9.58 A new access road is proposed to the south of the resource, extending the route of Warrener Lane to the north-west, past the scheduled monument, intersecting with the original route of the A66 to the south of the new offline section. The new road will serve as access to five new balancing ponds which will be located to the south-west and north-east of the rescource. These will represent substantial changes in the setting of the resource, introducing a new landscape boundary and designed, landscaped elements immediately adjacent to the southern part of the fort. For the purposes of the PEI Report, the worst-case scenario has been used, which is that, without mitigation, there would be sufficient excavation and changes in the setting of the resource required to result in a moderate adverse magnitude of impact resulting in a permanent large adverse effect. In this scenario, a programme of archaeological mitigation would be put in place to ensure preservation by record of any archaeological remains within the footprint of the works. As archaeological remains would be permanently removed it is not possible for the significance of effect to be reduced below moderate adverse, although it may be possible to reduce it from large depending on the scale of the impact.

8.9.59 A possible Roman vicus or roadside settlement has been identified to the west of Carkin Moor Roman fort, lying to the south of remains of the Roman road. Taking a cautious approach, it is assumed that the remains may be of schedulable quality and, as a result, it has been assessed as being of high value; the value of the resource may be reduced following further investigation. The previously identified features of the resource lie within the draft DCO boundary and these, alongside potential further settlement remains would be removed by construction activities asociated with the widening of the carriageway. The result of the proposed works would be a permanent major adverse impact, resulting in a large adverse effect. A programme of archaeological work would be put in place to record any archaeological remains present. With full and detailed recording it may be possible to reduce the magnitude

of impact to moderate adverse, although this would still result in a moderate adverse significance of effect, which is significant. The significance of effect may be lower if the site is of moderate or lower heritage value.

8.9.60 A non-designated, post-medieval milestone of low value is located within the draft DCO boundary to the west of Carkin Moor Roman fort. Although it has not been possible to groundtruth the survival of the milestone, it is assumed for the purposes of the PEI Report that it is still present and has retained, to date, its resource value. The milestone would be removed by the construction of the approach to the Moor Lane eastbound junction, a major adverse impact, resulting in a permanent moderate adverse significance of effect. In mitigation, it would be carefully removed and stored offsite during construction, prior to being reinstalled at an appropriate new roadside location once construction is complete. This would reduce the magnitude of impact to minor adverse, which would result in a slight adverse significance of effect, following mitigation, which is not signficiant.

8.9.61 A possible site of Roman quarrying and rectangular enclosure (low value) has been identified at Stephen Bank within the draft DCO boundary. Construction and mitigation works (where the latter involve intrusive works) will result in the remains suffering severe loss to key characteristics resulting in a major adverse impact. Without mitigation a moderate adverse effect will result.

8.9.62 Table 8-25: Stephen Bank to Carkin Moor - likely significant effects (Cultural Heritage) summarises the likely significant effects for Stephen Bank to Carkin Moor.

Table 8-25: Stephen Bank to Carkin Moor - likely significant effects (Cultural Heritage)

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Roman Fort and Prehistoric enclosed settlement 400m west of Carkin Moor Farm	Moderate adverse	Neutral	This potential effect is based on a worst-case scenario where excavation is required within the scheduled fort. The design is currently being developed to seek to minimise this and the results will be reported in the ES. Should excavation be required, a programme of archaeological investigation would be put in place, to ensure preservation by record of the impacted area.	Yes - Depending on the scale of impact it may be possible to reduce this to moderate adverse.
Roman vicus at Carkin Moor Fort	Major adverse	Neutral	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy.	Yes

Receptor	Potential Impacts (Construction)	Potential Impacts (Operation)	Design, Mitigation and Enhancement Measures	Likely Significant Effect Following Mitigation?
Post-medieval milestone, on the A66 close to Carkin Moor Roman fort, East Layton	Major adverse	Neutral	The milestone would be recorded before being removed under archaeological supervision and stored in a safe location off-site. Once the work is complete it would be relocated to the closest point to its current location possible within the completed road landscape design.	No
Possible site of Roman quarrying and rectangular enclosure	Major adverse	Neutral	Preservation by record in accordance with a programme of archaeological works laid out in an Archaeological Mitigation Strategy.	No

A1(M) Junction 53 Scotch Corner

8.9.63 No likely significant effects on cultural heritage resources are anticipated as a result of the A1(M) Junction 53 scheme.

8.10 Monitoring

Route wide

8.10.1 Monitoring is not proposed in connection with cultural heritage resources anywhere along the route.