

Adwick Washlands Habitat Creation Scheme - Design and Access Statement

Report for planning submission

13 October 2010

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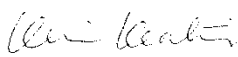
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Draft Version 3 issued 29/09/2010		Pete Wall RSPB, Stuart Jenkinson, EA, Heather Rennie NE
Version 4	English Heritage response, Habitat Map, Visitor Infrastructure Details added	
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Contract

This report describes work commissioned by RSPB, on behalf of Dearne Valley Green Heart partnership. DVGH's representative for the contract was Pete Wall of RSPB. Steph Hughes, Mike Williamson, Richard Barnard and Andy Wood of JBA Consulting carried out this work.

Prepared by Stephanie Hughes, Landscape Architect

Reviewed by  Kevin Keating, Technical Director

Purpose

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Executive Summary

This design and access statement has been prepared to support a planning application for the creation of wetland habitat at the Adwick Washlands, Bolton-upon-Deerne, South Yorkshire.

The planning application has been made by and this statement prepared by, JBA Consulting on behalf of the Dearne Valley Green Heart Partnership (DVGH).

The purpose of this statement is to provide additional detail to the planning application and explain the design thinking behind the proposals. This design and access statement also incorporates the information that might otherwise be provided by a supporting planning statement.

The planning application seeks permission to create wetland habitat to benefit wildlife and the local community on low lying arable farmland between Bolton upon Dearne and Harlington, north of the River Dearne. The proposed area for wetland creation comprises approximately 66 hectares (ha) of land owned by the Environment Agency (EA). The site is an active flood storage facility in extreme flood conditions and is defined as the Adwick Washlands. The flood storage capacity of the washlands will not be affected by the proposals.

The land is currently farmed under tenancy for arable crops. The tenancies ceased in on 30 September 2010 and there is therefore an opportunity to create wildlife habitat and improve the area for local communities while maintaining the washland's flood storage function.

The RSPB/DVGH are seeking to create 20 ha of wetland habitat; primarily wet grassland which is a priority UK Biodiversity Action Plan (BAP) habitat and a Local Biodiversity Action Plan (LBAP) priority habitat. Reedbed (UKBAP and LBAP habitat), fen (UKBAP habitat) and open water (LBAP habitat) will also be created. The wetlands will provide new habitat for breeding waders, including the lapwing *Vanellus vanellus* (a UK BAP priority bird species) and offer greatly enhanced opportunities for a variety of other wildlife compared to the existing farmland.

The partnership is also aiming to improve the public access to the area by creating and upgrading rights of way and providing low-key visitor infrastructure such as screens and rest points.

The creation of wet grassland will replace arable crops and the area will be separated into grazing units for highland cattle.

The RSPB manages a suite of nature reserves in the Dearne Valley; the proposed wetland creation site at Adwick would supplement these sites and would be a key link for wildlife and people between Old Moor RSPB reserve, Bolton Ings and other sites to the west and Denaby Ings (Yorkshire Wildlife Trust) to the east.

This statement describes the evolution of the design of the proposal, from initial site investigations, through evaluation to final design, describes the proposals, discusses any potential impacts and describes the access arrangements for the site.

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Abbreviations

Above Ordnance Datum (AOD)
Barnsley Metropolitan Borough Council (Barnsley MBC)
Biodiversity Action Plan (BAP)
Commission for Architecture and the Built Environment (CABE)
Construction Design and Management (CDM)
Dearne Valley Green Heart Partnership (DVGH)
Ecology Land and People (ELP)
Environment Agency (EA)
English Heritage (EH)
Flood Risk Assessment (FRA)
High density polyethylene (HDPE)
Internal Drainage Board (IDB)
Kilowatts (kW)
Local Biodiversity Action Plan (LBAP)
National Vegetation Classification (NVC)
Natural England (NE)
Planning Policy Statement (PPS)
Public right of way (PRoW)
Renaissance Market Towns (RMT)
Royal Society for the Protection of Birds (RSPB)
Scheduled Ancient Monument (SAM)
United Kingdom Biodiversity Action Plan (UK BAP)
Unitary Development Plan (UDP)
Yorkshire Water plc (YW)

1. Introduction

1.1 Purpose of this design and access statement

This design and access statement has been prepared to support a planning application for the creation of wetland habitat at the Adwick washlands, Bolton-upon-Deerne, South Yorkshire.

The planning application has been made by and this statement prepared by JBA Consulting on behalf of the Dearne Valley Green Heart Partnership (DVGH).

The purpose of this statement is to provide additional detail to the planning application and explain the design thinking behind the proposals. This design and access statement also incorporates the information that might otherwise be provided by a supporting planning statement.

The statement has been prepared with reference to national guidance on design and access statements, including Circular 01/06 (Communities and Local Government): 'Guidance on Changes to the Development Control System' and the Commission for Architecture and the Built Environment's (CABE's) publication 'Design and access statements: how to read, write and use them'.

The assessment of the existing site and its context is outlined in Section 2.1, details of consultations carried out and involvement sought are included in Section 2.3 and the evaluation of the information gathered is described in Section 0. The design of the proposed site is described in Section 3 which includes descriptions of aspects such as its use, amount, layout, scale, landscaping and appearance where appropriate.

Access is discussed in Section 4.

1.2 Project outline

The planning application seeks permission to create wetland habitat to benefit wildlife and the local community on low lying arable farmland between Bolton upon Dearne and Harlington, north of the River Dearne. The proposed area for wetland creation comprises approximately 66 hectares (ha) of land owned by the Environment Agency (EA). The site is an active flood storage facility in extreme flood conditions and is defined as the Adwick Washlands.

The land is currently farmed under tenancy for arable crops. The tenancies are due to end in October 2010 and there is therefore an opportunity to create wildlife habitat and improve the area for local communities while maintaining the washland's flood storage function.

The RSPB/DVGH are seeking to create 20 ha of wetland habitat; primarily wet grassland which is a priority UK Biodiversity Action Plan (BAP) habitat. The wetlands will provide new habitat for breeding waders, including the lapwing *Vanellus vanellus* (a UK BAP priority bird species).

The partnership is also aiming to improve the public access to the area by creating and upgrading rights of way and providing low-key visitor infrastructure such as screens and rest points.

The creation of wet grassland will replace arable crops and the area will be separated into grazing units for highland cattle. The flood storage capacity of the washlands will not be affected by the proposals. See Section 5.1 and Appendix E.

The RSPB manages a suite of nature reserves in the Dearne Valley; the proposed wetland creation site at Adwick would supplement these sites and would be a key link for wildlife and people between Old Moor RSPB reserve, Bolton Ings and other sites to the west and Denaby Ings (Yorkshire Wildlife Trust) to the east. See Drawing 2010s4268-032.

1.3 Project background

1.3.1 Dearne Valley Green Heart partnership

This project is proposed by DVGH, which is a partnership of organisations working to improve the valley for people and wildlife. RSPB, EA and Natural England (NE) are the lead partners; the local authorities of Barnsley, Doncaster and Rotherham are also involved. DVGH partners are working to improve green spaces, such as washlands, rivers and streams, paths and trails so that people and wildlife can benefit.

In general, the range of green spaces in the Dearne Valley offer a multitude of benefits:

- They improve the appearance of the area.
- They provide vital areas to hold floodwater which helps to reduce the risk of flooding to homes and businesses.
- They are home to wildlife.
- They provide space for local people to enjoy the natural environment.
- They offer people from across the region opportunities for walking, cycling, bird watching and angling making it a valuable destination in South Yorkshire for outdoor recreation.
- They connect towns, villages and green spaces by an improved network of paths and cycle routes, encouraging greener travel and helping reduce CO2 production.

DVGH partnership works with neighbourhoods, schools, colleges, local organisations and businesses to increase the opportunities for local people to get involved with looking after their valley. Their aim is for communities in the Dearne Valley to feel confident and safe to enjoy the countryside on their doorstep, and have the opportunity to live active healthy lives by exploring their local environment.

1.3.2 The need for the proposed development

Environmental

The proposed wetland will attract wading birds and other wildlife, enhancing the green infrastructure of the Dearne Valley.

Birds are under more pressure than ever before due to agricultural intensification, climate change, growing demands for water, expansion of urban areas and transport infrastructure, and the over-exploitation of the seas. Many species have halved in number over the last 25 years, including some of the UK's best known countryside birds. The lapwing in particular has declined massively since the 1940s due to large-scale changes to farming such as conversion of grassland to arable, drainage of land, intensification of farming practices and use of agrochemicals. Between 1987 and 1998 lapwing numbers dropped by 49% in England and Wales; since 1960 the numbers dropped by 80%.

It is possible to halt and reverse the decline in lapwing numbers with sympathetic farming methods; these proposals aim to improve lapwing numbers in the Dearne Valley through the provision of suitable breeding habitat. The proposals will also benefit species such as redshank (*Tringa totanus*) and water vole (*Arvicola amphibius*).

Socio-economic

The decline of the coal mining industry has resulted in higher than average levels of socio-economic deprivation in the Dearne Valley. To address these issues the area was chosen for the Renaissance Market Towns (RMT) project approach which was developed by Yorkshire Forward to ensure that market towns within the region have a clear, long term vision of their economic future.

The aim of the RMT programme is to ensure that these settlements, together with their hinterlands, are "the kind of places people will want to and can live, work, invest and visit".

Outputs from the Dearne RMT programme include the Barnsley Dearne Valley R.E.S.P.E.C.T. Charter¹ and Strategic Development Framework².

The R.E.S.P.E.C.T. Charter includes aims with regard to the environment and green links:

"Develop a programme of activity to improve access and connections between green spaces within the villages and the surrounding countryside. ...improve links to the Trans Pennine Trail, retain and develop open spaces and improve access to river and wetland resources...improve and strengthen connections between the villages and employment areas, services and leisure facilities."

The Strategic Development Framework expands on these aims, emphasising the importance of linkages between settlements and countryside, and access to the River Dearne.

The Dearne Valley is also the subject of an eco-vision developed by Sheffield City Region partnership of the area as a green eco-valley, a new green heart for the wider area. It proposes "big moves" with regard to ecological know-how, community infrastructure and natural regeneration in the next 20 to 30 years. In particular, reducing dependence on private cars and enhancing the natural environment of the Dearne and marshalling its natural assets for economic and environmental benefit are mentioned in the vision.

The policies and aims of Dearne Valley Green Heart and the RMT and the Sheffield City Region eco-vision approach are mutually compatible and DVGH works with the RMT team developing proposals in the area. DVGH also sits on the eco-vision team.

The amenities and links provided by this proposal help achieve many of the environmental aims of both the RMT approach and the Sheffield City Region eco-vision approach, contributing to the environmental and socio-economic development of the area.

¹ <http://www.yorkshire-forward.com/sites/default/files/documents/Barnsley%20Dearne%20RESPECT%20Charter.pdf>

² The Barnsley Dearne Garden Villages Sustainable Development Framework, revised Final Draft 21/08/07

2. Design process

2.1 Assessment of the existing site and its context

This section describes the site and its context with regard to its various functions and features. A number of studies and surveys were carried out during the early stages of the development of these proposals and these are outlined in the sections below.

2.1.1 Site description

A location plan showing the site in its wider context is included with this application (Drawing 2010s4268-030). The existing site layout and features are shown on Drawing no. 2010s4268-031 also included with the planning application. The site is centred on Ordnance Survey Grid Reference SE470028.

The site is located north of the River Dearne, between the settlements of Bolton upon Dearne and Harlington, in the Barnsley Metropolitan Borough Council area of South Yorkshire.

The site is an area of low-lying, relatively flat arable farmland which forms part of the system of washlands known as the Adwick Washlands, within the River Dearne catchment. The land around the site in the wider area rises gradually to the north and south with a mosaic of woodland, settlement and arable farmland covering the gentle slopes (See Figure 2-1).

Figure 2-1 View north east across the arable fields of the Adwick washlands



The site is owned by the EA who operate the majority of the site as a flood storage reservoir. This is discussed in more detail in Section 2.1.2.

Until recently the site was farmed under tenancies, however these tenancies ceased on 30 September 2010. The RSPB are negotiating the lease for this land with the EA for this proposal.

The arable farmland comprises fields divided by hedges and post and wire fences, with occasional hedgerow trees along Lowfield Lane.

The lower lying areas of the arable fields are subject to high groundwater levels, are unsuitable for crops and have developed wetland vegetation.

The site has been used historically as an open cast coal mine, but has been reinstated as agricultural land. An outline of the open cast coal workings is shown on Figure 2-5 below and it is also shown on Drawing 2010s4268-037.

2.1.2 Flood storage reservoir function

The existing site operates as a washland for flood storage for the River Dearne in flood conditions. A primary requirement of the scheme design was to avoid loss of flood storage in the creation of the wetland. A detailed description of the design from the flood storage aspect is provided in the Flood Risk Assessment (FRA) which forms part of the planning submission. The proposals will provide a small benefit for the flood storage function of the washlands.

2.1.3 Water level management of existing drainage system

There is a high level and a low level drainage system at Adwick. These systems are shown on Drawing 2010s4268-040 in blue and green respectively. The high level system drains by gravity through a sluice and a set of flap valves to the River Dearne. The low level system is pumped.

There are two 11.3 kW pumps for the low level system, located at Adwick Bridge. They were installed to prevent damage to crops rather than being part of the operation of the washland and are controlled by floats. These are not set to specific levels, rather, the position of the floats were set after observation of water levels. The lower float was set to allow for about 300 mm water depth in the drain to avoid pumping mud. The second pump only starts when the water level in the drain rises significantly and risks damaging crops. The proposals would not alter the arrangement or operation of the high level system; the changes to the low level pumped system are outlined in Section 3.2.

2.1.4 Public access

A plan (Drawing 2010s4268-048) showing the site and its associated routes is included with this planning application. The strategic routes are shown in their wider context in Drawing 2010s4268-032.

The site is accessed from the west from Lowfield Lane which runs through the site to the east to meet West Moor Lane which allows access from the east. This track is a public right of way; it is classed as a bridleway and is also classed as a traffic free link route to the Trans Pennine Trail/National Cycle Route 62. The surface of the track (see Figure 2-2) is currently rough and rutted and muddy in wet conditions.

Figure 2-2 Lowfield Lane



The Dearne Way runs close to the southern boundary of the site along the River Dearne flood embankments and the Trans Pennine Trail/National Cycle Route 62 runs to the south of the River Dearne, roughly parallel to the river. Both of these routes can be accessed close to Adwick Bridge, where there is a small (15 spaces) car park, rest perch (a simple, slightly raised bench) and route signage (see Figure 2-3 and Figure 2-4).

The routes all appear to be well used by the general public for walking, cycling, access to fishing opportunities etc, and provide links between communities and out to the wider area and the other RSPB sites such as the visitor centre at Old Moor in particular. The site and its immediate surroundings offer opportunities for circular routes, but these are generally longer than 2 km and are limited by the poor surface of Lowfield Lane and a lack of link routes. In particular, there is a lack of short, circular routes that are accessible for those of limited mobility, in wheelchairs or with pushchairs.

Figure 2-3 Trans Pennine Trail Signage at Adwick Bridge



Figure 2-4 Dearne Way Signage at Adwick Bridge



2.1.5 Biodiversity

Surveys of biodiversity including Phase 1 Habitat, breeding birds, wintering birds, water voles, great crested newts have been carried out. The findings of these surveys are summarised in Appendix F.

Appendix F also discusses the extent of BAP habitat creation and the potential impacts of the proposals on biodiversity and concludes that while arable farmland and some hedgerows will be lost, there will be a substantial gain in BAP habitats which will favour a range of BAP species and other species without detrimentally affecting those species currently extant on site.

Drawing 2010s4268-033 and Table 2-1 show the areas of habitat that will be created:

Table 2-1 Areas of habitat creation

Habitat	Status	Area (ha)
Reedbed	UKBAP, LBAP	1.65
Wet grassland	UKBAP	16.97
Open water	LBAP	0.88
Fen	UKBAP	0.58
Total		20.09

2.1.6 Non-native species

During the initial site visit, a number of non-native plant species were identified, including Japanese Knotweed (just outside the site boundary on the verges of Lowfield Lane), Himalayan Balsam (on the banks of the River Dearne, adjacent to the southern boundary of the site and the pond weed *Elodea* species. In Crane Well Dike and West Moor Dike. These species are listed on Schedule 9 of the Wildlife and Countryside Act, and under this act it is an offence to plant or cause to grow any plant species listed on Schedule 9. Activities such as excavation or soil movement could cause such species to spread.

These are discussed further in Appendix F - Ecological surveys report. Basic mitigation measures will be needed to ensure that there is no spread of the species described above. This is likely to take the form of avoiding works within the areas holding these species; if works are required in these areas then these will be controlled to ensure minimal movement of material. The EA have implemented a programme of control for Japanese Knotweed.

2.1.7 Archaeology

An Archaeological Desk-based Assessment was carried out for the site by ARCUS in 2009 and is supplied with this planning application (Appendix C). This report suggested that the potential for sub-surface archaeology within the site is low to moderate. In the areas affected by open cast coal mining (see Figure 2-5), any archaeological remains would have been removed by the mining activity. The main archaeological potential is for buried remains of paleochannels associated with the River Dearne, Cranewell Dike and West Moor Dike. There is also moderate potential for prehistoric to Romano-British remains in the undisturbed areas of the site, and the remains of Barnburgh Mill may survive as a buried feature in the southwest corner of the site.

A World War II heavy anti aircraft gun emplacement site which is designated as a Scheduled Ancient Monument (SAM) is present to the west of the site. The ARCUS report concluded that the creation of the wetland will not impact physically on the SAM and the visual impact on the setting of the SAM is considered to be low.

Subsequent consultations with the County Archaeologist and English Heritage (EH) are outlined in section 2.3; EH require an application for Scheduled Monument Consent which will be submitted at the same time as the planning application.

2.1.8 Geotechnical study

A site investigation was carried out by Ecology Land and People in 2007³. An extract of the ELP report is included in Appendix A.

A summary of the report is as follows:

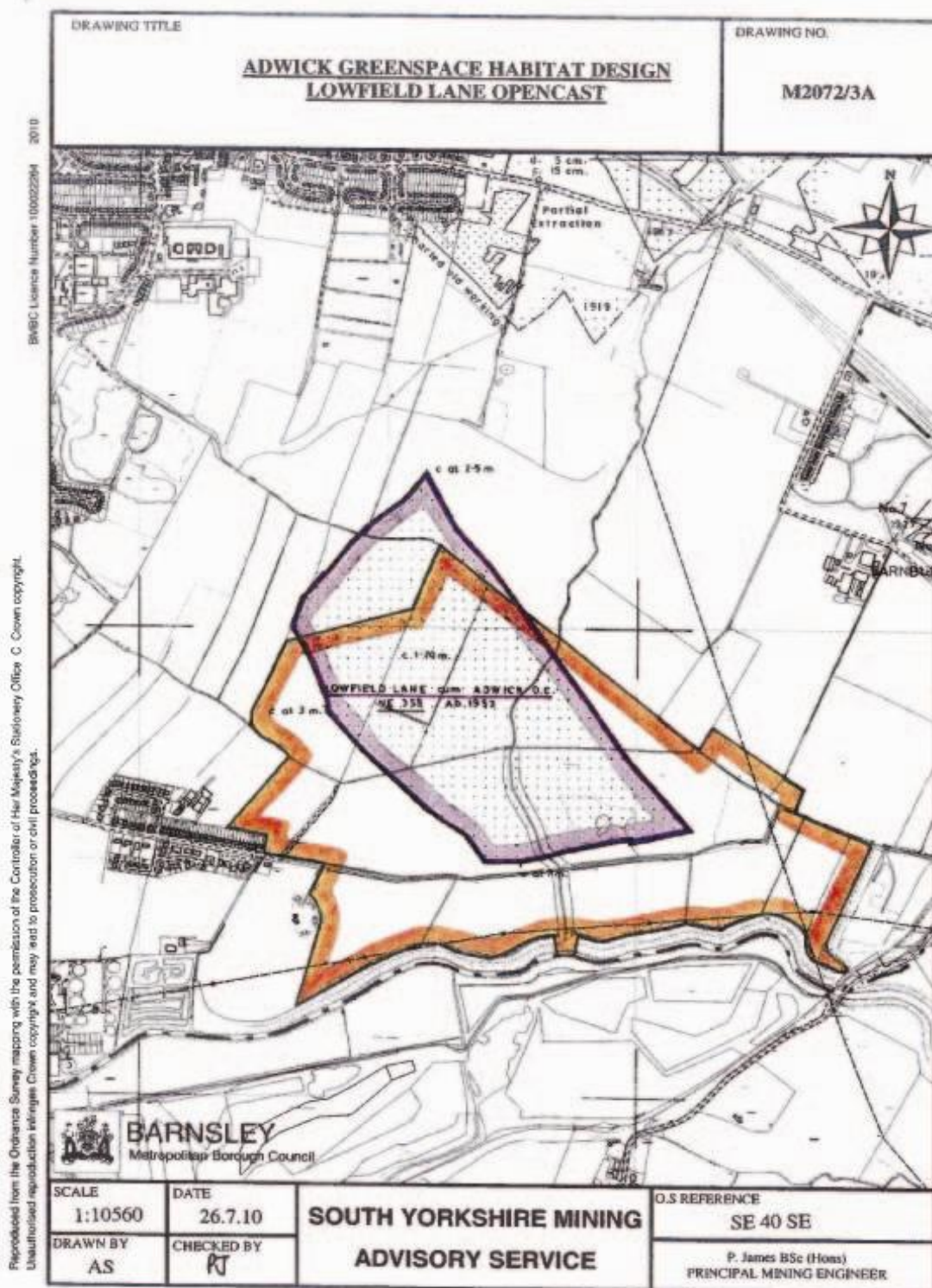
- The site is underlain by coal measures (ELP 2007, Section 4.2.1).
- The coal measures are overlain by river alluvium in close to the River Dearne. These are mainly sands and gravels.

³ Ecology Land and People, March 2007, Wet grassland creation - feasibility study

- Made ground consists of surface mine backfill consisting of silty mudstone, siltstone, sandstone and seatearth.
- ELP took 46 soil cores across the site. The locations are shown on Figure 6 in Appendix A with a distribution of the soil types. The log results are shown in Appendix A.
- The soils consist of sandstone soils on the higher ground, clay slope soils on the higher ground, filled clayey soils in the area of the open cast mining, alluvial soils on the lower ground. Sections have been drawn through the site at the locations of the soil cores which are Section A to C in Appendix A.

South Yorkshire Mining Advisory Service have provided a plan showing the extent of open-cast coal extraction (and therefore colliery spoil backfill) which is reproduced in Figure 2-5 below.

Figure 2-5 Location of open-cast coal excavation
Excavated area indicated by dotted area outlined in grey



2.1.9 Landscape

The site falls within National Character Area 38 Nottinghamshire, Derbyshire and Yorkshire Coalfield. This highlights the potential for enhancing the landscape through nature conservation and recreation opportunities.

Barnsley MBC carried out a landscape character assessment at a more localised level and the site is within character area C2 'Lower Dearne Lowland River Floor' of this Barnsley Borough landscape character area assessment. Wetland is described as being a dominant feature in the landscape and offering important wildlife habitat. The strategy objective for the character unit is to conserve and enhance the landscape of this character unit. Landscape management opportunities include conservation and enhancement of the open, undeveloped character of the valley floor by restoring and managing post-industrial land for agriculture, conservation and recreation. Conservation and enhancement of green corridors for the migration of wildlife and conservation and enhancement of existing wildlife habitats such as wetland are also identified as seen as key opportunities.

The proposed wetland creation falls in line with the opportunities for conserving and enhancing landscape character identified by the landscape character assessment for the Lower Dearne Lowland River Floor. It will help to retain the continuous open green corridor of the valley floor protecting it from development pressures.

2.1.10 Trees and hedges

A survey of the trees and hedges present on the site has been carried out by ELP (ELP 2009⁴, Appendix 2 and 3) and is attached with this planning application (Appendix B). Drawing 2010s4268-047 shows the existing trees and hedges, identifies where trees and hedges may need to be removed and replaced and identifies where tree and hedge planting will be carried out.

The tree survey shows that there are 24 semi-mature/mature trees present within the study area, the majority of which are located along Lowfield Lane, Crane Well Lane or the river embankment. Those recorded along Lowfield and Crane Well Lane were mainly ash or willow with an occasional oak. Willow was accompanied by silver birch on the river embankment, while scattered individuals of willow, blackthorn, hawthorn and ash marked the edges of some arable fields. The structural condition of the majority of trees recorded (with one exception) was at least "satisfactory" and often "healthy and vigorous".

There were several hedges recorded within the study area. Along Crane Well Lane these consisted of intact but species-poor blackthorn-dominated hedges, with some ash, elder, field maple and bramble. Hawthorn-dominated hedges were recorded on both sides of Lowfield Lane, some of which was intact whilst other sections were semi-derelict with many gaps. Associated species included ash, oak, dog rose, willow species and hazel. However, all but the western end of the lane would still be considered species poor and of low conservation interest.

Three sections of derelict species-poor hedge were recorded along West Moor Dike, which typically consisted of hawthorn and gorse. A cluster of hedges was also recorded in the eastern corner of the study area, consisting mainly of hawthorn or blackthorn dominated, species-poor but intact hedges. Finally, two hedges were recorded in the north-west corner of the site, which were species-poor and dominated by hawthorn and blackthorn (one of which was intact but the other was derelict).

In summary, the results show that there are several trees within the study area (particularly along Lowfield and Crane Well Lane, and along the river embankment) which may be of some conservation interest and should be retained where possible. The hedges found at the edges of fields within the main body of the site are of low conservation importance due to their derelict and/or species-poor condition. Hedges recorded along Lowfield Lane should be retained where possible, primarily because they will provide a screen between those people using the public right of way (PRoW) and breeding birds but also because of their amenity interest.

⁴ Ecology Land and People, March 2009, Adwick Greenspace Habitat Redesign

2.1.11 Sewerage outfalls

An outfall (showing signs of sewage debris) discharges into the low level system adjacent to Lowfield Lane. Yorkshire Water have been consulted with regard to this outfall and it is discussed further in Section 2.3.1 and Section 5.9.

2.2 Planning policy context

The current development plan for the area is the Barnsley Unitary Development Plan (UDP) (adopted December 2000). This will eventually be replaced by the Local Development Framework.

2.2.1 Barnsley UDP policies

The UDP has three goals which underpin the plan's strategic policy framework. This project is aligned most closely with Goal B:

Goal B: "To conserve and improve the physical environment for its own sake and in order to maintain and increase the attractiveness of Barnsley as a place to live, work, invest and visit."

The project will help to achieve the following policy aims through its provision of wildlife habitat for nature conservation and improvement of recreational routes:

Policy Aim B2: "To protect and enhance the countryside, valuable landscapes, higher quality agricultural land, and the natural and built environments, particularly nature conservation sites, conservation areas, listed buildings and archaeological sites".

Policy Aim B3: "To safeguard and enhance major recreation routes, areas and facilities".

The project also has some relevance to Goal C through its provision of improved recreational routes:

Goal C: "To revitalise communities and lessen disadvantage".

The UDP aims to achieve these goals and policy aims through the implementation of a range of policies. This proposal accords with several policies as follows:

Policy GS12 Development of Agricultural Land states that:

"The best and most versatile agricultural land is a national resource for the future. Considerable weight will be given to protecting such land from development".

The site is located in an area classed as moderate to good quality agricultural land by the Ministry of Agriculture, Fisheries and Food Agricultural Land Classification of England and Wales. The proposals will convert the land from arable to pasture for cattle. It is likely that the use of the land for grazing will be more compatible with the site's flood storage function. The wet nature of the ground already limits the arable productivity of the site, with wetland vegetation already established in some areas.

The proposals will mean that the land will be unsuitable for arable production but will be suitable for low intensity grazing. The proposals will also provide a wider range of other environmental and recreational functions and benefits.

Policy GS 21 Enhancing Areas of Nature Conservation Interest states that:

"The council will seek to increase the number and quality of areas of nature conservation interest available for education and general public enjoyment...."

The nature conservation function and improved public access provided by the proposals accord with this policy.

Policies GS26 and GS28 Recreational Routeways and Networks state that "The council will develop and promote a network of safe multiuser recreational routeways" and "The council will wherever practicable, preserve, protect and enhance existing public rights of way

and will require that new development retains an attractive route for existing rights of way..." The proposals' improvements to the existing right of way and proposed new link routes accord with this policy. Drawing Number 2010s4268-032 shows how the routes link with the wider PRow network.

The proposal will also accord with the following green space policies:

Policy GS7 Development within the Green Belt which states "development in green belt land will not be permitted unless it maintains the openness of, and does not conflict with the purposes of including land in, the green belt."

Policy GS9 Visual Amenity "development within the green belt, or conspicuous from it, should not by reason of its siting, materials or design result in significant harm to the visual amenity of the green belt."

Policy GS15 Protecting Habitats and Species which states ".....development proposals should, where appropriate, include measures to conserve and enhance existing features of nature conservation interest and to create new nature conservation areas."

Policy GS33 Countryside Recreation "Proposals for the use of land or other development for other forms of countryside recreation will be considered having regard to the policies of the plan, including those concerned with improving the environment, green belt, landscape, nature conservation, countryside recreation activities, agriculture, rural economy and residential amenity."

The proposals and the design process also accord with the following:

Policy BE3 Archaeological Sites "Where nationally important archaeological remains, whether scheduled or not, and their settings are affected by proposed development there will be a presumption in favour of their physical preservation..... On sites of identified or potential archaeological significance, the council may require an archaeological field evaluation to be submitted as part of a planning application."

A desk based archaeological evaluation has been carried out (Appendix C) and consultation with the County Archaeologist has determined that there is no requirement for further field evaluation. This is discussed in more detail in Appendix C.

Policy ES4 Washlands "Development will not be permitted in areas designated as washlands on the proposals maps except where:

- A) the proposed development would not significantly affect the function of the washland, or it incorporates adequate alternative floodwater storage capacity and
- B) there would be no serious risk to the development from flood debris or pollution."

The proposals accord with this policy and such issues are discussed in further detail in Section 5.1 and Appendix E.

Policy ES7 Contaminated Land requires investigations and appropriate measures with regard to contaminated land. This has been discussed in Section 2.1.8 and Appendix G and accords with council policy.

2.2.2 Barnsley Local Development Framework draft core policies

The emerging Local Development Framework for Barnsley will eventually replace the UDP. The Core Strategy is currently under consultation⁵ and therefore may be revised further before it is adopted. In its current state the Core Strategy contains a number of core policies which will be supported by this proposal including:

- CSP33 Green Infrastructure policy - maintaining and enhancing the Deane Valley Green Heart Corridor by providing an attractive environment where people can visit, enhance biodiversity and landscape character, improve the opportunity for tourism and respect local distinctiveness and historical heritage.

⁵ Barnsley Local Development Framework Core Strategy, June 2009 revised Preferred Options

- CSP35 Green Space policy - as the site lies within green belt land and open green space, the proposal will help to retain both green belt land and green space providing a valuable resource for wildlife and biodiversity and raising the quality of the local environment.
- CSP36 Biodiversity and Geodiversity policy - highlights the need for protecting and improving habitats and species, conserving and enhancing the form, local character and distinctiveness of the Dearne river corridor as a natural flood plain and important strategic wildlife corridor. The proposed wetlands will help to preserve and improve the existing biodiversity along the Dearne Valley Corridor in conjunction with this policy. The proposal will enhance existing biodiversity networks along the Dearne Valley

2.2.3 Other local and regional policy

The Yorkshire and Humber Biodiversity Forum has recently produced the Yorkshire and Humber Biodiversity Delivery Plan as the region's contribution towards the England Biodiversity Strategy Delivery Framework.

The plan identifies landscape-scale biodiversity opportunity areas within Yorkshire and Humber which provide the biggest opportunities for enhancement and creation of Biodiversity Action Plan habitats. The Dearne Valley has been identified as a Biodiversity Opportunity Area and has specific targets for delivery of floodplain grazing marsh, reedbed and fen. The development of Adwick washland to create Biodiversity Action Plan habitats will make a considerable contribution to these targets.

The Barnsley Biodiversity Trust have produced a local Biodiversity Action Plan for Barnsley which identifies priority Biodiversity Action Plan species and habitats for conservation and expansion in the Barnsley district. This development will create floodplain grazing marsh (HAP7) and reedbed (HAP14) and will support priority species including water vole (SAP3), otter (SAP4), and lapwing (SAP9).

Policy CSP33 Green Infrastructure of the submitted Barnsley Core Strategy identifies the Dearne Valley Green Heart corridor as a key green infrastructure corridor in Barnsley. Green Infrastructure can be defined as a network of connected multi functional green spaces that provide multiple benefits for people and wildlife. It is an important part of the strategic infrastructure of the borough. Barnsley's recently completed Green Infrastructure Strategy further considers the networks identified in the Core Strategy providing a strategic direction to enhance and expand the network. This development will increase the number of functions that the land at Adwick performs therefore helping to deliver the Barnsley Green Infrastructure strategy.

2.2.4 National policy

PPG 2 Green Belt

The proposal will help to maintain the undeveloped nature of the green belt land between Bolton Upon Dearne and Harlington for the foreseeable future in line with PPG2 Green Belt "The essential characteristic of green belt land is their permanence. Their protection must be maintained as far as can be seen ahead." The proposal will help to retain and enhance the landscape near to where people live and will secure its nature conservation interest in line with the key objectives of PPG 2.

PPS25 Development and Flood Risk

A flood risk assessment of these proposals has been carried out, in accordance with Planning Policy Statement: Development and Flood Risk (PPS25). The proposals are explained in a separate document that accompanies the planning application (Appendix E).

PPS9 Biodiversity and Geological Conservation

The proposal will help to meet overall national biodiversity targets and help to strengthen the natural habitat networks along the Dearne Valley, acting as a stepping stone between local biodiversity sites for migration, dispersal and genetic exchange of species in the wider environment, along with providing the opportunity for people to access and enjoy the wider countryside. This accords with the objectives of PPS9 which aims to "conserve, enhance and restore the diversity of England's wildlife" and to "contribute to rural renewal and urban renaissance by enhancing biodiversity in green spaces and among developments so that they are used by wildlife and valued by people, recognising that healthy functional ecosystems can contribute to a better quality of life and to people's sense of well-being"

2.3 Involvement

2.3.1 Statutory consultees

Formal (Barnsley MBC pre-application planning advice process) and informal consultation has been carried during the design process with relevant local authority departments (Highways, Archaeology, Development Management), the EA, NE, the Dearne and Dove Internal Drainage Board (IDB) and Yorkshire Water (YW).

Key issues arising from the consultation (in addition to the partner requirements for the project outlined in Section 2.4.2 below) are outlined in Table 2-2 below:

Table 2-2 Issues raised during consultation	
Consultee	Issue
Environment Agency	- required the 2007 flood level to be used in calculations rather than the levels used in the feasibility design. - require no loss in flood storage
County Archaeology Service	- may require field evaluation if areas outwith the area affected by open cast coal extraction are excavated as part of the proposals.
English Heritage	Natural England has consulted with EH with regard to the scheme during previous iterations. Further consultation was carried out and Scheduled Monument Consent is required for the works due to concerns about the impact of the raised groundwater on the SAM. EH may require monitoring of groundwater levels.
Dearne and Dove Internal Drainage Board (IDB)	The Dearne and Dove IDB expressed their concerns with regard to the scheme in a letter to the EA on 25 September 2009. These concerns were: • That there should be no impact on water levels in the watercourses upstream of the site • That the Board should continue to maintain the high level drainage system in order to ensure continued drainage standards to land upstream • That access for this maintenance is retained. The Bye Laws state no obstructions within 9 m of the drain bank top. This can be reduced in certain circumstances with prior consent from the Board. • That if the pumping station were to be decommissioned in the future there should be no effect on drainage standards in land outside the site.
Yorkshire Water	Suggest that sewage debris observed on site is unlikely to be from pumping station as this is monitored by telemetry and last recorded discharge was in June 2009. They suggest there may be an improper foul connection to the sewer and will investigate this possibility.

2.3.2 Community consultation

An informal 'drop-in event was held on the afternoon of the 28th July and a slightly more formal evening meeting on the same day. Posters were produced for the event and a

newsletter was sent prior to the events to properties on Lowfield Lane and Kennedy Drive (see Appendix D). Information was also sent to local politicians and other stakeholders.

A report of the feedback given at the meetings is included with this planning application (see Appendix D).

The general spirit of the discussions held with residents was very positive, with a high degree of interest being expressed by local people in the proposals. This was reflected in the willingness of many who attended the events to work alongside the RSPB to ensure a successful scheme (an example was a willingness to report difficulties or inappropriate access / behaviour on the site). Specific comments made included:

- Adwick will be great – the sooner it's done the better!
- Good idea for village and for people
- I think it is a fantastic idea – I wish it could start tomorrow

Concerns were raised regarding the following issues:

- Dog dirt/need for dog bins on site
- Antisocial behaviour (air rifles, trespassing)
- Predation of fish.
- Signage and maps at entrance needed to help people navigate site and keep to paths

Queries were raised and answered with regard to pathways, flood risk, agriculture, views, traffic, planning process, antisocial behaviour and funding.

2.4 Evaluation

2.4.1 Project history

The design process has progressed over several years through a number of stages and changes which have been informed by the studies and consultations outlined above. These are summarised below:

- June 2004 - Feasibility Study carried out for the Environment Agency by Babbie, Brown and Root⁶ -
- March 2007 - the consultants Ecology, Land and People carried out a Wet Grassland Creation Feasibility Study⁷ for Adwick Washland for the RSPB. This collated existing data, a topographical study and soil samples. Several designs for washland creation were suggested as part of this work.
- March 2009 - the consultants Ecology, Land and People produced the Adwick Greenspace Habitat Design for Natural England (incorporating tree survey and hedgerow survey work) based on the feasibility study, technical studies and discussions with the EA, RSPB and NE.
- March 2010 - the consultants Ecology, Land and People produced a revised version of the Adwick Greenspace Design for NE.

JBA involvement commenced in July 2010. JBA's role is to implement the project comprising three phases.

- Phase 1 - a review of the project.
- Phase 2 - the submission of documents to secure planning permission.

⁶ Babbie Brown and Root (2004) West Moor Closes (Adwick Washlands). Wetland Creation Feasibility

⁷ ELP (2007) Adwick Washland Wet Grassland Creation – feasibility study. Unpublished report to RSPB, North west region.

- Phase 3 - the preparation of final design and tender documentation.

2.4.2 Project review

The ELP design was based on the design requirements agreed with the project NE, EA and RSPB as follows, that the scheme should be:

- based on a simple hydrological system which is easy to manage and will not require large amounts of staff time to operate;
- aim to create approximately 25 ha of wetland habitat;
- accommodate a range of wetland habitat types including open water (both deep and shallow), wet grassland, reedbed/swamp and fen/marsh;
- provide new habitat for fish/eels and facilitate migration back to the river after flood events by limiting the use of water control structures;
- ideally allow water to exit the washland via gravity so that the pumping station can be decommissioned;
- provide new habitat for water voles and otters; and
- restore the main watercourses to a more natural profile.

The ELP design also required to take into account a number of constraints:

- The continued operation of the washland as a flood storage reservoir
- The presence of contaminated land areas.
- The potential for protected species.
- Archaeological constraints.
- Topographical and soils constraints.
- Limited sources of water.
- The continued use of the site by the public.
- Services and infrastructure in the area.

During JBA's review of the design in 2010, a number of factors emerged that meant that the ELP design was no longer viable; the main change was that EA stated its wish to use a 2007 flood level as the basis for the washland volume storage calculation and provided a level for this flood of 16.34 mAOD. ELP's calculations for the washland storage had been based on a lower level of 15.5 mAOD. This change in the required flood storage level, and other changes in the data used for the calculations meant that ELP's design would cause a loss in storage of 41,500 m³. This loss in storage is not acceptable to the EA.

To achieve the ELP design, one option would be to move this volume of spoil out of the washland area below the 2007 flood level, however since at least some of the material is likely to be contaminated this would incur a very high cost, making the scheme unviable.

The alternative was to redesign the scheme to avoid a loss of storage; the scheme presented in this planning application is the result of this redesign. The new design offers a slightly reduced area of wet grassland (20 ha instead of 25 ha) and less open water compared to the ELP design, but still offers a good range and scale of habitats to help achieve habitat creation targets and benefit priority species. The new design requires the pumping station at Adwick Bridge to remain in service, but it is anticipated that it will be required to operate at reduced periods compared to currently, offering cost savings and environmental benefits for the EA who operate the pump.

It is understood that the EA Asset Systems Management would prefer to decommission the pumps at some point in the future. This would lead to higher water levels across the site at times when river levels are high and gravity drainage to 13.00 mAOD is not possible. This would potentially change flood antecedent conditions. Based on the current constraint to

maintain flood storage, acceptance of this solution is likely to require a reassessment of the flood risk as well as the potential environmental impacts to bird breeding in particular.

There has been discussion about the provision of a flood bund for the houses on Lowfield Road. The bund is not part of the wetland creation because it lies within the 2007 flood area. A bund would cause further loss of washland storage for flood events below the crest level of the bund and this would therefore require flood storage compensation elsewhere. Owing to site restraints, stemming from the high 2007 design flood level, it would be very difficult to provide this compensation within the boundary of the EA owned site at Bolton-upon-Dearne.

3. Description of the proposed design

The proposed scheme is illustrated on Drawing 2010s4268-033 and Drawing 2010s4268-034 and offers:

- 16.97 ha of wet grassland (providing habitat for waders such as lapwings) with the potential for a further 0.58 ha fen communities to develop in areas as indicated.
- Approximately 1.65 ha of reedbed habitat.
- 0.88 ha of open water which offers wildlife habitat and facility for improved fish migration back to river following washland operation.
- The restoration of main watercourses to a more natural cross section (in the feeder ditch system and the foot drains only) to provide wildlife habitat.
- Habitat for water voles and otters within the proposed ditch system.
- Improved public access and visitor infrastructure.

This will be achieved through:

- earth moving (cut in some areas, fill in others to achieve an overall balance across the site);
- a change in water level management through alteration of the land drainage regime controlled by the pumping station at Adwick Bridge and installation of new water control structures;
- creation of new feeder ditches and foot drains;
- reprofiling of existing ditches and
- upgrading of track surface and provision of new footpaths and visitor infrastructure.

3.1.1 Earth moving

The scheme comprises two site demarcation zones for the control of water levels; Zone 1 is to the north of Crane Well Dike, Zone 2 is to the south of Crane Well Dike. The demarcation zones are shown in Drawing 2010s4268-038. The main earth movement is cut from Zone 1 and fill to Zone 2. Cross sections showing existing and proposed ground levels are shown on Drawing 2010s4268-035.

In the Zone 2 low lying areas it is proposed that ground levels are raised to a mean 13.00 mAOD level. The volume of fill required is 37,800 m³. In Zone 2 ground water levels will be controlled to approximately 13.00 mAOD. This is a higher than under the current land drainage regime and will be achieved by altered operation of the pump at Adwick Bridge.

The fill material for Zone 2 will be removed by cut from Zone 1. This cut and fill is below 16.34 mAOD design washland storage level so that balance in cut and fill is maintained. Compaction of placed fill material is proposed and there will be long term consolidation so there will be no loss in flood storage.

Existing deep ditches in Zone 1 and Zone 2 will be partly backfilled. An estimate has been made of the loss of storage caused by backfilling and flooding of the existing ditches to a higher level and flooding of the open water in Zone 2. Also, included in the estimate is the length of new feeder ditches and foot drains required. The overall net loss of storage in Zone 1 and 2 caused by ditch filling / wetting is approximately 11,500 m³. Material for part ditch filling will also be taken from the area for excavation in Zone 1.

This volume equates to a loss of flood storage compared to the existing basin. To compensate for this loss additional earth will also be excavated from Zone 1 and this material will be placed in the fill area to the north of the site which is above the 16.34 mAOD washland design flood level (i.e. 11,500 m³ of material is to be deposited in the area outside the existing floodplain).

The final level in Zone 1 after excavation will be approximately 13.61 mAOD. In Zone 1 groundwater levels will be controlled to the new excavated level.

The fill area to the north of the site will be raised by approximately 2 m to 18.2 mAOD level. Areas of raised ground will be planted with appropriate native species to help mitigate their visual impact and integrate them with the wider landscape. There may be scope to extend fill and planting outwith the site area in consultation with neighbouring land owners. However, this is not currently part of the scheme proposal.

Table 3-1 summarises the washland earth cut and fill balance. The table also summarises the washland storage loss and gain balance and it demonstrates that there is a small gain in the washland storage of approximately 1,200 m³ from the scheme.

Table 3-1 Washland earth cut and fill and storage volume loss and gain balance (m³)				
	Earth moving		Washland storage	
	Fill	Cut	Loss	Gain
Earthmoving				
Fill to Zone 2 to 13.00 mAOD level	37,800		37,800	
Excavation from Zone 1		37,800		37,800
Fill to existing deep ditches	28,500		28,500	
Excavation from Zone 1 for ditches		13,400		13,400
Excavation from Zone 2 for ditches (topsoil)		15,100		15,100
Construct new feeder ditches		1,400		1,400
Place feeder drain excavated material locally	1,400		1,400	
Construct new foot drains		3,600		3,600
Place foot drain excavated material locally	3,600		3,600	
Ditch flooding				
Flood existing ditches Zone 2 to 13.00 mAOD			1,700	
Flood feeder drains to ground level			1,400	
Flood foot drains to ground level			3,600	
Flood open water Zone 2 to 13.00 mAOD			3,600	
Loss and compensation				
Excavate Zone 1 for net loss		11,500		11,500
Fill above 16.34 mAOD flood storage level	11,500			
Totals	82,800	82,800	81,600	82,800

Section 2.1.1 mentioned that part of the site has been used for open cast coal mining and has been backfilled with colliery spoil. Since this material is likely to be contaminated with coal fragments, measures to mitigate the impacts of this potential contamination are dealt with in Section 5.6.

3.2 Water level management

Proposed Zone 1 water levels

The water level in Zone 1 will be managed by an adjustable weir structure across the high level drain West Moor Dike (Weir 2). The invert level of the weir will be 13.61 mAOD. The position of this weir is shown in Drawing 2010s4268-034.

At the north end of the wet grassland in Zone 1 it is proposed that a second weir and sluice be installed at 13.71 mAOD (Weir 1, Side Orifice 1). This will provide a positive head to enable flow through the wetland. Feeder drains will be constructed from the second weir into the area.

Proposed Zone 2 water levels

Weirs and sluices

At the north end of Zone 2, a weir and sluice is proposed on West Moor Dike and Crane Well Dike at approximately 13.10 mAOD (Weir 3, Side Orifice 3).

Pump operation

The existing pumps at Adwick Bridge will continue to operate under the proposed scheme but at higher water levels. It is proposed that the float levels are raised so that the grassland is maintained in a wet condition. Under the scheme the pumps may need to operate over a narrower depth range than at present to maintain the grassland at an optimum wetness and avoid excessive ponding that would cause a loss in flood storage.

In Zone 2 the proposed water level of the wet grassland is at a mean of 13.00 mAOD. The upper start float for pump 1 will need to be at approximately 13.10 mAOD to avoid deep ponds forming on the site. For pump 1 the lower pump stop float will be set at 13.00 mAOD to avoid lowering ground water levels below the optimum level required for the wet grassland.

The upper start float for pump 2 will need to start at a slightly higher level than 13.10 mAOD to provide additional pump capacity as in the current land drainage situation. The stop float for pump 2 will be set at the same level as pump 1 which is 13.00 mAOD.

It is expected that pump floats may need to be adjusted during the first couple of years of operation of the scheme to achieve the optimum wetness in the grassland.

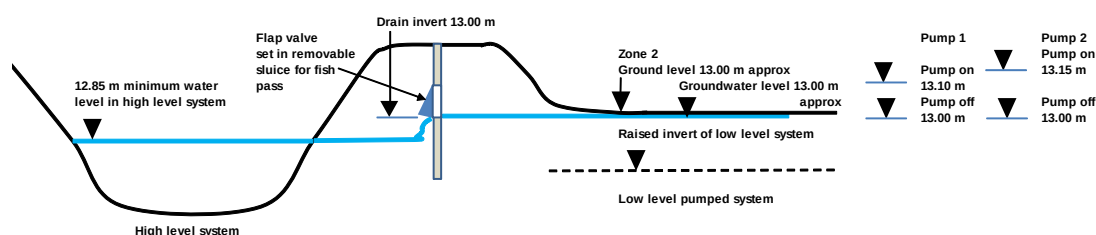
Low level gravity drainage

It is proposed that a means to drain the low level system by gravity is also provided under the new scheme. Gravity drainage will be possible when water levels are low in the high level system and flow into the low level system is generally insufficient to trigger pump operation. A set of culverts with flap valves from the low to the high level system will be provided close to the high level outlet at the river (Outlet 2).

A schematic diagram showing the proposed operating pump levels and the gravity outlet for Zone 2 is shown in Figure 3-1.

Since Zone 2 may gravitate at certain times the pump operation will be less than in the present operating regime.

Figure 3-1 Proposed gravity drainage at Outlet 4 from Zone 2

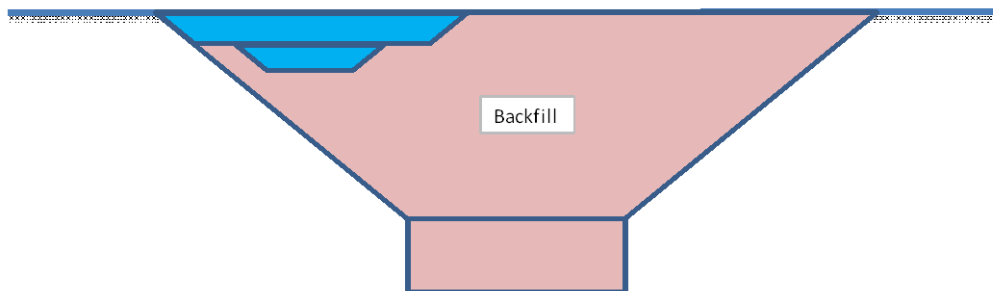


3.2.1 Existing ditch improvement and ditch creation

Partial backfilling of low level system

It is proposed that the existing deep drains in the low level system will be partly backfilled to create ditch profiles with shelved margins that are more beneficial for habitat creation. An indicative backfilling is shown in Figure 3-2. The final proposed profile is also shown on Drawing 2010s4268-041.

Figure 3-2 Backfilling of existing deep ditches



The plan layout of the existing ditches (green low level system on Drawing 2010s4268-040) has been retained as far as possible to minimise cost.

New feeder drain creation

New feeder drains will be provided from the upstream extent of Zone 1 and Zone 2 into the wetland areas (orange lines on Drawing 2010s4268-034). The minimum depth will be 1 m. These will also have shelved margins to provide biodiversity habitat opportunities.

3.3 Habitat design details

3.3.1 Reed bed

Reedbed habitat requires a watertable 10 to 30 cm above ground level. Reedbed is proposed in the shelved margins of the feeder ditches and low level system. It is estimated that the length of feeder ditches and low level system will be approximately 4 km. Allowing for 1.5 m width of reedbed at each site, the estimated area of reedbed achieved would be approximately 1.2 ha.

Additional areas of reedbed would be achievable in the foot drains and partly in the 0.8 ha of open water.

Establishment of reedbed vegetation will be through translocation of rhizomes from wet areas existing on site; this will allow semi-natural regeneration of reedbed and is preferable to importing plants from elsewhere as it maintains the local nature of the plant communities.

3.3.2 Wet grassland

Wet grassland requires a water level 0 to 30 cm below ground level. In order to maximise the habitat value of the wet grassland, embayments or 'fingers of wet grassland' will be provided into the surrounding drier grassland areas to create habitat diversity, so some areas are wetter and some drier.

It is proposed that the levels for the wet grassland in Zone 1 and Zone 2 are mean levels and that some gradual undulation approximately ± 100 mm from the mean level is provided across the area. The embayments are also proposed along the margins of the wet grassland.

In all the areas of wet grassland it is proposed that foot drains are installed at a density of 200 m/ha to maintain a minimum preferred wetness for breeding lapwings.

Seeding of grassland areas will be undertaken using hay obtained from appropriate local sources. This is preferable to importing seed from outwith the area as it maintains the local nature of the plant communities.

3.3.3 Fen

As described above in Section 2.5.2, the proposed levels for the wet grassland in Zones 1 and 2 are mean levels, incorporating gradual micro-topographic undulations. Given the absence of peat and the site's history of mining and agricultural exploitation, this approach has been taken in order to maximise the encouragement of fen-type vegetation species and communities, through the provision of a variety of hydrological conditions. It is hoped that the lower areas within the engineered micro-topography will offer the potential for the initial development of fen-like wet grassland communities, but this is not assured.

Fen-like habitat has established at the eastern end of Zone 2 on the existing site. The new raised levels for this area will be used to encourage fen habitat.

As with the grassland areas local hay will be used to seed the proposed fen areas in Zone 2. Since fen-like communities already exist on site it is hoped that fen communities will also develop naturally.

3.3.4 Open water

A small area of open water has been included in the scheme. It is proposed that the centroid of the open water area is placed in Zone 2 close to an existing small area of standing water and reedbed. The existing standing water was at 12.20 mAOD at the time of the ELP survey (ELP 2007).

The area of open water will be approximately 0.8 ha and the mean depth will be approximately 0.45 m. The depth at the centre of the open water will be to existing ground level to avoid filling locally and to preserve the existing habitat. The margins will be built to create a shelved pond.

No plants will be introduced to the proposed open water - aquatic communities are likely to rapidly establish naturally.

3.3.5 Tree and hedge removal/planting

A tree and hedgerow survey has been carried out as part of the feasibility studies prepared by ELP and is summarised in Section 2.1.10 above. A copy of the tree survey is included with this planning application.

Tree and hedgerow removal may be necessary alongside Lowfield Lane where the track is to be raised and resurfaced (see Section 3.7.1) and in areas where cut or fill of ground levels is proposed. Trees and hedges removed during construction will be replaced. Drawing 2010s4268-047 shows the locations where trees/hedges may need to be removed and replaced. Where possible the exact line of the raised and resurfaced track and the extents of the cut and fill operations will be determined on site during construction in order to retain mature trees and hedgerows.

Additional hedge and hedgerow tree planting is proposed in order to screen areas of the wetland and encourage public to remain on the rights of way and paths and discourage public access to sensitive breeding areas.

Additional tree and hedge planting is proposed in the fill area to the north of the site which will be raised by approximately 2 m to 18.2 mAOD level. Areas of raised ground will be planted with appropriate native species to help mitigate their visual impact and integrate them with the wider landscape. There may be scope to extend fill and planting outwith the site area in consultation with neighbouring land owners. However, this is not currently part of the scheme proposal.

It is proposed that there will be a net gain in trees and hedges overall.

Replacement tree planting will be of native species, including oak, ash, and willow; hedge planting will be of native species including blackthorn, hawthorn, hazel, field maple, dog rose and elder in accordance with the existing species currently on site.

3.4 Water level control structures

Design details of water level control structures are shown on Drawing 2010s4268-041 to 2010s4268-043.

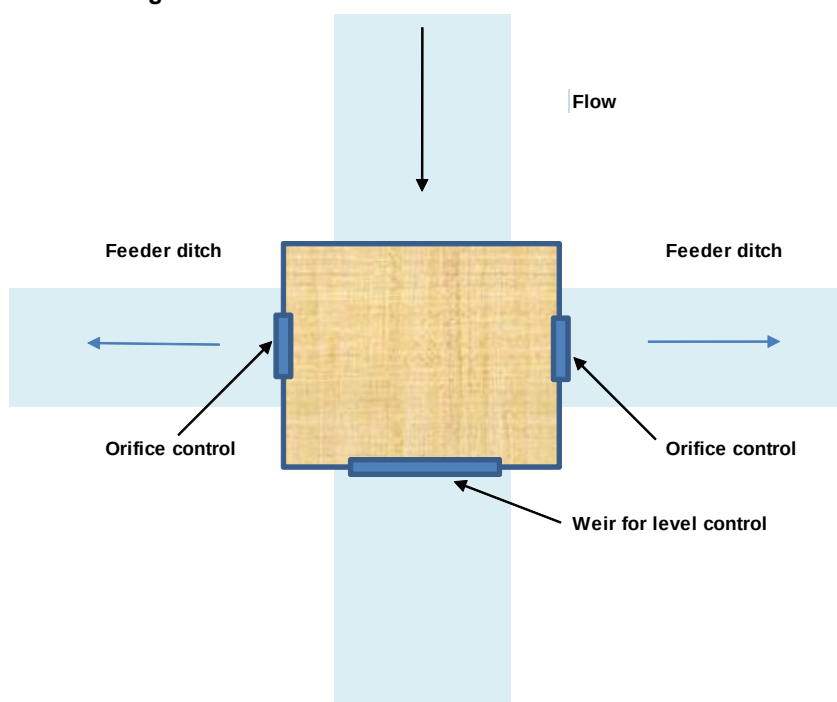
The moveable control structures will be set into simple sheet piled weirs. It is proposed that recycled plastic is used supplied by APE piling or similar (www.miniape.com).

The weirs will have simple orifice control structures for adjustment of the water levels. For safe operation these will be accessed from timber decking structures with handrails.

It is proposed that the weirs (Weir 1, 2 and 3), the side orifices (Side Orifice 1 and 3) and Outlet 2 are provided with a removable sluice to enable fish movement down the drainage system following washland operation. A typical arrangement is shown in Figure 3-3.

- In Zone 1 bunding will be required to the north of Crane Well Dike to retain water levels.
- In Zone 2 bunding will be required to the east of Crane Well Lane to avoid flooding the lane.
- In Zone 2 bunding will be required to West Moor Dike to maintain the current channel capacity in flood conditions.

Figure 3-3 Weir and orifice control to feeder ditches



3.5 Outfall structure, eels and fish

Improved fish passage from the washland to the river is an aim of the scheme. Fish refuge ponds are not viable owing to the loss of flood storage. However, improvements for fish and eel movement can still be achieved within the new scheme.

It is proposed that light weight high density polyethylene (HDPE) flap valves are used to replace the existing flap valves at the outlet structure. The arrangement of the new valves will be prepared during the final design programme in Phase 3. It is also proposed that a low concrete wall is installed on the downstream side of the concrete apron to increase the water depth and allow fish movement across the apron (Drawing 2010s4268-043).

After washland operation some fish will be trapped in the ditches of the high level and low level drainage system. It is also proposed that the scheme weir and sluices (Weir and sluice 1, 2 and 3) are designed so that more flow can be introduced through the low level drainage system following washland operation until most of the fish have returned to the river. This mode of drainage is preferably by gravity alone to avoid trapping fish behind the pumping station inlet screen. It could be achieved after river levels had dropped to a level to maintain the gravity drainage.

3.6 Culverts

New culverts are to be designed for the site at footpath and agricultural crossings (ELP 2010, Section 1.2.2). These will be cheaper to construct than bridges.

The preferred design from the EA fisheries perspective is a culvert which is as short as possible and has a large a diameter as possible. The culvert will be excavated into the existing ditch bed so the culvert invert in its final state has a natural bed.

3.6.1 Grazing access routes

The ELP report (2010, Section 1.2) states the requirement for grazing highland cattle and for access routes for agricultural vehicles.

Crossing points for grazing access routes over the feeder ditches and the foot drains are to be agreed. The number and density is to be agreed with the partners to balance the need for grazing access and scheme cost.

It is proposed that the access crossings will generally be provided by culverts; details of these crossings will be supplied to Barnsley MBC and the EA if required once locations and designs have been agreed.

3.7 Public access and visitor infrastructure

3.7.1 Public right of way

The PRoW will be maintained through the site. It is proposed that track levels are raised to prevent flooding. A longitudinal section through the track is shown on Drawing 2010s4268-035 (Section C-C) and a typical cross section on 2010s4268-036. Path widths will be between 2 and 3 m with a maximum 1:50 cross slope.

It is also proposed that two new paths are provided to link the PRoW to the embankment path on the River Dearne; these paths are also shown on Drawing 2010s4268-034. The link path running north to south from Lowfield Lane to the River Dearne along West Moor Dike is currently used as an informal route (see Drawing 2010s4268-032; there is no existing route running north south from Lowfield Lane to the River Dearne along the western boundary of the site as this is farmed for arable crops, but the proposals offer the opportunity to create a link route which, in conjunction with the link path along West Moor Dike, would offer a range of circular walk options.

The raising of the levels of Lowfield Lane PRoW will be associated with resurfacing, probably with a crushed stone surface to allow access for pedestrians, bikes, horses, wheelchairs, pushchairs etc. as well as agricultural and maintenance vehicles.

The surfacing of the two link paths is proposed as part of this application but may be carried out at a later date than the surfacing of the main track as it requires DVGH to obtain further funding.

3.7.2 Screens

DVGH propose to place three screens on the site to provide bird viewing and rest opportunities such as seats or perches. It is proposed that one will be located on the western section of Lowfield Lane looking south over Zone 2, while the other will be located on the

eastern section of Lowfield Lane looking north over Zone 2. Another will be placed at the end of Crane Well Lane to provide panoramic views of the area. See Drawing 2010s4268-034 for proposed locations. Drawing 2010s4268-046 and Figure 3-4 show examples structures used by the RSPB on similar sites. The structures are likely to be of a similar scale to these examples but will be designed specifically for the site and will be sympathetic to the local landscape character and heritage, therefore materials, shape and other details are likely to vary. Proposed designs and exact locations will be submitted to Barnsley MBC for approval.

Figure 3-4 Example screen design to show scale



3.7.3 Information boards

DVGH propose to locate low key, robust information boards on site, these are likely to be located at the site access points and at the viewing screens. See Drawing 2010s4268-034 for likely locations, however the board located at the eastern boundary of the site in the drawing may be better located at the junction of West Moor Lane and Cycle Route 62. Barnsley MBC will be consulted regarding final placements of boards. A board may also be provided at the existing car park near Adwick Bridge. The structures will be designed specifically for the site and will be sympathetic to the local landscape character and heritage. Proposed designs and exact locations will be submitted to Barnsley MBC for approval.

3.7.4 Rest points and perches

Resting points with rest perches or wildlife screens with seats or perches will be provided approximately every 300 m along the paths (see Drawing 2010s4268-034 for proposed locations).

Rest points will be set back from the path and, in addition to the path width, be at least 1200 mm wide and 1500 mm long. They will contain informal style, low key perches. The height of the perches will be between 500 and 750 mm.

Drawing 2010s4268-046 gives for example design details for rest perches and screens with seats or perches (see Section 3.7.2). The design of the perches will be low key and robust, in accordance with structures used successfully elsewhere in the Dearne Valley - see example Figure 3-5 which shows a perch located close to Adwick Bridge. They will be constructed of timber with well compacted earth and stones or concrete foundations. Proposed designs and exact locations will be submitted to Barnsley MBC for approval.

The location and design of rest opportunities will be in accordance with the "BT Countryside for All Standards and Guidelines: A good practice guide to disabled people's access in the countryside" standards for rural and working landscapes published by the Fieldfare Trust.

Figure 3-5 Typical rest perch



3.7.5 Access Controls

Access controls such as gates may be necessary on the site but are not proposed as part of this planning application. DVGH will work with Barnsley MBC Public Rights of Way team to assess the requirement for and design of any access structures.

3.8 Overall wet grassland management

The control structures will be adjustable weirs that are simple to operate from access platforms. Maintenance will be carried out by the EA.

The scheme is more complicated than that proposed in the feasibility study since the Adwick pump operation will be necessary. Some adjustment is expected in the first couple of years of operation to set the pump floats to the correct levels. However, in subsequent years the level of effort is expected to reduce.

It is understood that the EA Asset Systems Management would prefer to decommission the pumps at some point in the future. This would lead to higher water levels across the site at times when river levels are high. Based on the current constraint to maintain flood storage, acceptance of this solution is likely to require a reassessment of the flood risk as well as the potential environmental impacts to bird breeding in particular.

Periodic silt removal may be required from the ditches by the operator to maintain ditch capacity.

Further guidance on the seasonal management of the water levels provided in the Wet Grassland Practical Manual, Breeding Waders, RSPB, 2005.

4. Access

4.1 Construction stage

4.1.1 Construction vehicle access

It is proposed that the main access to the site is from Furlong Road/Harlington to the south west of Harlington. Access into the site will be via the West Moor Lane track.

The construction of the scheme is primarily an earth moving operation. There will be no removal of earth material off site and all the earth movement takes place within the boundary of the site.

The main vehicle movements will be at the commencement of the construction phase. Approximately 8 to 10 low loader movements are expected at the start of the job to deliver plant and equipment. A similar number of vehicle movements are expected towards the close of construction.

During the construction phase there will be a small number of deliveries of materials (e.g. sheet piles, pipes, fencing) to create the small number of structures. There will an import of hard core material for the track and this may take approximately 20 lorry movements of 20 tonnes each.

The other daily vehicle movements will be transportation of the workforce to and from the site.

Since the main construction is well away from the local housing at Bolton-upon-Deane construction noise is not expected to be an issue on this site.

4.1.2 Construction facilities

The construction compound and site security area is proposed at the junction of West Moor Lane with Lowfield Lane. This is shown on Drawing 2010s4268-048. This is the proposed location for the parking of contractor's vehicles during the construction period. The compound will have lockup facilities for contractor's equipment.

Since the site covers a large area it is expected that other temporary compounds and facilities will be created closer to the working areas to suit the construction programme.

4.1.3 Visitors to the site

Visitors to the site will be limited to contractor's staff, site supervision staff and operatives for delivery of materials during the construction period.

The PRoW which is a link route to the Trans Pennine Trail will be temporarily closed during the construction period so that public access will be prohibited. Extensive vehicle movements will be required over this track and works to raise levels in parts of the track and resurface the track are required. It is proposed that the access along the Dearne Way will be left open (Drawing 2010s4268-032).

The existing 15 space car park at Adwick Bridge will not be used by the contractor.

4.1.4 PRoW closure

During the work on the raising and resurfacing of Lowfield Lane, it is likely that closure of all or part of the route will be necessary. An application for a temporary footpath closure will be made to Barnsley MBC Highways and Engineering Service three months prior to any work commencing. An alternative route (as suggested by Barnsley MBC's PRoW representative during pre-application discussions) is available and is shown on Drawing 2010S4268-049.

4.2 Post -construction

4.2.1 Public access

The proposals for public access are described in Section 3.7. They will improve opportunities for public access by upgrading the existing PRow which is currently rutted and muddy when wet. The new surface will enable access by pedestrians, cyclists and riders as before but will also enable wheelchairs and pushchairs to access the site and will make it easier for pedestrians with limited mobility to access the site through the provision of rest points. Signage will also make it easier for users to navigate around the site.

The future proposal to surface the link routes to the river will also improve recreational access opportunities.

There is no provision for new car parking for the site as it is anticipated that the majority of users will arrive on foot or by bicycle. The existing Barnsley MBC car park at Adwick Bridge is likely to provide sufficient car parking for those visiting the area by car.

The track works will bring the surface of the PRow into line with the recommendations of the "BT Countryside for All Standards and Guidelines: A good practice guide to disabled people's access in the countryside" standards for rural and working landscapes.

5. Impact assessment

5.1 FRA

A flood risk assessment (FRA) has been prepared for the proposals (Appendix E). The outcome of the FRA shows that there is a small gain in flood storage for the washland.

5.2 Dearne and Dove IDB drainage

5.2.1 Maintenance requirement

The Dearne and Dove IDB expressed their concerns with regard to the scheme in a letter to the EA on 25 September 2009. These concerns were that:

- That there should be no impact on water levels in the watercourses upstream of the site
- That the Board should continue to maintain the high level drainage system in order to ensure continued drainage standards to land upstream.
- That access for this maintenance is retained. The Bye Laws state no obstructions within 9 m of the drain bank top. This can be reduced in certain circumstances with prior consent from the Board.
- That if the pumping station were to be decommissioned there should be no effect on drainage standards in land outside the site.

Minimal alteration is proposed to the profile of the West Moor and Crane Well Dikes. It is proposed that the bank conditions are also maintained as in the present condition within the required 9 m access strip. The Board maintains Crane Well Dike and West Moor Dike which consists of flail mowing the banks and removing aquatic vegetation from the bed. This is to ensure that the drainage standard of land upstream is maintained. In Zone 1 it is proposed that bunds are retained to West Moor Dike at 9 m width so that the current flood regime from West Moor Dike into the wetland is maintained and controlled.

Access arrangements around the proposed structures (weirs/orifices) will need to be agreed with the IDB.

5.2.2 Water levels

Water levels in the IDB drainage system upstream of the site boundary are unlikely to be affected by the design proposals even under high flow conditions.

- For Zone 2 the highest proposed weir in West Moor Dike will be approximately 13.71 mAOD. The invert level of this dike at the site boundary is approximately 16.90 mAOD which is approximately 3.5 m above the proposed weir.
- For Zone 1 the highest proposed weir in West Moor Dike will be 13.10 mAOD. The invert level of the west side of Crane Well Dike at the boundary of the site was surveyed as 13.58 mAOD and therefore water levels upstream will not be affected.
- For Zone 1 the invert level of the east side of Crane Well Dike at the boundary of the site is approximately 13.53 mAOD. Beyond the boundary of the site water levels in this ditch will not be affected by the proposed weir. Also, land rises steeply to the north away from this ditch and from the site boundary and therefore water levels in upstream land drainage ditches are not expected to be impacted.

5.3 Access

5.3.1 Public right of way

The PRoW along Lowfield Lane will need to be closed for a period while the track is raised and resurfaced. This will have an adverse affect on users in the short term; however this will be mitigated by the signing of alternative routes. The improvements to the track and additional paths offered by the proposals will provide better access for a wider range of users in the long term.

5.3.2 Parking

The majority of visitors to the site are likely to arrive by foot or on bicycles; because of the low key nature of the proposals it is considered that the numbers arriving by car are likely to be minimal therefore no new parking is associated with this development. The Barnsley MBC car park at Adwick Bridge is likely to be able to comfortably deal with any increased numbers of visitors arriving by car.

5.4 Biodiversity

Overall the proposals will offer a substantial improvement in the biodiversity value of the site.

Wet grassland (UKBAP habitat), reedbed (UKBAP and Local BAP habitat), fen (UKBAP habitat) and open water (Local BAP habitat) will be created, offering greatly enhanced opportunities for a range of wildlife compared to the existing arable farmland.

With regard to protected species which may be impacted by the development, two water vole surveys have been conducted by the EA in 2009. Both were negative. A study by RSPB in 2009 showed some evidence of water voles, but no evidence to support these findings was found in repeat surveying by the EA in 2010. A water vole survey was also conducted by JBA in July 2010 along the Internal Drainage Board controlled main West Moor Dike and Crane Well Dike. This survey was also negative.

There is still a possibility of encountering water voles or other protected species on the site during the construction period. In this event construction will be halted and the most appropriate course of action determined so as to avoid any adverse impact to this species.

5.5 Archaeology

5.5.1 Archaeological remains

During the phase 1 work by JBA Consulting there were discussions with the planners about the feasibility design and the requirements for archaeological investigation. It was stated that a pre-planning investigation would be needed. However, it was accepted that there is unlikely to be any remains within the area of open-cast mining.

In the redesign of the scheme the bulk excavation has been limited within the area of the open-cast mine. This is shown on Drawing 201024268-037.

Outside of the open-cast area, excavation will be mainly lengths of shallow feeder and drainage ditches to and from the wet grassland areas and open water. Most of this length is within the areas of fill for Zone 2 and there are only very short lengths of feeder ditch proposed outside of this area.

The works are unlikely to have an impact on any archaeological resource.

5.5.2 Scheduled Ancient Monument

The Archaeological Desk-based Assessment was carried out for the site by ARCUS in 2009 concluded that the creation of the wetland will not impact physically on the SAM and the visual impact on the setting of the SAM is considered to be low.

Subsequently English Heritage have been consulted about the need for Scheduled Monument Consent. This will be required as EH are concerned about the potential impact of the raised water levels on the foundations and below-ground elements of the SAM. Scheduled Monument Consent will be applied for at the same time as this planning application. It is possible that EH will require periodic monitoring of water levels in the SAM.

The change from arable to pasture is unlikely to have an adverse impact on the setting of the SAM.

5.6 Contaminated land

5.6.1 Earth moving

It was noted in Section 2.1.8 that colliery spoil had been used to backfill the open cast mine workings. Colliery spoil is an inherently contaminated material that is composed of fragments of coal measures. This material is likely to contain levels of heavy metals and organics, including iron, lead, mercury, arsenic, polycyclic aromatic hydrocarbons and phenols. Iron staining recorded in the archive logs (see Appendix G) suggests that the ground will contain high levels of iron, and that some iron has been mobilised within the existing drainage system.

Colliery spoil has already been used in embankment construction for both West Moor Dike and the river (ELP report 2007). It is proposed that the spoil from shallow excavations (less than 2 m deep) will be used to construct earth bunding and for fill borrow pit material within the project area.

Appendix G contains details of contamination testing that was carried out by ELP (ELP 2007, Section 6.8) to a depth down to approximately 1 m below the subsoil. Appendix G also contains a figure showing the location of the contamination testing logs (ELP 2007, Figure 12). The results of the testing are also included in Appendix G.

Some coal lumps were present in the testing points 2, 4, 5, 6, 8, 9 and 10 (ELP 2007, p59). The results suggest that the soil contamination testing points 5, 6 and 7, showing the highest levels of contamination are to the north of, and close to, Lowfield Lane (ELP 2007, Table 8, p59). In this area, once the topsoil has been removed from the existing surface, only filling is proposed.

There will be potentially contaminated material from the Zone 1 excavation area. To minimise the possible impact of this material on the proposed wetland an earth moving method is proposed.

1. Topsoil and the upper layers of the tilled subsoil will be removed from the Zone 1 excavation area. This material will be temporarily stockpiled on site for reuse.
2. Topsoil and the upper layers of the tilled subsoil will be removed from the Zone 2 fill area. This material will be temporarily stockpiled on site for reuse.
3. The lower level fill and the partial ditch filling at the lower levels in Zone 2 will use cut material from Zone 1.
4. The upper levels of the ditches and the upper level of fill in Zone 2 will use the topsoil and uncontaminated subsoil from Zone 2.
5. The final surface of the excavated bench for Zone 1 will use the topsoil and uncontaminated subsoil from Zone 1.

There will be no transport of excavated material off site. No import of material is proposed.

The scheme has been designed with weir structures as explained in Section 3.4 so that a positive flow of water can be forced through Zone 1 and Zone 2 and return to the IDB drainage. This will minimise the possibility of stagnant water on the site holding contaminants.

The Construction Design and Management Safety Plan will explain the risks with handling the contaminated material during construction. The contractor will be asked to prepare a method statement.

5.6.2 Vegetation establishment

The key wet grassland National Vegetation Classification (NVC) communities all contain species that are reportedly tolerant of heavy metal contamination, but which will also thrive under lower stress conditions (RSPB et al., 1997). Such 'pseudometallophytes' include species appropriate to this design such as Creeping Bent *Agrostis stolonifera*, Rough Meadow-grass *Poa trivialis* and Yorkshire Fog *Holcus lanatus*.

The RSPB have a local source of hay to seed the grassland and proposed fen areas. Reedbeds will be established by translocation of rhizomes from reeds already present on site.

5.7 Trees and hedges

Although some trees and hedges may need to be removed during the construction, replacement planting is proposed along with additional planting, there for there will be a net gain in tree and hedge cover.

5.8 Pylons

National Grid has been informed about the change in groundwater levels. The scheme will affect groundwater levels at some of the pylon bases through the site. National Grid has not responded yet.

5.9 Sewerage outfalls

Yorkshire Water plc (YW) has been consulted about the sewer overflow from Lowfield Lane and have informed that a consent for this overflow exists with the Environment Agency, with which YW are compliant. There is an existing YW foul pumping station on Lowfield Lane.

YW report that the pumping station from which the sewer overflow emanates is linked to telemetry which monitors discharges; the last reported sewerage discharge from the pumping station was in July 2009. YW suggest it is possible that the recent sewage evidence present on site may have come from another source, such as an improper foul connection to the surface water sewer somewhere upstream. YW have stated that they will investigate this possibility and have suggested that the discharge is unlikely to be from the pumping station as if it was it would be greater in volume and that their telemetry would have recorded it.

If YW investigations fail to resolve the potential discharge issue, and in the event that discharges are likely to be frequent, a reed bed could be provided for treatment of the discharge.

6. Health and safety and CDM

Design decisions have been recorded during the preparation of the redesign. Design risks will be carried through in to the Construction Design and Management (CDM) Regulations Safety Plan.

Appendices

- A. Geotechnical site investigations**
- B. Trees and hedges**
- C. Desk based archaeological study**
- D. Public consultation**
- E. Flood Risk Assessment**
- F. Ecological Surveys**
- G. Contaminated Land**

References

Circular 01/06 (Communities and Local Government): 'Guidance on Changes to the Development Control System'

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