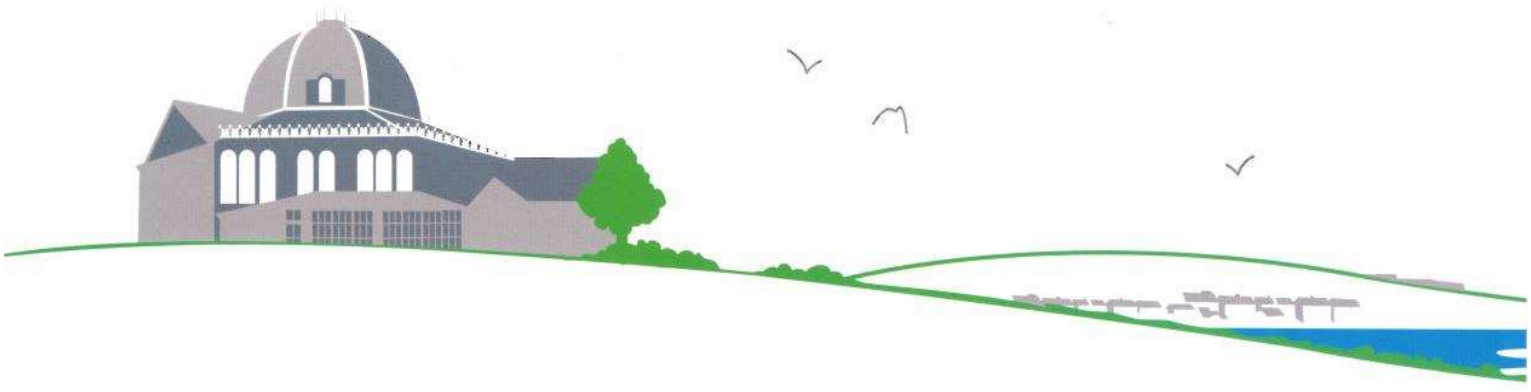
Penny Anderson Associates Ltd
CONSULTANT ECOLOGISTS

CANAL & RIVER TRUST

THE CONSTRUCTION OF A PERMANENT VEHICULAR ACCESS TRACK LEGALLY REQUIRED AS A MEASURE IN THE INTEREST OF SAFETY UNDER THE RESERVOIRS ACT FOR ESSENTIAL SAFETY WORKS, ONGOING INSPECTION, MAINTENANCE, AND EMERGENCY ACCESS AND THE ERECTION OF FENCING AT MARCH HAIGH RESERVOIR

ENVIRONMENTAL STATEMENT

VOLUME 1: MAIN TEXT



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ENVIRONMENTAL STATEMENT

VOLUME 1: MAIN TEXT

Penny Anderson Associates Limited
'Park Lea'
60 Park Road
Buxton
Derbyshire
SK17 6SN

Project Manager and Author
Sarah Ross BSc (Hons), PhD, MCIEEM, CEnv (Associate Director, Penny Anderson Associates)

Authors
Sacha Rogers BSc (Hons), MCIEEM, CEnv (Managing Director, Penny Anderson Associates)
Sarah Ross BSc (Hons), PhD, MCIEEM, CEnv (Associate Director, Penny Anderson Associates)
Chris Burnett, BSC BLD CMLI (Principal Partner and Chartered Landscape Architect, Chris Burnett Associates)

April 2023

This project has been undertaken in accordance with PAA policies and procedures on quality assurance.

Signed:_____

Penny Anderson Associates Ltd
CONSULTANT ECOLOGISTS

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1. INTRODUCTION

Background

1.1 The Canal & River Trust (the 'Applicant') is seeking planning permission to construct an essential permanent access track from Blake Lea Lane to the spillway of March Haigh Reservoir (the 'Proposed Development'). The track will be used for surveillance, operation, maintenance and emergency response. March Haigh Reservoir is located approximately 3.5 km northwest of Marsden in the Metropolitan District of Kirklees, West Yorkshire at grid reference SE 016 093 (the 'Site').

1.2 Kirklees Council[1], as the relevant Local Planning Authority[2] having taken into account the criteria specified in Regulation 15 of the Town and Country Planning (Environmental Impact Assessment[3]) Regulations (2017) ('the EIA Regulations') and in consideration of sufficient information for the purpose, has adopted a statutory EIA scoping opinion to clarify what information must be included in an Environmental Statement[4] to address the possible impacts of the Proposed Development.

1.3 This ES has been coordinated by Penny Anderson Associates[5] Ltd on behalf of the Applicant.

Legal Framework for the Environmental Statement

1.4 The need for EIA is determined by the definitions and criteria provided in Schedule 1 or Schedule 2 and Schedule 3 of the EIA Regulations. Where projects are of a description mentioned in Schedule 1, EIA is mandatory.

1.5 If a proposed project is listed in the first column in Schedule 2 of the EIA Regulations and exceeds the relevant thresholds or criteria set out in the second column (sometimes referred to as '*exclusion thresholds and criteria*') the proposal needs to be screened by the LPA to determine whether significant effects on the environment are likely and hence whether an EIA is required. Projects listed in Schedule 2 which are located in, or partly in, a sensitive area also need to be screened, even if they are below the thresholds or do not meet the criteria.

1.6 The Proposed Development does not fall within the definitions set out within Schedule 1 of the EIA Regulations. However, the Proposed Development does fall within Schedule 2 10(f) of the EIA Regulations. That is:

'10. Infrastructure projects…(f) Construction of roads (unless included in Schedule 1)'

[1] *KC*

[2] *LPA*

[3] *EIA*

[4] *ES*

[5] *PAA*

1.7 Furthermore, the Proposed Development meets the applicable threshold for Schedule 2 10(f) projects:

> *'The area of the works exceeds 1 hectare'*

1.8 The Proposed Development also falls within (either wholly or partially) one or more '*sensitive areas*' as defined by the EIA Regulations, that is:

> *'(a) land notified under section 28(1) (sites of special scientific interest) of the Wildlife and Countryside Act 1981(a);*
>
> *(b) a National Park within the meaning of the National Parks and Access to the Countryside Act 1949); and*
>
> *(g) a European site'*

1.9 In this instance EIA is required by virtue of the Proposed Development being of a type which is mentioned in Schedule 2 of the EIA Regulations and being of a size which exceeds the threshold for this type of development (>1ha) as well as being wholly or partially located in a '*sensitive area*' as defined in the EIA Regulations.

Scope of the Environmental Impact Assessment

1.10 The scope of the EIA was agreed with KC via a formal EIA Scoping process. The purpose of Scoping was to ensure that all relevant environmental issues in respect of the Proposed Development were identified from the outset and to confirm that the EIA process would conform to the requirements of the EIA Regulations.

1.11 The key issues to be addressed by the EIA were identified through pre-application consultation with statutory consultees comprising KC and Natural England and consideration of available environmental information together with professional judgement and relevant experience.

1.12 An EIA Scoping Report (PAA 2022) submitted to KC in November 2022, with a request for comment on the methodology proposed to be used for the EIA and the scope and content of the ES, is provided as Appendix 1.1 (ES Volume 2).

1.13 A copy of KC's Scoping Opinion dated 16th January 2023 is provided in Appendix 1.2 (ES Volume 2).

1.14 The Scoping process identified that four topics were considered to be significantly affected by the Proposed Development and warranted detailed assessment as follows:

- Landscape and Visual Assessment to include viewpoints;
- Ecology Assessment including Biodiversity Net Gain[6], ecological enhancement and connectivity;
- Peat Soils and Hydrology including peat removal/re-use and potential for peat carbon release; and

[6] *BNG*

- Access and Recreation to include assessment of potential impacts on nearby Public Rights of Way[7], National Trails, and other accessible/open land.

1.15 A 'Shadow' Habitat Regulations Assessment[8] has also been completed and is submitted as a separate report (PAA 2023a).

1.16 Topics scoped out of the Environmental Statement and the rationale for scoping out are presented in Table 1.1 (below).

Table 1.1 Topics Scoped out of the Environmental Statement

Topic	Reason for Scoping Out
Air Quality	Development will not generate significant emissions to air during construction or at completed and operational development stage. Any impacts likely to be localised and temporary (during construction) and likely only impact on habitats, which will be addressed through the Biodiversity Chapter of ES.
Climate Change	Development will not generate significant carbon emissions during construction or at completed and operational development stage. All peat impacted will be retained and re-used on Site in a way that minimised drying and oxidative losses. Any impacts of future climate change will be addressed through the Biodiversity Chapter of ES.
Highways and Transport	The Construction Traffic Management Plan will include measures to manage the interface of construction plant with other road users, where they overlap. Development will not generate significant traffic movements during construction or at completed and operational development stage.
Noise and Vibration	Development will not generate significant noise or vibration during construction or at completed and operational development stage. No significant effects anticipated. The Construction Traffic Management Plan will include measure to minimise any noise or vibration on the properties around White Hill Farm
Socio-Economics	Development has no socio-economic consequences. No significant effects anticipated.
Soils, Geology and Agricultural Land Quality	Effects on peat resource to be addressed in Biodiversity Chapter of ES. No significant loss of geological features or agricultural land quality is anticipated. The CEMP will include measures for peat/soil management and re-use during construction. No material will be removed off Site.
Water Resources, Surface Water and Ground Water Hydrology	Effects on peat hydrology (comprising effects on water quality and hydrological function) will be addressed in Biodiversity Chapter of ES. The CEMP will include measures for management of surface water during construction and consider the need to maintain the hydrological continuity between peatland habitats that are dissected by the Development. No other significant effects anticipated.

[7] *PRoW*

[8] *HRA*

Structure of the Environmental Statement

1.17 This ES comprises three volumes:

- ES Volume 1: Main Text;
- ES Volume 2: Technical Appendices; and
- ES Volume 3: Non-Technical Summary[9].

Volume 1: Main Text

1.18 ES Volume 1 comprises ten Chapters and sets out the key findings of the EIA process in respect of the Proposed Development including:

- Introduction (Chapter 1) - including the methodology applied in the EIA process including any difficulties (technical or otherwise) encountered by the Applicant in compiling the required ES and supporting information;
- A description of the Site, Environment and Setting and current development situation, including the Site's environmental context and sensitivity (Chapter 2);
- A description of the Proposed Development and construction methodology including all ancillary development such as temporary storage of material and plant alongside or otherwise remote from any part of the track (Chapter 3);
- A description of the proposed restoration for any temporary construction phases (Chapter 4);
- An assessment of need and the main alternatives considered (Chapter 5);
- A Chapter on each environmental topic, comprising:
  - Landscape & Visual Assessment (Chapter 6);
  - Ecology and Biodiversity (Chapter 7);
  - Peat Soils and Hydrology (Chapter 8); and
  - Access and Recreation (Chapter 9).
- Assessment of effect interactions (Chapter 10).

Volume 2: Technical Appendices

1.19 ES Volume 2 contains detailed technical reports to support the ES technical chapters including all supporting data, information and topic-specific figures and drawings.

Volume 3: Non-Technical Summary

1.20 The EIA Regulations require the submission of a summary of the ES in non-technical language. As such, ES Volume 3 provides a concise summary of the ES without excessive technical details or scientific language so as to be readily understood by non-technical experts and members of

[9] *NTS*

the public who may not be familiar with EIA. The NTS is produced as a separate document to facilitate wider public distribution.

EIA Methodology

Introduction

1.21 This ES has been prepared to comply with the EIA Regulations and with reference to current best practice, comprising:

- Impact Assessment Guidelines and ES Review Criteria from the Institute of Environmental Management and Assessment[10]; and
- Topic-specific guidance referred to in the individual topic Chapters as appropriate.

1.22 The assessment of environmental effects was based on current knowledge of the Site and its surrounding environment. The assessments addressed both the likely adverse and beneficial effects of the Proposed Development during the construction and operational phases. In line with legislative and topic-specific requirements, the direct and indirect, cumulative and temporary and permanent effects are addressed.

1.23 Individual topic Chapters have been prepared by competent experts in accordance with EIA Regulations, Regulation 18, Part 5, as summarised in Table 1.2 with further details of the authors presented in each topic Chapter.

1.24 The overall coordination of the ES, along with preparation of the Ecology and Access and Recreation Chapter was undertaken by Sacha Rogers, Managing Director of Penny Anderson Associates Ltd (PAA). Prior to joining PAA, Sacha was previously a Technical Director at Wardell Armstrong, where her role included management and coordination of EIA.

1.25 An independent quality review of the ES was undertaken by Susan Raine, Associate Director of Wardell Armstrong in accordance with the IEMA EIA Quality Mark and considered regulatory compliance, context and influence, content and presentation. Susan works within the Environment and Planning Team at Wardell Armstrong and specialises in EIA.

Table 1.2 Statement of Expertise

Topic	Name, Professional Title, Qualifications and Experience	Organisation
ES Coordination	Sacha Rogers, Managing Director. BSc (Hons) Rural Environment Studies. Sacha has 28 years of experience as an ecologist, including review and preparation of ES Chapters and 3 years of EIA Coordination in her previous role as Technical Director, Wardell Armstrong.	PAA
ES Quality Review	Susan Raine, Associate Director. BSc (Hons) MSc PIEMA. Susan has an MSc in EIA and Management from the University of Manchester and is also a Practitioner member of the IEMA. Susan has extensive experience in the co-ordination of EIA and the review of ES for a range of developments.	Wardell Armstrong LLP

[10] *IEMA*

Topic	Name, Professional Title, Qualifications and Experience	Organisation
Landscape and Visual Assessment	Chris Burnett, Principal Partner. BSC BLD CMLI and Chartered Landscape Architect. Chris has 38 years of experience as landscape architect, specialising in Landscape Visual Impact Assessments of Developments in both rural and urban contexts.	Chris Burnett Associates Ltd
Ecology Assessment	Sarah Ross, Associate Director. BSc (Hons) Pure and Applied Ecology. Sarah has a PhD Wetland Ecology and 30 years of experience in ecological survey and assessment, with expertise in the moorland environment.	PAA
Peat Soils and Hydrology	Sarah Ross, Associate Director. BSc (Hons) Pure and Applied Ecology. Sarah has a PhD Wetland Ecology and 30 years of experience in ecological survey and assessment, with expertise in the moorland environment.	PAA
Access and Recreation	Sacha Rogers, Managing Director. BSc (Hons) Rural Environment Studies. Sacha has 28 years of experience in review and preparation of ES Ecology Chapters, many of which interface with access and recreation issues.	PAA

Identification of Likely Significant Environmental Effects

1.26 The likely significant environmental effects of the Proposed Development upon specific receptors or groups of receptors have been established for the construction stage and for the completed and operational development. This was undertaken using information relating to:

- The relevant environmental baseline conditions; and
- The description of the Proposed Development, including construction programme and methods.

1.27 Assessments have been informed by professional and expert judgement, calculations and/or detailed, scientific modelling and the detailed methodologies are presented in the relevant topic Chapter in this ES.

1.28 As part of the EIA and design process, the Proposed Development has evolved to take account of environmental constraints and opportunities. In this respect, environment desk-based assessment and baseline surveys have influenced the evolution of the Proposed Development. Consequently it has been possible to incorporate design measures to avoid or minimise significant environmental effects wherever feasible.

1.29 In addition to the above, a separate Shadow HRA report has been prepared (PAA 2023a), the findings of which have been used to inform detailed construction methods and design to ensure that sufficient mitigation is embedded from the outset to avoid any adverse effect on the integrity of European Sites as far as possible.

1.30 In undertaking an assessment of likely significant effects, such design measures have been considered as inherent elements of the Proposed Development.

1.31 Similarly, when considering likely significant effects at the construction stage it has been assumed that any methods of environmental management or protection (i.e. tertiary mitigation) would be applied

> *'…regardless of any EIA assessment, as is imposed, for example, as a result of legislative requirements and/or standard sectorial practices. For example,*

considerate contractor practices that manage activities which have potential nuisance effects.' (IEMA 2016[11])

1.32 Examples would be implementation of best practice pollution control measures.

Defining the Level of Effects

1.33 For each of the environmental topic areas assessed as part of the EIA process, and reported within the ES, an assessment has been made in relation to the relative level of the likely environmental effects identified. This has been carried out with reference to definitive standards and legislation, where available. Where it is not possible to quantify effects, qualitative assessments have been undertaken based on available knowledge and professional judgement.

1.34 The level of predicted effects has been determined with reference to assessment criteria for each environmental topic considered. These criteria apply a common EIA approach of classifying effects according to whether they are major, moderate or minor effects that are adverse or beneficial, or they are insignificant. Specific criteria have been adapted for each topic as necessary but broadly considered the following criteria, as relevant:

- Extent and magnitude of the effect;
- Duration of the effect (short, medium or long-term);
- Permanence of the effect (temporary or permanent);
- Nature of the effect (direct or indirect, reversible or irreversible);
- Whether the effect occurs in isolation, is cumulative or interactive;
- Performance against environmental quality standards or other relevant pollution control thresholds; and
- Sensitivity of the environmental resource/receptor.

1.35 In order to provide a consistent approach in reporting the outcomes of the various studies undertaken as part of the EIA, the following terminology has been adopted to describe the likely level of identified effects:

- Insignificant: No significant effect to an environmental resource or receptor;
- Significant beneficial: Advantageous or positive effect to an environmental resource or receptor; and
- Significant adverse: Detrimental or negative effect to an environmental resource or receptor.

1.36 Whilst there is no recognised definition of what constitutes a '*significant*' effect, it is good practice to identify the level or importance of an effect. Effects have, therefore, been described in accordance with the following terminology:

- Minor effect: Slight, very short or highly localised effect;

- Moderate effect: Limited effect (by extent, duration or magnitude) which may be considered significant; and
- Major effect: Considerable effect (by extent, duration of magnitude) of more than local importance or in breach of recognised acceptability, legislation, policy or standards and which may be considered significant.

1.37 For the avoidance of doubt, it should be noted that effects of moderate and major level are considered as '*significant effects*'. Minor effects are considered '*not significant*' (unless otherwise specified in the topic-specific methodology.

1.38 The specific criteria for identifying the level of effect for each of the environmental topic areas assessed as part of the EIA process has been identified within the stated methodology for each of the environmental topic areas reported within the ES.

Additional Mitigation Measures and/or Enhancement

1.39 Where significant adverse environmental effects are identified and attributable to the Proposed Development, additional mitigation measures have been identified and set out in the ES.

1.40 Where opportunities for further environmental enhancement exist to maximise significant beneficial effects, this has also been identified and set out in the ES.

1.41 It is important to note that such mitigation and enhancement is different to, and additional to, the inherent mitigation designed into the Proposed Development for which detailed planning permission is sought and the tertiary mitigation previously described, e.g. best practice pollution control measures.

1.42 It is anticipated that such additional mitigation measures and/or enhancement will be transposed into appropriate planning conditions or other planning related legal agreements. In this way, implementation of the additional mitigation and/or enhancement can be ensured which then provides confidence in the resulting assessment of the likely significant residual effects of the Proposed Development.

Identification of Residual Effects

1.43 The likely significant residual environmental effects of the Proposed Development have been established, again, for construction phase and operational development. This has been undertaken using information relating to:

- The likely significant effects of the Proposed Development; and
- The implementation of additional mitigation measures and/or enhancement.

1.44 As for the identification of likely significant effects, assessments have been informed by professional and expert judgement, calculations and/or detailed, scientific modelling. Similarly, the level of residual effects has been determined in line with the assessment criteria established for each environmental topic area assessed as part of the EIA process and reported within the ES using the terminology provided earlier.

Cumulative Effects

1.45 In line with Schedule 4 Paragraph 5(e) of the EIA Regulations, an ES must provide a description of the likely significant effects of a project on the environment resulting from:

> *'…the cumulation of effects with other existing and/or approved projects...'*

1.46 Such effects are known as '*cumulative effects*'. The potential for cumulative effects has considered '*approved projects*' defined as projects with:

- A resolution to grant planning permission;
- A valid planning permission and yet to start on site; and
- A valid planning permission and under construction.

1.47 The Applicant has gone further than this and included not only existing and approved projects but also specific development for which the Applicant is to seek planning consent.

1.48 Given the relatively remote nature of the proposals, distant from other built development, a zone of approximately 1km from the Site boundary was considered appropriate for the consideration of cumulative effects, unless topic-specific considerations required a wider zone to be considered, e.g. for consideration of long-distance views.

1.49 Identification of projects within an approximate 1km search zone was conducted by interrogation of the KC planning portal to identify proposed and consented planning applications, supplemented with information obtained via pre-application consultation and local knowledge of the Site.

1.50 A summary of the identified existing/approved projects is given in Table 1.3. There are also a number of approved developments dating from 1989 up to 2018, which relate to barn conversions, Listed Building consents, changes of use of agricultural buildings to dwellings associated with Blake Lea Lane Cottage, Bank Top Farm and White Hall Farm located off Blake Lea Lane. Similarly, there is a historic consent for change of use of the former Buckstones Inn public house on the A640 to private dwellings. All of these permissions are assumed to have been implemented and not relevant to the cumulative assessment, but form part of the baseline conditions in the vicinity of the Site.

Table 1.3 Summary of Existing/Approved Projects within a 1km Search Area

Type of Project and Location	Description of Project	Planning Reference, Status and Date Granted (Where Relevant)
March Haigh Reservoir 'measures in the interests of safety'	Works at the March Haigh Reservoir to be undertaken on completion of the proposed access track.	Planning application to be submitted in 2023
Proposed Tree Planting	Proposed by National Trust within Haigh Clough to the south of the proposed access track.	Works do not require planning consent
Moorland Restoration Programme, National Trust Marsden Moor Estate	Large scale programme of moorland restoration in partnership between National Trust and Yorkshire Water.	On-going

1.51 The assessment of cumulative effects assumes that all mitigation relevant to the Proposed Development will be implemented, thus, the assessment is based on consideration of any significant residual effects only.

1.52 The results of the cumulative assessment are described within each technical Chapter of this ES. However, for the majority of chapters the nature of the existing/approved projects is such that there are no cumulative effects, and this is stated in the relevant Chapter.

Effect Interactions

1.53 Regulation 4(2)(e) of the EIA Regulations requires that the interaction between environmental effects must be considered; that is, the combination of different environmental effects resulting from one project upon individual sensitive environmental resources/receptors, or a set of sensitive resources/receptors. This assessment is distinct from the assessment of cumulative effects which consider the cumulative effects arising from other projects.

1.54 Likely effect interactions have been considered for the construction phase and operational development. The assessment of effect interactions has been informed by the results of the EIA process in respect of each topic area scoped into the ES.

Difficulties Encountered in EIA Process

1.55 There were no difficulties or constraints, technical or otherwise, encountered in the EIA process or preparation of this ES.

2. EXISTING SITE, ENVIRONMENT AND SETTING

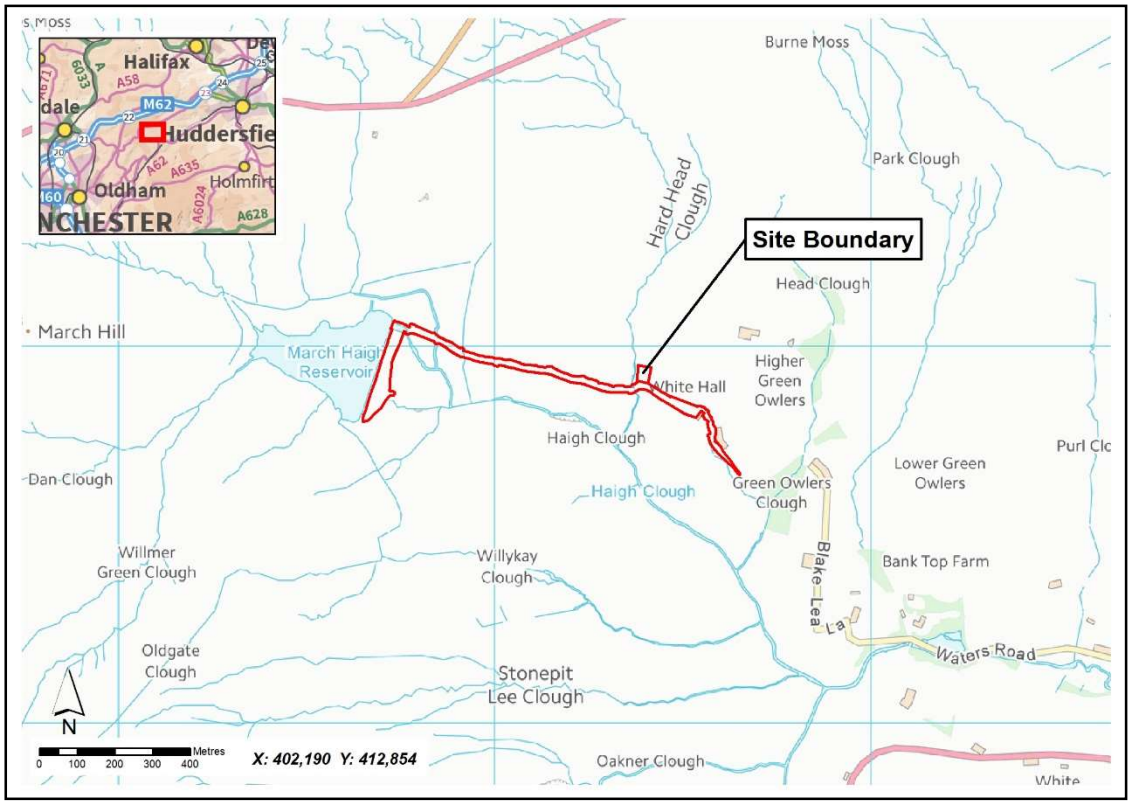
Introduction

2.1 This Chapter presents a summary of the predominant existing land uses and activities currently occurring on or around the Site. This Chapter also describes the key environmental characteristics of the Site and adjacent areas thereby identifying potentially sensitive receptors which may be affected by the Proposed Development. A full description of the baseline conditions relevant to each topic covered in this ES is presented in the relevant technical Chapters, with a summary of the key points given below.

Location and Setting

2.2 March Haigh reservoir is located approximately 1.6km north-west of the town of Marsden, in the Metropolitan Borough of Kirklees, West Yorkshire. The proposed access track begins at the access track to White Hall Farm just off Blake Lea Lane and runs towards the reservoir spillway. The Site includes the reservoir embankment (south of the spillway) to accommodate a stock fence proposed along the base of the embankment. An indicative Site location is presented at Figure 2.1 (below).

Figure 2.1 General Site Location



Topography

2.3 The Site comprises in-bye land and un-enclosed open moorland situated at approximately 300m Above Ordnance Datum[12]. The land continues to rise to the north of March Haigh Reservoir up to the A640 A-road, at approximately 425m AOD. To the south of the Site, the land falls away steeply into Haigh Clough. The Site is crossed by a number of small unnamed watercourses plus Hard Head Clough, all of which drain into Haigh Clough.

Geology

2.4 The March Haigh Catchment, below the present-day March Haigh Reservoir, is underlain by sedimentary rocks of Namurian age (326Ma to 313Ma), a subdivision of the Carboniferous period.

2.5 The Haigh Clough flows over Upper Kinder Scout Grit described as a medium to very coarse-grained feldspathic sandstone. A thin outcrop of the Hebden Formation is exposed in the steep sides of the Haigh Clough, a fine-to-course-grained felspathic sandstone interbedded with siltstone and mudstone.

2.6 The north of the catchment consists of the Marsden Formation and other sedimentary rocks that belong to the Millstone Grit Group.

2.7 These sedimentary lithologies were largely formed in a coastal setting and include deltaic, estuarine, fluviatile and palustrine deposits.

2.8 The predominant rock type is gritstone with thinner intervening mudstones and siltstones, and occasional turbidites and thin seams of coal. There are no superficial unconsolidated deposits except for deeper peat, that is confined to the upper reaches of the catchment and interfluves between surrounding upland catchments.

Predominant Land Uses and Activities

2.9 The area within which the Site is located is subject to a number of landscape and nature conservation designations reflecting the sensitive nature of the location.

2.10 The primary land uses are sheep farming on the in-bye land at the moorland edge, with nature conservation, recreation and water supply the main forms of land use on the open moorland areas. There is a dwelling and farmstead at the eastern end of the Site, accessed off Blake Lea Lane, comprising White Hall Farm. Other properties access off Blake Lea Lane include Blake Lea Lane Cottage and Bank Top Farm.

2.11 The Site falls within catchment of March Haigh Reservoir which is owned and managed by the Applicant to provide potable water to Yorkshire Water's supply network. The Applicant currently visits the Site to inspect the reservoir up to three times a week, on foot.

2.12 Moorland on either side of the Site (to the north and south) falls within the Marsden Estate owned and managed by the National Trust. This land is subject to an ongoing programme of restoration in partnership between the National Trust and Yorkshire Water.

[12] *AOD*

Key Environmental Characteristics

Landscape

2.13 The land across the area surrounding March Haigh reservoir is predominantly managed for nature conservation, recreation and water supply across the open moorland areas (including cattle grazing between 1st May and 31st August) along with sheep farming and pony grazing on the enclosed fields associated with White Hall Farm.

2.14 The development lies in open moorland within the Southern Pennines Landscape Character Area[13]. The Southern Pennines are part of the Pennine ridge of hills, lying between the Peak District National Park[14] and the Yorkshire Dales National Park. The LCA document[15] describes the general character as:

- A landscape of large-scale sweeping moorlands, pastures enclosed by drystone walls, and gritstone settlements contained within narrow valleys;
- Containing internationally important mosaics of moorland habitats that support rare birds such as merlin (*Falco columbarius*[16]), short-eared owl (*Asio flammeus*) and twite (*Linaria flavirostris*);
- Peat soils, including blanket bog, that store significant volumes of carbon;
- High rainfall and impervious rocks important for water supply, with many reservoirs supplying water to nearby conurbations; and
- Important for recreation due to the extensive open access areas and footpaths often within easy reach of towns.

2.15 Within the Kirklees District LCA[17] the Site is within the High Moorland Plateaux of the Southern Pennines. This part of the LCA is adjacent to the PDNP, which is located to the south. The LCA is, therefore, a continuation of the wider moorland expanses of the National Park, contributing to the flow of landscape character beyond the National Park boundary (which is recognised as one of the National Park's '*special qualities*')[18].

2.16 The development is classified as being within the Uplands area of the Biodiversity Opportunities Zones mapping[19] developed by KC.

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[13] *LCA*

[14] *PDNP*

[15] *publications.naturalengland.org.uk/publication/511867*

[16] *Bird species names follow British Ornithologists' Union, 2017. See also Technical Appendix 7.2.*

[17] *www.kirklees.gov.uk/beta/planning-policy/pdf/supportingDocuments/climateChange/Kirklees-Landscape-Character-2015.pdf*

[18] *www.peakdistrict.gov.uk/looking-after/strategies-and-policies/landscape-strategy*

[19] *www.kirklees.gov.uk/beta/delivering-services/pdf/biodiversity-opportunity-zones-map.pdf*

Biodiversity and Geological Interest

2.17 The Site falls within the South Pennine Moors Site of Special Scientific Interest[20], the South Pennine Moors Special Area of Conservation[21] and the South Pennine Moors (Phase 2) Special Protection Area[22]. These sites are designated for their nationally and internationally important habitats, including blanket bog, and their breeding bird assemblage.

2.18 The reservoir and its immediate surroundings are included as part of Unit 149 of the South Pennine Moors SSSI and is designated for upland bog habitat dominated by purple moor-grass[23], which is in Unfavourable Recovering condition. The proposed track also crosses through SSSI Unit 141 Foxstone Moss, which is also designated for its blanket bog, and also recorded as being in Unfavourable Recovering condition due to the dominance of purple moor-grass. A small section of the application Site boundary at the eastern end overlaps with SSSI Unit 142, however, there are no proposed construction works within Unit 142 as all works at this location are north of the boundary wall delineating the protected area (i.e. outside of the SSSI boundary).

2.19 The SSSI mosaic of habitats support a moorland breeding bird assemblage which, because of the range of species and number of breeding birds it contains, is of regional and national importance. The assemblages of breeding bird species are of international importance, including nationally important breeding populations of merlin and golden plover (*Pluvialis apricaria*), as reflected in the SPA designation.

2.20 Much of the moorland habitat is within the Dark Peak Nature Improvement Area[24] and classed as 'heathland' within the Wildlife Habitat Network within Kirklees Development Plan[25].

2.21 There is a Local Geological Site[26] just to the west and north of March Haigh Reservoir, known as March Haigh and Buckstones LGS (46.26ha).

Access and Recreation

2.22 The Site crosses an extensive area of upland moorland that is Registered Common Land and Open Access/Section 15 Land, as defined by the Countryside and Rights of Way Act 2000. The reservoir and adjacent land is owned and managed by the Applicant. The surrounding moorland is designated common land which is owned and managed by the National Trust as part of the wider Marsden Moor Estate. Three commoners have grazing rights across the moors, which are also managed by the National Trust.

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[20] *SSSI*

[21] *SAC*

[22] *SPA*

[23] *Botanical species names follow Stace 2019. Common names only are referred to in text. Scientific names can be found in Technical Appendix 7.1 and its associated species list.*

[24] *NIA*

[25] *www.kirklees.gov.uk/beta/planning-policy/local-plan.aspx*

[26] *LGS*

2.23 A number of PRoW are present and, in places, intersect with or run close to the Site, with the more well used of these (pers. comm. Ramblers Association) comprising a footpath (COL/195/30) running approximately parallel with and south of the Site. Key recreational activities within the wider area include walking, dog walking, mountain biking and, to a lesser extent, horse-riding. The Site is accessed from Blake Lea Lane to the east where there is limited space for parking by a few cars only on the verges of Blake Lea Lane, or from the Pennine Way and Buckstones public car parks located on the A640 to the north. There is some informal access to the moorland from the A640 but not directly to March Haigh Reservoir.

3. DESCRIPTION OF PROPOSED SCHEME AND CONSTRUCTION METHODOLOGY

Introduction

3.1 This Chapter provides a description of the Proposed Development as defined by the planning application and is supported by detailed drawings submitted separately to this ES.

3.2 The Proposed Development is described as:

> *'The construction of a permanent vehicular access track legally required as a Measure in the Interest of Safety under the Reservoirs Act for essential safety works, ongoing inspection, maintenance, and emergency access and the erection of fencing at March Haigh Reservoir'*

3.3 The Proposed Development consists of a 4.0m wide access track with passing places and will follow the same alignment as an earlier temporary track and where possible will reuse the stone that remains in place (albeit currently buried) to provide additional foundation support. This will minimise the impact on the environment by reducing the need to construct on undisturbed land.

3.4 This description of the Proposed Development and the following paragraphs form the basis of the assessments presented in the technical Chapters of this ES.

Proposed Route

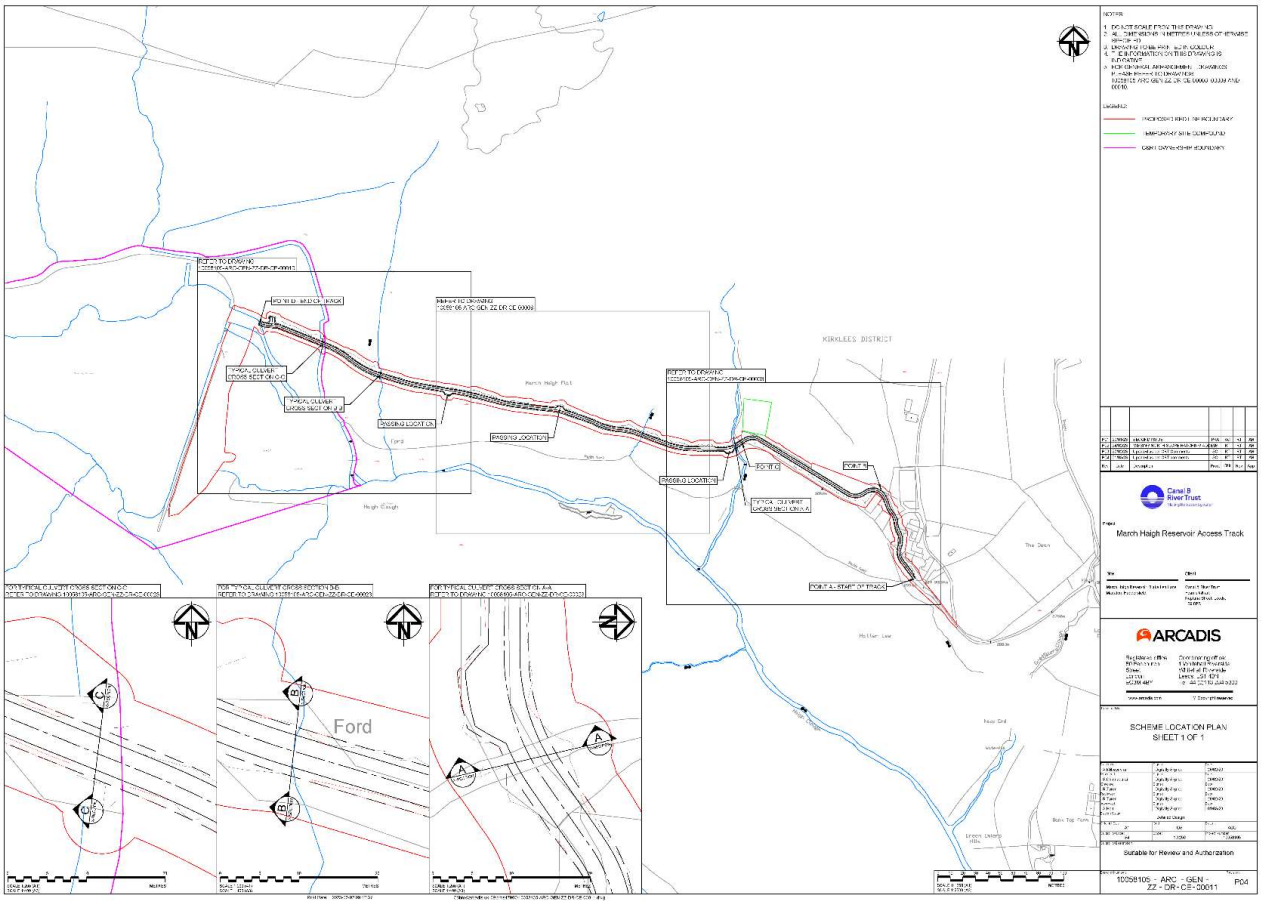
3.5 A general arrangement plan of the proposed route is presented in Figure 3.1 (below) and in Appendix 3.1 with additional plans to show the detail at a larger scale also included at Appendix 3.1a, Appendix 3b and Appendix 3c.

3.6 The proposed access track begins on an existing track just off Blake Lea Lane (grid reference SE 0259 1272 [402594,412720]) and runs towards the reservoir spillway (grid reference SE 0172 1305 [401726,413056]) and in part crosses the open moorland area of March Haigh that forms part of the South Pennines Moors.

3.7 A section of the development then diverts south over the spillway and along the base of the existing reservoir embankment for approximately 180m (grid reference SE 0171 1287 [401717,412878]). Along this stretch permanent stock fencing is proposed to provide protection to the dam embankment from grazing cattle on the wider moorland.

3.8 Associated upgrades to the section of the existing track just off Blake Lea Lane that runs below the farm buildings and corresponds with the proposed new track alignment will be required, to accommodate access by the necessary vehicles.

Figure 3.1 General Location of Proposed Route



Design Principles

3.9 The design concept has been selected following a robust optioneering assessment that considered how to provide satisfactory essential access requirements whilst minimising the environmental impacts. The design has been developed according to three principles:

- Reduce long term operational safety risk and reduce the risk to public safety;
- Deliver an environmentally sensitive project that minimises impacts on protected species and designated areas; and
- Provide fit-for-purpose infrastructure, essential for long term access for surveillance and maintenance, plus emergency access to the high-risk reservoir, ensuring safety of the public and Applicant's staff.

3.10 The track will be required to facilitate construction vehicles carrying materials up to March Haigh Reservoir, initially for the '*Measures in the Interest of Safety*[27]', and in the future for major emergency or maintenance construction works.

3.11 During construction, up to five vehicles per hour per day are expected to be using the track.

3.12 The track width is designed to accommodate the vehicles listed in Table 3.2 (see para. 3.49 below).

3.13 The passing places are designed to allow a 20-tonne tracked dumper to be passed by other vehicles. This is not the largest vehicle that will use the track; however, it is the most frequent in an emergency. The design for the passing places has been guided by the requirements during periods of maintenance when typically, 20-tonne dumpers would be required to drive in and straighten up to allow other vehicles to pass safely. The track design allows for regular maintenance when vehicles, such as dumpers, would be required to transport equipment and material. During construction, maintenance works and for emergencies, larger vehicles, up to 28-tonne, will use the track, and road plates may be required at tight turns, to protect the track edges from damage due to overrun. This ensures the track is no wider than it needs to be in the permanent state.

Design Detail

Access Track

3.14 The proposal is for a 4m wide track, with materials selected to minimise impacts on habitats and hydrology and to blend with the landscape. The stone has, therefore, been selected for its chemical makeup as well as strength characteristics in order to for it to be suitable within the environment in which it is going to be used. It will also be suitable to maintain hydrological continuity across the peat and will comprise a granular stone of a suitable rock type, e.g. gritstone, to match with the locally occurring geology.

3.15 The track has been designed to be capable of transporting the vehicles required for the Applicant to ensure the safe operation of March Haigh Reservoir.

3.16 The width of the track is 4m which is the minimum width to allow all vehicles to utilise the track without detriment to the edges. The track geometry has been designed to follow the alignment of the previously constructed temporary track where possible, and the natural ground profile as a best fit, without introducing what could appear to be an undulating track following the ground profile exactly. The design philosophy is to utilise the existing track as a capping layer and construct the proposed track on top of this. However, as the existing track is 3m wide and the proposed track is, by necessity, 4m wide, there will be a need to extend construction works onto land outside of the existing 3m wide track base.

3.17 The track has been designed for regular use by 7.5-tonne vehicles which is the anticipated requirement during routine reservoir operation and maintenance works. For emergencies, larger vehicles, up to 28-tonne, may be required to use the track, with any damage caused by additional wheel load being repaired immediately afterwards. Temporary road plates may be required at tight turns to protect the edges from damage due to overrun.

[27] *MIOS*

3.18 The depth of the stone track varies across the track length and is dependent on the condition of the existing stone, the strength of the sub-strata and the horizontal alignment. Broadly, the stone depths will be of minimum pavement depth 250mm between Points A and B (Chainage 0 to 130m) and between Points B and C (Chainage 130 to 325m).

3.19 Beyond Point C (Chainage 325m to 965m) the minimum pavement stone depth will be 530mm, although in some areas this may be deeper due to depressions, ruts and additional areas of build-up required beneath the pavement formation layer.

3.20 Stone usage has been reduced as far as is practicable by use of geogrid and geotextile layers. This will improve durability and reduce the volume of material required.

3.21 The track surface will be unbound with no kerb or edging so that water is able to continue to flow through the track.

3.22 Minor earthworks have been allowed for along the northern edge of the track to re-profile the batter of the proposed pavement to be at grade with the existing ground level to promote natural drainage and reduce future degradation of the track.

3.23 Some infill will also be used to fill minor gaps along the southern edge and peat excavated from construction works will be utilised to cover the southern edge of the track, ensuring the peat used for this purpose is of sufficient integral integrity to minimise future risk of erosion.

3.24 The existing farmer's wall and fence will be retained along the first section of track between the end of Blake Lea Lane and Hard Head Clough.

Passing Places

3.25 Due to the number of construction vehicles using the track during proposed construction works, routine operation of the reservoir and planned maintenance or in an emergency, passing places have been located at strategic positions along the track which aim to give optimal sight distance between them. The topography of the land and alignment of the track dictate where they have been positioned, and the number of passing places has been minimised as far as practicable whilst maintaining appropriate levels of safety. In this case, there will be three passing places at Chainage 340, 560 and 705m, though a degree of flexibility will be adopted to allow for exact positioning within +/- 5 to 10m of these locations.

3.26 The passing place dimensions will be 3m wide and 6m long on the outside edge with an entry/exit taper making them approximately 12m long on the outside tracked edge.

Snow Poles

3.27 Snow poles will be provided at both sides of passing places and at other locations throughout the track to delineate passing places and provide good forward visibility of no less than 200m between poles. Snow poles will be wooden posts painted in 'invisible green' with reflective tape at the top.

Gates and Railings

3.28 Existing farmer's gates at the eastern end of track located at White Hall Farm and east of Hard Head Clough will be temporarily removed and reinstated or replaced with new gates. Gates will be locked to deter unauthorized use of the track.

3.29 Where the track crosses watercourses at Chainage 335m and 880m the existing culverts will be replaced (if necessary) with concrete culverts and headwalls (see further details below regarding drainage, culverts and pipes) and will be fitted with steel protection railings painted in 'invisible green' to provide a visual and physical restraint to mitigate the risk of vehicles and people leaving the track.

Footpath Crossing

3.30 The track will cross an existing public footpath at Hard Head Clough. Temporary Heras fencing and signage will be used during construction with a banksman as necessary.

Dry Stone Walls along Blake Lea Lane

3.31 The dry-stone walls on Blake Lea Lane are reported to have shallow footings (National Trust, per. comm.) and frequently have to be rebuilt. Construction wagons have the potential to cause vibration and weakening of the walls. It is, therefore, proposed to ensure the Contractor undertakes a suitable pre-start survey to register the condition of all such features and reinstate on completion.

Construction Methodology

3.32 The previous temporary track stone material was left in place and re-covered with approximately 200mm of excavated peat and vegetated turves on completion of the previous works during the late 1990s. The temporary track will be fully uncovered in the first instance to review condition. All soil materials, including any peat that was used to cover the previous temporary track, will be stored for re-use within the Site as far as possible. The peat will be used to form a batter on the southern side of the track or spread on the proposed Site compound prior to re-instatement as acid grassland.

3.33 The permanent track construction will incorporate the same alignment as the previous temporary track where possible, minimising impact to undisturbed land and taking advantage of any residual strength in the existing track. As previously mentioned, the proposed track construction will be of a granular stone material incorporating a synthetic geotextile (geogrid) layer or layers (depending on stone depth) to provide reinforcement.

3.34 An additional geotextile layer will be added, to provide separation at the base of the track in areas where the depth of stone will exceed the minimum pavement depth, to satisfy ecological requirements for protecting the surface of any peat.

3.35 Construction will allow for a stone fill of depressions, ruts and minor seepage channels to build up the levels to pavement formation level. This will be undertaken using the same granular stone as for the pavement formation.

3.36 Stone will be delivered to Site and unloaded at the proposed compound area before being loaded into a tracked dumper and transported to the working area where it will be tipped. Plant will not work ahead of the track.

3.37 Steel road plates (or similar) will be installed in areas along the access track where the geometry is unable to accommodate construction vehicles, to prevent vehicle over-run at the edge of the track.

Programme

3.38 The Proposed Development is for a permanent access track. Subject to planning permission the Proposed Development is anticipated to commence from October 2023 until February 2024.

3.39 The construction programme is set by the legal requirement of the Environment Agency to have completed the statutory measures at March Haigh Reservoir identified in the Reservoirs Act Section 10 report by February 2024 (refer to separate justification report prepared by the application in support of this planning application, Canal & River Trust 2023).

Drainage Considerations

3.40 The drainage and surface water strategy for the access track varies along the track according to the finished ground levels as follows:

- Point A to B (Chainage 0 to 130m) – pavement thickness of 250mm and the top of the track will match the existing ground so that the farmer who will share use of the track can access the track from any direction;
- Point B to C (Chainage 130 to 325m) – pavement thickness of 250mm but with no restrictions on the finished ground level; and
- Point C to D (Chainage 325 to 965m) – pavement thickness of 550mm with the proposed track being largely designed to sit on top of the existing access track.

3.41 The overall philosophy beyond Point C is to provide an unbound track that allows water to flow through, ensuring that the peat either side of the track receives the necessary flow of water and natural water flow is maintained. Through drainage will be achieved by using a base layer of stone of sufficient granular size to allow water to flow through.

3.42 Between Point A and B at Chainage 90 there is an existing culvert of unknown size and condition taking a small watercourse through the farm. This will be retained and replaced as necessary subject to condition.

3.43 Between Point B and C, the drainage strategy will allow for flow of surface water over the track's surface (as is currently the case).

3.44 From Point C onwards, the track will take an elevated position on top of the previous temporary (now buried) track and will sit above the adjacent landform. Culverts will be required to carry the track over three larger watercourses located at Chainage 335m, 795m and 880m. If the existing culverts need to be replaced, the new culverts will be pre-cast concrete. Detailed design will be formalised but is likely to include headwalls faced in re-used stone or other similar locally occurring gritstone at Chainage 335m and Chainage 880m; details are presented in Table 3.2 below.

Table 3.1 Summary of Pipe and Culverts

Chainage (m)	Culvert and Pipe Details (if Replacement Required)
90	Existing culvert of unknown size and condition taking watercourse within the farmland, assumed in need of being replaced (to be confirmed)
335	Replace existing single plastic culvert with 1no. pre-cast concrete culvert, 1050mm diameter and 4m length, pre-cast concrete headwalls and metal railings
795	Installation of a new pre-cast concrete pipe, 1050mm diameter
880	Replace existing twin plastic pipes and three overflow pipes (the latter not in current use) with twin pre-cast concrete culvert, each opening 1050mm diameter, pre-cast concrete headwalls and railings.

3.45 Crossings have been designed to accommodate 1:10 year return events. If exceeded, water will flow over the track and be directed towards the downstream watercourse. Heather bales and/or coir rolls will be positioned at the downstream end of the pipe crossings during construction and held in place with hardwood stakes, to attenuate flow and reduce erosion risk downstream.

3.46 To minimise the potential for peat erosion along the upslope side of the track measures will be incorporated comprising use of coir 'baffles' to attenuate and slow the flow of water and localised reprofiling. These measures will only be deployed where required under guidance from the supervising Ecologist.

3.47 Water quality will be protected during construction with the stone to be used for the access track construction being a suitable rock type, e.g. gritstone, to match the locally occurring geology. Stone will, as far as practicable, be free of fine material that could wash into local watercourses or onto the moor in general. During construction, when some fines may be present, silt traps e.g. heather bales, coir rolls, or straw bales will be used to contain any washout. These will be removed off Site on completion of construction.

Site Compounds

3.48 The main Site compound location is a farmer's field immediately east of Hard Head Clough. This field was previously used to stockpile peat and materials during the earlier temporary track construction, and the stockpiled peat was used to cover over the track in the late 1990s. The compound will be used to provide the main welfare, storage and parking facilities. The compound will need to be surfaced prior to the start of works to infill low spots and provide a suitable base for the installation of site offices, welfare and parking. A suitable geotextile will be used on the ground before stockpiling any excavated peat or construction materials.

Vehicle Movements

3.49 Proposed vehicle movements at the operational stage of the Proposed Development are summarised in Table 3.2 below.

Table 3.2 Proposed Vehicle Movements – Operational Phase

Activity	Frequency	Vehicle	People	Duration
Reservoir Surveillance Inspector[28]	3 times a week*	Welfare van (3-tonne)	2 people	4 Hours
Routine maintenance (Minor repairs) – i.e. repair vandalism damage, pitching repairs	Biannually	Tipper vehicle (7.5-tonne) and Welfare van (3 tonne)	2 to 4+ people	1 to 5 Days
Operation - Valve adjustment to set discharge rate	Weekly	Welfare vehicle	2 People	1 Hour
Grass cutting – General for embankments	4 times per year	Welfare van (3-tonne) plus 4WD (Land Rover and medium-sized trailer)	2 to 4 people	1 Day

[28] *RSI*

Activity	Frequency	Vehicle	People	Duration
Vegetation clearance and removal from structures	4 times per year	Welfare van (3-tonne) plus 4WD (Land Rover and medium-sized trailer)	2 to 4 people	1 Day
Planned Preventative Maintenance[29] within Confined spaces access to Bull Pit, chambers and tunnels– Mechanical cleaning, oiling and replacing	Annually	Welfare van (3-tonne), Tipper vehicle (7.5-tonne)	2 to 4 people	1 Day
Inspecting engineer inspections - Including annual S12 inspection (legal requirement)	Biannually	3 x Private vehicles (2-tonne), Welfare vehicle (3-tonne)	4 to 8 people	1 Day
S10 Inspection (legal requirement)	At least every 10 years	3 x Private vehicles (2-tonne), Welfare vehicle (3-tonne)	4 to 10 people	2 Days
Duty Officer (Access out of hours, all weather, any time, to operate valves)	Emergency	Private vehicle	1 to 2 people	As required
Major maintenance construction works	As a result of defect discovered during routine inspection	*See Liebherr – LTC-1050-3.1	In excess of 10 people	Expect 1 to 6 months
Major emergency	Defect requiring emergency drawdown	As above.	In excess of 10 people	Expect 1 to 6 months
*Note: Liebherr – LTC-1050-3.1 is omitted from turning analysis for the track design. It is assumed this vehicle will not exceed the design loads of a 28-tonne crane.				

[29] *PPM*

4. DESCRIPTION OF PROPOSED RESTORATION OF TEMPORARY CONSTRUCTION PHASES

Introduction

4.1 The Proposed Development comprises an access track that would remain *in-situ* on a permanent basis. Some small areas of cut and the batter along the southern side of the permanent track across the moorland will require some habitat creation to stabilise bare peat areas. This is proposed for acid grassland habitat creation. The installation of the permanent fence along the base of the embankment would have minimal impact on the habitats and soils and as such no restoration is required in this area.

4.2 The only area requiring significant restoration is the temporary Site compound east of Hard Head Clough.

4.3 On completion of works the compound will be re-instated for agricultural use by removing the stone surface or geotextile, spreading over no more than 500mm of peat (as excavated from the moorland section of the track) and re-seeding the field with a suitable native grass and heather seed mix as presented in Table 4.1 below using species that are suitable to the locality and currently present within the Site. The seed mix will be supplemented with seed of additional plant species that will support foraging twite, such as autumn hawkbit (*Scorzoneroides autumnalis*), cat's ear (*Hypochaeris radicata*), sheep's sorrel (*Rumex acetosella*) and common sorrel (*Rumex acetosa*).

4.4 The Applicant will be responsible for restoration of areas affected during the construction phase, with the works being implemented by a contractor under the guidance of a suitably experienced ecologist.

4.5 Further details are provided in the separate BNG[30] assessment (PAA 2023b).

Table 4.1 Upland Acid Grassland Seed Mix

Common Name	Scientific Name	% By Weight
Common bent	*Agrostis capillaris*	40
Sheep's fescue	*Festuca ovina*	40
Wavy hair-grass	*Deschampsia flexuosa*	10
Heather	*Calluna vulgaris*	10
	Total	100

[30] *BNG*

5. ASSESSMENT OF NEED AND ALTERNATIVES

Introduction

5.1 The EIA Regulations Schedule 4, Paragraph 2 requires an ES to include

> *'A description of the reasonable alternatives ... studied by the developer, which are relevant to the proposed project and it's specific characteristics, and an indication of the main reasons for selecting the chosen options, including a comparison of the environmental effects'.*

5.2 In addition, the EIA Regulations Schedule 4, Paragraph 3 requires consideration of the evolution of a site in the absence of development, in other words a 'Do Nothing' option.

Need for the Development

5.3 The need for the development is set out in detail in a separate justification document (Canal & River Trust 2023) which accompanies the planning application. This application is for an essential permanent access track to March Haigh Reservoir for maintenance, inspection, repairs and emergency access. A permanent access track is essential in order to safely manage this high-risk reservoir, and under the most recent Section 10 report for March Haigh the provision of such a permanent access track is now a legal requirement.

Consideration of Alternatives

5.4 The Applicant is legally required to provide a permanent access track to March Haigh Reservoir as it is required as a MIOS under Section 10 of The Reservoirs Act 1975.

5.5 In order to operate March Haigh Reservoir, there is no legal alternative to the construction of a permanent access track. A permanent access track is considered by the Defra-appointed Inspecting Engineer to be an essential requirement to ensure the safety of the reservoir, and to enable the further 24 safety-critical works to be undertaken. A MIOS is a legally binding obligation; failure to provide the track is a criminal offence. Therefore, the only potential alternatives to be considered are:

- An alternative choice of route for the access track; or
- Reservoir discontinuance, if this were to be approved by the Environment Agency as the regulator, and all other necessary approvals were in place to enable works to be completed prior to the February 2024 MIOS deadline.

Do-Nothing

5.6 To ‘do-nothing’ would result in a failure to meet the legal requirement for the Applicant to have carried out these MIOS by February 2024. Under this scenario, the route of the proposed access track would remain in its current state and the reservoir would by necessity have to be decommissioned as summarised below.

Alternative Routes

5.7 The proposed permanent track will largely follow the same alignment as for the previous temporary track route. Two alternative routes have been considered; a northern route that would access the Site from the A640 near Cupwith Hill and a western route from Haigh Gutter following an existing footpath. The northern route is approximately 1.8km in length with four major river crossings and would pass through a large area of blanket bog and other physical constraints

comprising large boulders and a steep ravine, resulting in a tortuous route. The western route is over 2km in length and would be highly visible, crossing two hillsides and steep gradients. In contrast the preferred route (the Proposed Development) is 1km in length and follows a direct and straightforward route, following an existing metalled farm track and relatively level gradients to reach March Haigh Reservoir. The appropriateness of this route was considered in the assessment of the planning application for that temporary track. It was acknowledged in the planning assessment for the temporary track that the alternative routes would require longer tracks and the crossing of blanket bog areas adjacent to steep ravines. The suitability of these alternative routes has been considered again in light of the current requirements. However, the same topographical and visual constraints still apply, the routes are longer and would result in impacts on habitats that have not previously been impacted by the temporary track. There are, therefore, no alternative routes which would provide appropriate access for the required vehicles and equipment needed during an emergency or for maintenance. In addition, using the same alignment as the temporary track reduces the need to construct on undisturbed land.

Reservoir Discontinuance

5.8 If the reservoir was discontinued and drained, with the dam removed so that no substantive residual risk remained, this would preclude the practical need for a permanent access track. It should be noted that a substantial temporary access track would be required to facilitate the significant physical works associated with discontinuance due to the likely significant environmental effects of discontinuing the reservoir this has not been considered further as an alternative.

5.9 In addition, the Applicant has reviewed the need for March Haigh Reservoir the high-level issues around discontinuance. The conclusion of this work is that discontinuance of the reservoir is not considered to be a viable or desirable alternative, for reasons explained in detail in Section 5.1.2. of the separate justification document (Canal & River Trust 2023) that accompanies the planning application.

Alternative Methods if the Track were Not a MIOS Requirement

5.10 Prior to the access track becoming a legal requirement, the Applicant investigated alternative options for access for maintenance works at the reservoir, all of which had been discounted as not feasible. None of these previously explored options are now available to the Applicant as an alternative way of overcoming the safety issues that have been identified.

5.11 Pursuant to the Section 10 report, the Applicant is under a strict legal obligation to provide a permanent access track. The options considered, but no longer available, were:

- Use of low ground pressure all-terrain vehicles;
- Helicopter access; and
- Temporary access track for the planned major civil engineering works.

Use of Low Ground Pressure All-Terrain Vehicles

5.12 Regular use of alternative vehicles such as a Hagglund/Softrack, would form informal irregular tracks and impact on the moorland habitats, with informal tracks likely to evolve and widen over time in an unmanaged way as vehicles sought to avoid ruts and damaged areas, thereby likely causing greater damage over the long term than a well-designed access track. All-terrain vehicles do not satisfy all access requirements, nor can they carry the pumps and plant required to provide maintenance or emergency access.

Helicopter Access

5.13 It would not be possible to utilise helicopters in poor weather when access would be more likely to be required in an emergency. Helicopters have insufficient load capacity for the equipment required. In addition, the altitude and location of the reservoir can mean that helicopter access is prevented by wind or cloud and cannot be relied upon as the primary means of emergency response. The method is also not feasible for the regular small-scale maintenance that is necessary and does not resolve safety concerns with the surveillance visits require two times per week, as a minimum. It is also worth noting that the landing area required would need to be large and be sited within the SAC/SPA, which in itself may require work requiring a planning application, and/or an HRA. In addition, equipment required for use in an emergency would still need to be bought in by road, with helicopters being used to transport sandbags only, so this would not be acceptable from a reservoir safety emergency planning point of view.

Temporary Access Track for Major Civil Engineering Works

5.14 A temporary access track has been used previously at March Haigh in order to complete major maintenance at the reservoir in 1999. Using a similar approach going forward would not address access requirements for regular inspection and maintenance and the failure to complete regular routine maintenance can lead to defects developing with an increased risk of dam failure. A temporary track would also not be a practicable means of access in case of an emergency.

6. LANDSCAPE AND VISUAL IMPACT ASSESSMENT

Introduction

6.1 This Chapter assesses the impact of the Proposed Development, a proposed permanent access track to March Haigh Reservoir, on short, medium and long-distance views and landscape character and resources. The assessment has been carried following the guidelines set out in *Guidelines for Landscape and Visual Impact Assessment*[31] (Landscape Institute[32] and the IEMA 2013) and will assess the effects on both landscape and visual receptors. The Proposed Development, which is described in more detail in Section 3 consists of constructing an all-weather stone surfaced track of 4.0m in width.

6.2 A Technical Appendix supports this assessment, Appendix 6.1, which consists of maps, Representative Viewpoint photographs and Accurate Visual Representation[33] Photomontages of the Proposed Development taken from a number of selected and agreed viewpoints. Appendix 6.2 sets out the Methodology employed for the Visualization of Viewpoints 1 and 8.

About the Author

6.3 Chris Burnett (BSC, BLD and CMLI) is a Chartered Landscape Architect and principal partner of Chris Burnett Associates, a registered practice of landscape architects established in 1985, who specialise in Landscape Visual Impact Assessments of developments in both rural and urban contexts.

Policy Context

National Planning Law, Policy and Guidance

6.4 The National Planning Policy Framework[34], revised in 2021, defines the purpose of the planning system:

> *'to contribute to the achievement of sustainable development' (paragraph 7). The planning system has three overarching objectives: economic, social and environmental, 'which are interdependent and need to be pursued in mutually supportive ways' (paragraph 8). The environmental objective is 'to contribute to protecting and enhancing our natural, built and historic environment; […]'* Paragraph 8c.

6.5 Section 15 of the NPPF; '*Conserving and Enhancing the Natural Environment*', is of particularly high importance in respect of landscape matters. Planning policies and decisions should contribute to and enhance the natural and local environment by:

[31] *GVLIA*

[32] *LI*

[33] *AVR*

[34] *NPPF*

'a) Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the Development plan);

b) Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;

c) Maintaining the character of the undeveloped coast, while improving public access to it where appropriate;

d) Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

e) Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

f) Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'

Local Plan Policies and Designations

6.6 The Proposed Development falls within the jurisdiction of KC who adopted their Local Plan in 2019. The most relevant policy in terms of landscape is Policy '*LP 32 Landscape'* which states:

'Proposals should be designed to take into account and seek to enhance the landscape character of the area considering in particular: a. the need to protect the setting and special qualities of the Peak District National park, views in and out of the park and views from surrounding viewpoints; b. the setting of settlements and buildings within the landscape; c. the patterns of woodland, trees and field boundaries; d. the appearance of rivers, canals, reservoirs and other water features within the landscape.'

Assessment Methodology

6.7 This section of the Landscape and Visual Impact Assessment[35] describes the study area, how baseline information has been gathered, and the method of assessing the level of effects.

Study Area

6.8 The study area for this assessment comprises a 3km area focussed on the March Haigh Reservoir.

[35] *LVIA*

Baseline Surveys

Field Surveys

6.9 Field surveys were undertaken in June and December 2022 and February 2023 to describe, assess and map the current Site and surrounding landscape character and also to photograph the Site from a representative number of viewpoints.

Consultations

6.10 Kirklees District Council were consulted and agreed the selection of 14 Representative Viewpoints to assess the effects of the proposed works construction and operation on views and surrounding landscape. These are represented in Technical Appendix 6.1.

6.11 Views were selected as being representative of the most accessible and the most appropriate type of viewpoint. The principal category of viewpoint in this case were views from public footpaths or roads. However, it should be noted that all of the land surrounding the reservoir is open access land under the Countryside Rights of Way[36] Act and some of the viewpoints were located on this land where they provide a good view of the works and their implications.

6.12 A Zone of Theoretical Visibility[37] map was prepared to illustrate the visibility of the Proposed Development from the surrounding area.

Method of Assessing Level of Effect

6.13 The LVIA was undertaken in accordance with the methodology and approach set out in the GVLIA (2013) produced by the LI and IEMA:

> *'The GLVIA requires that a clear distinction is drawn between landscape and visual effects:*
>
> *Landscape effects relate to the degree of change to characteristics or physical components of an urban area, which together form the character of that landscape, e.g. topography, buildings and vegetation.*
>
> *Visual effects relate to the degree of change to an individual receptor's or a receptor group's view of that landscape, e.g. local residents, users of public footpaths or motorists passing through the area.'*

6.14 The relationship between the effects of the Proposed Development on Landscape and Visual Issues are interdependent, but not exclusively so. The effects will, therefore, be examined in terms of:

Landscape Character Effects

6.15 For the purposes of this study the effects will be focussed on the area surrounding the reservoir which is described as the South Pennine Moors LCA. The effects will include:

- Direct effects on specific landscape elements and resources; and
- Effects that are more subtle in nature, which affect the character of the landscape.

[36] *CRoW*

[37] *ZTV*

Visual Effects

6.16 Visual effects will be focused on the effects of the Proposed Development on people or visual receptors. This is examined through the Representative Viewpoint Approach, in which the effects of the Proposed Development are assessed in short, medium and long-distance views from variety of key locations, all of which are publicly accessible.

6.17 These viewpoints, which have been selected to cover a number of different elevations and angles of view, are located on the most commonly used footpaths.

6.18 The field assessment process occurred in June and December 2022 and February 2023, in which baseline viewpoint photographs were taken using a Canon RP Full Frame Sensor[38] camera using a 50mm lens in accordance with the LI's latest technical advice note on '*Visual Representation of Development Proposals: Technical Guidance Note'* (LI 2019).

6.19 This Technical Guidance Note offers the following advice on the selection of camera and lens type:

> *'The specifications are based on a 50mm Focal Length (FL) and Full Frame Sensor (FFS) combination and are suitable for all types of photography and visualisation […] A 50mm FL sits between 'wide-angle' lenses, which can create distortion towards the edges of images, and telephoto lenses, which can create an unnatural visual 'stacking' effect. Whilst both of these can be effective in artistic photography, the 40° HFoV image captured by a 50mm lens is regarded as being the closest to human eyesight, albeit that we typically have wider peripheral vision. A fixed 50mm FL lens is considered the benchmark for landscape technical photography. A fixed FL lens ensures that the image parameters of every photograph are the same, simplifies the construction of panoramas, and ensures compatibility of photography for all viewpoints[...]FFS digital cameras set a photographic standard which is reliable, well-understood and consistent with professional requirements'*

6.20 In some cases a series of 50mm photographs, each taken from the same location, have been stitched together to form a panorama e.g. Viewpoint 14. The Photomontages conform to Visualization Type 2 according to guidance contained in Technical Guidance note (LI 2019) which is deemed to be an appropriate level of accuracy in these circumstances. The details of each photograph location are recorded in Appendix 6.1 and the approximate route of the Proposed Road is marked on the baseline photograph as a dotted line. However, in two cases, for Viewpoints 1 and 8, an additional method of visualization has also been used. This is a Type 4 Level 3 Visualization and accurately illustrates the nature of the Proposed Development on the views from these two viewpoints as verified views. The methodology employed in the construction of these visualizations is contained in Appendix 6.2.

Defining Level of Effect

6.21 The level of landscape and visual effects can broadly be determined by the interaction of the sensitivity of the receptor and the magnitude of effect with professional judgement playing an important part in identifying the overall values for each receptor category. Effects are described in terms of their **beneficial**, **adverse**, **neutral or no change** effect.

[38] *FFS Full Frame Sensor*

Landscape - Sensitivity of Receptor

6.22 The sensitivity of a landscape receptor is an expression of its ability to accommodate the Proposed Development. Sensitivity is a judgement based on an assessment of the susceptibility of the type of change, or development, proposed with the value of the landscape concerned.

6.23 Susceptibility indicates the ability of a defined landscape receptor to accommodate the Proposed Development:

> *'[…] Without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.'*
>
> (LI 2013, paragraph 5.40).

6.24 A description of how susceptibility would be evaluated for each receptor type is included below in Table 6.1

Table 6.1 Susceptibility of Landscape Receptor

Susceptibility	Criteria
High	Little ability to accommodate the Proposed Development without undue harm.
Medium	Some ability to accommodate the Proposed Development without undue harm.
Low	Substantial ability to accommodate the Proposed Development without undue harm.

6.25 Landscape Value is '*the relative value that is attached to different landscapes by society'* (LI 2013) It is assessed using the following scale as a guide:

Table 6.2 Landscape Value

Value	Description
High	Sites, features or areas of national or international importance with settings of high quality such as World Heritage Sites, Areas of Outstanding Natural Beauty[39], National Parks, Grade I Listed buildings or Registered Parks and Gardens.
Medium	Sites, features or areas of local or regional importance with intact character such as Grade II and Grade II Listed Buildings or Registered Parks and Gardens, Conservation Areas, Scheduled Monuments, local nature site, long distance recreational routes. Tree Preservation Orders[40] and local designations that exhibit wider geographic, cultural or landscape importance.
Low	Areas or features of local importance such as TPO, PRoW and locally listed buildings.

[39] *AONB*

[40] *TPO*

6.26 The overall sensitivity of each landscape receptor would be rated within the range of High-Medium-Low and would be informed by combining the susceptibility and value as described above.

Landscape - Magnitude of Effect

6.27 The magnitude of a landscape effect is assessed in terms of its size or scale, the geographical extent of the area influenced by that effect, and its duration and degree of reversibility and would be rated within the range of Major-Moderate-Minor-Negligible-No Change set out below in Table 6.3.

Table 6.3 Magnitude of Landscape Effect

Category	Criteria
Major adverse landscape effect	The Proposal will result in a total change in the key characteristics of landscape character; will introduce elements totally uncharacteristic to the attributes of the receiving landscape; and/or will result in a substantial or total loss, alteration or addition of key elements/features/characteristics.
Moderate adverse landscape effect	The Proposal will result in a partial change in the key characteristics of landscape character; will introduce elements partially uncharacteristic to the attributes of the receiving landscape; and/or will result in partial loss, alteration or addition of key elements/features/characteristics.
Minor adverse landscape effect	The Proposal will result in a small change in the key characteristics of landscape character; will introduce elements that are not uncharacteristic to the attributes of the receiving landscape; and/or will result in a minor loss, alteration or addition of elements/features/characteristics.
Negligible adverse landscape effect	The Proposal will result in a just discernible adverse change to landscape character/elements/features/characteristics.
Neutral effect	The Proposal will have a neutral or little effect on the landscape character/elements/features/characteristics.
Negligible landscape benefit	The Proposal will result in a just discernible improvement to the landscape character/elements/features/characteristics.
Minor landscape benefit	The Proposal will achieve a degree of fit with the landscape character/elements/features/characteristics and go some way towards improving the condition or character of the landscape.
Moderate landscape benefit	The Proposal will achieve a good fit with the landscape character/elements/features/ characteristics or would noticeably improve the condition or character of the landscape.
Major landscape benefit	The Proposal will totally accord with the landscape character/elements/features/characteristics, or would restore, recreate or permanently benefit the condition or character of the landscape.
No Change	The Proposal will not cause any change to the landscape character/ elements/ features/ characteristics.

6.28 The size and/or scale of change in the landscape takes into consideration the following factors:

- The extent/proportion of landscape elements lost or added;
- The contribution of that element to landscape character and the degree to which aesthetic/perceptual aspects are altered; and
- Whether the effect is likely to change the key characteristics of the landscape, which are critical to its distinctive character.

6.29 The geographical extent of effects relates to:

- The area over which landscape effects are likely to be experienced, i.e. this could be at the site level, the immediate setting of the Site, or landscape character type or area; and
- The area over which visual effects are likely to be visible; and duration.

Visual Receptors - Sensitivity of Receptor

6.30 In terms of assessing the baseline visual sensitivity, key factors to consider are the type of view and the likely numbers and types of viewers (the visual receptors). The type of view and the number of viewers are described in the following terms:

- Glimpsed (i.e. in passing)/Filtered/Oblique/Framed/Open Views; and
- Few/Moderate/Many Viewers.

6.31 The value attached to views has regard to a number of factors, including:

- Recognition through planning designations or heritage assets; and
- The popularity of the viewpoint, its appearance in guidebooks, literature or art, on tourist maps and the facilities provided for its enjoyment.

6.32 The GLVIA identifies that the susceptibility of visual receptors to changes in views and visual amenity is a function of:

- The occupation or activity of people experiencing the view at a particular location; and
- The extent to which their attention or interest may, therefore, be focused on the views and visual amenity they experience at particular locations.

6.33 The assessment of receptor sensitivity is rated on the scale High-Medium-Low and combines judgements on the susceptibility of the receptor to the specific type of development proposed and the value attributed to that receptor, determined from the criteria below.

Table 6.4 Visual Receptor Susceptibility

Susceptibility	Type of Receptor
High	Users of public space, including users of PRoW, whose attention is likely to be focused on the landscape and on particular views. Visitors to heritage assets or other attractions where views of the surroundings are an important part of the experience. Communities where views contribute to the landscape setting enjoyed by residents and Travellers on scenic routes.
Medium	Travellers on road, rail or other transport routes, where the view is moderately important to the quality of the journey. Users of public space, where the view is part of the wider experience of the place.
Low	People at their place of work, where the setting is not important to the quality of working life. Travellers on road, rail or other transport routes, where the view is fleeting and incidental to the journey. People engaged in outdoor sport or recreation, or users of a public space, which does not involve appreciation of views.

Table 6.5 Visual Receptor Value

Value	Criteria
High	Views from landscapes/viewpoints of national importance, or highly popular visitor attractions where the view forms an important part of the experience, or with important cultural associations. An example may be where the viewpoint features a nationally important designated asset as the main focus of the view.
Medium	Views from landscapes/viewpoints of regional/district importance or moderately popular visitor attractions where the view forms part of the experience, or with local cultural associations. The viewpoint may be a good location to view a designated asset of regional/ local importance, or where a nationally important designated asset is not the main focus of the view.
Low	Views from landscapes/viewpoints with limited designations, not particularly popular as a viewpoint and with minimal or no cultural associations. The viewpoint may include designated assets of regional/local importance which do not form the main focus of the view.

Visual - Magnitude of Effect

6.34 The magnitude of a visual effect is assessed in terms of its size or scale, the geographical extent of the area influenced, its duration and degree of reversibility and will be rated within the range of Major-Moderate-Minor-Negligible-No Change or Neutral set out below.

Table 6.6 Magnitude of Visual Effect

Category	Criteria
Major adverse or beneficial visual effect	The Proposal will cause a dominant or complete change or contrast to the view, resulting from the loss, addition or introduction of substantial features in the view and will substantially alter the appreciation or composition of the view.
Moderate adverse or beneficial visual effect	The Proposal will cause a clearly noticeable change or contrast to the view, which would have some effect on the composition, resulting from the loss, addition or introduction of new, features in the view and will noticeably alter the appreciation or composition of the view.
Minor adverse or beneficial visual effect	The Proposal will cause a perceptible change or contrast to the view, but which would not materially affect the composition or the appreciation of the view.
Negligible adverse or beneficial visual effect	The Proposal will cause a barely perceptible change or contrast to the view, which would not affect the composition or the appreciation of the view.
Neutral effect	The Proposal will cause no change in the character of the view.

6.35 The size or scale of change in the view relates to the degree of contrast or integration likely to result from the Proposed Development and is influenced by the relative time over which a view is experienced and whether it is a full, partial or glimpsed view.

Duration of Effect

6.36 Both Landscape and Visual effects may be experienced over a range of timescales. For this assessment, the following timescales are considered appropriate:

- Short-term: one year or below;
- Medium-term: Between one and ten years in duration; and
- Long-term: Greater than ten years in duration.

Level of Effect

6.37 The objective of the assessment process is to identify and evaluate the likely significant effects arising from the Proposed Development for both Landscape and Visual Receptors. The level of effect indicates the importance or gravity of the effect. Table 6.7 is offered in support of professional judgement in determining the level of effect and is used as a guide to the narrative explanation of the nature and level of both landscape and visual effects brought about by the Proposed Development.

Table 6.7 Level of Effect

		Magnitude of Effect				
		Major Effect	**Moderate Effect**	**Minor Effect**	**Negligible Effect**	**No Change or Neutral**
Sensitivity of Receptor	**High**	Major	Moderate	Moderate	Minor	No change
	Medium	Moderate	Moderate	Minor	Negligible	No change
	Low	Moderate	Minor	Negligible	Negligible	No change

6.38 The effects on both landscape and visual receptors is examined for each Representative Viewpoint. The results of this exercise can be found in Appendix 6.1. In each case, the effect of the Proposed Development is compared with the baseline condition or view and an assessment made in terms of receptor susceptibility, value of landscape setting or view, receptor sensitivity and magnitude of effect. A judgement is then made as to whether the effect is of a major to negligible level of effect using the Level of Effect Matrix in Table 6.7 and then a judgement made as to whether the effect is **significant** or **not significant** in EIA terms. For the purposes of this LVIA, which has been undertaken in the context of an ES, effects of **Moderate** and above are considered to be **Significant**. Those values of Minor and below are, therefore, deemed to be **Not Significant**. A professional judgement is then made as to whether the effect is of an adverse or beneficial or neutral in nature.

Baseline Conditions

Landscape Baseline

6.39 Kirklees District Council carried out a Landscape Character Assessment in 2015 (KC 2015) in which the district was separated into character areas of homogenous landscape character. The Proposed Development lies within the **High Moorland Plateaux Landscape** type and **LCA1 The South Pennine Moors LCA**. The Character Assessment records the following as a summary of the Key Characteristics.

Topography, Geology And Drainage

- A series of even ridges which form a large-scale sweeping plateau which ranges in elevation between 300m and 450m;
- The landform drops in elevation from west to east/ north to south and wraps around March Haigh Reservoir and the upper section of Haigh Clough;
- Large number of streams, cloughs and waterfalls create incisions in the plateau, radiating towards the reservoir and main watercourse (River Colne to the east); and
- The underlying Millstone Grit geology creates distinctive physical features such as frost weathered tors, which crown some of the moorland summits.

Woodland Cover

- Woodland cover is sparse, owing to the elevation and exposure of the landform.

Land Use And Field Patterns

- Land cover is dominated by open moorland and extensively grazed as common land. Some small areas of enclosed pasture fields are evident on lower slopes; and
- Typically an open and unenclosed landscape. Boundaries, where they do exist, are mostly dry-stone walls or post and wire fences.

Semi-natural Habitats

- Mosaic of upland habitats including heather moorland, blanket bog, acid grassland and wet and dry heathland.
- Much of the area is contained within the South Pennine Moors SAC, SPA and SSSI. recognised for its heathland, bogs and fens and its international importance for upland breeding bird populations.

Archaeology and Cultural Heritage

- Important archaeological landscape with strong historic interest dating from prehistoric times to the Industrial Revolution.

Settlement and Road Pattern

- Remote and sparsely settled landscape with isolated farmsteads focused on the lower lying, sheltered areas in the Haigh Clough valley; and
- The A640 provides the key route through the area, crossing the moorland plateau to the north.

Views and Perceptual Qualities

- Open in character, with expansive views and wide areas of inter-visibility, particularly to the PDNP to the south and north across Moss Moor in Calderdale;
- The far-reaching views reveal the contrast between the sparsely settled upland moorland of this LCA and the densely populated below;
- A perception of remoteness, isolation and wildness provided by the altitude, absence of trees and settlements and expansive nature of views; and
- The neighbouring LCA, which lie in close proximity to the Proposed Development are **D7 The Peak Fringe Upland Pastures** and **F4 Settled Valley of Colne** (**Slaithwaite, Marsden**)

Landscape Character of the Site

6.40 The landscape character of the Site fits well with the characteristics of LCA1 the South Pennine Moors. It consists of open moorland which is unenclosed with few boundaries. Natural springs and cloughs, some of which are deep and incised are a common feature of the landscape. Where boundaries do exist, they are dry stone walls or post and wire fences. Settlement is sparse and restricted to the eastern end of the Site where buildings associated with the White Hall Farm and Lower Green Owlers Farm occupy prominent positions in the landscape. Small fields are also associated with these settlements. The line of an existing track, which the proposed access track

follows, is just discernible in the landscape. Trees are few and far between, with only a few scrubby willow occurring along the line of the existing track.

6.41 March Haigh Reservoir itself, with its earth dam and triangular water body, is a prominent feature of the landscape and more so from higher elevations.

Views and Visual Baseline

6.42 Visual perception is a very important part of the experience of any visitor to this area and a major part of this remote area's attraction. The landscape is very open with long distance views a key feature of its special character. Much of the perception is dynamic in nature as the view unfolds and changes as the visitor enters and travels along the many footpaths that provide access to this landscape. Most visual receptors are drawn from walkers of footpaths, apart from those residents who reside in properties which surround the Site. Table 6.8 sets out the Viewpoints and receptor categories assessed.

6.43 The visual baseline is illustrated with reference to the photographs that capture the view from a series of Representative Viewpoints in Appendix 6.1.

Identification and Evaluation of Construction Effects

Construction Effects

6.44 Procedures involved in the construction of the new proposed access track will be intrusive and adverse in nature as they are associated with noisy machinery and disruptive operations, which are unavoidable in any large-scale construction project such as the Proposed Development. They will, however, be time-limited, so the duration of these effects is judged to be short-term in nature. The same receptor groups will be affected as those considered under Operational Effects (see below) and the sensitivity of both landscape and visual receptors is medium to high. The magnitude of effect for the construction phase is judged to be moderate adverse which translates to a level of effect value of **moderate adverse.**

Identification and Evaluation of Operational Effects

Landscape Effects

Introduction

6.45 The assessment of landscape effects deals with the effects of change caused by a development on the landscape when considered as a resource. The concern here is with how the Proposed Development will affect the elements that make up the landscape, and its distinctive character. Effects can be caused by:

- Change in and /or partial or complete loss of elements, features or aesthetic or perceptual aspects that contribute to the character and distinctiveness of the landscape;
- Addition of new elements or features that will influence the character and distinctiveness of the landscape; and
- Combined effects of these changes on overall character.

6.46 The nature of the effect can be understood by assessing the sensitivity of the landscape and magnitude of change brought about by the Proposed Development.

Landscape Character – Sensitivity Assessment

6.47 Sensitivity is assessed as a function of the receptor's landscape character, in this case, capacity to accommodate change combined with an assessment of its value. In terms of the landscape character, the area in which this Proposed Development is located is open, moorland in character and largely undeveloped. The Proposed Development is outside the PDNP. The setting is accentuated by the valley in which the Proposed Development sits, forming a natural amphitheatre largely free of development of any kind apart from March Haigh Reservoir itself and a cluster of farm buildings. This implies a high sensitivity but with some ability to accommodate development without undue harm. Accordingly, landscape susceptibility is judged to be **medium**.

6.48 As far as landscape value is concerned, a similar situation applies. As the Landscape Character Assessment (KC 2015) acknowledges:

> *'In the west of the District, upland unenclosed moorland provides a continuation of character from the Peak District National Park, which provides a dramatic backdrop to many views throughout Kirklees and contains internationally valued upland heath, bog and scrub habitat.'*

6.49 In terms of designations, the Proposed Development lies outside the PDNP which is a landscape of the highest designation although it is in close proximity to it. As a consequence the landscape value is also judged to be **medium**.

6.50 It follows, therefore, that the overall sensitivity value for this component of the landscape receptor category, landscape character, is **medium.**

Landscape Resources – Sensitivity Assessment

6.51 Landscape resources are those elements that comprise the landscape and can range in scope from woodland, trees, hedgerows to natural or semi natural vegetation cover. The predominant resource in this case is peat and its associated vegetation. This resource is a sensitive and valuable one, acknowledged by its designation as a South Pennine Moors SSSI, the South Pennine Moors SAC and the South Pennine Moors (Phase 2) SPA protected areas.

6.52 Overall, therefore, the sensitivity of landscape resources affected is judged to be **high** in this case.

Landscape Character – Magnitude of Change

6.53 Tracks are often a feature of this landscape, as manifested by several trails in the area including the Pennine Way and Standedge trail, but in this instance the Proposed Development is located in an open moorland setting where manmade intrusions are limited. It is also situated in a highly visible location. The footprint of the Proposed Development, for the most part, does follow, however, the route of a former track, albeit one that has fallen into disuse over time and is now barely discernible. The track has been designed for regular, if infrequent, use by 3.5-tonne/4 x 4 vehicles. Scheduled inspections using these vehicles will be three times a week. For routine reservoir O&M and for emergencies larger vehicles may be required to use the track. This is clearly a change to the status quo. Therefore, considering all of the above factors, the magnitude of change is judged to be **minor adverse**

Landscape Resources – Magnitude of Change

6.54 In terms of resources there will a loss of moorland as a result of the Proposed Development. In total, the footprint of the 4.0m wide track will result in 0.5959ha of moorland being lost (this includes degraded blanket bog, acid flush and acid grassland habitats). However, in the context of the extent of surrounding moorland, this is not judged to be considerable loss although the track does extend over a reasonable distance. No walls or significant trees will be lost as a result of this development. A value **of minor adverse** is, therefore, recorded.

Landscape Effects – Level of Effect

6.55 Using Table 6.7 to support the assessment of the level of effect, which is a combination of judgements made on the sensitivity of the receptor and magnitude of change involved, the levels of effect can be determined. In both cases, landscape character and landscape resources the landscape has been judged to have medium sensitivity with a magnitude of change judged to be minor adverse in scope. The level of effect value therefore is judged to be minor adverse. This is **not significant** in Environmental Agency Regulation terms.

Visual Effects

6.56 A Representative Viewpoint approach has been used to assess the proposed works in developing a proposed, permanent access track to March Haigh Reservoir. A total of 14 viewpoints have been selected and agreed with Kirklees District Council, two of which, Views 1 and 8, were selected for photomontage. Information on the viewpoints are summarized in Table 6.8.

Table 6.8 Representative Viewpoints

No.	Viewpoint Location	Receptor Category	View Type	Distance from Proposed Development (m)
1	Buckstones Public Car Park	Visitors in vehicles, walkers or people engaged in recreation	Panoramic	530
2	Start of footpath on A640	Road users, walkers or people engaged in recreation, residents of Buckstones House	Panoramic	910
3	A640	Road users	Panoramic	1130
4	A640	Road users	Panoramic	1340
5	Public footpath	Walkers. people engaged in recreation and residents in White Hall Farm	Panoramic	0
6	Public footpath	Walkers. people engaged in recreation	Panoramic	100
7	Reservoir	Walkers or people engaged in recreation	Panoramic	300
8	Reservoir	Walkers or people engaged in recreation	Panoramic	50
9	Footpath	Walkers or people engaged in recreation	Panoramic	520
10	Road user	Road users	Panoramic	1000
11	Public footpath	Walkers or people engaged in recreation	Panoramic	450
12	Public footpath	Walkers or people engaged in recreation	Panoramic	310
13	Public footpath	Walkers or people engaged in recreation	Panoramic	305
14	Public footpath	Walkers or people engaged in recreation	Panoramic	275

Zone of Theoretical Visibility

6.57 Nextmap 5m DSM data and 10K vector mapping was used to produce a ZTV map which is included in Appendix 6.1. The ZTV illustrates that although the development will be visible over a wide area it will be contained, to a degree, by topography. This means that the Proposed Development will not be visible beyond the surrounding ridges such as Way Stone edge to the north Standedge to the west or Pule Hill to the south. Nor will it be visible from the town of Marsden which is a situated for the most part in an incised clough. Nonetheless, within the ZTV it is widely visible especially at higher elevations.

Visual Effects – Receptor sensitivity

6.58 In terms of sensitivity, it is worth noting that the Proposed Development lies outside the PDNP Authority, although in terms of landscape character it is considered to be more or less continuous. Nonetheless the landscape does not fall into the highest category, i.e. a landscape designated to be of National importance.

6.59 So, dealing first with susceptibility to change, the receptor types are judged to fall into two categories: 1), the **high** category:

> *'Users of public space, including users of PRoW, whose attention is likely to be focused on the landscape and on particular views; Visitors to heritage assets or other attractions where views of the surroundings are an important part of the experience; Comm*
>
> *unities where views contribute to the landscape setting enjoyed by residents; and Travellers on scenic routes.' (Table 6.4 of this ES)*

6.60 And 2), the **medium low** category:

> *'Travellers on road, rail or other transport routes, where the view is moderately important to the quality of the journey' (Table 6.4 of this ES)*

6.61 In terms of Visual Receptor Value, however, the category is judged to be **medium**:

> *'Views from landscapes/viewpoints of regional/district importance or moderately popular visitor attractions where the view forms part of the experience, or with local cultural associations. The viewpoint may be a good location to view a designated asset of regional/ local importance, or where a nationally important designated asset is not the main focus of the view' (Table 6.5 of this ES).*

6.62 Logically, therefore, a judgement of **medium** to **high** applies to visual receptor sensitivity for the most sensitive viewpoints i.e. viewpoints which lie on footpaths in open moorland and **medium** to **low** for those viewpoints which are from public roads or on footpaths which are not in open moorland settings.

Visual Effects: Magnitude of Effect

6.63 The magnitude of effect is now examined in relation to each of 14 the Representative Viewpoints that have been selected. The effects are both static and dynamic. Static in that a stone surfaced track of approximately 4.0m width will be introduced into an open moorland environment and dynamic in that vehicles will use the track on a regular, if infrequent, basis.

Viewpoint 1 (AVR Photomontage)

6.64 This viewpoint is located on the edge of a public car park at Buckstones, with panoramic views across open moorland below to the distant Pennine hills beyond. The entire length of the track is visible below. The existing track is also visible but no more than a thin dark line that is not readily identifiable. The Proposed Development is barely legible in this view as the AVR photomontage demonstrates effectively. Its linear nature resembles many similar lines in the landscape such as

dry-stone walls or narrow cloughs and it does not stand out as an intrusive scar in this view. Nonetheless, it cannot be regarded as an improvement or enhancement to the existing baseline in landscape or visual terms, so an adverse effect is registered. In terms of magnitude of effect a judgement of negligible adverse is recorded for this viewpoint. This translates to a level of effect value of **negligible adverse** which is **not significant** in EIA Regulation terms.

Viewpoint 2

6.65 This viewpoint is situated at the start of the Public Footpath across the slope above March Haig to the Dean. Receptor sensitivity is, therefore, judged to be high. It also represents the view from Buckstones House which is on the opposite side of the road. Most of the Proposed Development will be visible in this view, albeit in telescoped form, and one that occupies only a small proportion of the view. The impact is substantially mitigated by distance however, so the magnitude of effect value in this view is judged to be negligible adverse which translates to a value of **minor adverse** which is **not significant** in EIA Regulation terms.

Viewpoints 3 and 4

6.66 A similar situation applies for these two viewpoints, which are both located on the A640 and provide elevated panoramic views down the valley. The Proposed Development is seen in a telescoped way from both viewpoints and will be fully, but distantly, visible**.** Once again, the proposed access track will be barely legible in this landscape although vehicles when using it will be prominent features. The introduction of a new track into this environment, however, cannot be regarded as an enhancement and so the effect is once again judged to be adverse. A value of negligible adverse is therefore recorded for these viewpoints for magnitude of effect, in the context of medium receptor sensitivity, which translates to a level of effect of **negligible adverse** which is **not significant** in EIA Regulation terms.

Viewpoint 5

6.67 This viewpoint represents a close-up view of the Proposed Development from its origin adjacent to White Hall Farm. A farm track is also part of this view but has been grassed over through irregular use. Other than the barn, hard features are represented by post and wire fences and dry stone walls but the landscape is essentially a soft one, typical of many moorland views in the area. Buckstones House is seen on the horizon along with vehicles on the A640 and March Haigh Reservoir dam is seen in the middle distance. The Proposed Development will follow and formalize the existing track in the foreground before wrapping around the buildings and running behind the drystone wall. The levels are such that the new track will likely be concealed by the existing moorland grasses and rushes and also by the wall. Vehicles using the track will, however, be prominent. Rising ground will ensure that the more distant elements of the route are obscured. On balance, therefore, a value of no change/neutral is registered for this location in terms of magnitude of effect which translates into **no change/neutral** for level of effect. This is **not significant** in EIA Regulation terms.

Viewpoint 6

6.68 This viewpoint is located along the public footpath which runs along the upper sections of Haigh Clough. The sense of open, moorland character is stronger here than previous viewpoints with limited features which are manmade in the view, other than the reservoir dam but this is a distant and recessive feature and is not unduly prominent. Traces of the former track are also visible but only in a vestigial way. The proposed, permanent, access track will become a prominent feature in this view and will be visible for much of its length as an intrusive and clearly manmade structure.in an open moorland setting. As such, the magnitude of effect value is considered to be moderate adverse in these circumstances which translates into **moderate adverse** level of effect values in the context of medium high receptor sensitivity which is **significant** in EIA Regulation terms.

Viewpoint 7

6.69 Located on the south western corner of the reservoir dam, this views shows the entire length of the proposed access track as it runs at ground level above Haigh Clough following the line of the old track. The Proposed Development will be in full view here and will appear as a prominent feature in this view as an intrusive and clearly manmade linear structure in an open moorland landscape where moorland character is strong. The concrete and stone culvert crossings of one of the principal streams which flow down the hillside into Haigh Clough will also be visible from this viewpoint, together with railings and snow poles. As this viewpoint location is not on a designated right of way but on CRoW Act open access land, the visual receptor sensitivity is judged to be medium. Magnitude of effect, in this case, is judged to be moderate adverse for the reasons outlined above which translates to a **moderate adverse** level of effect which is **significant** in EIA Regulation terms.

Viewpoint 8 (AVR Photomontage)

6.70 Also located on the dam, but at the north eastern end, this viewpoint illustrates the manner in which the proposed track will access the dam. This view shows the way in which the proposed access track successfully integrates itself into the underlying topography. The moorland grasses effectively soften the impact of the track and its route is far from straight, allowing it to follow the undulating terrain successfully. As a result, the profile and footprint of the track becomes discontinuous. Nonetheless, the Proposed Development cannot be regarded as a landscape enhancement measure, so the effects are registered as adverse. Vehicles will also be very prominent, particularly on the approach to the dam. A magnitude of effect value of minor adverse, therefore, is registered for this viewpoint which, in the context of medium receptor sensitivity translates into a level of effect value of **minor adverse** which is **not significant** in EIA Regulation terms.

Viewpoint 9

6.71 This viewpoint is situated at the intersection with a path from the reservoir with a well-used footpath from the valley and offers a view of the start of the proposed access track. Only a short section of the track will be visible from this location as a combination of topography, existing moorland vegetation and a dry-stone wall obscure much of it. Distance also plays its part in lessening the impact of the Proposed Development. As a consequence, a magnitude of effect value of no change / neutral is registered for this viewpoint which translates to a value of **no change/neutral** level of effect which is **not significant** in EIA Regulation terms.

Viewpoint 10

6.72 This viewpoint is a representative Viewpoint both from the A62 and the Standedge Trail which coalesce at this point. The majority of the proposed track will be visible in this view but because the viewpoint is more or less at the same elevation as the track, moorland vegetation is likely to obscure much of it. Distance plays a part in reducing the effects substantially. Accordingly, a value of negligible adverse is recorded for this viewpoint in terms of magnitude of effect in the context of medium receptor sensitivity. This translates to a level of effect value of **negligible adverse** which is **not significant** in EIA Regulation terms.

Viewpoint 11

6.73 Located on the Public Footpath which crosses the slope from the A640 to The Dean only a short section of the Proposed Development will be visible from this viewpoint. This is because the route of the track is largely concealed by topography running as it does on the upper slopes of Haigh Clough. The upper section, as it accesses the reservoir, will be clearly visible however, and represents a minor visual intrusion into an open moorland setting. A value of negligible adverse is registered for magnitude of effect here which translates into a **minor adverse** level of effect which is **not significant** in EIA Regulation terms.

Viewpoint 12

6.74 A similar situation applies here but both ends of the proposed track will be visible. Once again, however, a combination of topography and surface vegetation will combine to reduce the impact of the proposed access track such that a value of negligible adverse is recorded for magnitude of effect here. This translates into a **minor adverse** level of effect which is **not significant** in EIA Regulation terms

Viewpoint 13A (looking south west)

6.75 Only a short section of the end of the track will be visible in this view as most of it is obscured by topography. Its effects are reduced also due to the prominence of the reservoir itself, a large manmade structure which dominates the view. In this context, a value of negligible adverse is recorded which, in the context of high receptor sensitivity, translates into a level of effect value of **minor adverse** which is **not significant** in EIA Regulation terms.

Viewpoint 13B (looking south east)

6.76 A much longer section of the proposed access track will be visible here which is in close proximity to the viewpoint and viewed from a higher elevation. However, the moorland character is diluted to some extent, in this view, by clusters of farm buildings and fields with walled enclosures, both in the foreground and background. In these circumstances, therefore, the magnitude of effect is judged to be negligible adverse which translates, in the context of high receptor sensitivity, into a value of **minor adverse** level of effect which is **not significant** in EIA Regulation terms.

Viewpoint 14

6.77 The whole length of the proposed track will be visible from this well used public footpath above Lower Green Owlers. Receptor sensitivity is lower here as views of the development only become visible when the route of the footpath descends into a domestic setting and follows a route along a well-worn farm track amongst buildings. Receptor sensitivity is, therefore, judged to be medium low in this context. The character of the landscape in this view is mixed with open moorland but also influenced to a significant degree by manmade features such enclosed pasture and farm buildings. The proposed access track will intrude to a degree but the bulk of it, before it is obscured by topography, will be in the context of this domestic agricultural landscape. The magnitude of effect is judged to be minor adverse as a consequence. This translates to a level of effect value of **minor adverse** which is **not significant** in EIA terms.

Duration

6.78 This Proposed Development can be regarded as long-term, i.e. greater than ten years.

Summary of Visual Effects

6.79 The following table, Table 6.9, summarizes the effects from all 14 selected Representative Viewpoints in relation to the sections of track concerned. In most cases the effects are judged to be **minor** to **negligible adverse** but in two cases, effects are judged to be **moderate adverse**.

Table 6.9 Summary of Effects

Viewpoint	Receptor Sensitivity	Magnitude of Effect	Level of effect
1	High	Negligible adverse	Negligible adverse
2	High	Negligible adverse	Minor adverse
3	Medium	Negligible adverse	Negligible adverse
4	Medium	Negligible adverse	Negligible adverse
5	High	No change/neutral	No change/neutral
6	High	Moderate adverse	Moderate adverse
7	Medium	Moderate adverse	Moderate adverse
8	Medium	Minor adverse	Minor adverse
9	High	No change/neutral	No change/neutral
10	Medium	Negligible adverse	Negligible adverse
11	High	Negligible adverse	Minor adverse
12	High	Negligible adverse	Minor adverse
13A	High	Negligible adverse	Minor adverse
13B	High	Negligible adverse	Minor adverse
14	Medium	Minor adverse	Minor adverse

Mitigation and Enhancement

6.80 The very nature of the Proposed Development infers that there is little scope for mitigation measures to reduce the level of impact in terms of route. Any significant tree planting, for instance, apart from being an uncharacteristic feature of this landscape, would only serve to draw attention to it. Similarly, earth mounding would only make the Proposed Development more prominent and disturb more land. However, as the design has progressed, various features have been employed to reduce the effects of the Proposed Development as far as possible. These include restricting the width to 4.0m (using excavated peat on the embankments to the track, using 1.0m high snow poles painted invisible green, using fencing painted invisible green and ensuring the track matches the local topography and follows the route of the former track as closely as possible. At this stage, it is expected that the existing culverts will need to be replaced with like-for-like diameter new concrete culverts and headwalls. However, it is possible that upon further detailed inspection during the early stages of construction it could be established that the existing culverts *in situ* are, in fact, satisfactory and do not need replacing. Indicative details relating to a potential design solution for new culverts as a replacement are submitted with the application and have been considered in this assessment. However, full, and final designs including any mitigation measures will not be prepared until it is confirmed both that culverts need to replaced.

Cumulative Effects

6.81 In terms of cumulative effects, the most significant scheme is the one which affects Haigh Clough. This will involve the planting of *c.*50ha of native broadleaved woodland and successional scrub by combined parties such as the National Trust, the Woodland Trust, Yorkshire Water etc. This, over time, will have a dramatic effect on the landscape as the Clough becomes woodland. It will also have an equally dramatic cumulative effect on the effects of the Proposed Development, which will become much less prominent as the trees mature and (from some viewpoints) views of

the proposed access track are likely to be obscured entirely. The effect is assessed as being of a **moderate beneficial** level which will be **significant** in EIA Regulations terms.

Residual Effects

6.82 The residual effects will remain the same as recorded for the operational effects as all mitigation measures proposed have been included.

Conclusions

6.83 Introducing a track into a sensitive open moorland setting is not without its challenges and the LVIA has examined the effects of such a development on landscape character and resources and from a range of distances and elevations.

6.84 Receptor sensitivity has been judged in landscape terms to be **medium** and, in visual receptor terms, to be **medium high.**

6.85 For both categories, the effects are judged to be **minor adverse** as the proposed access track is a functional device that cannot be regarded as a landscape enhancement measure. However, various measures have been adopted in its design which help to mitigate the overall effects. These include restricting the width to 4.0m, using excavated peat on the embankments to the track to avoid taking it off site, using 1.0m high snow poles painted invisible green, using fencing painted invisible green, ensuring the track matches the local topography and follows the route of the former track as closely as possible.

6.86 In landscape effect terms, the effects of the Proposed Development are judged to be **minor adverse,** which is not significant in EIA Regulation terms and in accordance with the methodologies used in this assessment.

6.87 In visual effect terms, the effects are also judged to be adverse but vary in scale depending on distance and elevation. In the overwhelming majority of cases the effects of the proposed access track are limited with 12 of the values judged to be minor/negligible or no change. This is **not significant** in EIA Regulation terms. There are only two views in which a moderate adverse effect is recorded, and these are from footpaths in close proximity to the Proposed Development. These effects are **significant** in EIA Regulation terms.

6.88 In cumulative effects terms, when the Haigh Clough woodland planting scheme matures then the operational effects of the Proposed Development will subside rapidly and, in some cases, register no impact at all where the tracks becomes obscured by trees.

7. ECOLOGY AND BIODIVERSITY ASSESSEMENT

Introduction

7.1 This Chapter deals with the assessment of the effects of the Proposed Development on ecology and biodiversity. Additional detail on hydrology, water chemistry and the peat resource is presented in Chapter 8.

7.2 The assessment has been carried following the guidelines set out the in the Chartered Institute for Ecology and Environmental Management[41] *'Guidelines for EIA in the UK and Ireland - Version 1.1'* (CIEEM 2018) referred to hereafter as 'the guidelines'.

7.3 The Chapter is supported by a number of technical appendices, comprising:

- Appendix 7.1 - Phase 1 Habitats and National Vegetation Classification[42] Survey;
- Appendix 7.2 - Breeding Bird Survey Report;
- Appendix 7.3 - Water Vole and Notable Species;
- Appendix 7.4 - Fungi Survey;
- Appendix 7.5 – Desk Review.

7.4 A separate Shadow HRA been prepared (PAA 2023a) and should be read in conjunction with this Chapter.

7.5 This Chapter also includes a summary of the BNG calculation in accordance with the Defra Biodiversity Metric 3.1 to quantify habitat losses and gains. The full BNG assessment and completed Metric is presented as a separate report (PAA 2023b).

About the Author

7.6 This Chapter has been prepared by Sarah Ross, BSc. (Hons), PhD., MCIEEM[43] and Chartered Environmentalist. Sarah is the Associate Director of PAA, a long-established ecological consultancy, with expertise in the survey, assessment, management and restoration of upland and peatland habitats. Several collaborators have also contributed to the collection and interpretation of field data, as detailed in the accompanying Technical Appendices.

Consultation

7.7 A pre-application consultation was undertaken with KC in November 2022 and a formal EIA Screening Request and Scoping Request was also submitted in November 2022. An EIA Screening and Scoping Opinion from KC was received on 16th January 2023 and a pre-application consultation response was received from KC on 19th January 2023.

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[41] *CIEEM*

[42] *NVC*

[43] *Full member of CIEEM*

7.8 The Scoping Opinion confirms that the EIA should include an EIA, a BNG assessment using Defra Metric 3.1 and include measures and opportunities for enhancement and improving connectivity with wider ecological networks.

7.9 The pre-application consultation response provides further details of relevant constraints and Kirklees Local Plan policies, including identification of the requirement for a +10% net gain is demonstrated through the use of the Defra Metric 3.1.

7.10 Consultation with Natural England was also carried out in February 2023.

7.11 In summary, the issues raised and addressed in this Chapter are:

7.12 Consideration of direct effects, both permanent and temporary, on designated features of the South Pennine Moors SSSI, the South Pennine Moors SAC and the South Pennine Moors (Phase 2) SPA;

- Consideration of indirect effects on adjacent degraded blanket bog habitat and measures to avoid adverse impacts;
- The need for Appropriate Assessment to satisfy the requirements of the Habitat Regulations;
- Assessment of effects on breeding bird interest associated with the SSSI and the SPA;
- Effects on secondary features i.e. not in themselves notified features of the SSSI/SAC and SPA but with potential to indirectly support designated features, for example, streams and flushes;
- Identification and mapping of habitat features;
- Opportunities to enhance the SSSI and associated features adjacent to the route; and
- Other potential impacts protected species (water vole[44], reptiles and mountain hare[45]).

Policy and Legislative Context

International and National Policy and Legislation

7.13 A range of international and national legislation has been established in the UK to protect important nature conservation sites and priority species. At the international level, European Union[46] Directives require individual member states to implement their conservation provisions nationally for the benefit of Europe as a whole. These Directives have been transposed into UK law by the Conservation of Habitats and Species Regulations 2010 (further amended in 2011 and 2012); further details can be obtained from the Joint Nature Conservation Committee[47] website at www.jncc.defra.gov.uk.

[44] *Arvicola amphibius*

[45] *Lepus timidus*

[46] *EU*

[47] *JNCC*

7.14 Other international conventions include: the Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979), which requires the maintenance of populations of wild flora and fauna, giving particular protection to endangered and vulnerable species; and the Bonn Convention on the Conservation of Migratory Species of Wild Animals (1979), which requires the protection of migratory species throughout their entire range. The above conventions are implemented in England and Wales via the Wildlife and Countryside Act[48] (1981) (as amended) and the CRoW Act 2000. This legislation also protects important habitats and sites such as SSSI.

7.15 At the national level, the UK Post-2010 Biodiversity Framework published in 2012 is the Government's response to the Convention on Biological Diversity (2010). It describes the UK's biological resources, commits a detailed plan for the protection of these resources within the UK's devolved framework across England, Wales, Scotland and Northern Ireland. The document identifies future priorities for nature conservation and adopts a more strategic approach, including ecosystem services and sustainability alongside biodiversity. Despite administrative changes following devolution, there is still an underlying objective of protecting and enhancing a range of priority species and habitats, often still based on the objectives and classifications of the original UK Biodiversity Action Plan[49]. Biodiversity 2020 is England's national biodiversity strategy. Building on the Natural Environment White Paper published in 2011, this provides a means of delivering the international and EU commitments to biodiversity. Under Biodiversity 2020, Priority Species and Habitats referred to are those of '*Principal Importance'* for the conservation of biodiversity in England listed on Section 41 (England) of the Natural Environment and Rural Communities[50] Act 2006.

7.16 Finally, the NPPF (last updated in 2021) provides guidance for local authorities on the content of the Local Plans and is a material consideration in determining planning applications. The NPPF has replaced much existing planning policy guidance, including Planning Policy Statement 9: Biological and Geological Conservation.

7.17 Briefly, with an overall focus on sustainable development, the NPPF states that developments should aim to engender positive outcomes for biodiversity, with a particular focus on the maintenance and creation of ecological networks. Furthermore, the NPPF also states that any planning proposals for which significant negative impacts on biodiversity cannot be avoided, mitigated or compensated should be refused. Biodiversity 2020 Priority Species are also referred to as 'species of principal importance' for the conservation of biodiversity in England within Section 74 of the CRoW Act 2000, and Sections 41 (England) of the NERC Act 2006. The NPPF states that the planning system should contribute to and enhance the natural environment through a range of actions, including:

- Protecting and enhancing valued landscapes, geological interests and soils;
- Recognising the wider benefits of ecosystem services; and
- Minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

[48] *WCA*

[49] *BAP*

[50] *NERC*

Local Planning Context and Policy

7.18 The Proposed Development lies in open moorland within the Southern Pennines LCA. The Southern Pennines are part of the Pennine ridge of hills, lying between the PDNP and the Yorkshire Dales National Park. The LCA document (KC 2015) describes the general character as:

- A landscape of large-scale sweeping moorlands, pastures enclosed by drystone walls, and gritstone settlements contained within narrow valleys;
- Containing internationally important mosaics of moorland habitats that support rare birds such as merlin, short-eared owl and twite;
- Peat soils, including blanket bog, that store significant volumes of carbon;
- High rainfall and impervious rocks important for water supply, with many reservoirs supplying water to nearby conurbations; and
- Important for recreation due to the extensive open access areas and footpaths which are often within easy reach of towns.

7.19 Within the Kirklees District LCA the Site is situated in the High Moorland Plateaux of the Southern Pennines. This part of the LCA is adjacent to the PDNP, which is located to the south. The LCA is, therefore, a continuation of the wider moorland expanses of the National Park, contributing to the flow of landscape character beyond the National Park boundary (which is recognised as one of the National Park's 'special qualities').

7.20 The Proposed Development is classified as being within the Uplands area of the Biodiversity Opportunities Zones mapping developed by KC, part of the Dark Peak NIA and also within the Heathland Wildlife Habitat Network.

7.21 Kirklees Local Plan[51] - Policy LP30 Biodiversity and Geodiversity establishes that the Council will seek to protect and enhance the biodiversity and geodiversity of Kirklees, including the range of international, national and locally designated wildlife and geological sites, Habitats and Species of Principal Importance and the Kirklees Wildlife Habitat Network. The policy refers specifically to the need to demonstrate that Proposed Development that may harm the interest features of protected areas or negatively impact protected species will need to clearly demonstrate that the need outweighs the harm and that suitable compensatory measures are secured.

7.22 Policy LP30 also considers BNG and states that development proposals will be required to:

> *'(i) result in no significant loss or harm to biodiversity in Kirklees through avoidance, adequate mitigation or, as a last resort, compensatory measures secured through the establishment of a legally binding agreement;*
>
> *(ii) minimise impact on biodiversity and provide net biodiversity gains through good design by incorporating biodiversity enhancements and habitat creation where opportunities exist;*
>
> *(iii) safeguard and enhance the function and connectivity of the Kirklees Wildlife Habitat Network at a local and wider landscape-scale unless the loss of the site*

[51] https://www.kirklees.gov.uk/beta/planning-policy/pdf/local-plan-strategy-and-policies.pdf

and its functional role within the network can be fully maintained or compensated for in the long term;

(iv) establish additional ecological links to the Kirklees Wildlife Habitat Network where opportunities exist; and

(iv) incorporate biodiversity enhancement measures to reflect the priority habitats and species identified for the relevant Kirklees Biodiversity Opportunity Zone.'

7.23 Furthermore, Policy LP29 Management of Waterbodies identifies the need to maintain any existing water areas within a development site and supports the use of Sustainable Drainage System[52] approaches to water management, including suitable planting for flood alleviation. The policy notes that effective management of surface water can help to prevent increased flood risk and negative impacts on water quality as well as providing associated biodiversity benefits.

7.24 Finally, Policy LP31 Strategic Green Infrastructure Network states that within the Strategic Green Infrastructure Network identified on the Policies Map, priority will be given to safeguarding and enhancing green infrastructure networks, green infrastructure assets and the range of functions they provide. The Site is within the South Pennine Moors SPA/SAC Strategic Green Infrastructure Network. In terms of ecology and biodiversity, the relevant part of the policy is that all development within or adjacent to a Strategic Green Infrastructure Network should ensure:

'(iv) the protection and enhancement of biodiversity and ecological links, particularly within and connecting to the Kirklees Wildlife Habitat Network.'

Assessment Methodology

Relevant Guidance

7.25 The guidelines (as per CIEEM) are intended to promote good practice in EIA relating to terrestrial, freshwater and coastal environments within the UK. The guidelines have been developed with reference to various existing guidance including Byron (2000), Oxford (2000) and the IEMA (2004). The guidance is in line with Planning Policy Statement 9 on Biodiversity and Geological Conservation (Office of the Deputy Prime Minister 2005) which supports the NPPF (2021).

7.26 Individual habitat and species assessment were undertaken in accordance with the Scoping Report proposals submitted in November 2022 and used the most up to date guidance documents available at the time. These documents are referenced in the Technical Appendices that relate to this Chapter, namely:

- Appendix 7.1 - Phase 1 Habitats and NVC Survey;
- Appendix 7.2 - Breeding Bird Survey Report;
- Appendix 7.3 - Water Vole and Notable Species;
- Appendix 7.4 - Fungi Survey;
- Appendix 7.5 – Desk Study.

[52] *SuDS*

7.27 The CIEEM (2018) approach broadly comprises the following steps:

> *'(i) Identification of the ecological features of interest (ecological receptors) both on Site and in the wider landscape as required.*
>
> *(ii) Assigning a value to each ecological receptor, including legal protection where applicable.*
>
> *(iii) Identifying the potential impact on each ecological receptor, including its confidence, duration, reversibility and timing/frequency of the impact.*
>
> *(iv) Assessing the significance of the potential impact on each ecological receptor.*
>
> *(v) Assessing cumulative impacts.*
>
> *(vi) Identifying appropriate mitigation or compensatory measures.*
>
> *(vii) Identifying any residual impact remaining after measures are in place.'*

Desk Study

7.28 Desk based consultation was undertaken in October 2021, comprising:

- Interrogation of the Multi-Agency Geographic Information for the Countryside[53] website to search for European designated sites within a 10km search zone centred on the Site and for nationally designated sites, e.g. SSSI within a 5km search zone; and
- Desk based consultation with West Yorkshire Ecology Services[54] to obtain details of non-statutory designated sites and protected and notable species within a 2km search area along the linear route.

7.29 Pre-existing reports relating to the earlier temporary track were also reviewed (PAA 1998, PAA 1999a, PAA 1999b) were reviewed to provide background information and context for the current proposals.

7.30 Update reviews of MAGIC were completed throughout the course of the assessment.

Field Surveys

7.31 Full details of all ecology field survey methods and results are presented in separate technical appendices (Appendix 7.1, Appendix 7.2 Appendix 7.3, Appendix 7.4) and, in summary, comprise:

- Phase 1 Habitat survey and NVC Survey in June 2021 to map and describe habitats along the route to Phase 1 level and classify according to NVC, and extended in November 2022 to include updates to the application Site boundary;
- A breeding bird survey conducted over four visits across April, May and June 2021;
- Water vole survey in October 2021 and repeated August 2022 of watercourses crossing the proposed track route;

[53] *MAGIC*

[54] *WYES*

- Reptile and mountain hare habitat suitability assessment of the proposed route in October 2021;
- Badger (*Meles meles*), hedgehog (*Erinaceus europaeus*) and bat walkover survey in December 2022; and
- Fungi survey along the proposed route in November 2021.

Ecological Impact Assessment Methodology

Evaluation

7.32 For the purposes of this Chapter, the evaluation of habitats and species are put into context by placing each ecological receptor within a geographical frame of reference which draws upon the approach in the CIEEM guidelines.

7.33 The adapted framework assigns each of the ecological receptors present within the Site to one of five geographical frames of reference. The evaluation of habitats and species are put into context by placing each site or feature into one of five geographical levels, i.e. National, County etc. In addition, each site or feature can also be assessed in terms of its designation or protected status.

7.34 Where an ecological feature falls into more than one category of scale (e.g. a site designated at both the International and National level) then the highest category is always selected for evaluation purposes.

7.35 The CIEEM guidelines require the identification of various characteristics for each ecological feature that are important in terms of biodiversity, but which are not necessarily related to the geographical frame of reference or designation status. The characteristics identified by the CIEEM guidelines comprise:

> *'(i) Animal or plant species, subspecies or varieties that are rare or uncommon, either internationally, nationally or more locally;*
>
> *(ii) Endemic species or locally distinct sub-populations of a species;*
>
> *(iii) Ecosystems and their component parts, which provide the habitats required by the above species, populations and/or assemblages;*
>
> *(iv) Habitat diversity, connectivity and/or synergistic associations (e.g. networks of hedges and areas of species-poor pasture that might provide important feeding habitat for rare species such as the greater horseshoe bat (Rhinolophus ferrumequinum);*
>
> *(v) Notably large populations of animals or concentrations of animals considered uncommon or threatened in a wider context;*
>
> *(vi) Plant communities (and their associated animals) considered typical of valued natural/semi-natural vegetation types - these will include examples of naturally species-poor communities.*
>
> *(vii) Species on the edge of their range, particularly where their distribution is changing as a result of global trends and climate change;*
>
> *(viii) Species-rich assemblages of plants or animals; and*
>
> *(ix) Typical faunal assemblages characteristic of homogenous habitats.'*

7.36 A number of sources of information have been used to assess the importance of the ecological features in terms of biodiversity, including national, regional and local BAPs, local flora and faunal

atlases and lists of species of nature conservation concern. The resulting analysis informs the final value assigned to each ecological feature (see Table 7.1, below).

Table 7.1 The Nature Conservation Evaluation Framework in Relation to the Geographical Framework and the Designation of Sites and Features

Description	Relevant Ecological Site or Feature Within Each Class	Level of Importance
International	All internationally important sites such as NATURA 2000 sites – SAC and SPA and Ramsar sites. Species receiving the highest level of protection within the UK legislative framework – European Protected Species[55].	Very High
National	SSSI and other nationally important sites such as National Nature Reserves[56]. Species receiving protection under the WCA 1981 (as amended). Priority Species and Habitats in the national BAP although subject to other considerations such as diversity and rarity.	High
Regional, County, District (or Unitary Authority, or Borough)	These categories typically relate to sites that may be classified as non-statutory 'Local sites', as defined by Defra (2006). They are resources that are already, or would merit consideration for designation as, Local Wildlife Sites[57]. Biological Heritage Sites[58], Local Nature Reserves[59], County Wildlife Site[60], Regionally Important Geological and Geomorphological Sites [61]. Regional or Local BAP species and habitats. Birds of high or medium conservation concern (Red or Amber listed).	Medium
Local	Typically within the scale of a parish. Species or species assemblages of local interest as identified from local atlases for flora and fauna.	Low
Within zone of influence/on the site	Ecological resources of value within the boundaries of the site or extending to its zone of influence for the feature concerned. Badger, as protected under the Protection of Badgers Act 1992. Invasive plant species as identified under Schedule 9 of the WCA 1981 (as amended).	Low

[55] *EPS*

[56] *NNR*

[57] *LWS*

[58] *BHS*

[59] *LNR*

[60] *CWS*

[61] *RIGS*

Assessing the Magnitude of the Impact

7.37 A framework has been used to assess the magnitude of the impact on the ecological sites and features identified. Following this approach, the magnitude of impacts of the Proposed Development proposal upon ecological sites and features are set out in Table 7.2

Table 7.2 Framework for Categorisation of the Magnitude of the Ecological Impact

Category	Ecological Impact
Major positive	Likely to represent a key factor in the decision-making process with effects generally associated with features of national importance.
Moderate positive	Beneficial effects associated with regional or district scale considerations, which are likely to be important issues in the decision process.
Minor positive	Positive effects important at local scale but not likely to be key issues in the decision process.
Negligible	No effect.
Minor negative	Effects important at local scale but not likely to be key issues in the decision process (generally capable of amelioration by mitigation measures).
Moderate negative	Effects associated with regional or district scale considerations which are likely to be important issues in the decision process. Mitigation measures required may not be successful / adequate.
Major negative	Likely to represent a key factor in the decision-making process with effects generally associated with features of national importance. Mitigation measures are likely to be inadequate.

7.38 The interpretation of the magnitude of the impact also draws upon other important characteristics based upon the CIEEM guidelines (2018), as follows:

'(i) Confidence (certain, probable, unlikely, highly unlikely);

(ii) Duration (short, medium or long-term);

(iii) Reversibility (temporary, permanent); and

(iv) Timing/frequency (occurring at a critical stage in lifecycle, regular or irregular).'

Level of Effect Criteria

7.39 The assessment of the level of effect of the potential impacts considers both the likely magnitude of the ecological impact and the values of the Site/feature category to derive an overall 'Appraisal Category'. This is presented in Table 7.3.

7.40 In order to assess the level of effect of the impacts the following definitions of level of effect have been assumed as follows (using the standard terminology adopted across all disciplines in this ES). It should be noted that in accordance with EIA Regulations terminology only those effects of a 'moderate' or 'major' level are considered *significant.* Effects of a minor level or less are *not significant* in EIA terms:

(i) Major/Substantial - An impact on one or more receptor(s) of International, European, UK or National Value (i.e. High or Very High). Only Major negative impacts on features of Very High or High value are normally assigned this level of effect. They should be considered to represent key factors in the decision-making process;

(ii) Moderate - An impact on one or more receptor(s) of Regional, County or Unitary Authority Area (i.e. Medium) Value. These effects may be important, but are not likely to be key decision-making factors;

(iii) Minor - An impact on one or more receptor(s) of Local (i.e. Low or Lower) Value. These effects are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project; and

(iv) Negligible - No impacts on key nature conservation receptors. Absence of effects, or only those effects that are beneath levels of perception.

Table 7.3 Relative Level of Effect

		Value of Receptor				
		Negligible	**Low**	**Medium**	**High**	**Very High**
Magnitude of Impact	**Negligible**	Neutral	Neutral	Neutral	Neutral	Neutral
	Minor	Neutral	Minor	Minor	Moderate	Moderate
	Moderate	Neutral	Minor	Moderate	Moderate	Major/ Substantial
	Major	Neutral	Moderate	Moderate	Major/ Substantial	Major/ Substantial

Baseline Conditions

7.41 The following section summarises the baseline environment as derived from the desk study and field surveys. Full details are presented in the Technical Appendices (Appendix 7.1 through to Appendix 7.5). Desk study results are included within the relevant section below, to help contextualise the Site survey results.

Habitats

Overview

7.42 Habitats within and adjacent to the Site comprise a range of moorland vegetation types including flushes and streams, modified blanket bog over deep peat, purple moor-grass-dominated marshy grassland over thinner peat, acid grassland, and rush-dominated areas, the latter often associated with the line of the former temporary track.

7.43 The habitats are, for much of the Site, already somewhat modified due to the previous temporary track, however, there has been substantial revegetation of the former track route over the intervening years and hydrological connectivity between the blanket bog area above the Site and the thinner peats and remnant blanket bog areas below the former track line has been retained. The location of these habitats on the edge of the main blanket bog area makes them somewhat vulnerable to impacts such as drying, erosion, or slumping.

7.44 The desk study identified that the Site falls within the South Pennine Moors SSSI, the South Pennine Moors SAC and the South Pennine Moors (Phase 2) SPA. These sites are designated for their nationally and internationally important habitats, including blanket bog, and their breeding bird assemblage.

7.45 The reservoir and its immediate surroundings are included as part of Unit 149 of the South Pennine Moors SSSI and is designated for upland bog habitat in Unfavourable Recovering condition.

7.46 The proposed track also crosses through SSSI Unit 141 Foxstone Moss, which is also designated for its blanket bog, recorded as being in Unfavourable Recovering condition. A small section of Unit 142 is also included in the red line boundary; however, no works are anticipated in the moorland area at this section (the Proposed Development is confined to areas on the existing track.

7.47 The SSSI mosaic of habitats support a moorland breeding bird assemblage which, because of the range of species and number of breeding birds it contains, is of regional and national importance. The assemblages of breeding bird species are of international importance, including merlin, golden plover and twite as reflected in the SPA designation.

7.48 Much of the moorland habitat is within the Dark Peak NIA and classed as 'heathland' within the Wildlife Habitat Network within Kirklees Development Plan.

7.49 Two dedicated habitat classification methodologies, Phase 1 Habitat survey and NVC survey were utilised across the Site to establish the types and locations of habitats present. The results of each are summarised below and details provided in Technical Appendix 7.1.

7.50 The section of the Site within the protected area is classed on the MAGIC website as 'Blanket bog Priority Habitat' but with a 'low' confidence as the information is from the Dark Peak Environmentally Sensitive Area[62] Land Cover survey of 1995 and was classed as '*Molinia*-dominated grassland'. The route of the previous temporary track has been omitted from the Priority Habitat layer as have the steepest slopes, with shallow soils, leading to Haigh Clough.

7.51 In the UK BAP Priority Habitat Description[63], there is no agreed minimum depth of peat which can support blanket bog vegetation, and the definition states that '*peat depth is also very variable, with an average of 0.5-3m being fairly typical but depths in excess of 5m is not unusual*'. The principal vegetation (NVC) types covered by the blanket bog definition are M1, M2, M3, M15, M17, M18, M19, M20 and M25, together with their intermediates. Although these communities are not allocated to the vegetation on Site, the current vegetation will have been derived from at least one of these communities in the past.

Habitats - Sections A to C (Chainage 0 to 325m)

7.52 This section runs from the existing rough-surfaced track at Blake Lea Lane, through White Hull Farm (Sections A to B) and alongside inbye fields up to the start of the moorland bog section of the route (Sections B to C). It is largely outside the protected area, with a small section of the designated area included in the red line boundary but not included in any active construction works.

7.53 The habitats include the acid grassland of the inbye fields, with abundant soft-rush (*Juncus effusus*) indicating wet soils. In addition, there are areas of tall herb along a well-used farm track. Other land use types include small areas of garden and farmyard associated with the farm complex.

Habitats - Sections C to D (Chainage 325m to 965m)

7.54 This part of the Site falls within the protected open moorland and follows the alignment of the previous temporary track, the stone of which remains under the peat surface and is now covered

[62] *ESA*

[63] *https://data.jncc.gov.uk/data/aadfff3d-9a67-467a-ac65-45285e123607/UKBAP-BAPHabitats-03-BlanketBog.pdf*

over and re-vegetated. It runs due east towards March Haigh reservoir and crosses four watercourses, all of which are currently culverted as part of the previous temporary track works in 1999.

7.55 The peat depth varies across this section, ranging from shallow to very occasional deeper peats in isolated locations (please refer to Chapter 8 for a full description).

7.56 The shallower peats support habitat that is dominated by purple moor-grass with locally occasional wavy hair-grass, common bent, sweet vernal-grass, mat-grass and sheep's-fescue. These areas often have a cover of greater than 90% of purple moor-grass.

7.57 The dominant vegetation on the deeper peat is purple moor-grass with locally occasional patches of common cottongrass. Other typical species of this habitat such as heather, crowberry, and hare's-tail cottongrass were very rare within the Site on the deeper areas of peat. There were highly localised small patches of *Sphagnum* moss, typically *S. fimbriatum*, *S. fallax* and *S. palustre* with rare patches of *S. papillosum,* predominantly associated with the line of the former track where small ruts and hollows (the result of previous temporary track works) held more water. Other mosses were generally sparse, with *Hypnum jutlandicum* the most common and localised patched of *Polytrichum commune*. Other species recorded in this habitat included localised patches of soft-rush, rosebay willowherb and one area of bladder-sedge.

7.58 Under Phase 1 Habitat classification, the habitats are assessed as marshy grassland and modified wet bog, comprising largely similar vegetation types separated by the underlying depth of peat (wet modified bog being classified as developed over deeper peats greater than 0.5m depth). Taken as a whole, the peatland habitat across the Site is best termed a degraded blanket bog[64], which reflects both its current condition and species-poor nature and its variable underlying peat depth.

7.59 The degraded blanket bog habitat has a poor fit to any NVC community achieving a maximum correlation co-efficient of 29.7, which is very low. The interspersed acid grassland areas are best described as U5. There are localised areas of more distinct M6c acidic flushes and rush-dominated M23b around watercourses and flushed areas.

7.60 Within the protected area the habitats are limited to areas dominated by purple moor-grass, areas of relatively species-poor acid grasslands, bracken beds and areas of rush-pasture vegetation. There are no areas of particularly high botanical value. A small colony of bladder sedge, of local interest (Wilmot and Moyes 2009,), was located within a relatively discrete area north of the Site as in expected to remain unaffected by the Proposed Development.

7.61 There is a localised occurrence of the Schedule 9 invasive non-native Himalayan balsam just inside the SSSI boundary at the eastern end. Prompt management of this area would prevent the spread of this species at this early stage of establishment.

7.62 The route of the previous track, through the central portion of the SSSI, remains visible on the aerial photographs and to some extent on the ground as a line of vegetation dominated by soft-rush with occasional scattered trees.

Water Vole

7.63 A survey to identify the presence/absence of water vole was undertaken on five sections of streams within 50m either side of the proposed access track route in October 2021 and repeated

[64] *The UK Habitat Classification. Habitat Definitions. Version 1.1 https://ukhab.org/*

in August 2022. These watercourses are presented in Appendix 7.3 Figure 1. No desk study records were received for water vole; however, this species is known to occur at Dove Stones Reservoir (PDNP) and Wessenden Head (Yorkshire Water). Neither are close to the Site; however, they indicate that this species is known from upland moorland areas in the wider region.

7.64 Watercourses were assessed from within the channels for signs of water vole, including burrows, droppings/latrines, feeding stations and footprints. Habitats along each of the watercourse sections were also assessed in detail for habitat suitability to support water vole.

7.65 No evidence of water vole was recorded on watercourses, with signs being limited to bank vole (*Myodes glareolus*) only.

7.66 Watercourses 1 and 4 initially seemed suitable for water vole, with densely vegetated banks and margins and with some small 'flush-like' stretches where forbs were more readily visible. However, the overall availability of forage, the bankside structures and substrate, upon closer inspection, indicate unsuitable conditions. Furthermore, it is considered unlikely that there any high-water refuges that these two watercourses could provide as the banking is shallow and on peat that on this and other visits, for example bird surveys, was regularly wet or saturated

7.67 Watercourses 2, 3 and 5 are considered at least sub-optimal and possibly non-functional for water vole.

7.68 It is considered that should water voles occur anywhere on the Site, they would be at very low population densities and such habitat would likely support only transient populations and would not support water voles through the winter due to the limited availability of forage.

Mountain Hare

7.69 Mountain hare can occupy heather moor, mixed moor, wet heath, blanket bog and areas of mixed heath and grassland. Four records for mountain hare were returned in the desk review. The dates for the records range between 2004 and 2016, with the closest record located 1.67km north-west from the Site.

7.70 No evidence (field signs such as droppings or sightings of the animals themselves) of mountain hare on or in the vicinity of the Site have been observed during the initial species walkover survey (October 2021) or on other site visits across the assessment period (2021 to 2022).

7.71 The dominance of purple moor-grass, a less favoured habitat for this species (Mallon *et al.* 2012), rules out the likely presence of large numbers of this species. This is supported by the lack of data for this species close to the Site (i.e. within *Molinia*-dominated areas) within the desk study review. Mountain hare are considered more likely to be present in areas with at least some heather present (on which they rely for forage in the winter months), such as that present on Buckstones Moor north of the A640. Potential impacts on this species are, therefore, ruled out.

Other Mammals

7.72 Areas around White Hall Farm were to provide opportunities for roosting bats in the farmhouse and various buildings. The open habitats of the upland location were less suitable as important foraging and commuting habitat. The area is within the Kirklees Bat Alert Area and numerous records for bat species were derived from the desk review, with the nearest roost being a common pipistrelle (*Pipistrellus pipistrellus*) roost some 775m away, located towards Marsden.

7.73 Badger and hedgehog can occur in many rural areas with suitable habitats. The desk review identified a single hedgehog record over 1.5km from the Site and no badger records were returned. Anecdotal evidence from a local landowner indicated badger may forage on the inbye fields close to White Hall Farm.

7.74 A walkover assessment of the area around White Hall Farm was completed on 15th December 2022 by Senior Ecologist Rob Lamb (ACIEEM[65] and licensed bat worker), with a view to searching for any evidence of use by badger within the inbye field and immediate environs where the proposed construction compound will be located, plus viewing how the proposed track development lies in relation to the buildings of White Hall Farm in respect of any risk of disturbance to roosting bats (if present).

7.75 No evidence of use by badger was recorded, and while the time of year may have limited the opportunity to find evidence of foraging, any mammal tracks and setts would have been clearly visible. No suitable habitat for hedgehog was identified within the proposed route of the track or the compound area. In addition, the proposed route of the track through the farm complex was considered as highly unlikely to result in any disturbance to roosting bats, should there be any roosts within the farm buildings. The track was some distance from the nearest buildings with any potential for roosting bats and indirect disturbance from, for example, noise, vibration or dust was ruled out. Potential impacts on these species were, therefore, ruled out.

Reptiles and Amphibians

7.76 The search results retuned two common lizard (*Zootoca vivipara*) records, recorded in 2015 and 2016. The nearest record is located approximately 735m south-east from the Site. The only other records were for common frog (*Rana temporaria*), over 1km from the Site. No nearby ponds were identified through the desk review that could host breeding amphibian species such as great crested newt[66] (*Triturus cristatus*).

7.77 Following the October 2021 walkover, habitat was considered sub-optimal for reptiles, with the habitat dominated by tussocky purple moor-grass with few open areas suitable for basking or dry and sheltered enough for hibernation. However, a single common lizard was observed on Site (close to the reservoir embankment) on 18th May 2022, confirming a small population is present on Site.

7.78 The potential for grass snake (*Natrix helvetica*) was limited - this species is more typically associated with marshy grassland, wet woodland scrub in proximity to ponds, lakes and ditches in a lowland environment. Similarly, the location was considered less suitable for slow-worm (*Anguis fragilis*) which prefer not to bask in the open and requires shelter from dense vegetation, scrub, log piles etc.

7.79 The Site held some limited opportunity for use by common toad (*Bufo bufo*), with wet tussocky areas potentially available for shelter, but no significant opportunity for other protected amphibians. In addition, no areas suitable for breeding amphibians were identified either during the desk review or site surveys.

White Clawed Crayfish

7.80 Five watercourses that cross the Site were surveyed for potential to support white-clawed crayfish[67] (*Austropotamobius pallipes*) in October 2021.

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[65] *Associate member of CIEEM*

[66] *GCN*

[67] *WCC*

7.81 The watercourses assessed were considered sub-optimal for WCC due the upland (acidic) location and flashy nature of the streams that will scour away refugia on a regular basis. In addition, the lack of woody debris or other organic matter in the streams reduce the suitability of the Site for WCC as prey species will be considerably reduced.

7.82 This species was not noted in the desk review and, although colonies are known to be present in some upland environments, the nearest colony is at Castleshaw Reservoir, some distance from the March Haigh moorland.

Fungi

7.83 A single survey visit was completed on 7th November 2021, conducted by Neil Barden, a specialist surveyor in mycology. During the survey, 29 fungal records of ten different species were collected. This was considered a very low number considering the area surveyed. Table 7.4 presents the list of fungi species for the Site.

Table 7.4 Complete Fungi Species List

Genus/Species
Cystoderma amianthinum
Galerina pumila
Gliophorus laetus
Hygrocybe quieta
Lycoperdon nigrescens
Mycena filopes
Panaeolus acuminatus
Panaeolus papilionaceus var. *papilionaceus*
Psilocybe semilanceata
Stropharia semiglobata

7.84 In terms of assessment, the CHEG[68] profile, developed by Rotheroe (1999 and 2001) was utilised, which is model a grassland's fungal conservation value is evaluated using four fungi groups, which are:

- Clavaroid fungi - the fairy clubs;
- *Hygrocybes* - the waxcaps;
- *Entoloma* (as per Noordeloos) - the pinkgill; and
- *Geoglossaceae* - the earth tongues.

7.85 Each species from one of these groups counted towards a numerical score for each grassland site. This scoring system is known as the CHEG profile and takes its name from the initials of the

[68] *Clavaroid, Hygrocybe, Entoloma, Geoglossaceae*

four groups of fungi listed above. It enables a comparison between grassland sites for their relative conservation value. Evans *et al*. (2003) considered important grassland sites would have a CHEG profile of: C8 H17 E15 G4.

7.86 Nitare (1988) and Griffiths *et. al.* (2013) modified the CHEG criteria for assessment of grassland fungi by separating the *Hygrocybeae* from the *Dermoloma* species. This gave the now widely used CHEGD notation. This adjustment has been seen as giving a more precise picture of the fungal conservation value of a site, by leading researchers such as Griffiths *et al.* (2013). However, no consensus has been reached on the quantification of how many *Dermoloma* species would count as significant. We should perhaps rewrite the Evans *et al.* (2002) significant CHEG figure as: C8 H17 E15 G4 D?.

7.87 In terms of *Dermoloma* species, the JNCC now recommends a 'D' (*Dermoloma* and allied species) value of five, therefore, the above should has now be amended to read: C8 H17 E15 G4 D5.

7.88 Comparing the Site CHEGD, with the Rald (1985) scale, as amended by Vesterholt (1999), the Site would rank as of no importance for its waxcaps as only two species were recorded in a single visit.

7.89 The species recorded were evaluated against suitable, recognised assessment approaches. When all records for the Site are considered, the CHEGD profile is: **C0 H2 E0 G0 D0.** In addition, the criteria laid out by Bosanquet *et al.* (2018), for notification as a SSSI do not apply as insufficient species were recorded.

7.90 The two species of CHEGD fungi found - heath waxcap (*Gliophorus laetus)* and oily waxcap (*Hygrocybe quieta*) are common species of heaths and well-dunged grassland. They are both common species and of little conservation concern when found without an accompanying suite of other, rarer fungi.

7.91 Apart from these records, some very common saprobic grassland fungi of no conservation concern, were recorded.

7.92 In summary, the grasslands along the route of the proposed trackway at March Haigh Reservoir had very few waxcaps and no other CHEGD species of fungi. Based on the Rald (1985) and Vesterholt (1999) scales, the CHEGD fungi rate as of no importance. The waxcaps that were recorded were in no way rare or of conservation concern.

7.93 In addition, the other fungi recorded were very common or common species, which are almost ubiquitous in grassland habitats across the UK. The Site, therefore, hosts no fungi of conservation concern whatsoever.

Breeding Birds

7.94 A breeding bird survey carried out in 2021 confirmed that the Site and adjacent habitats support a breeding bird assemblage which is generally representative of the protected area's designations. This Site also likely provides functional habitat for bird species which are listed in the SPA citation, namely golden plover and merlin.

7.95 Species recorded included dunlin (*Calidris alpina*), common sandpiper (*Actitis hypoleucos*), snipe (*Gallinago gallinago*), curlew (*Numenius arquata*) and golden plover along with common reed bunting (*Emberiza schoeniclus*), willow warbler (*Phylloscopus trochilus*), song thrush (*Turdus philomelos*), house sparrow (*Passer domesticus*) and bullfinch (P*yrrhula pyrrhula*). Overall, however, the abundance of each species was relatively low.

7.96 Previous surveys (PAA 1999a) undertaken on the Site in 1999, as part of the former temporary track works, identified some additional notable species on the moorland as follows:

- Twite – probable breeder, observed one pair by White Hall Farm and a singing male amongst bracken along Broadrake Clough (the latter area being off Site); and
- Skylark (*Alauda arvensis*) – confirmed breeding, three singing individuals on areas south of March Haigh Reservoir on Berry Greave moorland area (off Site).

7.97 Twite, which are listed as a feature of interest on the citation for the South Pennine Moors SSSI, are also known to have previously nested in the area north of March Haigh Reservoir (Royal Society for the Protection of Birds[69], pers. comm.), covering Broadrake Clough and the moorland east of this towards the upper section of Buckstones Slack.

7.98 A large number of Twite records were provided within the desk study data return, with the closest records form the most recent (2014) data giving one sighting on the south-east end of Haigh Clough and two sightings along the upper reaches of Hard Head Clough.

Breeding Bird Assemblage

7.99 The breeding bird survey was conducted in 2021, comprising four visits between April and June 2021 and encompassing walking the route including a zone extending approximately 50 to 100m either side of the route.

7.100 Although numbers of individuals were low, the species assemblage was diverse with a total of 31 species recorded over the four survey visits and reflecting the combination of moorland and moorland fringe habitats, including patchy trees and scrub present within and adjacent to the route. Passerines and waders are reasonably well represented with the latter comprising common sandpiper, curlew, dunlin, golden plover and snipe. Raptor species were restricted to kestrel (*Falco tinnunculus*) and sparrowhawk (*Accipiter nisus*), and waterfowl comprised Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos)* and tufted duck (*Aythya fuligula*). Wheatear (*Oenanthe oenanthe*) was also recorded. A summary of the breeding bird survey results is presented below.

7.101 The section east of White Hall Farm comprised primarily hard surfaced track and road with adjacent grass verges, grazed grassland and mature trees and scrub. Species recorded were mainly common and widespread, but also included Birds of Conservation Concern[70] such as Red listed song thrush and house sparrow and Amber listed bullfinch.

7.102 The route west of White Hall Farm comprises grazed rush pasture and purple moor-grass-dominated vegetation, much of it degraded blanket bog. Overall, birds were sparsely recorded along this section, however, the majority of Red and Amber listed species were recorded in this habitat/area.

7.103 Snipe were recorded from within the field immediately west of White Hall Farm on all but the first breeding visit. Records of chipping snipe were all approximately 50 to 80m north of the proposed track route through this field.

7.104 Common reed bunting and willow warbler were both recorded regularly from the scrubby elements that have developed within the wet, rutted route of the former temporary track across the purple moor-grass vegetation.

[69] *RSPB*

[70] *BoCC*

7.105 A number of waders were recorded using or flying over the Site, including dunlin and common sandpiper on the reservoir margins and curlew and golden plover calling just beyond the route boundary or flying above the Site. Curlew were recorded regularly in suitable habitat and so are categorised as probable breeders, the remaining three species are categorised as possible breeders due to infrequent records. It is, however, likely that these three species are breeding nearby but at a distance from the Site as the behaviour recorded during surveys did not indicate alarm or distress at the surveyor's presence.

Breeding Status

7.106 The species assemblage contained species typical of the habitats surveyed. Of the total assemblage of 31 species, seven were confirmed breeding, with many of the other species also suspected as breeding within the survey area, although this could not be definitively confirmed. The breeding status is given below:

- Confirmed breeding (seven species) – carrion crow (*Corvus corone*), goldfinch (*Carduelis carduelis*), jackdaw (*Coloeus monedula*), meadow pipit (*Anthus pratensis*), pied wagtail (*Motacilla alba*), common reed bunting and wren (*Troglodytes troglodytes*);
- Probable breeding (nine species) – Canada goose, common chaffinch (*Fringilla coelebs*), curlew, dunnock (*Prunella modularis*), house sparrow, robin (*Erithacus rubecula*), skylark, snipe and willow warbler; and
- Possible breeding (fifteen species) – blackcap (*Sylvia atricapilla*), bullfinch, blackbird (*Turdus merula*), common sandpiper, dunlin, golden plover, kestrel, magpie, mallard, pheasant (*Phasianus colchicus*), red grouse (*Lagopus lagopus*), sparrowhawk, song thrush, tufted duck and wheatear.

7.107 Confirmed and probable breeding species represent 51.6% of the total number of species recorded.

7.108 Determination of breeding status is dependent upon particular behaviour being observed. It is likely that a greater proportion of the recorded assemblage are breeding within the Site, but that the behaviour that would confirm this was not displayed or recorded during the survey period.

SPA Bird Species

7.109 The South Pennine Moors (Phase 2) SPA qualifies under article 4.1 of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain population of a species listed in Annex I, in any season:

- Merlin - 28 breeding pairs in period 1990/1998 (4.3% of British population); and
- Golden plover - 292 breeding pairs in period 1990/1998 (1.2% of British population).

7.110 The Site also qualifies under article 4.2 by supporting in summer a diverse assemblage of breeding migratory birds or moorland and moorland fringe habitats, comprising: golden plover, lapwing (*Vanellus vanellus*), dunlin, snipe, curlew, redshank (*Tringa totanus*), common sandpiper, short-eared owl, whinchat (*Saxicola rubetra*), wheatear, ring ouzel (*Turdus torquatus*) and twite.

7.111 The only SPA-qualifying species under article 4.1 recorded during the survey is golden plover, however, the Site and wider area is considered to provide functional habitat for both golden plover and merlin. Six of the species listed under article 4.2 (an internationally important breeding bird assemblage) are recorded within approx. 100m the Site during 2021 surveys, namely common sandpiper, dunlin, golden plover, snipe, curlew and wheatear. Snipe are only recorded on land outside of the protected site boundary (the inbye fields), however, it is likely these areas act as functional land in terms of the SPA designation, possibly also providing some foraging habitats for golden plover. This inbye field is within/close to the Site as the proposed construction compound for the Proposed Development is located here.

Birds of Conservation Concern

7.112 Of the 31 species recorded, 16 (51.6%) are in general decline and listed as Amber or Red BoCC (Stanbury *et al.* 2021).

7.113 The Amber listed species include bullfinch, common reed bunting, common sandpiper, dunnock, kestrel, mallard, meadow pipit, snipe, song thrush, sparrowhawk, wheatear and willow warbler. Meadow pipit and common reed bunting are confirmed breeders on the Site, with dunnock, snipe and willow warbler as probable breeders and the remaining Amber listed species are possible breeding species.

7.114 The Red listed species include dunlin, curlew, skylark and house sparrow. Curlew, skylark and house sparrow are probable breeders and dunlin is a possible breeding species.

7.115 Eurasian bullfinch, curlew, dunnock, skylark, house sparrow, red grouse, and song thrush are all BAP species recorded from the Site. A number of these species are also listed on the Kirklees Local BAP[71].

Conclusions

7.116 The survey area supports a breeding and non-breeding bird assemblage which is typical of the moorland and moorland fringe habitats A high proportion of species are Amber and Red listed BoCC. The assemblage includes a number of waders and other species associated with the SSSI/SAC designations.

7.117 The surveyed route comprises two distinctly different habitats. The section east of White Hall Farm is primarily hard surfaced track and road with adjacent grass verges, grazed grassland and mature trees and scrub. Species recorded were mainly common and widespread, but also included BoCC such as Red listed house sparrow and Amber listed bullfinch and song thrush.

7.118 The route west of White Hall Farm comprises grazed rush pasture and purple moor-grass dominated vegetation, much of it degraded blanket bog. Birds were sparsely recorded along this section, however, the majority of Red and Amber listed species were recorded in this habitat/area.

7.119 Snipe were recorded from within the field immediately west of White Hall Farm on all but the first visit. Records of chipping snipe were all approximately 50 to 80m north of the proposed track route through this field. This area is close to the proposed construction compound location.

7.120 Common reed bunting and willow warbler were both recorded regularly from the scrubby elements that have developed within the wet, rutted route of the former temporary track across the purple moor-grass vegetation.

7.121 A number of waders were recorded using or flying over the Site, including dunlin and common sandpiper on the reservoir margins and curlew and golden plover calling just beyond the route boundary or flying above the Site. Curlew were recorded regularly in suitable habitat and so are categorised as probable breeders, the remaining three species are categorised as possible breeders due to infrequent records. It is, however, quite likely that these three species are breeding on the wider March Haigh Flats moorland at a distance from the Site.

7.122 Dunlin, common sandpiper, curlew and golden plover along with wheatear are all listed as features of interest on the South Pennine Moors (Phase 2) SPA citation (see Technical Appendix 7.2). Snipe is also listed, and while snipe are only recorded on land outside of the protected Site

[71] https://www.kirklees.gov.uk/beta/delivering-services/pdf/biodiversity-species.pdf

boundary (the inbye fields), it is likely these areas act as functional land in terms of the SPA designation. The inbye field is within/close to the Site as the proposed construction compound for the Proposed Development is located here.

7.123 All birds are afforded protection when breeding including when outside of protected areas, therefore, the presence of all nesting birds is a consideration when assessing the Proposed Development.

Potential Effects

Introduction

7.124 This section sets out the identification and evaluation of the key potential effects of the main stages of development with reference to ecological considerations taking account of incorporated or 'embedded' mitigation. The ecological receptors that are likely to be affected by the Proposed Development and assessed in this Chapter of the ES comprise:

(i) Designated sites comprising the South Pennine Moors SSSI; South Pennine Moors SAC and South Pennine Moors Phase 2 SPA;

(ii) Blanket bog and associated features within the SSSI/SAC comprising flushes and streams;

(iii) Moorland breeding bird assemblage and functioning habitat within and outside of the SSSI/ /SPA; and

(iv) Protected and/or notable species comprising water vole, mountain hare, common toad and common lizard.

During Construction

7.125 The potential effects of the Proposed Development during construction, without mitigation, comprise:

(i) Direct loss of habitat within the South Pennine SSSI and South Pennine Moors SAC and South Pennine Moors Phase 2 SPA comprising blanket bog and associated features including flushes and streams;

(ii) Damage/destruction of nests and indirect disturbance or displacement of breeding bird assemblage, including species associated with the South Pennine Moors SSSI and South Pennine Moors Phase 2 SPA; and

(v) Disturbance or harm to other species either on Site or potentially on Site at low populations, comprising water vole, mountain hare, common toad and common lizard.

7.126 A summary of overall levels of effects on ecology during construction is presented in Table 7.5.

Loss of Blanket Bog and Associated Features within SSSI/SAC/SPA

7.127 The construction of the permanent stone track and associated passing places above would result in the loss of 0.4296ha of degraded blanket bog dominated by purple moor-grass and a small area of acid flushes (0.0133ha). This includes habitats that have been previously disrupted by the former (now buried) temporary stone track. The habitat loss also includes limited acid grassland (0.077ha) plus some neutral grassland (0.35ha). There would also be minor impacts on the four stream crossings which would require three existing culvert structures to be replaced and one watercourse to be culverted.

7.128 Peat re-use within the scheme along the southern edge of the proposed track to form a 1:3 batter (to minimise the removal of peat material from Site as waste) will result in disruption to a further

0.076ha of modified blanket bog and associated habitats. This is due to the need to remove existing vegetation from this area to enable the batter to be formed from re-used peat material.

7.129 In recognition of the effects of the Proposed Development on the blanket bog resource, mitigation has been embedded into the design and construction methodology from the outset. This 'embedded' mitigation is described below and then an assessment of the effects on the blanket bog resource is made with the embedded mitigation taken into account.

Embedded Mitigation for Blanket Bog Habitat

7.130 A number of alternative routes have been considered and the final route. which largely follows as far as possible the same alignment along the route of the former temporary track was selected as the least environmentally damaging. A temporary track solution (as adopted for the earlier scheme) will not address the current needs of the Applicant for permanent access for vital reservoir inspection and maintenance.

7.131 The track will be the minimum width possible to accommodate the type of vehicles required for construction and operational purposes, with a running width of 4m plus additional width to allow for the edges to be battered to existing ground level. Passing passes and compounds have largely been located within the footprint of the earlier temporary track to avoid impacting on new areas.

7.132 The stone to be used for track construction has been selected to be similar in composition to the local natural geology whilst also providing the necessary structural qualities, for example, gritstone. The existing stone track bed (from the previous temporary track) will be retained where possible and added to, to minimise disruption to the substrates underlying this feature.

7.133 The track geometry has been designed to follow the alignment of the previously constructed temporary track where possible, and the natural ground profile as a best fit, without introducing what could appear to be an undulating track following the ground profile exactly. The design philosophy is to utilise the existing track as a capping layer and construct the proposed track on top of this. However, as the existing track is 3m wide and the proposed track is, by necessity, 4m wide, there will be a need to extend construction works onto land outside of the existing 3m wide track base.

7.134 Construction and restoration will be closely supervised by an experienced Ecological Clerk of Works[72] with expertise in the peatland environment. Best practice measures will be implemented to protect retained ecological features within or habitats adjacent to the construction route.

7.135 The blanket bog resource (including other associated habitats such as flushes and seepages) is of **very high** value and, despite the embedded mitigation measures described above to reduce the effect of the Proposed Development there remains a permanent loss habitat which, given its area, would be an impact of **minor** magnitude. The overall level of effects is **moderate adverse** in respect of permanent habitat loss.

Semi-Improved and Improved Acid Grassland

7.136 The construction of the permanent stone track and associated passing places would result in the loss of 0.077ha of acid grassland along with the temporary loss of 0.14ha associated with the creation of the construction compound. This habitat does not support any particular botanical or fungal interest.

[72] *ECoW*

7.137 Acid grassland habitat (total 0.46ha) would be recreated within the scheme following the sowing of the necessary cut-fill works along the edges of the track route (0.32ha) and re-instatement of the vegetation across the temporary compound area (0.14ha). A species mix is proposed and will be enhanced to include some additional plant species that will provide suitable seed-bearing plants for twite feeding (e.g. autumn hawkbit, cat's-ear, sheep's sorrel and common sorrel).

7.138 The grassland resource is of **low** value and the permanent loss would be an impact of **minor** magnitude with an overall level of effect of **minor adverse**.

Impacts on Breeding Bird Assemblage, including Species Associated with SSSI/SPA

7.139 The key effect on the breeding bird assemblage, and specifically those species which are qualifying species of South Pennine Moors Phase 2 SPA, is risk of disturbance to nest sites and associated foraging habitat during the construction phase, which may result in breeding failure and nests being abandoned with subsequent loss of chicks.

7.140 Impacts on breeding birds would not be expected within the scheduled timeframe of the Construction period (October 2023 to February 2024).

7.141 With embedded mitigation in place (i.e. timing constraints) the effect of disturbance on the moorland breeding bird assemblage (SSSI/SPA species) would be an effect of **negligible** magnitude on a receptor of **very high** value resulting in an overall level of effect of **neutral.**

7.142 With embedded mitigation in place (i.e. timing constraints) the effect of disturbance on the general (non SSSI/SPA) breeding bird assemblage would be an effect of **negligible** magnitude on a receptor of **high** value resulting in an overall level of effect of **neutral.**

Impacts on Other Species (Water Vole, Mountain Hare, Common Toad and Common Lizard)

7.143 The construction of the track and associated passing places would result in the risk of direct harm to individual species (if present) and/or displacement from functioning habitat used for (for example) basking, feeding and shelter.

7.144 If present, these species are considered to be a resource of **medium** value and the risk of harm or displacement would be an impact of **moderate** magnitude with an overall level of effect of **moderate adverse**.

Table 7.5 Summary of Levels of Effect During Construction

Receptor and Value	Potential Effects	Extent, Duration, Magnitude	Level of Effect
Blanket bog within SSSI/SAC/SPA. Very high value.	Permanent loss of 0.4296ha plus 0.076ha modified due to peat re-use along batter	Direct, permanent loss of minor magnitude	Moderate (adverse)
Semi-improved and improved acid grassland. Low value.	Permanent loss of 0.077ha with creation of 0.32ha along the track edges, and temporary loss plus re-creation of 0.14ha associated with the compound	Direct, permanent loss of minor magnitude	Minor (adverse)
Moorland (SSSI/SPA) breeding bird assemblage. Very high value.	No anticipated impacts due to seasonal timing of construction works to period October 2023 to February 2024	Negligible	Neutral

Receptor and Value	Potential Effects	Extent, Duration, Magnitude	Level of Effect
General (non-SSSI/SPA) breeding bird assemblage. High value.	No anticipated impacts due to seasonal timing of construction works to period October 2023 to February 2024	Negligible	Neutral
Other species (water vole, mountain hare, common toad, common lizard). Medium value.	Risk of harm to individuals and displacement from functional habitat	Both direct and indirect, temporary, moderate magnitude	Moderate (adverse)

Operational Phase

7.145 The potential effect of the Proposed Development during the operational phase, with embedded mitigation only, comprise:

(i) Increased disturbance to moorland breeding bird assemblage, including species associated with the South Pennine Moors SSSI and South Pennine Moors Phase 2 SPA.

7.146 A summary of overall levels of effects on ecology during the operational phase is presented in Table 7.6.

Increased Disturbance to Breeding Bird Assemblage, including SSSI/SPA Species

7.147 At the operational phase of the Proposed Development, the introduction of a permanent access track into the moorland environment could result in the following activities, which may result in disturbance to or displacement of breeding bird species:

- Recreational use of the track by e.g. walkers and dog walkers to link up with existing Public Right(s) of Way[73] and informal paths;
- Unauthorised off-road vehicles use; and
- Authorised vehicle use for operational purposes with at least two visits per week.

7.148 Unauthorised vehicle use of the track is highly un-desirable for the Applicant as this could lead to erosion, fire damage, pollution and vandalism (all of which could have additional indirect impacts on the protected area). To address the risk of increased disturbance to breeding birds, including the species listed within the SSSI/SPA designations, the following embedded mitigation measures will be adopted from the outset:

- The existing gate at White Hall Farm on Blake Lea Lane to be replaced with a new padlocked gate;
- A second padlocked gate to replace the existing gate at Hard Head Clough;

[73] *PRoW*

- The Applicants 'Operation and Maintenance'[74] Manual for the completed Proposed Development will include the requirement for twice-weekly inspection of these gates by the Applicant's operatives, who will carry suitable equipment for on-the-spot repairs and maintenance of these gates as required; and
- Authorised vehicles will be limited to slow speeds.

7.149 It is understood that there is already an issue with unauthorised off-road vehicles leaving the A640 and entering the moorland from the north. The Proposed Development could potentially encourage greater access from the north, and it is suggested to closely monitor this situation and to work with the National Trust to put additional management in place, if required.

7.150 The following additional mitigation measures are proposed to assist with the management of potential increased recreational use (if this arises), such as increased numbers of walkers, dog walkers and runners etc. The need, or otherwise, for these measures would be subject to ongoing monitoring by the Applicant and in liaison with the National Trust:

- Installation of barriers and 'no parking' signage on road verges at Blake Lea Lane to prevent increased numbers of cars parking here;
- Addition of finger posts at suitable locations to direct users to PRoW if the need for increased visitor management arises; and
- Access track to provide easier access for firefighting compared with current situation, should the need arise.

7.151 The moorland bird assemblage is a resource is of **very high** value but the risk of long-term disturbance and/or displacement is potentially of **minor** magnitude resulting in an overall level of effect of **moderate adverse.**

7.152 For the general breeding birds assemblage, the resource is of **high** value but the risk of long-term disturbance and/or displacement is potentially of **minor** magnitude resulting in an overall level of effect of **moderate adverse**.

Table 7.6 Summary of Level of Effect at Operational Stage

Receptor and Value	Potential Effects	Extent, Duration, Magnitude	Level of Effect
Moorland breeding bird assemblage. Very high value	Disturbance from operational vehicle from Point C onwards and potential increased recreational use	Indirect, permanent and of minor magnitude	Moderate (adverse)
General breeding bird assemblage. High value	Disturbance from operational vehicle use, and potential increased recreational use	Indirect, permanent and of minor magnitude	Moderate (adverse)

[74] *O&M*

Additional Mitigation Measures

Introduction

7.153 The proposed mitigation measures, in addition to the embedded mitigation described above, are presented below. The Applicant will be responsible for the implementation of mitigation and subsequent monitoring.

During Construction

Designated Sites (Including Degraded Blanket Bog Habitat)

7.154 Mitigation has been embedded into the track design and methodology from the outset to reduce the effect of the Proposed Development as far as is possible. The embedded mitigation features are discussed in the main assessment (see section on 'Potential Effects'). No additional mitigation is proposed at the construction stage.

Other Habitats

7.155 No additional habitat mitigation is considered necessary for the non-designated habitats comprising low value neutral grassland and acid grassland.

Breeding Bird Management Measures

7.156 If the construction period is delayed, e.g. due to poor weather, that it is possible that construction plant and associated noise and visual disturbance will still be occurring in March or even April 2024. At this time, the risk of disturbance would be relatively high and may deter nesting attempts.

7.157 Should these circumstances occur, mitigation will comprise the use of an ECoW to monitoring golden plover activity and provide advice on suitable avoidance measures to avoid disturbance such as use of temporary screens, or temporary cessation of works in vicinity of any measures to deter nesting birds from nesting within the immediate footprint of the proposed track will be adopted should construction not be completed by end February 2024 (i.e. start to impinge on the start of the bird breeding season). The aim of bird deterrent measures is to deter nesting by any of the moorland breeding bird assemblage along the proposed construction route after Point C by making the route and immediate environs less attractive. This will be achieved through a combination of:

- Maintaining a stripped vegetation corridor along the construction route to ensure suitable nesting habitat is not present / does not develop; and
- Use of a dog and handler in hi-vis to walk the route at particular times and/or locations as required to deter nesting attempts.

7.158 The effectiveness of the bird deterrent measures will be subject to regular monitoring by the ECoW to record the location and activity of breeding bird species over this period.

7.159 If required, temporary visual screening along either side of the track will also be used to reduce visual disturbance to ground nesting species, if monitoring confirms nests have established.

Precautionary Measures for Other Species

7.160 During construction, precautionary measures of work will be adopted to avoid disturbance to and displacement of other species, namely water vole, common lizard and mountain hare, if present. This will include pre-construction checks, watching briefs by a suitably experienced ECoW, hand/destructive search of suitable vegetation and any potential shelter areas (e.g. stone walls, rubble piles) prior to works commencing along with sensitive soil/vegetation stripping (where required).

Operational Phase

7.161 At the operational phase of development, the introduction of a permanent access track into the moorland environment could result in the following activities, which may result in disturbance to or displacement of SPA qualifying species:

- Recreational use of the track by e.g. walkers and dog walkers to link up with existing PRoW and informal paths;
- Unauthorised off-road vehicles use; and
- Authorised vehicle use for operational purposes with at least two visits per week.

7.162 There would also be a permanent loss of supporting habitat, i.e. habitat used for nesting and/or foraging and feeding by moorland bird species, including SPA qualifying species, the latter being addressed in detail in the separate shadow HRA (PAA 2023a). The loss of supporting habitat for the breeding bird assemblage is small, covering approximately 0.5ha in total of degraded blanket bog, acid grassland and acid flush habitat and is mainly confined to land within the SSSI/SPA, with only very small areas of permanent habitat loss of acid grassland along the edges of the track on land outside of the SSSI/SPA. The main area of temporary habitat loss comprising the site compound will be re-instated on completion of works and enhanced as outlined in previous sections of the ES to provide additional feeding habitat for twite. This will be an impact of minor magnitude on a receptor of very high value, resulting in an effect of **moderate adverse** level.

7.163 To address the risk of increased disturbance, a number of mitigation measures will be adopted from the outset. Unauthorised vehicle use of the track is highly un-desirable for the Applicant as this could lead to erosion, fire damage, pollution and vandalism.

7.164 These built-in measures comprise the existing gate at White Hall Farm on Blake Lea Lane to be replaced with a new padlocked gate, and a second padlocked gate to replace the existing gate at Hard Head Clough (specifications to be provided). The Applicants O&M Manual for the completed Proposed Development sets out the requirement for twice weekly inspection of these gates by the Applicant's operatives, who will carry suitable equipment for on-the-spot repairs and maintenance of these gates as required.

7.165 It is understood that there is already an issue with unauthorised off-road vehicles leaving the A640 and entering the moorland from the north. The Proposed Development could potentially encourage greater access from the north, and it is proposed to closely monitor this situation and to work with the National Trust to put additional management in place as outlined below.

7.166 The following additional measures will be employed to manage of potential increased recreational use, such as increased numbers of walkers, dog walkers and runners, etc.:

- Litter picks around March Haigh Reservoir and along access track by the Applicant (operatives to visit at least twice a week, potential to increase this if litter becomes a substantially increased problem);
- Installation of barriers and 'no parking' signage on road verges at Blake Lea Lane to prevent increased numbers of cars parking here;
- Addition of finger posts to direct users to PRoW (suitable locations to be confirmed);
- The inclusion of additional signage on finger posts and styles to identify the need to keep dogs on a lead during the bird nesting season (suitable wording and locations to be confirmed); and
- Access track to provide easier access for firefighting compared with current situation, should the need arise.

7.167 The Applicant will continue to monitor levels of recreational use and will commit to take action in partnership with the National Trust if there is a notable increase in visitors to the area, for example by contributing funding towards Ranger time for visitor management, footpath repair or cutting of firebreaks.

7.168 As previously mentioned, the Applicant is highly motivated to prevent unauthorised use of the Proposed Development by off-road vehicles. In addition to the provision and maintenance of padlocked gates to prevent unauthorised vehicle access from the east, the Applicant is committed to working with the National Trust to put in place additional surveillance and management of unauthorised off-road use if there is a notable increase in this.

7.169 The Applicant would also work with other stakeholders including the West Yorkshire Fire and Rescue Services and West Yorkshire Police to put any required measures in place to manage any notable increase relating to fire risk, vandalism or pollution. With the above mitigation measures in place, it is concluded that any potential adverse effects on SPA qualifying bird species, and other breeding birds, can be avoided.

Residual Effects

Introduction

7.170 Any residual impacts remaining after all mitigation measures have been incorporated are detailed below and summarised in Table 7.7 (below).

During Construction

7.171 Due to the unavoidable permanent loss of 0.4296ha of degraded blanket bog within the South Pennine Moors SSSI/SAC there will be an adverse effect on the integrity of the habitats of the protected area. This is an effect of **moderate adverse** level which is significant in EIA Regulations terms. Peat re-use within the scheme along the southern edge of the proposed track to form a 1:3 batter (to minimise the removal of peat material from Site as waste) will result in disruption to a further 0.076ha of modified blanket bog and associated habitats. This is due to the need to remove existing vegetation from the 'peat re-use' area to enable the batter to be formed from re-used peat material (see Chapter 8 of this ES for further details).

7.172 The loss of degraded blanket bog cannot be addressed through mitigation measures. A compensation strategy is, therefore, required to off-set the loss of degraded blanket bog habitat.

7.173 Further details of the proposed compensation strategy are presented in a separate Shadow HRA report (PAA 2023a).

7.174 With planned mitigation in place (timing constraints), there is no residual impact predicted for the breeding bird assemblage with regard to the construction phase, including those moorland species listed as features interest within the protected area.

7.175 Similarly, with the above planned mitigation in place, there is no predicted residual impacts on other protected/notable species that may occur on or in the vicinity of the Site (water voles, mountain hare, common toad and common lizard). Mitigation measures allow all construction impacts to be managed to the minimal level.

Operational Phase

7.176 With mitigation in place to minimise the key effects at the operational stage of the Proposed Development there remains a potential for operational vehicle movements and increased recreational use to result in some ongoing disturbance to the breeding bird assemblage. This is reduced as far as possible with mitigation measures to prevent unauthorised vehicle use and

deter pedestrian and unauthorised vehicular use of the track, coupled with use of slow moving (authorised) vehicles along the track.

7.177 However, it is still possible the Proposed Development will result in increased recreational use, both use in terms of increased footfall from walkers, dog walkers etc. and potentially also increased use by un-authorised off-road vehicles. Therefore, a series of measures to manage this risk to an acceptable level are included and would be subject to ongoing monitoring by the Applicant with a commitment to partnership working with the National Trust as required to ensure measures were proportionate and reactive as needed.

7.178 With these measures in place, it is anticipated that the risk of potential disturbance is able to be reduced to sufficiently minimised along the entire length of the track thus an effect of **negligible** magnitude is predicted effecting a moorland bird assemblage (including qualifying SPA species) of **very high value** resulting in a potential residual effect that **neutral.**

7.179 For other breeding birds considered to be of **high value**, the predicted **negligible magnitude** of the effect also results in a potential residual effect that is also **neutral.**

7.180 In addition to the above, there would be a residual effect of **moderate adverse** level resulting from the permanent loss (albeit small in extent) of habitat for the moorland breeding bird assemblage, including SPA qualifying species.

Cumulative Impacts

7.181 Cumulative impacts have been assessed considering projects listed in Table 1.3 within Chapter 1 of this ES, comprising (1) the proposed 'measures in the interests of safety' at March Haigh Reservoir, (2) proposed tree planting by the National Trust and (3) the ongoing moorland-wide habitat restoration works across the Marsden Estate.

7.182 Of these, the proposed works at March Haigh Reservoir, which are anticipated to take place after the completion of the access track in February 2024, would introduce additional likely impacts.

7.183 The footprint of the works at the reservoir is anticipated to be minimal and largely contained within the footprint of the existing built infrastructure. There would be no loss of blanket bog habitat and only minor and temporary disturbance to acid grassland habitats in the immediate vicinity of the works including along the dam walls. This would not significantly alter the overall assessment of impacts in respect of the Proposed Development.

7.184 In terms of breeding moorland birds, if these proposed reservoir works coincided with the bird breeding season in 2024 this could result in disturbance to those species which are associated with the reservoir. Should this be the case, it is anticipated that suitable mitigation measures, such as screens, can be deployed during the reservoir works to minimise disturbance effects to neutral. There would be no additional operational effects as once the reservoir works are complete (the effects are essentially those associated with the access track and associated operational vehicle movements already assessed in this Chapter).

7.185 The proposed programme of tree planting in March Haigh Clough by the National Trust is unlikely to result in any cumulative adverse effects on ecology. The planting will be beneficial in terms of increasing habitat diversity. The tree planting could provide cover and perches for predators of ground nesting birds but would not directly overlook the likely nest sites for species such as golden plover which are some distance to the north on March Haigh Flat.

7.186 The moorland restoration programme, which is currently being implemented across the National Trust Marsden Moor Estate in partnership between the National Trust and Yorkshire Water, is likely to result in a long-term change of the condition of blanket bog from Unfavourable towards Favourable condition as the results of grip blocking, re-wetting and other measures take effect. It is not anticipated that the Proposed Development would impact cumulatively with this ongoing programme of restoration work.

Biodiversity Net Gain Assessment

7.187 To quantify the habitat losses and gains resulting from the Development, a Biodiversity Net Gain calculation has been carried out using the Defra Metric 3.1 (see PAA 2023b for the full report). The assessment does not include the bespoke off-site compensation at Home Moor, Marsden, developed for the loss of the irreplaceable habitats (blanket bog and acid grassland) and this is dealt with under a separate Shadow Habitat Regulations Report (PAA 2023a). Overall, the scheme results in a small loss of habitats (other than the irreplaceable habitats) and off-site compensation has been developed in the form of 2.5ha of acid grassland diversification and upland heath creation at Redbrook Reservoir, near Marsden. Overall, this delivers a +18.72% net gain in biodiversity units.

Summary and Conclusions

7.188 A desk study and field surveys have been undertaken to establish the baseline conditions of the Site and desk study search area.

7.189 The Site falls partially within the South Pennine Moors SSSI, South Pennine Moors SAC and South Pennine Moors (Phase 2) SPA. These sites are designated for the nationally and internationally important upland habitats and moorland bird assemblages which they support.

7.190 The Proposed Development would result in the permanent loss of 0.4296ha of blanket bog in unfavourable recovering condition, and associated features, plus 0.0133ha of acid flush, located within the SSSI/SAC and SPA along with a further 0.076ha blanket bog modified due to the intention to re-use a proportion of peat rather than remove off site as waste. A total of 0.077ha non-designated low value semi-improved acid grassland would be permanently lost. There is no potential for damage/destruction of nests and disturbance to the breeding bird assemblage, including species associated with the SSSI/SPA at the construction stage due to timing constraints. There is potential for disturbance to birds from operational vehicle use and increased recreational disturbance at the operational phase of the Proposed Development.

7.191 Mitigation measures have been incorporated as an inherent part of design from the outset to minimise impacts on the environment. This has included careful route selection and sensitive design and construction methods. A number of alternatives to the Proposed Development including do-nothing and discontinuance of the reservoirs have been considered, as well as alternative routes, construction methods and programme.

7.192 Additional mitigation measures are proposed to further reduce the impacts on habitats and protected species. This would include creation of acid grassland habitat on the limited areas of earthworks along with measures to retain critical hydrological links (see Chapter 8 of this ES). Should the construction programme unavoidably extend into the nesting season, bird deterrent measures such as strimming, controlled use of conservation dogs and screening would be deployed with the aim of preventing direct loss of nests and to minimise disturbance of breeding birds adjacent to the construction zone.

7.193 At the operational stage additional measures will be implemented to minimise the effects of any increase in recreational pressures to limit any disturbance to breeding birds.

7.194 Precautionary measures of working will also be adopted in relation to other species which may be present within the construction zone, comprising water vole, mountain hare, common toad and common lizard.

7.195 With the above measures in place, there will remain an unavoidable and permanent loss of blanket bog within the SSSI/SAC/SPA which cannot be mitigated. A separate Shadow HRA report (PAA 2023a) has been prepared to set out the proposals for compensation measures to off-set adverse effects on the integrity of the European sites. These measures are intended to also address the impacts of the Proposed Development on the South Pennine Moors SSSI.

7.196 The residual risk of disturbance to both the designated moorland bird assemblage and bird assemblage in general will be reduced to **neutral** by measures designed to limit parking opportunities, encourage users to make use of existing footpaths (through signage, for example) and to monitor/review recreational pressures and implement a suite of further measures, if required in collaboration with the National Trust. However, there would be a residual effect of moderate adverse level with regard to the loss of habitat for moorland breeding birds, including SPA qualifying species. It is proposed to provide habitat compensation measures that will benefit the moorland breeding bird assemblage, including those species which are listed as qualifying features of the South Pennine Moors (Phase 2) SPA. The habitat compensation measures are set out in detail in the shadow HRA (PAA 2023a).

7.197 Table 7.7 summarises the results of the evaluation process and residual impacts.

Table 7.7 Summary of Residual Effects on Ecology

Receptor and Value	Potential Effect	Extent, Duration, Magnitude	Level of Effect Without Mitigation	Mitigation	Level of Residual Effect With Mitigation
During Construction					
Blanket bog within SSSI/SAC. Very high value.	Permanent loss of 0.4296ha plus modification of 0.076ha due to peat re-use on Site	Direct, permanent, of major magnitude	Major (adverse)	Embedded mitigation through careful route selection, design and construction methods	Moderate (adverse)[75]
Semi-improved and improved acid grassland. Low value.	Permanent loss of 0.077ha with creation of 0.32ha of new acid grassland along track edges. Temporary loss and recreation of 0.14ha of acid grassland on the contractor compound area.	Direct, permanent/ temporary, of minor magnitude	Minor (adverse)	None proposed	Minor (adverse)
Moorland breeding bird assemblage (SPA/SSSI features). Very high value.	No anticipated impacts due to seasonal timing of construction works to period October 2023 to February 2024.	N/A	Negligible	None required – but measures proposed in case of unavoidable overrun of programme	Neutral
General breeding bird assemblage. High value.	No anticipated impacts due to seasonal timing of construction works to period October 2023 to February 2024.	N/A	Negligible	None required - but measures proposed in case of unavoidable overrun of programme	Neutral

[75] *Addressed through off site compensation - see separate Shadow Habitat Regulations Assessment (PAA 2023a).*

Receptor and Value	Potential Effect	Extent, Duration, Magnitude	Level of Effect Without Mitigation	Mitigation	Level of Residual Effect With Mitigation
Other species (water vole, mountain hare, common toad, common lizard). Medium value.	Risk of harm to individuals and displacement from functional habitat.	Both direct and indirect, temporary / permanent, moderate magnitude	Moderate (adverse)	Precautionary methods of working	Neutral
During Operation					
Moorland breeding bird assemblage. Very high value.	Disturbance from potential for increased recreational use.	Indirect, permanent, of minor magnitude	Moderate (adverse)	Slow moving vehicles only. Padlocked gates to prevent unauthorised vehicle use. Pedestrian use of stone track deterred. Suite of measures and actions to redress ongoing impacts, with ongoing monitoring and review.	Neutral
	Permanent loss of approximately 0.5ha of habitat used for nesting, foraging/feeding	Direct, permanent, minor magnitude	Moderate (adverse)	Inclusion of suitable seed mix for twite in restoration of temporary works areas.	Moderate (adverse)
General breeding bird assemblage. High value	Disturbance from potential for increased recreational use	Indirect, permanent, of minor magnitude	Moderate (adverse)	As above	Neutral

8. PEAT SOILS AND HYDROLOGY

Introduction

8.1 This Chapter deals with the assessment of the effects of the Proposed Development on peat resources and hydrology. The assessment has been carried out following the guidelines set out in the CIEEM publication *'Guidelines for EIA in the UK and Ireland - Version 1.1'* (CIEEM 2018) referred to hereafter as 'the guidelines'.

8.2 The Chapter is supported by the following technical appendices:

- Appendix 8.1 – Hydrology and Peat Depth Survey; and
- A FRA [76]

8.3 A separate Shadow HRA has been prepared (PAA 2023a) and should be read in conjunction with this Chapter.

8.4 This Chapter also includes an assessment of embedded carbon in the peat resource.

About the Author

8.5 This Chapter has been prepared by Sarah Ross, BSc (Hons), PhD, MCIEEM and Chartered Environmentalist with assistance from Gerard Hawley, BA (Hons), MSc, DipPSE, MCIEEMrtd. Sarah is the Associate Director of PAA, a long-established ecological consultancy with expertise in the survey, assessment, management and restoration of upland and peatland habitats. Gerard has extensive experience of peat survey, assessment and restoration.

Consultation

8.6 A pre-application consultation was undertaken with KC in November 2022 and Natural England in February 2023. A formal EIA Scoping request was submitted to KC in November 2022. A Scoping Opinion was received from KC in January 2023 and this included details of requirements to be included in this Chapter of the ES. The pre-application consultation identified that the issues to be considered in the ES should including consideration of peat removal and re-use and potential for peat carbon release.

Policy and Legislative Context

National Policy and Legislation

8.7 The NPPF, published in 2021, provides guidance for local authorities on the content of the Local Plans and is a material consideration in determining planning applications. The NPPF has replaced much existing planning policy guidance, including Planning Policy Statement 9: Biological and Geological Conservation. Briefly, with an overall focus on sustainable development, the NPPF states that developments should aim to engender positive outcomes for biodiversity/geodiversity, with a particular focus on the maintenance and creation of ecological networks. The NPPF states that the planning system should contribute to and enhance the natural

[76] *FRA*

environment through a range of actions, including the following are relevant to geodiversity, soils and hydrology:

- Protecting and enhancing valued landscapes, geological interests and soils, and;
- Recognising the wider benefits of ecosystem services.

Local Planning Policy

8.8 Within Kirklees Local Plan[77], Policy LP30 Biodiversity and Geodiversity establishes that the council will seek to protect and enhance the biodiversity and geodiversity of Kirklees, including the range of international, national and locally designated wildlife and geological sites, Habitats and Species of Principal Importance and the Kirklees Wildlife Habitat Network. The policy refers specifically to the need to demonstrate that development that may harm the interest features of protected areas or negatively impact protected species will need to clearly demonstrate that the need outweighs the harm and that suitable compensatory measures are secured.

8.9 Specifically in relation to geological sits of interest, LP30 states that "proposals having a direct or indirect adverse effect on a LWS or LGS, Ancient Woodland, Veteran Tree or other important tree, will not be permitted unless the benefits of the development can be clearly shown to outweigh the need to safeguard the local conservation value of the site or feature and there is no alternative means to deliver the proposal. In all cases, full compensatory measures would be required and secured in the long term."

Assessment Methodology

Relevant Guidance

8.10 The CIEEM guidelines are intended to promote good practice in EIA relating to terrestrial, freshwater and coastal environments within the UK. The guidelines have been developed with reference to various existing guidance including Byron (2000), Oxford (2000) and IEMA (2004). The guidance is in line with Planning Policy Statement 9 on Biodiversity and Geological Conservation (Office of the Deputy Prime Minister 2005) which supports the NPPF (2021).

8.11 Peat and hydrological assessments were undertaken using the most up-to-date guidance documents available at the time. These documents are referenced in the Technical Appendix that relates to this Chapter, namely:

- Appendix 8.1 – Hydrology and Peat Depth Survey;

8.12 The CIEEM (2018) approach broadly comprises the following steps:

(i) Identification of the ecological features of interest (receptors) both on Site and in the wider landscape as required;

(ii) Assigning a value to each receptor, including legal protection where applicable;

(iii) Identifying the potential impact on each receptor, including its confidence, duration, reversibility and timing/frequency of the impact;

(iv) Assessing the level of effect of the potential impact on each receptor;

[77] *https://www.kirklees.gov.uk/beta/planning-policy/pdf/local-plan-strategy-and-policies.pdf*

(v) Assessing cumulative impacts;

(vi) Identifying appropriate mitigation or compensatory measures; and

(vii) Identifying any residual impact remaining after measures are in place.

Desk Study

8.13 Desk-based consultation was undertaken in October 2021 with WYES to obtain details of locally designated sites with geological and geomorphological interest features within 2 km of the Site.

8.14 In addition, the relevant SSSI designation criteria were reviewed for any reference to geological and geomorphological interest.

8.15 About 40% of statutory SSSI in the UK include in the notification a reference to a geological/geomorphological feature that has led to, or been a significant consideration, in the designation. RIGS are non-statutory but generally classed as LWS by Local Authorities and afforded protection through the planning process.

Field Surveys

Hydrology Assessment

8.16 A walkover hydrological survey was carried out by Consultant Scientist Gerard Hawley on 8th October 2021 of a proportion of the March Haigh Catchment in the Southern Pennines across which the proposed permanent track would be constructed. The survey area was between March Haigh Reservoir and approximately 2.5km east, incorporating a corridor of land known as March Haigh Flat which the Site crosses.

8.17 The results of the hydrological field-based survey were combined with a desk review of the underlying geology and hydrogeology of the area to inform the overall hydrology assessment.

Peat Depth Mapping

8.18 Peat depth mapping was undertaken along the Site within the main moorland area (largely co-incident with the designations of SSSI/Special Areas of Conservation[78]/SPA), covering the line of the track and 50m either side. Measurements were taken at intervals of approximately 10m, 25m and 50m perpendicular to the centre of the former track line to identify in some detail the depth of peat on the previous track and in the adjacent area. A total of 196 peat depth measurements were taken.

8.19 Mapping was completed by a small team of surveyors, Gerard Hawley and Phoebe Gray on 15th October 2021 and Phoebe Gray and Beth Howes on 2nd November 2021. Additional data were collected in 2022 to expand the peat depth dataset to cover updates to the Site application boundary. Surveyors used pre-programmed handheld Global Position System[79] units (Garmin etrex 20) to navigate to each sample point in order to take the measurements.

8.20 Measurements were made using purpose-made calibrated peat depth probes that were extendable to 4m in length. The probe is inserted into the soil with pressure applied until the basal material is struck by the probe. At this point, the depth is measured to the nearest 1cm. The

[78] *SAC*

[79] *GPS*

average of two measurements was recorded at each point and if they were significantly different, then a third was taken to clarify the results.

8.21 The depth measurements were used to categorise the peat depth into those recording shallow peat (<40cm) and those recording deep peat (≥40cm). The 40cm definition of deep peat is widely used and follows that used by the Soil Survey of England and Wales (1983[80]) and is more conservative than the 50cm depth category used by the Phase 1 Habitat methodology (see Appendix 7.1).

Peat Depth Model

8.22 The peat depth point measurements were used to generate a model of peat depth across the entire survey site using an advanced statistical method in which values are interpolated using distance weighting, with the weighting dependent on the best fitted statistical model for the dataset.

8.23 Full details of all field survey methods and results are presented in the separate technical appendix (Appendix 8.1).

Peat Carbon Resource

8.24 As part of the delivery of the proposed scheme, the Site will be subject to some disturbance / removal of peat to enable construction of a safe and suitable permanent track required under the MIOS for March Haigh Reservoir. The design of the track and construction methods has minimised the footprint of the scheme in terms of land-take for the proposed permanent track. Evaluation of the design identified a total of 0.5959ha of peatland habitat and underlying (shallow) peat will be unavoidably lost. This includes degraded blanket bog plus small areas of acid flush and acid grassland. The majority of this is peat that has already been disturbed in the past (that was re-laid over the former temporary track and has revegetated). A small proportion of this peat will be from previously undisturbed peatland areas.

8.25 To assess potential impacts of peat disturbance/removal and re-use on carbon resources on Site, the volume of peat affected by the Proposed Development has been established and the subsequent re-use and handling of the peat has been evaluated. The amount of carbon resource affected by these actions has been calculated using published guidance (Lindsay 2010) providing the amount of carbon as 104kg per m^3 of peat, considered typical for damaged blanket bog.

8.26 The peat disturbance / removal operations are not considered to correspond to the description of 'peat extraction' as referred to under the NPPF (2021) (Chapter 17, paragraph 211d), as the primary intention of the peat disturbance/removal is to enable safe and suitable construction (not to acquire the peat as a mineral resource, *per se*). This aspect of peat 'use' is, therefore, not considered further within the Chapter.

[80] *Soil Survey of England and Wales, 1983, Soils of Northern England, Sheet 1.*

Impact Assessment Methodology

Evaluation

8.27 For the purposes of this Chapter, the evaluation of peat resources and hydrology (including geodiversity) are put into context by placing each receptor within a geographical frame of reference which draws upon the approach in the CIEEM guidelines.

8.28 The adapted framework assigns each of the receptors present within the Site to one of five geographical frames of reference, i.e. National, County etc. In addition, each site or feature can also be assessed in terms of its designation or protected status.

8.29 Where a feature falls into more than one category of scale (e.g. a site designated at both the International and National level) then the highest category is always selected for evaluation purposes.

Table 8.1 The Nature Conservation Evaluation Framework in Relation to the Geographical Framework and the Designation of Sites and Features

Description	Relevant Ecological Site or Feature Within Each Class	Level of Importance
International	All internationally important sites such as NATURA 2000 sites – SAC and SPA. Ramsar sites.	Very High
National	SSSI and other nationally important sites such as NNR.	High
Regional, County, District (or Unitary Authority, or Borough)	These categories typically relate to sites that may be classified as non-statutory 'Local sites', as defined by Defra (2006). They are resources that are already or would merit consideration for designation as LWS. BHS, LNR, CWS, RIGS.	Medium
Local	Typically within the scale of a parish.	Low
Within zone of influence/on the site	Resources of value within the boundaries of the site or extending to its zone of influence for the feature concerned.	Low

Assessing the Magnitude of the Impact

8.30 A framework has been used to assess the magnitude of the impact on the sites and features identified. Following this approach, the magnitude of impacts of the Proposed Development proposal upon sites and features are set out in Table 8.2

Table 8.2 Framework for Categorisation of the Magnitude of the Impact

Category	Ecological Impact
Major positive	Likely to represent a key factor in the decision making process with effects generally associated with features of national importance.
Moderate positive	Beneficial effects associated with regional or district scale considerations, which are likely to be important issues in the decision process.
Minor positive	Positive effects important at local scale but not likely to be key issues in the decision process.
Negligible	No effect.
Minor negative	Effects important at local scale but not likely to be key issues in the decision process (generally capable of amelioration by mitigation measures).
Moderate negative	Effects associated with regional or district scale considerations which are likely to be important issues in the decision process. Mitigation measures required may not be successful/adequate.
Major negative	Likely to represent a key factor in the decision making process with effects generally associated with features of national importance. Mitigation measures are likely to be inadequate.

8.31 The interpretation of the magnitude of the impact also draws upon other important characteristics based upon the CIEEM guidelines as follows:

(i) Confidence (certain, probable, unlikely, highly unlikely);

(ii) Duration (short, medium or long-term);

(iii) Reversibility (temporary, permanent); and

(iv) Timing/frequency (occurring at a critical stage in lifecycle, regular or irregular).

Level of Effect Criteria

8.32 The assessment of the level of effect of the potential impacts considers both the likely magnitude of the ecological impact and the values of the site/feature category to derive an overall 'Appraisal Category'. This is presented in Table 8.3.

8.33 In order to assess the level of effect of the impacts the following definitions of potential level of effect have been assumed as follows (using the standard terminology adopted across all disciplines in this ES). It should be noted that in EIA Regulations terminology those effects of a 'moderate' or 'major' level are considered to be *significant.* Effects of a minor level, or less are considered to be *not significant* in EIA Regulations terms:

(i) Major/Substantial - An impact on one or more receptor(s) of International, European, UK or National Value (i.e. High or Very High). Only Major negative impacts on features of Very High or High value are normally assigned this level of effect. They should be considered to represent key factors in the decision-making process;

(ii) Moderate - An impact on one or more receptor(s) of Regional, County or Unitary Authority Area (i.e. Medium) Value. These effects may be important, but are not likely to be key decision-making factors;

(iii) Minor - An impact on one or more receptor(s) of Local (i.e. Low or Lower) Value. These effects are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project; and

(iv) Negligible - No impacts on key nature conservation receptors. Absence of effects, or only those effects that are beneath levels of perception.

Table 8.3 Relative Level of Effect

		Value of Receptor				
		Negligible	**Low**	**Medium**	**High**	**Very High**
Magnitude of Impact	**Negligible**	Neutral	Neutral	Neutral	Neutral	Neutral
	Minor	Neutral	Minor	Minor	Moderate	Moderate
	Moderate	Neutral	Minor	Moderate	Moderate	Major/ Substantial
	Major	Neutral	Moderate	Moderate	Major/ Substantial	Major/ Substantial

Baseline Conditions

8.34 The following section summarises the baseline environment as derived from the desk study and field surveys. Full details are presented in the Technical Appendix (Appendix 8.1).

Desk Study

Statutory Designations

8.35 The Site falls within the South Pennine Moors SSSI, the South Pennine Moors SAC and the South Pennine Moors (Phase 2) SPA. These sites are designated for their nationally and internationally important habitats, including blanket bog, and their breeding bird assemblage.

8.36 Three locations of special geological interest are identified within the South Pennine Moors SSSI: two areas of deltaic sedimentary rocks and a type locality for two diagnostic fossils. All three provide important exposures of the Millstone Grit Series, and are described below:

Derby Delph Quarry (SE 017161)

8.37 This quarry, located some 3km north of the Site, is of considerable sedimentological interest, it displays sandstones of Namurian age displaying two distinct bed form types, one consisting of large-scale cross-bedded units and the other showing undulatory bedding. The quarry and rock outcrops within this site provide excellent exposures of sandstone layers of the Namurian Series, formed during the Carboniferous Period of geological history, about 315 million years ago. The sandstones originally accumulated on the bed of a major river delta, perhaps comparable to the modern Mississippi delta. This is an important site for geological study of the Namurian which has made a significant contribution to the understanding of river-bed deposits.

Standedge Road Cutting (SE 018095-023098)

8.38 This site, approximately 3.3km south of the Site, provides one of the most complete sections through the Namurian Kinderscout Grit, almost in their entirety, with the Butterly Marine Band intervening. This road cutting provides important exposures of the Kinderscout Grit which formed during the Carboniferous Period of geological time, about 320 million years ago. The rock sequence consists of thick sandstone layers separated by layers of shale, clay and thin coal seams. The rocks accumulated on a large river delta and contain important layers rich in the fossilised remains of marine animals, which accumulated during periods when the delta became flooded by the sea. This is an important site for geological study of the Namurian series and is of special interest as a reference section for comparative purposes.

Pule Hill (SE 032112-0321117)

8.39 The section here exposed, located approximately 2km south-east of the Site, contains the Namurian Pule Hill Grit, at its type locality, overlying a sequence of goniatite-bearing shales. These constitute the type locality of the stratigraphically diagnostic goniatites Reticuloceras bilingue and R. gracile. The Pule Hill Grit is of particular interest at this locality for containing abundant bivalve and gastropod fauna. The quarry faces and rock outcrops within this site provide excellent exposures of rocks of the Namurian Series originally formed during the Carboniferous Period, about 320 million years ago. The rocks consist of shales overlain by a thick sandstone layer known as the Pule Hill Grit, both rock types containing fossils of particular interest. This is an important site for geological study of the Namurian Series especially in respect of the fossils used for dating rocks of this age.

Non-Statutory Designations

8.40 There is a LGS to the west and north of March Haigh Reservoir, known as March Haigh and Buckstones LGS (46.26ha). A description of the site taken from the West Yorkshire Geology Trust[81] is provided below:

March Haigh (SE 008132)

8.41 The site, located approximately 650m west of March Haigh Reservoir, illustrates large scale landslip structures developed in shales below the Upper Kinderscout Grit which dates from the Upper Carboniferous period. Slip planes can be seen where detached material has moved down-slope. The slope is active especially after heavy rain when rapid movement can occur.

Buckstones (SE 018 136)

8.42 Exposures of Midgley Grit, located approximately 500m north of March Haigh Reservoir, form an impressive 500m long gritstone edge overlooking Marsden Moor and Pule Hill to the south. The edge has weathered into large blocks, 5 to 10m high.

8.43 A traverse along the edge reveals a range of sedimentary structures and occasional plant fossils.

8.44 The mineralogy of the Midgley Grit can be observed in fresh blocks of fallen rock below the edge. Exposures of underlying Upper Kinderscout Grit can be seen by descending into Haigh Clough, 1km south-west of Buckstones.

Catchment Geology

8.45 The March Haigh Catchment, below the present-day March Haigh Reservoir, is underlain by sedimentary rocks of Namurian age (326Ma to 313Ma), a subdivision of the Carboniferous period.

8.46 The Haigh Clough flows over Upper Kinder Scout Grit described as a medium to very coarse-grained feldspathic sandstone. A thin outcrop of the Hebden Formation is exposed in the steep sides of the Haigh Clough, a fine to course-grained felspathic sandstone interbedded with siltstone and mudstone.

8.47 The north of the catchment consists of the Marsden Formation and other sedimentary rocks that belong to the Millstone Grit Group. These sedimentary lithologies were largely formed in a coastal setting and include deltaic, estuarine, fluviatile and palustrine deposits.

[81] www.wyorksgeologytrust.org/lgssheets/kirklees/March%20Haigh%20and%20Buckstones.pdf

8.48 The predominant rock type is gritstone with thinner intervening mudstones and siltstones, and occasional turbidites and thin seams of coal[82]. There are no superficial unconsolidated deposits except for deeper peat, that is confined to the upper reaches of the catchment and interfluves between surrounding upland catchments[83].

Catchment Hydrogeology

8.49 Millstone Grit forms a multi-layered aquifer system with the intervening thinner shales and mudstones acting as an aquiclude, tending to separate sandstone horizons that effectively act as separate aquifers (Abesser *et al*. 2005; Lewis *et al.* 2006). Sandstones are generally well cemented and water transmission is restricted to joints and fractures. The predominant mechanism for these rocks is fracture flow, which is faster than intergranular flow, suggesting groundwater travels relatively quickly to augment surface flow and the catchment response to rainfall events is swift (Banks 2017). There will also be a contribution from throughflow, i.e. lateral flow of water in the soil zone that either infiltrates to the water table or travels downslope.

8.50 On the day of survey (8th October 2021) the dense vegetation cover over March Haigh Flat, predominantly of purple moor-grass (*Molinia caerulea*), often obscured the surface conditions. However, it was clear during the survey that there are areas of very wet ground and a number of minor springs. These are likely attributable to the underlying alternating bands of thicker sandstone and inter-bedded thinner shales and mudstones. Where the shales and mudstones meet at the surface exposing the boundaries between these and sandstones, minor springs occur.

Surface Drainage and Water Quality

8.51 The reservoir water level is governed by the set height of an outflow channel that feeds into Haigh Clough. Following prolonged dry periods, the water level is likely to be below this set height. At times of extreme precipitation and high-water levels, an adjacent overflow and spillway will divert water to Haigh Clough. At the time of the survey the overflow spillway was dry, although it had previously been active, and a channel below the spillway has been eroded, although the frequency at which this occurs is not known.

8.52 The moorland area to the north of the Site, March Haigh Flat, has a small number of south-flowing watercourses that cross the proposed trackway route before joining Haigh Clough, a watercourse that leads eventually to the River Colne (classed as a Main river[84]) in Marsden. Haigh Clough occupies an incised, steep-sided, 'V'-shaped valley of interlocking spurs. The moorland area south of the proposed track route, including the upper reaches of Haigh Clough, is identified as a Drinking Water Safeguard Zone (Surface Water) (England)[85].

8.53 Two streams flow under the track route, rising to the north and passing beneath bridges. One is unnamed and close to the base of the dam of March Haigh Reservoir and the other is Hard Haigh Clough Stream at the far eastern boundary of the survey area. At the time of the survey these streams were at baseflow. The channel widths range between 1 and 2m. They are incised with

[82] *www.bgs.ac.uk/geological-data/opengeoscience (accessed 16/11/2021)*

[83] *www.bgs.ac.uk/technologies/the-bgs-lexicon-of-named-rock-units (accessed 16/11/2021)*

[84] *https://www.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386*

[85] *https://magic.defra.gov.uk/MagicMap.aspx*

vertical banks with a steep incline from the surrounding ground height. In both channels the longitudinal gradient descends in a step-like manner as a series of small chutes and falls and an occasional plunge pool.

8.54 This reflects the control exerted by the near-horizontal bedding planes of the underlying gritstone and sandstone on channel morphology. Bedrock is exposed in the banks and channel bed, and platy and slab-shaped boulders line the channels. There is an insignificant sediment load in the streams and little/no sediment deposited on the channel bed. Precipitation is the primary feed mechanism, supplying water to the sub-surface and surface water system.

8.55 There are also two minor channels traversing the track route marked by a depression and change in vegetation mix. One is more evident on the ground and has an existing culvert. The other is much less distinguishable and does not have an existing culvert feature.

8.56 The water in March Haigh Reservoir and in the streams that flow south across March Haigh Flat into Haigh Clough, were at the time of surveys, stained brown. This is quite typical of peat-covered upland area waterbodies and watercourses. The degree of discolouration is associated with the levels of dissolved organic carbon[86]. An important source of DOC in natural waters is the leaching of degraded organic matter and if organic-rich soils dry oxidisation leads to the loss of carbon to the atmosphere as carbon dioxide. The pH of the water in the stream immediately below the reservoir was measured and found to be acidic, with a pH of 5.69. The water measured in Hard Haigh Clough Stream at the eastern boundary of the survey area was found to be pH 5.4. These values are typical of catchments with organic-rich soils where microbial decay processes in organic material have the effect of reducing pH. Furthermore, the catchment underlying geology of gritstones and sandstones impart few soluble minerals, which results in more acidic water.

Soils

8.57 The Soil Survey of England and Wales (Avery 1980, Mackney *et al.* 1983, Cranfield University 2021) indicates there are three soil associations within the March Haigh Catchment. The upper areas of the catchment consist of Winter Hill soils that are very acid raw peat soils associated with blanket bog. These are perennially wet and prone to soil erosion if wetness decreases and/or vegetation is lost due to, for example, poor management, over-grazing, pollution or wildfires. On the steeper, higher slopes north of Haigh Clough the soils are classified as the Belmont association and described as coarse loamy very acid upland soils with a peaty surface horizon. March Haigh Flat, which the majority of the track traverses, is classified as Wilcocks II, which is a seasonally waterlogged loam over clay with a peaty surface horizon.

8.58 Each soil type is affected by high rainfall and a high-water table, particularly where the gradient is low, and waterlogged conditions that leads to impeded drainage and the development of peat and organic-rich soils (Avery 1990).

8.59 Where incised streams have exposed soils in profile in the banks, a weathered layer above the solid bedrock is visible and an organic-rich humic topsoil over loamy and gritty mineral substrate. The edge of the channels experience water table drawdown and tend to be drier than soils more distant from the channel edges. Elsewhere, a peat layer has developed where waterlogged anoxic conditions have led to peat accumulation.

[86] *DOC, operationally defined as the fraction that can pass through a filter between 0.22 and 0.7 micrometres*

Peat Depth Mapping

8.60 The peat depth survey shows variation in peat depth over short distances. To the south of the Site the soils are shallow with a thin organic surface horizon over a weathered and clayey substrate. This is particularly the case where the gradient is steep to the south of the track and falling towards Haigh Clough. North of the track the variability is likely the result of there being underlying hummocky terrain, likely the product of periglacial weathering in advance of a warmer climate and the establishment of vegetation and subsequent peat development.

8.61 The majority of the deepest peat depth measurements were taken along the northern edge of the sample area upslope of the Site. The deepest peat (120 to 140cm) was measured infrequently towards the centre of March Haigh Flat along with one measurement close to the reservoir spillway. Deep peat measuring 100 to 119cm was recorded on the moorland north of the spillway and again along the northern edge of the sample grid. Peat depths 40 to 99cm dominate the sampling taken within the first 25m north of the proposed track route. Along the track route itself, six out of the 28 sample points recorded a depth of 40cm or greater, the maximum being 102m deep. Below the proposed track route shallower peat depth measurements dominate with only 12 out of 84 measurements at 40cm or deeper.

8.62 An investigation of the March Haigh Reservoir catchment (Yeloff *et al*. 2006), instigated primarily as a research project to investigate the reasons for peat erosion and sediment fluxes in the catchment, provides a useful surrogate site. A range of surveys were carried out including taking peat samples for dating, recording the degree of humification, pollen analysis, plant microfossil identification and microscopic charcoal. The conclusion was that, as with other locations in the Southern Pennines, prior to the mid-20th Century degradation of vegetation was caused by pollution, climate change and fire. Following a severe fire in 1959 that removed vegetation, bare peat was maintained through over-grazing that caused widespread soil erosion.

8.63 Rainfall is relatively high in the Southern Pennines compared to many regions of the UK. Climate records are available for the Blackmoorfoot Reservoir that lies approximately 8km to the east of March Haigh Reservoir and at a similar altitude (Yeloff *et al.* 2006). Between 1886 and 2000 the ten-year moving average was 1154mm of rainfall. There has been a gradual trend throughout the period 1886 to 2000 of an increase in rainfall.

8.64 Examination of peat cores as part of the Yeloff investigation found that at most sampling sites peat was well humified and the macrofossil assemblage indicated peats composed of a mixture of grasses, sedges and ericaceous scrub in varying proportions, with small amounts of *Sphagnum*. Small bands of poorly humified peat suggested *Sphagnum* was more abundant before being replaced by grasses, sedges and ericaceous scrub. Peat accumulation records suggested low rates of accumulation between 1840 and 1905 with average accumulation rates 1840 to 2000, ranging from 0.3 to 1.5mm/year. South-facing areas had the higher accumulation rates, suggesting aspect influenced peat accumulation.

8.65 Detailed core examination did not form part of this peat depth survey, but the results above provide a reliable description of the nature of the wider peat body present at March Haigh Flat.

Peat Carbon Assessment

8.66 As part of the delivery of the proposed scheme, the Site will be subject to some disturbance/removal of peat to enable construction of a safe and suitable permanent track required under the MIOS for March Haigh Reservoir. The design of the track and construction methods has minimised the footprint of the scheme in terms of land-take for the proposed permanent track. Evaluation of the design identified 0.5959ha of peatland habitat and underlying (shallow) peat will be unavoidably lost. The majority of this is peat that has already been disturbed in the past (that was re-laid over the former temporary track and has revegetated). A small proportion of this peat will be from previously undisturbed peatland areas.

8.67 There is calculated to be approx. 1400m^3 of waste material derived from the construction phase of the Proposed Development. Not all of this will be peat, and some will be stone, vegetation and other materials, However, for the purposes of the assessment it as assumed that all material is peat and that all this peat conforms to the carbon content of a 'typical' damaged catotelmic peat type (104kg C per m^3).

8.68 The total carbon lost from Site through the removal of 1400m^3 of peat via the waste management stream can, therefore, be calculated.

Potential Effects

Introduction

8.69 This section sets out the identification and evaluation of the key potential effects of the main stages of development taking account of incorporated or 'embedded' mitigation. The ecological receptors that are likely to be affected by the Proposed Development and assessed in this Chapter of the ES comprise:

(i) Geological and hydrological aspects of the features of interest within the designated sites comprising the Dark Peak SSSI; South Pennine Moors SAC and South Pennine Moors Phase 2 SPA;

(ii) The LGS, March Haigh and Buckstones LGS; and

(iii) Peat carbon resource.

During Construction

8.70 The potential effects of the scheme during construction, without mitigation, comprise:

(i) Impacts on any notable geological features of interest;

(ii) Direct and indirect effects on hydrology and water quality; and

(iii) Direct and indirect impacts on the peat soil and the peat carbon resource.

8.71 A summary of overall levels of effects on the features during construction are presented in Table 8.4.

8.72 Embedded mitigation measures have been included to further reduce and avoid potential effects on peat hydrology, water quality and peat soil (and carbon) resource, as described below.

Impacts on Geological Sites of Interest

8.73 The three geological sites described under the South Pennine Moors SSSI citation are evaluated as being far enough away to be unimpacted during the construction phase of the scheme.

8.74 March Haigh and Buckstones LGS is located north-west of March Haigh Reservoir and is also unlikely to be impacted during the construction phase of the scheme due to distance from the Site. The LGS is within the upper catchment area of the moorland and would be unaltered by any potential changes in hydrology or water quality as a result of the Proposed Development and the peat resource underlying the LGS would remain similarly unaffected.

Impacts on Hydrology and Water Quality

8.75 The peat resource and hydrology are, for much of the Site, already somewhat modified due to the previous temporary track along the same route. However, there has been substantial revegetation of the replaced peat within the former temporary track route over the intervening years and

hydrological connectivity between the blanket bog area above the Site and the thinner peat soils and degraded blanket bog areas below the former track line have been retained.

8.76 The proposed track construction introduces the risk of changes to hydrology and water quality resulting from:

- Changes to existing flow regimes within the peat soils and watercourses;
- accidental spillage/pollution of the water environment;
- increased/altered surface runoff increasing risk of localised erosion; and
- introduction of a material of an unsuitable type (e.g. limestone) into the predominantly acidic environment that may alter the water chemistry of the local area.

8.77 Without embedded mitigation being built into track design and construction approach, the Proposed Development is likely to lead to further disruption of peat hydrology and function along the route resulting from impeded drainage on the upstream (north) side of the permanent track leading to the retention of water within the peat mass and possible formation of ponded water along the trackside and/or potential washout of the track structure due to altered flowlines/regimes.

8.78 The extent of indirect effects on the peat resource below (on the south side) of the track is difficult to quantify precisely but impeded drainage following the Proposed Development could potentially result in drying of the peat in this area, with risk of peat loss through increased erosion and oxidation.

8.79 In addition, water quality may be negatively affected if unsuitable material (e.g. limestone) is used within the scheme design and/or accidental pollution incidents occurred. This would potentially impact negatively on the watercourses and the peat habitats reliant on hydrological inputs.

Embedded Mitigation for Hydrology and Water Quality

8.80 The stone to be used for track construction has been selected to be similar in composition to the local natural geology whilst also providing the necessary structural qualities, such as gritstone. The existing stone track bed (from the previous temporary track) will be retained where possible and added to, to minimise disruption to the substrates underlying this feature.

8.81 The track across the moorland/protected area has been designed to be free-draining as far as possible to avoid the need for additional drainage features (e.g. under track pipes) to be installed.

8.82 The track through White Hall Farm (Chainage 0m to Chainage 130m) has a positive drainage system design, with a drainage ditch or filter drain being provided on the north side of the track connecting into the existing culvert at Chainage 90 with the outfall still entering the unnamed watercourse to the south. Flow rates at this point will remain unchanged by the Proposed Development.

8.83 Existing flow rates through present culverts (located at Chainage 335m and Chainage 880m) will be retained and culvert structures will be replaced (if necessary) to ensure they are suitable for the proposed vehicle use whilst maintaining existing flow regimes and also accounting for any predicted climate change as presented in the FRA report for the scheme. Culvert headwalls will likely be faced with locally derived stone to be sympathetic to the local environment and galvanised steel protection railings will be painted 'invisible green (RAL015) to help them to blend in with the landscape.

8.84 The unnamed stream at Chainage 795m has no current culvert installed, and a 150 mm concrete pipe is proposed to be installed underneath the formation level of the track to maintain hydrological links at this point.

8.85 All installed pipes will be pre-cast concrete and laid on a suitable granular material (not limestone).

8.86 At Chainage 450m there is a small unnamed watercourse marked on the OS map which appears on Site as a shallow, wet depression at the time of survey. There is no proposed pipe at this location and water is of a flow rate that is expected to be able to pass through or across the track at this point.

8.87 Works associated with the culverts and where flowpaths cross the scheme will be closely supervised by an experienced ECoW with expertise in the peat environment. Best practice measures will be implemented to safeguard the water environment from accidental spillage and pollution, as detailed in the Construction Environmental Management Plan[87].

Impacts on the Peat Resource

8.88 The construction of the permanent stone track and associated passing places would result in the loss of 0.5959ha of peat resource underlying the re-vegetated former temporary track, degraded blanket bog, acid flush and associated acid grassland. The peat soil along the route of the former temporary track has been moved and then replaced during the operation and restoration of the temporary track. Under this Proposed Development, the need to widen the track and provide passing places results in disturbance to additional areas of previously undisturbed peat adjacent to the temporary track route. The area includes habitats that are hydrologically linked to the adjoining areas of degraded blanket bog.

8.89 Overall, the scheme is calculated to require the disturbance/removal of 1400m^3 of material. Much of this material is expected to be unconsolidated peat overlying the (currently buried) temporary track structure and/or non-peat based (stone and other material), both of which will have lower or no carbon values. However, the volumes of each 'type' of material are imprecisely known, therefore, the calculations have assumed all material is a degraded catotelmic peat 'typical' of degraded blanket bog, providing a worst-case scenario for carbon calculations.

8.90 Using this approach, the Proposed Development (without embedded mitigation) would potentially result in 145,600kg carbon taken off Site as waste.

8.91 The Proposed Development has the potential to produce excess peat if not re-used on site and/or loss of peat (and associated carbon stores) via oxidation and erosion through inappropriate handling and storage.

Embedded Mitigation for Peat Soils and Peat Carbon Resource

8.92 A number of alternative routes have been considered and the final route, which largely follows the same alignment along the previous temporary track, was selected as the least environmentally damaging. A temporary track solution with re-instatement of peat soils (as adopted for the earlier scheme) will not address the current needs of the Applicant for permanent access for vital reservoir inspection and maintenance.

8.93 The track is the minimum width possible to accommodate the type of vehicles required for construction and operational purposes, with a running width of 4m, plus additional width to allow for earthworks, where needed, to site the track appropriately within the topography. Passing places and compounds have largely been located within the footprint of the earlier temporary track where possible to avoid impacting on new areas.

8.94 There will be minimal changes to ground levels only as required to ensure the track meets the required technical specification and to increase the stability of the adjacent peat, thus, reducing

[87] *CEMP*

risk of erosion or collapse. All cutting into the peat or filling in of the existing levels on either side of the track will be overseen by the ECoW to ensure the peat resource is appropriately handled. Bare peat areas created following the necessary earthworks will be carefully reseeded with a suitable acid grassland seed mix to stabilise these areas and reduce risk of erosion of exposed bare peat. A geotextile will be use if deemed necessary to further reduce erosion risk.

8.95 Considering the importance of peat as a carbon store and the aim of minimising waste transfer off Site, while also taking account of the need to minimise impacts on the protected area in terms of the Proposed Development footprint, the scheme includes the re-use of a proportion of the peat disturbed / removed as part of the construction phase, as detailed below.

8.96 The southern edge of proposed track from Section C onwards (Chainage 325m forward) across the protected area will have the edge slope of the track (the 'batter'[88]) built up to be a constant 1:3 slope, using peat that has had to be taken from elsewhere on the Site (and temporarily stored on the construction compound). This is calculated to re-use 219m^3 of peat within the scheme on the protected area. The highest quality peat, in terms of structure, will be used at this location to ensure stability (some peat removed from, for example, the former track alignment, may be very amorphous and/or contaminated with stone material from the previous track surface, and will be avoided for re-use). The placement of this peat will modify an additional narrow strip of peatland area along the southern edge of the permanent track, as the vegetation along this strip will need to be removed prior to the extended batter being formed. The batter will be reseeded with a suitable acid grassland / heather seed mix to ensure the peat revegetates quickly and is not lost to erosion. Over time, the expectation is that purple moor-grass and rushes will re-establish over this area.

8.97 This modification occurs on a narrow strip of land that amounts to 0.074ha of peatland habitat. The creation of this slightly larger 'batter' also allows the footpath to be less visually intrusive.

8.98 Increasing the track's southern batter to either a 1:4 or a 1:5 slope was also considered but was discounted, as while the increased slope enable a greater amount of peat to be re-used on the protected site (582m^3 and 974m^3), the impact of the additional disturbance on the adjacent peatland habitat was considered undesirable. Therefore, the 1:3 slope was selected as the preferred option.

8.99 In addition, the scheme proposes to re-use peat on the construction compound area as part of the re-instatement of this habitat after completion of the construction phase. Laying a depth of up to 0.5m of peat across this area (which will have been stripped of vegetation for use at the compound), prior to reseeding with a suitable seed mix (as indicated in Chapter 7 of this ES) will re-use approximately 688m^3 of peat.

8.100 The remaining 'peat' (493m^3) will be a mixture of stripped vegetation material, stone, debris and unconsolidated peat material, which will be removed off site under the Waste Management Plan[89] for the scheme.

8.101 The volumes of peat disturbed during the scheme, and either re-used on site or removed off site due to issues around contamination and/or instability for successful re-use) is summarised in Table 8.4 below, and the carbon content of each peat volume has been calculated. Carbon

[88] *'batter' = receding slope of a wall, structure, or earthwork*

[89] *WMP*

calculations have been undertaken using the value of 104kg carbon per m^3 of degraded catotelmic peat as described by Lindsay (2010, page 63).

Table 8.4 Peat Volumes and Carbon

Calculated Peat Volume	Intended Use	Estimated Carbon Content	Retained or Removed from Site
219m^3 peat	Re-use along southern batter of track and reseeded	219 x 104 = 22,776kg C	Retained
688m^3 peat	Re-use during the restoration of the construction compound	688 x 104 = 71,552kg C	Retained
493m^3 peat	Removed off Site as part of WMP	493 x 104 = 51,272kg C	Removed

8.102 Construction within and close to the protected area will be closely supervised by an experienced ECoW with expertise in the peat environment. Best practice measures will be implemented throughout the Proposed Development to safeguard the peat resource from accidental spillage and pollution.

8.103 Best practice peat soil handling and storage measures will be incorporated into the CEMP as an integral part of scheme implementation to minimise any additional impact on peat soils and their carbon stores through for example, oxidation or erosion during temporary storage during construction.

Assessment of Effects During Construction (Incorporating Embedded Mitigation)

8.104 In view of the proposed sensitive design and construction methods, it is anticipated that the effects on the hydrological functioning of the adjacent peat mass can be largely managed and kept to a minimum, resulting in a minor magnitude of impact.

8.105 Overall, the scheme is calculated to require disturbance/removal of 1400m^3 of material. Much of this material is expected to be unconsolidated peat overlying the (currently buried) temporary track structure and/or non-peat based (stone and other material), both of which will have lower or no carbon values. However, the volumes of each 'type' of material are imprecisely known, therefore, the calculations have assumed all material is a 'typical' blanket bog peat structure, providing a worst-case scenario for carbon calculations.

8.106 Using this approach, the scheme retains 907m^3 of peat material (64.79% of the total disturbed/removed during construction) on the Site when employing the creation of a continuous 1:3 batter along the southern edge plus re-use of peat across the compound area during restoration after construction is complete. This equates to the retention of 94,328kg of Carbon that might otherwise have been taken off Site as waste.

8.107 The volume of material removed from Site is 493m^3 (35.21% of the total disturbed/removed during construction) equating to a maximum of 51,272kg carbon, but this is likely to be lower due to the nature of the material (unconsolidated peats and/or non-peat material such as stone).

8.108 There would, therefore, be a maximum permanent loss of peat within the Proposed Development footprint of 493m^3 (equivalent to 51,272kg carbon), which cannot be avoided.

8.109 The blanket bog resource is of **very high** value but with the embedded mitigation described above, permanent effects on its hydrological function would be an impact of **minor** magnitude resulting in an overall level of effect of **moderate adverse**.

8.110 In terms of water quality, best practice pollution control measures will be incorporated as an integral part of scheme implementation to avoid any impact on water quality through accidental pollution and surface runoff during construction, including avoiding any surface runoff entering any watercourses.

8.111 The track design will incorporate stone of a suitable type similar to that of the local geology, e.g. gritstone, whilst maintaining structural stability and this will avoid any adverse impact on water quality, in particular pH values.

8.112 The blanket bog and associated watercourses are of **very high** value and temporary or permanent effects on the water quality are anticipated to be **negligible** resulting in an overall level of effect of **neutral.**

8.113 The peat associated with the Site is of **very high** value and embedded mitigation in the form of minimising the footprint of the track, re-use of peat on site and best practice handling and storage of peat soils will reduce effects to a minimum. The Proposed Development is assessed as having a **minor** impact on peat soils. The overall level of effects is **moderate adverse** in respect of peat soils.

8.114 The peat carbon resource is also of **very high** value and embedded mitigation in the form of re-use of peat soils on site and best practice approach to peat storage and handling during construction will result in a predicted small permanent loss of carbon during construction, which would be an impact of **moderate** magnitude. The overall level of effects is **major adverse** in respect of peat carbon loss.

Table 8.5 Summary of Level of Effect During Construction (with embedded mitigation)

Receptor and Value	Potential Effects	Extent, Duration, Magnitude	Level of Effect
Geological sites noted within SSSI. Very high value.	No effects identified due to distance from Site	N/A	Neutral
March Haigh and Buckstones LGS. Medium value.	No effects identified due to distance from Site	N/A	Neutral
Peat hydrology. Very high value.	Changes in hydrological function, localised wetting or drying of peat/habitats on and adjacent to Site	Direct and indirect, permanent, of minor magnitude	Moderate (adverse)
Water quality (of peat resource and watercourses). Very high value.	Risk of accidental pollution; introduction of unsuitable construction material at risk of altering local water chemistry will all be avoided with embedded mitigation	Negligible	Neutral
Peat soil resource and carbon store. Very high value.	Loss of 493m^3 of peat within Proposed Development footprint. Further disruption of peat soils along track route, additional impacts on localised areas of undisturbed peat due to cut and fill requirements, risk of carbon loss through peat removal from Site and/or inappropriate handling and storage	Direct and indirect, permanent, minor magnitude	Moderate (adverse)

Operational Phase

8.115 The potential effects of the scheme during the operational phase, without mitigation, comprise:

(i) Potential for increased footfall to impact on locally designated geological sites;

(ii) Potential for localised disruption to peat hydrology due to the presence of the track, in particular reduced hydrological inputs to peat below the track; and

(ii) Ongoing loss of peat soil and associated carbon because of the reduced hydrological inputs to peat soils below (south of) the track.

8.116 A summary of overall levels of effects on ecology during the operational phase is presented in Table 8.6.

Impacts on Geological Sites of Interest

8.117 The three sites of geological interest, as noted with the SSSI citation, are all at some distance from the Proposed Development and will not be impacted by it, resulting in a **neutral** effect.

8.118 March Haigh and Buckstones LGS is in the upper part of the catchment (above March Haigh reservoir) and will not be affected by any localised changes to peat hydrology at the Site.

8.119 The potential for increased visitor use of the wider moorland area has been considered in Chapter 9 of this ES, which concludes that there is a risk of increased recreational pressure from both authorised recreational use as well as un-authorised off road use. This has been assessed as being of a moderate adverse level of effect with regard to the wider Access Land/Common Land resource but could also potentially affect the designated features of the LGS for example with increased trampling, erosion and vandalism. The LGS is a feature of **medium** value, and the magnitude of effect is considered to be **minor** at worst, with the interest features unlikely to be lost but potentially subject to some minor degradation. The overall level of effect would be **minor adverse**.

Potential for Disruption to Peat Hydrology and Carbon Resource

8.120 Mitigation has been embedded into the track design and methodology from the outset to reduce the effect of the scheme on peat hydrology.

8.121 The stone track design across the protected area comprises free draining stone to minimise the long-term disruption of peat hydrology. Nevertheless, there is the potential for localised pooling of water on the upslope (north) side of the track potentially increasing erosion over time, which would need to be addressed through a programme of monitoring and maintenance. On the downslope (southern) side of the track localised scour may occur at culvert and pipe outfalls, again requiring monitoring and maintenance to prevent erosion from occurring.

8.122 A programme of regular monitoring and maintenance would be implemented to identify and address localised issues to prevent any long-term disruption to the peat mass, in particular accelerated scour and erosion.

8.123 The blanket bog is a feature of **very high** value, and with embedded mitigation in place the magnitude of impact is **negligible**, with a resulting level of effect of **neutral.**

8.124 The maintenance of the hydrological connectivity minimises the risk of increased loss of carbon from the peat resource as a result of any additional drying/oxidation. The blanket bog is a feature of **very high** value, and with embedded mitigation in place the magnitude of impact is **negligible**, with a resulting level of effect of **neutral**.

Table 8.6 Summary of Level of Effect at Operational Stage

Receptor and Value	Potential Effects	Extent, Duration, Magnitude	Level of Effect
Geological sites listed within the SSSI citation. Very high value.	No direct or indirect effects identified due to distance from Site	N/A	Neutral
March Haigh and Buckstones LGS. Medium value.	Potential for some increases in recreational use of wider area including in the vicinity of the LGS.	Indirect, permanent, minor magnitude	Minor (adverse)
Blanket bog. Very high value.	Disruption of peat hydrology – namely drying of peat below track avoided with embedded mitigation	Negligible	Neutral
Peat and peat carbon resource. Very high value.	On-going carbon loss due to drying of peat below track and peat re-use within the Site avoided with embedded mitigation	Negligible	Neutral

Additional Mitigation Measures

8.125 The proposed mitigation measures designed as an integral part of the scheme are presented below. The applicant will be responsible for the implementation of mitigation and subsequent monitoring.

8.126 The peat soils removed as part of the construction of the track is calculated as 2110m^3. Of this, 710m^3 will be re-used within the scheme as part of the earthworks design identified above. The remaining 1400m^3 of peat soil will be replaced as low bunds along the southern edge of the track, carefully located at points where peat stability will be greatest. This will require the existing vegetation to be temporarily stripped off as turves and then replaced over the low bunds once they are formed, with additional reseeding with a suitable acid grassland/heather mix where needed to ensure suitable establishment of moorland habitat. The bunds will be formed in a sensitive manner to tie in with the adjacent ground levels and work will be overseen by the ECoW.

8.127 Peat that is in excess of the volume able to be included in the low bunds, or of very low stability/ high wetness, will be stored on the compound and then re-deposited over the compound to a suitable depth, prior to the compound area being re-established as acid grassland habitat.

8.128 Both the low peat bunds and the re-deposited peat on the compound will need a suitable standoff from any nearby watercourses, ideally 2m. In addition, best practice measures for soil storage and handling will be employed to minimise drying out and oxidation of any stored material.

8.129 The disturbed and re-used peat soils will be vulnerable to rush (*Juncus*) invasion, and this will be monitored and managed where appropriate under the management and maintenance programme.

8.130 Measures to address the potential for increased recreational pressure are detailed in Chapter 9 of this ES and would comprise padlocked gates at White Hall Farm and Hard Head Clough to prevent unauthorised vehicle use and enable ongoing monitoring of recreational use by the Applicant and the commitment to work in partnership with the National Trust to implement additional surveillance and management measures, if required. With this additional mitigation in place to address any issues arising from increased recreational pressure, there are not anticipated to be any residual effects in relation to the LGS.

Residual Effects

8.131 Any residual impacts remaining after mitigation has been incorporated are detailed below and summarised in Table 8.7.

During Construction

8.132 Due to the unavoidable impacts on degraded blanket bog within the South Pennine Moors SAC comprising the permanent loss of 493m^3 of peat (35.21% of the total disturbed/removed during construction) equating to a maximum of 51,272kg carbon. However, this is likely to be lower due to the nature of the material (unconsolidated peats and/or non-peat material such as stone) which cannot be avoided. Similarly, the effects on peat hydrology, which are difficult to accurately quantify but likely to extend for at least several metres along either side of the track, there will be an overall adverse effect on the integrity of the SAC. The permanent loss of peat, disruption to the peat hydrology and peat carbon resources cannot be fully addressed through mitigation measures. This will result in a residual effect of a **moderate adverse** level, which is significant in EIA terms. A compensation strategy is, therefore, required to off-set the loss of blanket bog habitat and associated hydrological function and peat carbon storage.

8.133 Further details of the proposed compensation strategy are presented in a separate Shadow HRA (PAA 2023a).

8.134 It is intended that the proposed compensation measures would also address the residual impact of the Proposed Development on the South Pennine Moor SSSI.

Operational Phase

8.135 There are no residual effects at the operational stage.

Cumulative Impacts

8.136 Cumulative impacts have been assessed considering projects listed in Table 1.3 within Chapter 1 of this ES, comprising (1) the proposed 'measures in the interests of safety' at March Haigh Reservoir, (2) proposed tree planting by the National Trust and (3) the ongoing moorland-wide habitat restoration works across the Marsden Estate.

8.137 Of these, the proposed works at March Haigh Reservoir, which are anticipated to take place after the completion of the access track in February 2024, could introduce additional likely impacts relating to peat and hydrology. The scope of these impacts is as yet unclear but are considered unlikely to be of a scale and nature to increase the impacts above the currently predicted moderate adverse range, and at least some of these impacts (for example, lowering the reservoir level) will be temporary.

8.138 Overall, therefore, significant cumulative effects are not considered likely and have not been considered further.

Summary and Conclusions

8.139 A desk study and field surveys have been undertaken to establish the baseline geology, peat soils and hydrological conditions of the Site and desk study search area.

8.140 The Site falls within the South Pennine Moors SSSI, and the citation identifies three sites of geological interest within the designated area – Derby Delph Quarry (SE 017161), Standedge Road Cutting (SE 018095-023098) and Pule Hill (SE 032112-0321117). All of these sites are some considerable distance away from the Site and no impacts of the Proposed Development have been identified for these geological sites.

8.141 In addition, March Haigh and Buckstones LGS is present within the wider catchment, approximately 650m and 500m, respectively, to the west and north of March Haigh Reservoir. Due to the distance of the LGS, some distance for the Proposed Development and situated within the upper catchment of the wider March Haigh moorland, no direct impacts are identified. Therefore, no significant impacts are identified as a result of the Proposed Development, although these may be some minor increase in recreational access to this area of the wider moorland (see Chapter 9 of this ES). This is, however, identified as unlikely to result in any significant impact on the notable features of the LGS.

8.142 The Proposed Development would result in some further disruption of the hydrological integrity of the designated area in the vicinity of the track (with some disruption already having taken place as a result of the previous temporary track). In addition, the peat resource would, by necessity, be removed under the track width to enable the required design specification to be met. A significant proportion of this peat has already been removed and then replaced as part of the former temporary track design, resulting in some loss of structure to much of the peat affected by this Proposed Development. A smaller proportion of largely undisturbed peat would be required to be removed to provide appropriate levels for construction.

8.143 Localised earthworks along the edge of the track would re-use approximately 710m^3 of peat as part of embedded mitigation.

8.144 The *c.*1400m^3 peat removed/disturbed to enable track construction would be largely re-used within the Site to provide additional mitigation for impacts to the peat resource, as follows:

- Peat material with greater structural integrity would be re-used to form low bunds along the southern edge of the track. Vegetation would be removed prior to bund formation and then re-seeded with an acid grassland/heather mix. Where feasible, turves of vegetation would be re-laid, which would be Contractor-led with guidance from the EcoW. This would also soften the edge of the track within the landscape.
- Peat material with lower structural integrity (likely to be that peat removed from the wettest parts of the former temporary track) will be spread no deeper than 500mm across the compound area before restoration as acid grassland/heather on this area using an appropriate seed mix (including additional seed-bearing forage plants for twite).

8.145 The above mitigation would enable the scheme to retain 907m^3 of peat material (64.79% of the total disturbed/removed during construction) on the Site when employing the creation of a continuous 1:3 batter along the southern edge plus re-use of peat across the compound area during restoration after construction is complete. This equates to the retention of 108.84g of carbon that might otherwise have been taken off Site as waste.

8.146 The remaining 493m^3 of peat (35.21% of the total disturbed/removed during construction) equating to a maximum of 59.16g carbon, but this is likely to be lower due to the nature of the material (unconsolidated peats and/or non-peat material such as stone) would be removed as waste.

8.147 Under this approach approx. 65% of the peat directly affected would be retained within the Site, albeit in a modified form due to temporary removal, storage and re-use.

8.148 With the above measures in place there will remain an unavoidable impact of peat loss within the Proposed Development footprint and on localised hydrological integrity and peat carbon stores within the protected area which cannot be mitigated at the construction stage. A separate Shadow HRA (PAA 2023a) has been prepared to set out the proposals for compensation measures to off-set adverse effects on the integrity of the South Pennine Moors SAC. These measures are intended to also address the impacts of the Proposed Development on the South Pennine Moors SSSI.

8.149 Table 8.7 summarises the results of the evaluation process and residual impacts.

Table 8.7 Summary of Residual Effects on Hydrology, Peat and Peat Carbon Resources

Receptor and Value	Potential Effect	Extent, Duration, Magnitude	Level of Effect without Mitigation	Mitigation	Level of Residual Effect with Mitigation
During Construction					
Geological sites noted within SSSI. Very high value.	None (too distant from Site)	N/A	Neutral	None required	Neutral
March Haigh and Buckstones LGS. Medium value.	None (too distant from Site)	N/A	Neutral	None required	Neutral
Peat hydrology. Very high value	Loss of 1400m^3 of peat. Changes in hydrological function.	Direct and Indirect, permanent of minor magnitude	Moderate (adverse)	Impacts minimised with embedded mitigation through careful route selection, design and construction methods but unavoidable loss of 493m^3 peat/other material and residual effects on peat hydrology which cannot be mitigated.	Moderate (adverse)
Water quality (of peat resource). Very high value	Risk of accidental pollution; introduction of construction stone changing pH but all effects will be avoided with embedded mitigation.	Negligible	Neutral	Embedded mitigation best practice pollution control during construction. Selection of suitable stone type similar to the natural geology of the local area (i.e. gritstone).	Neutral
Peat soils and peat carbon resource. Very high value	Further disruption of peat soils. Additional impacts on localised areas of peat due to cut and fill. Risk of loss from Site of approx. 145,600kg carbon taken off Site as waste.	Both direct and indirect, temporary, Major magnitude	Major (adverse)	Embedded mitigation through careful route selection, design and construction methods but likely to be unavoidable disruption which cannot be mitigated. Re-use of peat on site to lower carbon losses to an estimated 51,272kg.	Moderate (adverse)
After Completion					

Receptor and Value	Potential Effect	Extent, Duration, Magnitude	Level of Effect without Mitigation	Mitigation	Level of Residual Effect with Mitigation
Geological Sites listed within SSSI citation. Very high value	None (too distant from Site).	N/A	Neutral	None required.	Neutral
March Haigh and Buckstones LGS. Medium value.	Potential for some increases in recreation use of wider area.	Indirect, permanent, minor magnitude	Minor (adverse)	Padlocked gates at White Hall Farm and Hard Head Clough to prevent unauthorised vehicle access. Ongoing monitoring by Applicant and commitment to working with National Trust and increased surveillance and management if required.	Neutral
Blanket bog. Very high value	Disruption to peat hydrology avoided through embedded mitigation.	Negligible	Neutral	Sensitive, careful design and construction to minimise risk of long-term changes to peat hydrology and regular monitoring and maintenance to address localised pooling and scour along stone track.	Neutral
Peat soils and peat carbon resource. Very high value	On-going risk of localised erosion and/or oxidation of peat soils and carbon losses avoided through embedded mitigation.	Negligible	Neutral	Sensitive, careful design and construction to minimise risk of increased localised peat erosion and regular monitoring and maintenance to address localised erosion.	Neutral

9. ACCESS AND RECREATION

Introduction

9.1 This Chapter details the assessment of effects on access and recreation. The Chapter has been prepared by PAA. A more detailed account of the effects of the proposals on visual amenity is presented in Chapter 6 (Landscape) and is summarised in this Chapter where relevant to recreational amenity. The interactions between effects on visual and landscape and effects on recreational users, e.g. walkers is also considered in Chapter 10 of this ES.

About the Author

9.2 This Chapter has been prepared by Sacha Rogers, BSc (Hons), MCIEEM[90] and Chartered Environmentalist. Sacha Rogers is the Managing Director of PAA, a long-established ecological consultancy with particular expertise in the survey, assessment and restoration of the moorland environment.

Consultation

9.3 A pre-application consultation was undertaken with KC in November 2022 and a formal EIA Screening Request and Scoping Request was also submitted in November 2022. An EIA Screening and Scoping Opinion from KC was received on 16th January 2023 and a pre-application consultation response was received from KC on 19th January 2023.

9.4 The Scoping Opinion confirms that the EIA should include an assessment of potential impacts on nearby ProW, National Trails and other accessible/open land.

9.5 The pre-application consultation response provides further details of relevant constraints and Kirklees Local Plan policies (KC 2019) including identification of the specific ProW that would potentially be impacted (namely: COL/195/10; COL/195/20; COL/195/30; COL/195/40 and COL/196/20) and the presence of a Strategic Green Infrastructure Network which is the subject of Kirklees Local Plan policy LP31.

9.6 The pre-application consultation response goes on to say:

> *'The site lies in close proximity to a number of Public Rights of Way (ProWs) and is located close to the Pennine Way National Trail. The site is also located in an area of designated Registered Common Land and Open Access/Section 15 Land under the Countryside and Rights of Way Act 2000 and is within the defined South Pennine Moors SPA / SAC Strategic Green Infrastructure Network area.*
>
> *The proposal has the potential to detrimentally impact on the ability of recreational users of Marsden Moor to access these ProWs due the proposed trackway being fenced/gated off from public use (particularly footpath COL/195/40 which crosses the site to link up with the wider network). The Council's EIA Scoping report sets out that this should be further assessed as part of an ES which will need to accompany a planning application. Policy LP31 sets out that priority will be given to safeguarding and enhancing green infrastructure networks, green infrastructure assets and the range of functions they provide'.*

[90] *Full member of CIEEM*

9.7 Pre-application consultation on access and recreation matters has also been undertaken with the National Trust, Ramblers Association and Open Spaces Society. Feedback received during these consultations has been considered within this assessment, with the main points of note being:

- The need for careful management at the point where the access track construction and subsequent reservoir works cross footpath COL/195/40;
- The need to consider the potential for increased recreational pressure, both authorised and un-authorised and associated increased fire risk, litter, disturbance and impact on land manager resources; and
- The need to maintain open access to Access Land and Common Land.

Policy and Legislative Context

Registered Common Land and Open Access/Section 15 Land

9.8 The Proposed Development falls within an extensive area of Access Land as designated by the CroW Act 2000 and CroW Act Section 15 (Common Land). Access Land denotes a public right of access to the land that is mapped as 'open country' comprising mountain, moor, heath and down. Within Access Land it is permitted to walk, sight-see, bird-watch, climb and run. Dog walking is permitted within Access Land but as a general rule visitors using their open access rights must keep dogs on a short lead of no more than 2m between 1st March and 31st July each year (except in the coastal margin) and at all times near livestock. In certain circumstances visitor access can be restricted.

9.9 Common land is land owned by one or more persons where other people, known as 'commoners', are entitled to use the land or take resources from it. The public have the right to access registered common land.

South Pennine Moors SPA/South Pennine Moors SAC Strategic Green Infrastructure Network

9.10 Kirklees Local Plan sets out the planning justification for the Strategic Green Infrastructure Network policy LP31. A relevant extract is provided below.

> *'National policy requires local planning authorities to set out a strategic approach in their Local Plans to plan positively for the creation, protection, enhancement and management of networks of green infrastructure.*
>
> *Green infrastructure is defined as networks of accessible green spaces and natural habitats that occur within and form connections between towns and villages. It functions in different ways and provides multiple benefits for wildlife, improved health and well being of people, local food growing, mitigating climate change, such as flood alleviation, and for the local economy by providing a high quality environment to help attract further economic investment.*
>
> *Natural England has mapped and analysed green infrastructure across the region. Using this information, areas of strategic green infrastructure have been identified in Kirklees where the functions of green infrastructure are considered to be significant and wide ranging. These are identified on the Policies Map where there is a concentration of green infrastructure assets …'.*

9.11 In this case, the relevant green infrastructure asset has been identified by Natural England as including the South Pennine Moors SPA Area and the South Pennine Moors SAC.

9.12 The Kirklees Local Plan goes on to say:

> *'Development proposals within the Strategic Green Infrastructure Network will not necessarily be prevented provided they do not conflict with other Local Plan Policies. However, the Council will seek to ensure that development proposals protect and enhance existing green infrastructure assets; minimise fragmentation of green infrastructure networks and maximise opportunities for new and improved green infrastructure and connecting links into the network where opportunities exist'.*

9.13 The policy itself is as follows:

> ***'Policy LP31 Strategic Green Infrastructure Network***
>
> *Within the Strategic Green Infrastructure Network identified on the Policies Map, priority will be given to safeguarding and enhancing green infrastructure networks, green infrastructure assets and the range of functions they provide. Development proposals within and adjacent to the Strategic Green Infrastructure Network should ensure:-*
>
> *(i) the function and connectivity of green infrastructure networks and assets are retained or replaced;*
>
> *(ii) new or enhanced green infrastructure is designed and integrated into the development scheme where appropriate, including natural greenspace, woodland and street trees;*
>
> *(iii) the scheme integrates into existing and proposed cycling, bridleway and walking routes, particularly the Core Walking and Cycling Network, by providing new connecting links where opportunities exist;*
>
> *(iv) the protection and enhancement of biodiversity and ecological links, particularly within and connecting to the Kirklees Wildlife Habitat Network.*
>
> *The council will support proposals for the creation of new or enhanced green infrastructure provided these do not conflict with other Local Plan policies.'*

Assessment Methodology

Relevant Guidance

9.14 There is no published guidance on the assessment of impacts relating to access and recreation *per se*. The assessment, therefore, follows the guidance set out in the Scoping Opinion issued by the KC in October 2020 and comprises:

- Identification of all recreational opportunities that may be affected including ProW, Open Access Land, adjacent recreational areas and legal, permissive and unauthorised uses;
- Determination of types of user, activities undertaken, levels of usage and travel distance; and
- Consideration of permanent and/or temporary closures and diversions, the loss or gain of amenity, existence of equivalent recreational opportunities and the displacement of activities.

9.15 The assessment of the level of effect broadly follows the approach taken for ecology and biodiversity (Chapter 7) which considers the sensitivity of the receptor, magnitude of impact and a resulting overall level of effects expressed in terms of minor, moderate and major (adverse or beneficial). The criteria used in the assessment are presented in Table 9.1, Table 9.2 and Table 9.3.

Table 9.1 Evaluation Framework for Access and Recreation

Description	Examples of Relevant Sites/Features	Level of Importance
National	Land designated under CROW Act 2000 e.g. Access Land National Trails National Parks Other nationally important recreation or sports facilities and destinations e.g. National Visitor Centres	High
Regional/County, District (or Unitary Authority, or Borough)	Regionally important trails, parks, recreational or sports facilities, Visitor Centres etc Country Parks	Medium
Local	Typically within the scale of a parish Local circular works and other rights of way Local parks, playgrounds, sports pitches, pools etc	Low

Assessing the Magnitude of the Impact

9.16 A framework has been used to assess the magnitude of the impact on access and recreation sites or features. Following this approach, the magnitude of impacts of the Development proposal are set out in Table 9.2

Table 9.2 Framework for Categorisation of the Magnitude of the Impact

Category	Impact
Major positive	Likely to represent a key factor in the decision-making process with effects generally associated with features of national importance.
Moderate positive	Beneficial effects associated with regional or district scale considerations, which are likely to be important issues in the decision process.
Minor positive	Positive effects important at local scale but not likely to be key issues in the decision process.
Negligible	No effect.
Minor negative	Effects important at local scale but not likely to be key issues in the decision process (generally capable of amelioration by mitigation measures).
Moderate negative	Effects associated with regional or district scale considerations which are likely to be important issues in the decision process. Mitigation measures required may not be successful / adequate.
Major negative	Likely to represent a key factor in the decision-making process with effects generally associated with features of national importance. Mitigation measures are likely to be inadequate.

9.17 The interpretation of the magnitude of the impact also draws upon other important characteristics based as follows:

(i) Confidence (certain, probable, unlikely, highly unlikely);

(ii) Duration (short, medium or long-term);

(iii) Reversibility (temporary, permanent); and

(iv) Timing/frequency (occurring at a critical stage in lifecycle, regular or irregular).

Level of Effect Criteria

9.18 The assessment of the level of effect of the potential impacts considers both the likely magnitude of the impact and the values of the site/feature category to derive an overall 'Appraisal Category'. This is presented in Table 9.3

9.19 In order to assess the level of effect of the impacts the following definitions of potential level of effect have been assumed as follows (using the standard terminology adopted across all disciplines in this ES). It should be noted that in EIA Regulations terminology those effects of a 'moderate' or 'major' level are considered *significant.* Effects of a minor level or less are considered to be *not significant* in EIA terms:

(i) Major/Substantial - An impact on one or more receptor(s) of National Value (i.e. High). Only Major negative impacts on features of High value are normally assigned this level of effect. They should be considered to represent key factors in the decision-making process;

(ii) Moderate - An impact on one or more receptor(s) of Regional, County or Unitary Authority Area (i.e. Medium) Value. These effects may be important, but are not likely to be key decision-making factors;

(iii) Minor - An impact on one or more receptor(s) of Local (i.e. Low or Lower) Value. These effects are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project; and

(iv) Negligible - No impacts on key nature conservation receptors. Absence of effects, or only those effects that are beneath levels of perception.

Table 9.3 Relative Level of Effect for Access and Recreation

		Value of Receptor			
		Negligible	**Low**	**Medium**	**High**
Magnitude of Impact	**Negligible**	Neutral	Neutral	Neutral	Neutral
	Minor	Neutral	Minor	Minor	Moderate
	Moderate	Neutral	Minor	Moderate	Moderate
	Major	Neutral	Moderate	Moderate	Major/ Substantial

Baseline Conditions

Desk Study

9.20 A desk-based review of Ordnance Survey mapping and interrogation of MAGIC (www.magic.defra.gov.uk) was undertaken to confirm the location and extent of access and recreation opportunities including PRoW, National Trails, Common Land and Access Land that could potentially be impacted by the Proposed Development.

9.21 A dedicated visitor survey to ascertain, for example, numbers of visitors and key recreational activities has not been undertaken, but *ad hoc* observations gathered during other surveys, e.g. during breeding bird surveys and landscape and visual assessment, have been drawn upon for this assessment.

Access Land and Common Land

9.22 The Proposed Development falls within an extensive area of Access Land (as designated by the CRoW Act 2000) and CRoW Act Section 15 (Common Land).

9.23 Based on observations gleaned during other the course of other surveys, it appears that current levels of recreational activity on the Access Land and Common Land are low and appear to be limited to informal activities such as walking, dog walking and running across the open moorland. However, such activity on the open moorland is limited and most activity appears to be confined to the footpath and bridleway network, although some informal desire lines also exist, including a circular route around March Haigh Reservoir.

9.24 There is reported to be unauthorised off-road vehicle use entering Marsden Moor from the northern side off the A640.

National Trails (the Pennine Way)

9.25 The Pennine Way is located approximately 1.4km south-west of the Proposed Development and is located on a ridge known as Standedge which affords views down to March Haigh.

Other Public Rights of Way

9.26 There are a number of numbered footpaths in proximity to the Proposed Development, of which three would interface with the Proposed Development (COL/195/40, COL/195/10 and COL/196/20) see Appendix 9.1 for locations). A bridleway (COL/197/10) runs parallel with the Proposed Development, along an alignment approximately 0.5km to the south where it follows Willykay Clough. In addition, there are various un-named footpaths which provide links up to the A640 to the north/west. As for the Access and Common Land, the most frequent forms of recreational use observed on the PRoW are walking, dog walking, running and (on the bridleway) mountain biking and horse riding.

9.27 Pre-application consultation with the Ramblers Association identified that the access track will not cross footpath COL/195/30 which is located to the south and reported as being a visible footpath and a popular route with high footfall (Ramblers Association, pers. comm.).

Permissive Rights of Way

9.28 There are no permissive rights of way within or adjacent to the Proposed Development.

Adjacent Recreational Areas

9.29 Aside from the wider Access Land and Common Land described above, there are no other adjoining recreation areas or facilities associated with the Site.

Parking Facilities

9.30 The main points of entry to the access and recreation features described above are via numbered footpaths from Blake Lea Lane (on the outskirts of Marsden) in the east, or via footpath/bridleway from the A640 to the north.

9.31 Parking for the Blake Lea Lane entry point is informal only and is at two locations on the road verges. There is limited parking at both locations.

9.32 There is a greater amount of parking available on the A640 with two locations available, namely the Pennine Way Car Park which provides access via the Pennine Way and thence onto unnamed footpaths across moorland to March Haigh Reservoir, and the Buckstones Car Park from which it is possible to informally access onto a numbered footpath (COL/195/40) that runs north of March Haigh Reservoir and joins footpath COL/195/20 near White Hall Farm.

Potential Effects

Introduction

9.33 This section sets out the identification and evaluation of the potential effects of the main stages of Proposed Development with reference to access and recreation and taking account of incorporated mitigation.

9.34 The access and recreation opportunities that have the potential to be affected by the Proposed Development and assessed in this section of the ES comprise:

(i) Access Land designated under the CRoW Act 2000 (as amended) and registered Common Land;

(ii) National Trail comprising the Pennine Way;

(iii) Other PRoW comprising footpaths and a bridleway; and

(iv) The South Pennine Moors SPA/SAC Strategic Green Infrastructure Network.

9.35 The user groups considered in this section are walkers and dog walkers. However, consideration is also given to the potential for recreational access to increase and the potential consequences of this for landowners and managers.

9.36 The potential effects of the Proposed Development on recreational and access during construction and operation are discussed below.

During Construction

9.37 The potential effects of the Proposed Development during construction comprise:

(i) Temporary loss of amenity of users of the Access Land and Common Land within which the track is located;

(ii) Temporary loss of amenity to users of the Pennine Way (assumes the Proposed Development is visible from the Pennine Way);

(iii) Temporary disturbance to and loss of amenity for users of other PRoW comprising footpaths and a bridleway; and

(iv) Temporary loss of amenity for users of the South Pennine Moors SPA/SAC Green Infrastructure Network.

9.38 An assessment of each potential effects is presented below, with a summary of overall level of effects on access and recreation opportunities during construction presented in Table 9.4.

Temporary Loss of Amenity to Users of Access Land and Common Land

9.39 The key effect during construction would be indirect disturbance to the amenity of users of Access Land and Common Land arising from noise and visual impacts during construction. The effects may result in loss of amenity and/or temporary avoidance of the area by recreational users. The effects are mitigated by the temporary nature of the construction phase which would be for a total of 16 weeks only. Experience from another nearby access track construction by the same Applicant is that the construction phase of works does not deter walkers who are happy to continue using the area.

9.40 There would be no direct loss of access for users of Access and Common Land during construction, with all parking areas and points of entry to the moorland being maintained. To ensure the safety of recreational users when passing through the construction area, there will be a maximum speed limited imposed on construction traffic of 10mph and a banksman will be used

where necessary to allow the public to pass through. Heras fencing and signage would also be used at the specific points where the Proposed Development interacts with PRoW to allow the public to safely cross through the construction area at times when the banksman is not present, i.e. evenings and weekends.

9.41 Access Land and Common Land is considered to be a **high value** access and recreation resource. The magnitude of the effect is considered **minor** due to the relatively localised and temporary nature of the Proposed Development. The overall level of effects on Access and Common Land would be **moderate adverse.**

9.42 Visual disturbance effects are dealt with in more detail in Chapter 6 (Landscape) which sets out measures to minimise visual disturbance and are not duplicated here.

Temporary Loss of Amenity to Users of the Pennine Way

9.43 The Proposed Development will not be visible from the Pennine Way due to distance from the Site and intervening topography. There will be no loss of access to or from the Pennine Way. Therefore, there will be no impact arising from the Proposed Development in respect of the Pennine Way during construction.

Temporary Disturbance to and Loss of Amenity for Users of Other Public Rights of Way

9.44 There are four PRoW (footpath numbers COL/195/40, COL/195/20, COL/195/10 and COL/196/20) which would be directly impacted for the duration of construction. These footpaths will be impacted by the Proposed Development and will experience passing construction traffic and associated disruption, noise and visual disturbance for a period of approximately 16 weeks.

9.45 There would also be a period of active construction at footpath number COL/195/40 whilst the new track surface, including passing place, is laid at this point, and a new culvert installed in Hard Head Clough immediately adjacent to the footpath.

9.46 There is also likely to be some temporary disruption to users of the informal 'loop' that circles March Haigh Reservoir itself when construction reaches that point.

9.47 It is not proposed to close or divert the footpaths. Instead access for the public will be maintained with use of a banksman to guide people safely through the area as necessary, with use of temporary Heras fencing and signage at times when the banksman is not present, i.e. evenings and weekends.

9.48 The procedures for construction traffic management on Blake Lea Lane, including where traffic interfaces with the PRoW, will be subject to a Traffic Management Plan[91] and CEMP to be prepared and submitted separately in support of the planning applicant.

9.49 As outlined in the baseline section of this Chapter, the levels of recreational use are low, and it is not anticipated that a significant number of people would be impacted. Rather, it is likely that the key impact would be on a relatively small number of people, most likely local residents, who make regular use of these footpaths. Non-residents are more likely to access the area from the A640 to the north or possibly the bridleway that links to the Pennine Way and would not be directly impacted by works to these footpaths.

[91] *TMP*

9.50 There would not be direct impacts on any of the other PRoW including the bridleway that runs along Willykay Clough. The key impact from these PRoW would be a temporary loss of amenity due to the presence of construction vehicles and personnel and associated noise and visual disturbance. As noted above in relation to indirect impacts to Access Land and Common Land, experience from another nearby access track construction by the same Applicant is that the construction phase of works does not deter walkers who are happy to continue using the area.

9.51 These PRoW of way are considered to be a **low value** access and recreation resource. The magnitude of the effect is considered **minor** in respect of indirect disturbance to **moderate** where rights of way are directly impacted. The impacts are considered to be moderated by the localised and temporary nature of the Proposed Development during construction. The overall level of effect is considered to be **minor adverse** in respect of indirect disturbance and also **minor adverse** in respect of direct impacts on footpaths numbers COL/195/40, COL/195/20 and COL/195/10.

Temporary Loss of Amenity associated with the Strategic Green Infrastructure Network

9.52 The key effects during construction would be the same as for Access Land and Common Land since the geographic location and receptors are the same, i.e. the South Pennine Moors SPA/SAC moorland within which the Proposed Development is partly located, and the same recreational user groups namely walkers, dog walkers, runners, plus mountain bikers and horse riders on the bridleway network.

9.53 The effects comprise temporary loss of amenity, but no direct loss of access since all parking areas, points of entry and PRoW will be maintained for the duration of works, with use of a banksman and safety fencing and signage as outlined previously.

9.54 The Strategic Green Infrastructure Network is considered to be a **high** value access and recreation resource. The magnitude of the effect is considered **minor** due to the relatively localised and temporary nature of the Proposed Development. The overall level of effects would, therefore, be **moderate adverse.**

9.55 Visual disturbance effects are dealt with in more detail in Chapter 6 (Landscape) which sets out measures to minimise visual disturbance and are not duplicated here.

Table 9.4 Summary of Level of Effect During Construction

Receptor and Value	Potential Effects	Extent, Duration and Magnitude	Level of Effect
Access Land and Common Land. (High Value)	Loss of amenity due to visual and noise disturbance, possible avoidance (but unlikely).	Indirect, temporary, minor magnitude	Moderate (adverse)
National Trail (Pennine Way). (High Value)	None	None	N/A
Other PRoW, comprising numbered footpaths, bridleway and other informal paths (Low Value)	Localised disruption of use at points where Proposed Development intersects PRoW. Loss of amenity due to visual and noise disturbance, possible avoidance (but unlikely).	Indirect, temporary, moderate magnitude Direct, temporary, minor magnitude	Minor (adverse)

Receptor and Value	Potential Effects	Extent, Duration and Magnitude	Level of Effect
South Pennine Moors SPA/SAC Strategic Green Infrastructure Network (High Value)	Loss of amenity due to visual and noise disturbance, possible avoidance (but unlikely). No direct loss of access proposed.	Direct, temporary, minor magnitude	Moderate (adverse)

Operational Phase

9.56 It should be noted that the completed Proposed Development will not be fenced off from the adjacent moorland (though permanent fencing incorporating a style will be erected along the base of March Haigh Reservoir embankment) so there will be no loss of access to the Access Land and Common Land, nor will there be any loss of access within the South Pennine Moors SPA/SAC Strategic Green Infrastructure Network, compared with the current situation in which land managers have unimpeded access across the Access Land and Common Land. The existing farm gate at the end of Blake Lea Lane will be replaced with a secure locked gate at the end of construction to prevent unauthorised vehicle access from the east. However, all existing parking places and points of entry to the moorland for pedestrian use and mountain bikes etc. will be maintained.

9.57 The potential effects of the Proposed Development during the operational phase are, therefore, limited to:

(i) Loss of recreational amenity across all receptors due to visual intrusion of access track and associated vehicle use; and

(ii) Potential for increased public access along the access track, and associated issues such as erosion, fire, littering and interaction with grazing livestock the latter issue being raised in pre-application consultation with the National Trust.

9.58 These potential effects are assessed in more detail below and a summary of overall level of effects during the operational phase is presented in Table 9.5.

Loss of Recreational Amenity Across all Receptors due to Visual Intrusion of Access Track and Associated Vehicle Use

9.59 The visual amenity impacts of the permanent track are considered in detail in Chapter 6 (Landscape) and are not duplicated in full here. The effects have been mitigated as far as possible by selecting a route that follows the line of a previous temporary track and a design that minimises visual impact. In summary, it is concluded in the Landscape Chapter that there would be either no change, negligible or effects of minor adverse level from the majority of viewpoints. An effect of a moderate adverse level in terms of visual effects would be experienced at two viewpoints located on footpaths COL/195/20 (Viewpoint 6), and the dam of March Haigh Reservoir (Viewpoint 7).

9.60 Vehicle use at the operation stage will generally comprise two vehicle movements to and from the reservoirs each week comprising 4x4 inspection vehicles. Other vehicle use would be for maintenance, construction and emergency use in accordance with the details in Table 3.2. For recreational users of the Access Land, Common Land and PRoW the introduction of vehicle movements would be a new feature at this location resulting in some loss of visual amenity but unlikely to be so significant that people would avoid visiting the area, as vehicle use will be limited in number and a transient feature.

9.61 The value of receptors that will experience a permanent loss of recreational amenity in terms of visual intrusion is **high** by virtue of the land being Access Land, Common Land and within the South Pennine Moors SPA/SAC Strategic Green Infrastructure Network and associated PRoW

and informal paths. The magnitude of impact is anticipated to be **moderate** (at worst) from two viewpoints (Viewpoint 6 and 7) and the overall level of effect on visual amenity would be **moderate adverse** from these two viewpoints. From the other twelve viewpoints the level of effect would be **negligible or minor adverse** at worst.

Potential for Increased Public Access along Access Track

9.62 The presence of the Proposed Development has the potential to encourage increased public use including unauthorised use, such as off-road vehicles, into this relatively un-used area of moorland. Although no formally collected data are available on current levels of recreational use, it is observed generally to be relatively limited to small numbers of walkers, dog walkers, runners and (on the bridleway that runs along Willykay Clough) mountain bikes and horse riding.

9.63 The access track falls within Access Land and Common Land and, as previously noted, it will not be fenced off from the adjacent moorland, though a fence incorporating a style will be erected along the base of March Haigh Reservoir embankment. It is possible, therefore, that it could be subject to informal recreational use linking in with the existing PRoW network.

9.64 It is uncertain whether the existence of the Proposed Development would lead to a greater level of recreational use compared with the current situation, since it does not introduce a new route to March Haigh Reservoir, rather it offers an alternative pedestrian route for existing users, from the point beyond the gate at Hard Head Clough. If levels of recreational use increase substantially then it may be necessary to put mitigation in place to assist with the management of issues that may arise from this, e.g. increased footpath erosion, fire risk, litter and interaction with grazing livestock.

9.65 Proposed measures for the management of increased visitor use are discussed under 'Mitigation' below. However, it should also be noted that there is an existing level of littering on the moorland, particularly at the northern side off the A640, and it is unlikely that the presence of the Proposed Development would alter this.

9.66 Unauthorised vehicle use of the track is highly un-desirable for the Applicant as this could lead to erosion, fire damage, pollution and vandalism. Measures have been incorporated into the design to minimise risk of unauthorised vehicle access, as well as ongoing monitoring and maintenance which will be incorporated into the O&M Manual for the completed Proposed Development.

9.67 These embedded measures comprise the existing gate at White Hall Farm on Blake Lea Lane to be replaced with a new padlocked gate, and a second padlocked gate to replace the existing at Hard Head Clough. The O&M Manual includes the requirement for twice weekly inspection of these gates by the Applicant's operatives who will carry suitable equipment for on-the-spot repairs and maintenance of these gates as required.

9.68 It is understood that there is already an issue with unauthorised off-road vehicles leaving the A640 and entering the moorland from the north. The Proposed Development could potentially encourage greater access from the north and it is proposed to closely monitor this situation and to work with the National Trust to put additional management in place if required. Further details are provided under 'Mitigation' below.

9.69 The receptors that could potentially be affected by increased recreational use, namely Access Land, Common Land, Strategic Green Infrastructure Network and its associated PRoW and informal paths, are a **high** value receptor. The magnitude of potential impacts is anticipated to be **moderate**, at worse, e.g. if levels of un-authorised vehicle use were to substantially increase. The overall level of effect, without mitigation, is anticipated to be **moderate** adverse.

Table 9.5 Summary of Level of Effect at Operational Stage

Receptor and Value	Potential Effects	Extent, Duration and Magnitude	Level of Effect
Access Land, Common Land, South Pennine Moors SPA/SAC Strategic Green Infrastructure Network and associated PROW and informal paths (High Value)	Loss of recreational amenity due to visual intrusion of track and associated vehicle movements	No change/neutral or minor magnitude for 12 of 14 viewpoints. Indirect, permanent, moderate magnitude from two viewpoints (Viewpoints 6 and 7)	Negligible or minor (adverse) for 12 viewpoints Moderate (adverse) for two viewpoints
Access Land, Common Land, South Pennine Moors SPA/SAC Strategic Green Infrastructure Network and associated PROW and informal paths (High Value)	Potential increase in recreational use including unauthorised off-road vehicles	Direct, permanent, moderate magnitude	Moderate (adverse)

Mitigation Measures

Introduction

9.70 Additional mitigation is proposed to assist with the management of potential increased recreational use of the Proposed Development at the operational stage, including unauthorised off-road vehicle use, should this arise. It should be noted that the extent to which these issues may occur is uncertain, therefore, the proposed mitigation would be triggered by ongoing monitoring by the Applicant, coupled with feedback from the National Trust which owns and manages the Marsden Estate.

9.71 No additional mitigation is required at the construction phase, over and above that incorporated into the construction methodology as outlined above.

During Operation

Measures to Manage Potential Increased Recreational Use

9.72 The following measures are proposed to assist with the management of potential increased recreational use (if this arises), such as increased numbers of walkers, dog walkers and runners etc. The need, or otherwise, for these measures would be subject to ongoing monitoring by the Applicant and in liaison with the National Trust:

- Litter picks around March Haigh Reservoir and along access track by the Applicant (operatives to visit at least twice a week, potential to increase this if litter becomes a substantially increased problem);
- Installation of barriers and ‘no parking’ signage on road verges at Blake Lea Lane to prevent increased numbers of cars parking here;
- Addition of finger posts at suitable locations to direct users to PRoW if the need for increased visitor management arises; and
- Access track to provide easier access for firefighting compared with current situation, should the need arise.

9.73 The Applicant will continue to monitor levels of recreational use and will commit to take action in partnership with the National Trust, if the need arises, for example by contributing funding towards Ranger time for visitor management, footpath repair or cutting of firebreaks.

9.74 As previously discussed, the Applicant is also highly motivated to prevent unauthorised use of the Proposed Development by off-road vehicles. In addition to the provision and maintenance of padlocked gates to prevent unauthorised vehicle access from the east, the Applicant is committed to working with the National Trust to put in place additional surveillance and management of unauthorised off-road use, should this be needed.

9.75 The Applicant would also work with other stakeholders including the West Yorkshire Fire and Rescue Services and West Yorkshire Policy as necessary to put any necessary measures in place. With the above proposed mitigation measures in place it is anticipated that it would be possible to reduce the magnitude of potential impacts to **neutral**, and this would result in an overall level of effect of **negligible.** However, as previously noted, the degree to which these effects will occur is uncertain and would be subject to ongoing monitoring.

Residual Effects

Introduction

9.76 Residual impacts remaining after mitigation has been incorporated are detailed below.

During Construction

9.77 Residual effects are anticipated at the construction phase in terms of temporary loss of amenity for recreational users which would be an effect of **moderate adverse** level. This is because although construction is localised and temporary, the receptors (Access Land, Common Land the South Pennine Moors SPA/SAC Strategic Green Infrastructure Network and associated PRoW and informal paths) are a high value receptor. There are no further mitigations that can be implemented to avoid or ameliorate this effect. However, the loss of recreational amenity is short-lived and it is unlikely, based on the experience of another similar access track construction by the same Applicant, that the public would be deterred from using the area. In addition, the number of people affect is relatively low, as the Site is not subject to high levels of recreational use.

9.78 There would also be a direct effect of **minor adverse** level in terms of four PRoW (numbers COL/195/40, COL/195/20, COL/195/10 and COL/196/20) which would be directly impacted by construction. Although mitigation has been designed in to include use of a banksman, and temporary localised fencing and signage to ensure the safe passage of people through the construction area, there would still be a degree of disruption that cannot be mitigated. The effect is short-lived, highly localised to two specific locations and unlikely to affect large numbers of people, and it considered preferable to the temporary closure or diversion of these footpaths.

Operational Phase

9.79 At the operational phase of Proposed Development there would be a residual effect of **moderate adverse** level in respect of permanent loss of recreational amenity at two locations caused by the visual intrusion of the access track and associated vehicle use. The locations are footpath COL/195/20 (Viewpoint 6) and the dam of March Haigh Reservoir (Viewpoint 7). The visual effects are described in more detail in the Landscape Chapter of this ES (Chapter 6). The effect has been mitigated as far as possible by careful route selection and design to minimise visual intrusion.

9.80 In addition, it is possible the Proposed Development may result in increased recreational use, both authorised use in terms of increased footfall from walkers, dog walkers etc. but potentially also use by un-authorised off-road vehicles. Whilst this could be considered a benefit for the users themselves, there are potential residual affects arising from increased use, e.g. increased erosion,

fire risk, litter and interface with grazing livestock. The potential effects are uncertain and would be subject to ongoing monitoring by the Applicant with a commitment to partnership working with the National Trust as required. With any additional mitigations put in place as required to address the effects of potential increased recreational use there would be no residual effect.

Cumulative Impacts

9.81 Cumulative impacts have been assessed taking into account projects listed in Table 1.3 of this ES and comprising 'measures in the interests of safety' at March Haigh Reservoir, proposed tree planting by the National Trust and the ongoing moorland-wide habitat restoration works across the Marsden Estate. Of these, the proposed works at March Haigh Reservoir, which are anticipated to take place after the completion of the access track in February 2024, would introduce additional temporary loss of amenity by extending the period over which construction related noise and visual disturbance would take place. This effect is anticipated to be no worse than that associated with temporary disturbance associated with the access track construction. No cumulative long-term effects on visual amenity or recreational and access are anticipated once the reservoir works have been completed.

Conclusions

9.82 A desk study has been undertaken to establish the baseline conditions of the Site and is supplemented with observations of current recreational use gleaned during the course of other surveys.

9.83 The Proposed Development falls within an area of Access Land and Common Land, crossed by several PRoW, a bridleway and informal paths and falls within the South Pennine Moors SPA/SAC Strategic Green Infrastructure Network. A National Trail (the Pennine Way) also traverses the moorland some 1.4km to the south but the Proposed Development is not visible or directly accessible from this route.

9.84 Current levels of recreational use are low and limited mainly to walking, dog-walking with some running and (on the bridleway that runs along Willykay Clough) mountain biking. There is reported to be unauthorised off-road vehicle use entering Marsden Moor from the northern side, off the A640.

9.85 The main points of access to the Site are via Blake Lea Lane to the east, where there are two informal parking areas on the verges of the lane. Access to the moorland is via PRoW. The other points of access are from the A640 to the north where the Pennine Way car park and Buckstones car park provide access via Access Land and a PRoW, respectively.

9.86 The Proposed Development would result in localised and temporary loss of recreational amenity during construction, as well as impacting directly on four PRoW. No temporary diversions or closures of the PRoW are proposed and there will be no loss of access to the designated Access Land/registered Common Land at any time. All existing parking areas will remain accessible. Safety measures comprising use of a banksman and short lengths of Heras fencing and signage will be deployed to guide the public safely through active construction areas as necessary.

9.87 A TMP will be prepared and implemented to manged construction traffic on Blake Lea Lane. A CEMP will be prepared and implemented to manage construction traffic along the proposed access track route.

9.88 With the above mitigation in place there remains a residual effect in terms of loss of recreational amenity at the construction stage. This is due to noise and visual disturbance and disruption to footpaths which cannot be avoided. However, these effects are localised and temporary, and would be likely to affect relatively low numbers of recreational users.

9.89 At the operational stage of Proposed Development, the introduction of the Proposed Development and associated vehicle movements is anticipated to result in a permanent loss of recreational amenity from two viewpoints (Viewpoints 6 and 7) due to visual intrusion of the track into the landscape which has been mitigated as far as possible by selecting a route that follows the line of a previous temporary track and limiting vehicle speed to 10mph.

9.90 The track would not be fenced off from the adjacent moorland (though a section of fencing incorporating a style will be erected along the base of March Haigh Reservoir embankment), so there will be no loss of access to and from Access Land/registered Common Land, although unauthorised vehicle use will be prevented from the east where existing gates will be replaced with padlocked gates at White Hall Farm and Hard Head Clough. It is possible, therefore, that the Proposed Development could result in an increase in levels of recreational use, though this is uncertain.

9.91 If levels of recreational use were to increase then this could lead to erosion, fire risk, litter and interface with grazing livestock. Additional mitigation measures are proposed, therefore, to monitor and take action, in partnership with the National Trust and in liaison with other relevant stakeholders including the fire service and police as required to reduce this effect to negligible.

9.92 A summary of the evaluation process and residual effects are presented in Table 9.6 below.

Table 9.6 Summary of Residual Effects on Access and Recreation

Receptor and Value	Potential Effect	Extent, Duration and Magnitude	Level of Effect without Mitigation	Mitigation	Level of Residual Effect with Mitigation
During Construction					
Access Land and Common Land (High Value)	Loss of amenity due to visual and noise disturbance, possible avoidance (but unlikely).	Indirect, temporary, minor magnitude	Moderate (adverse)	No direct loss of access at any time. Works are localised at any one time and temporary in nature. Relatively low numbers of people affected.	Moderate (adverse)
National Trail (Pennine Way). (High value)	None	None	None	None required.	None

Receptor and Value	Potential Effect	Extent, Duration and Magnitude	Level of Effect without Mitigation	Mitigation	Level of Residual Effect with Mitigation
Other PRoW comprising numbered footpaths, bridleway and other informal paths (Low Value)	Localised disruption of use at points where Proposed Development interests with PRoW. Loss of amenity due to visual and noise disturbance, possible avoidance (but unlikely)	Direct, temporary, moderate Magnitude Indirect, temporary minor magnitude	Minor (adverse)	PRoW will remain open for duration of works. Banksman, short lengths of safety fencing and signage to allow people to cross safety through works area. Works are localised at any one time and temporary in nature. Relatively low numbers of people affected.	Minor (adverse)
South Pennine Moors SPA/SAC Strategic Green Infrastructure Network (High value)	Loss of amenity due to visual and noise disturbance, possible avoidance (but unlikely).	Indirect, temporary minor magnitude	Moderate (adverse)	No direct loss of access at any time. Works are localised at any one time and temporary in nature. Relatively low numbers of people affected.	Moderate (adverse)
Operational Stage					
Access Land, Common Land, South Pennine Moors SPA/SAC Strategic Green Infrastructure Network and associated PRoW and informal paths (High value)	Loss of recreational amenity due to visual intrusion of track and associated vehicle movements	No change/ Neutral or minor magnitude from 12 of 14 viewpoints. Indirect, permanent, moderate magnitude at Viewpoints 6 and 7	Moderate (adverse) for four viewpoints	Route follows line of previous temporary track and design aims to minimise visual impact as far as possible. No additional mitigation possible.	Negligible or Minor (adverse) for 12 viewpoints Moderate (adverse) for two viewpoints

Receptor and Value	Potential Effect	Extent, Duration and Magnitude	Level of Effect without Mitigation	Mitigation	Level of Residual Effect with Mitigation
Access Land, Common Land, South Pennine Moors SPA/SAC Strategic Green Infrastructure Network and associated PRoW and informal paths (High value)	Potential increase in recreational use including unauthorised off-road vehicles	Direct, permanent, moderate magnitude	Moderate (adverse)	Padlocked gates at White Hall Farm and Hard Head Clough. Ongoing monitoring of recreational use by Applicant and commitment to work in partnership with National Trust to implement additional surveillance, mitigation and management measures if required.	Negligible

10. ASSESSMENT OF EFFECT INTERACTIONS

Introduction

10.1 This Chapter presents an assessment of the effect interactions of the Proposed Development arising from the likely combination of significant environmental effects arising in isolation but acting together across different disciplines. This is distinct from *'cumulative assessment'* which considers the cumulative effect of different projects. The assessment of effect interactions considers effects associated with the construction phase and the completed and operational scheme.

10.2 The assessment has been informed by the results of the individual topic assessments, as presented in the preceding Chapters of this ES.

Assessment Methodology and Level of Effect Criteria

10.3 There are no established methodologies for assessing the interaction of effects arising from different topics on a receptor or groups of receptors. The following approach applies professional judgement and experience in combination with ongoing liaison between the individual Chapter authors to review and sense-check the results. The approach considers:

- The range of likely significant residual effects arising at the construction and operational stage of the Proposed Development;
- The suite of sensitive receptors, or groups of receptors, identified by each individual Chapter author; and
- Tabulation of the above allowing for identification of sensitive receptors/groups of receptors that may experience multiple effects arising across different disciplines.

10.4 Only significant residual effects are considered in this assessment, namely those for which a *'moderate' or 'major'* level of effect or above has been identified. The assessment assumes that all stated mitigation will be implemented, hence consideration of significant residual effects only.

10.5 The levels of effect are based on professional judgement as presented in the topic-specific Chapters of this ES.

Likely Residual Effect Interactions and Level of Effect

10.6 A summary of all significant residual effects across all technical disciplines is presented in Table 10.1 (Construction Phase) and Table 10.2 (Operational Development).

Table 10.1 Summary of Significant Residual Effects Across all Disciplines (Construction Phase)

Topic/Receptor	Significant Residual Effect(s)	Level of Effect
Landscape & Visual Assessment		
Landscape and Visual	Noise and visual disturbance	Moderate
Ecology and Biodiversity		
Blanket bog and acid flush	Permanent loss of 0.5056ha and 0.0133ha, respectively 42ha	Moderate
Peat Soils and Hydrology		

Topic/Receptor	Significant Residual Effect(s)	Level of Effect
Peat resource underlying blanket bog, flush and acid grassland habitats	Permanent loss of or disruption to peat underlying 0.5959ha and changes to peat hydrology	Moderate
Access and Recreation		
Recreational amenity	Noise and visual disturbance from two viewpoints (Viewpoints 6 & 7)	Moderate

10.7 Table 10.2 provides a summary of significant residual effects at the operational stage of the Proposed Development.

Table 10.2 Summary of Significant Residual Effects Across all Disciplines (Operational Phase)

Topic/Receptor	Significant Residual Effect(s)	Level of Effect
Landscape and Visual Assessment		
Visual	Change in visual effect from two viewpoints (Viewpoints 6 & 7)	Moderate
Ecology and Biodiversity		
Moorland breeding bird assemblage (including SPA qualifying species)	Permanent loss of approximately 0.5ha of habitat used for nesting, foraging/feeding	Moderate
Peat Soils and Hydrology		
No significant residual effects		
Access and Recreation		
Recreational amenity	Change in visual amenity from two viewpoints (Viewpoints 6 & 7)	Moderate

Conclusions

10.8 The assessment of effect interactions demonstrates that during the construction phase significant residual effects, i.e. greater than of 'minor' level of effect are likely to arise from:

- Changes in visual effect from two locations, namely Viewpoints 6 and 7 which also will also result in changes in visual amenity as experienced by recreational users of the Site; and
- The permanent loss of 0.5056ha of blanket bog and 0.0133ha acid flush (to the track construction and the peat re-use along the batter), which is supported by the peat resource.

10.9 These effects are essentially the same effect, experienced by different receptors and there is no interaction between the individual topics that would result in a more significant effect. The same applies for the visual effects and effects on recreational amenity at the operational stage which are one and the same effect resulting from the existence of the track as viewed within the landscape but experienced by difference receptors. There are no effect interactions at the operational stage that would result in a more significant effect.

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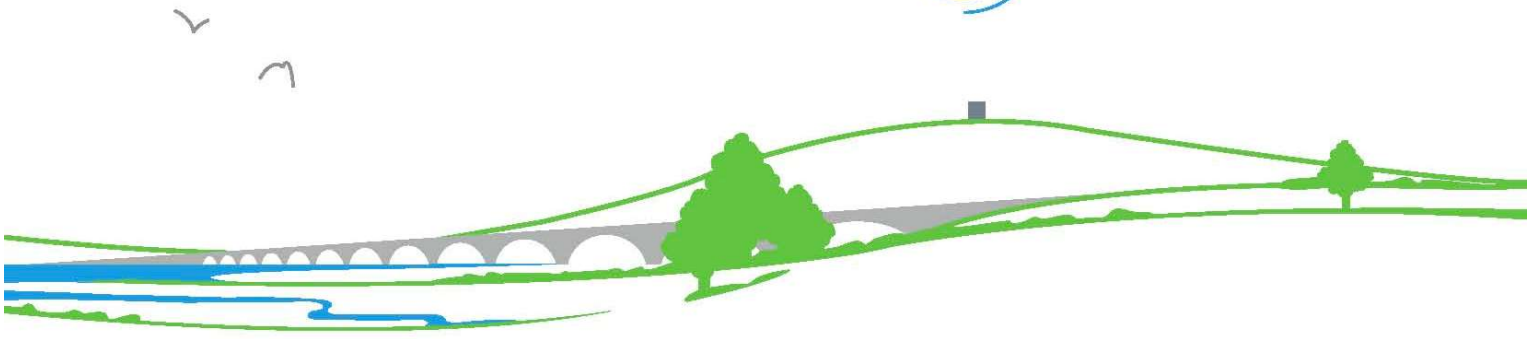

Park Lea, 60 Park Road, Buxton, Derbyshire SK17 6SN

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