

## LCT 6: Glacial Channels Landscape Character Type



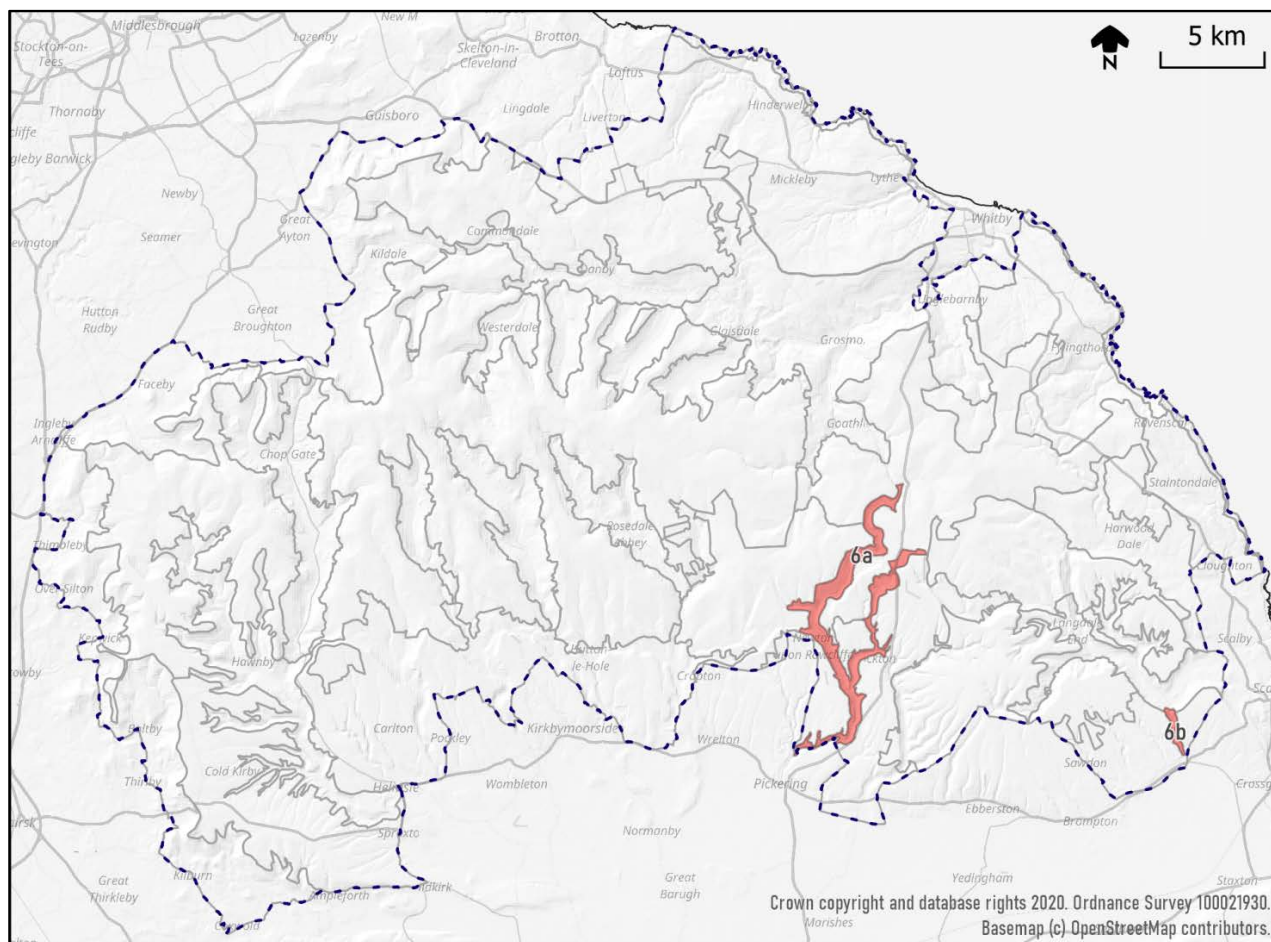
Fig.94 A typical scene within the Glacial Channels Landscape Character Type, Newtondale

### Location, Context and Setting

This Landscape Character Type (LCT) is the smallest of the LCTs, and is located in the south-east of the National Park. It encompasses the deep valleys of Newtondale, Levisham Beck (including the Hole of Horcum) and Forge Valley. Settlements in these valleys are limited to isolated buildings. Newtondale adjoins LCA 3a (Cropton Forest) to the west, and a ridge of LCA 1b (Eastern Moorland) separates Newtondale and the Hole of Horcum. The remainder of the LCT is cut into LCA 5c (Eastern Limestone Hills), although LCA 7a (Hackness Limestone Dale) adjoins Forge Valley to the north. The landform means that the valleys are visually enclosed, although there are some views into them from surrounding LCTs. Forge Valley forms the northern approach to East Ayton village.

### Summary Description

This LCT comprises dramatic landforms sculpted by powerful glacial meltwater, and the erosive power of water over millennia. Together they have created deep, gorge-like valleys, and the impressive bowl of the Hole of Horcum, which cut through the surrounding landscape. Woodland clothes the valley sides, including extensive areas of Ancient Woodland highly valued for their biodiversity. The steam trains running through Newtondale on the North Yorkshire Moors Railway add further character and sense of place through their sight, sounds and smells, and also enable people to experience the valley. Patterns of woodland, occasional fields, scrub, grassland and fen create a constantly-changing mosaic of colours and textures. Within the valleys, views are contained by the surrounding landform, limiting views out. This creates a strong sense of enclosure which contrasts markedly with the openness of the surrounding moorland and limestone hills landscapes. The lack of roads, and the absence of modern buildings and structures, adds to its unique character. It has a strong sense of tranquillity and detachment, and exceptionally dark skies.



Location map for Glacial Channels Landscape Character Type (LCT) 6a = Newtondale & Hole of Horcum; 6b = Forge Valley

## Key Characteristics

- Underlying geology of deltaic sandstone, Corallian limestone & Oxford clay visible in valley sides
- Dramatic topography comprises deep, U-shaped valleys running north-south, formed by glacial meltwater. V-shaped tributary valleys are eroded by streams, and the natural amphitheatre of the Hole of Horcum results from spring-sapping.
- Valley floors contain winding streams. Poor drainage has led to valley-floor fen habitat.
- Land use is predominantly woodland or pasture.
- Rich diversity of semi-natural habitats including extensive areas of Ancient Woodland, riparian habitats, fen, scrub, crags, wet meadows and flower-rich grassland.
- Trees include valley-side woodlands (Ancient Woodland and Plantations on Ancient Woodland Sites), riparian trees, hedgerows, wet woodland and scrub.
- A few irregular-shaped valley-floor fields, separated by hedges or woodland.
- Very few buildings and an almost total lack of modern structures. Buildings associated with the North Yorkshire Moors Railway have a strong historic character and the valley is regularly used as a film set. Rich diversity of well-preserved archaeological features covering multiple periods.
- Generally few roads, but many tracks, footpaths, and a railway line through Newtondale.
- Woodlands and other semi-natural habitats create a mosaic of textures and seasonal colours.
- High levels of tranquillity and a sense of isolation due to the enclosing effect of the landform.
- The popularity of the North Yorkshire Moors Railway means that Newtondale is a well-known landscape. Steam trains create evocative sounds and smells which add to the sense of place.

## Natural landscape features

The Glacial Channels LCT covers the complex geological transition between deltaic sandstone, Oxford clay, and Corallian limestone. These rocks can therefore be seen in various combinations, including in section down valley sides. For example, at Forge Valley, the surrounding elevated farmland is limestone; the steep valley sides are sandstone, and clay forms the valley floor. At the Hole of Horcum, limestone has been eroded to reveal the clay beneath. The northern part of Newtondale contains crags of sandstone at the tops of the valley sides.

The main valleys of this LCT run in a roughly north-south direction. Newtondale and Forge Valley originated at the end of the last ice-age, when they were cut by torrents of glacial meltwater. Newtondale was formed by overflowing meltwater from a lake or glacier in Esk Dale. It was prevented from reaching the sea by a wall of ice, and instead broke through to the south, carving out Newtondale and dumping debris known as 'moraine'. Similarly, water trapped by ice created a lake at Hackness, which eventually overtopped and cascaded southwards, eroding Forge Valley into the Vale of Pickering. Today these valleys contain tiny streams which meander across the valley floors.



Fig.95 Glacial moraine, Newtondale

These meltwater channels have U-shaped profiles, with flat valley floors and steepening

sides topped with vertical crags. They are different from the V-shaped valleys (known locally as griffs) such as the Levisham Beck Valley and other tributaries of Newtondale. These have very narrow valley bottoms and steeply-sloping sides, and were created through erosion by streams.



Fig.96 Wooded V-shaped valley of the Levisham Beck

The Hole of Horcum, which forms a large bowl at the head of Levisham Beck valley, has very different origins. It is one of the most spectacular features in the National Park – a huge natural amphitheatre 400 feet deep and more than half a mile across. According to legend, it was created when the giant Wade picked up a handful of dirt to throw at his wife. In reality, it was created by a process called spring-sapping, whereby water welling up from the hillside gradually undermines the limestone slopes above, eating the away the rocks grain by grain. Over thousands of years, a once narrow valley has widened and deepened into an enormous bowl – and the process still continues today.



Fig.97 The Hole of Horcum, from viewpoint on A169

Woodland has thrived on the steep valley sides which are too steep to plough. Newtondale, Levisham Beck Valley, and Forge Valley all contain extensive areas of Ancient Woodland. This rich habitat contains a diversity of tree species and ground flora, which support many species of insects, birds and animals. Forge Valley is a Site of Special Scientific Interest and National Nature Reserve. Newtondale also contains large areas of Plantations on Ancient Woodland Sites (including conifer plantations), which have potential to be restored to native woodland. In addition there are riparian trees and vegetation along watercourses, wet woodland, hedgerows, and patches of scrub.



Fig.98 Ancient Woodland at Forge Valley

Newtondale is designated SSSI for its geological interest, and its succession of habitats between the upper and lower valleys. Their survival is due to traditional land management, and the valley’s inaccessibility. Habitats here include wet woodland, fen, valley mire, wet hay meadow, herb-rich neutral grassland, grazed marsh and moorland edge. Poor drainage at the head of Newtondale has enabled peaty fen habitat to form on the valley floor. Fen Bog is a Special Area of Conservation and Local Nature Reserve managed by the Yorkshire Wildlife

Trust. It is a nationally-important example of an oligotrophic (nutrient poor) valley mire.



Fig.99 Fen Bog, upper Newtondale

Designation	Sites
SAC	Fen Bog
SSSI	Newtondale; Hole of Horcum; Raincliffe and Force Valley Wood
NNR	Forge Valley
LNR	Fen Bog (Yorkshire Wildlife Trust)

Key designated nature conservation sites

### Cultural landscape features

Land use within the valleys primarily comprises woodland with occasional valley-bottom fields, divided by hedgerows.

Buildings are limited to a handful of isolated farms, and buildings associated with the North Yorkshire Moors Railway. These have a very distinctive character, and include Levisham Station, with its station house, waiting room and signal box. The partially-ruined Church of St Mary is located in the Levisham Beck Valley, isolated from the village of Levisham which is located on high land above the valley.

Lanes cross Newtondale and the Levisham Beck Valley, but these valleys are otherwise inaccessible except by track, footpath or steam railway. A minor road and footpaths run through Forge Valley. Forge Valley is named after the iron forges which existed

here in the 14<sup>th</sup> Century, fuelled by charcoal made in the woods.



Fig.100 Levisham station on the North Yorkshire Moors Railway

Designation	Sites
Scheduled Monuments	Horcum Dyke (prehistoric earthwork); Part of Levisham Moor prehistoric and medieval remains; barrows in Levisham Wood
Conservation Areas	West and East Ayton (small part)
Listed Buildings	Occasional farms; Levisham Church; Levisham Station House

Key designated heritage conservation sites

### Perceptual qualities and views

One of the most striking qualities of this LCT is its lack of modern buildings or structures. This, combined with the visual isolation created by the landform gives it a strong sense of timelessness and detachment from the modern world. The sense of ‘going back in time’ is enhanced by the presence of the steam railway in Newtondale, and is presumably one of the reasons that the valley is in demand as a film location.

The scale of the landform, particularly the Hole of Horcum, is very impressive, and creates a sense of awe at the power of ice and water.

Combinations of streams, woodlands, and the striking backdrops of the valley sides make pleasing compositions and have a picturesque quality. They are seen as a sequence in views

from the train along Newtondale. The mosaic of landcover (including woodland, fields, open land, scrub, rocky outcrops, fen and moorland) creates a variety of colours and textures which change throughout the year. The deciduous woodlands are particularly spectacular in autumn.

In Newtondale, the sense of place is enhanced by sounds and smells of steam trains. The lack of settlements and main roads creates an exceptionally strong sense of tranquillity, and the dense woodland helps to mask the sounds of traffic using minor roads. The LCT has very dark night skies with no sources of light pollution, and is within the Dark Skies Core Area or buffer zone. Many of the wooded parts of the LCT are identified as remote due to their landcover, and the northern part of Newtondale is also identified as remote under Policy ENV3.

Forge Valley, Levisham Beck, and Levisham station are accessible by road. Otherwise access is limited to paths and tracks, which adds to the sense of remoteness and detachment. However, these paths offer good connections with the nearby settlements of Pickering and West and East Ayton. The Tabular Hills Walk crosses Newtondale and runs through the Hole of Horcum, enabling users to experience this extraordinary landform.

Within the valleys, landform frames views along the valleys. The steep sides create visual enclosure, effectively cutting off views out of the valleys.

There are some elevated views into the LCT, notably the viewpoint on the A169 overlooking the Hole of Horcum, and Skelton Tower on Levisham Moor overlooking Newtondale.

## Ecosystem Services provided by the Glacial Channels LCT

Type of Ecosystem Service	Existing Contributions	Opportunities
Cultural Services	<p>The landforms are excellent examples of unusual geomorphological processes and provide geodiversity and education and research opportunities.</p> <p>The North Yorkshire Moors Railway provides historic and cultural interest, and a very strong sense of place. It is popular with tourists, and also as a film set. It enables people to experience the landscape and a sense of history.</p> <p>Tracks and paths throughout the LCT provide opportunities for quiet recreation and exercise, promoting health and wellbeing and allowing people to appreciate tranquillity and dark skies. Routes include direct footpath connections with Pickering and East Ayton.</p>	<p>There are further opportunities to design and promote walks within the LCT, particularly car-free routes from local towns and villages.</p>
Provisioning Services	<p>Trees provide timber, wood fibre and biomass.</p> <p>Patches of farmland provide food and fibre (wool). Springs and streams provide fresh water.</p>	<p>There are opportunities to manage plantations to increase their biodiversity and enhance their fit into the landscape, including restoration of Ancient Woodland.</p>
Regulating Services	<p>Trees and peat store carbon (mitigating climate change) and trees improve air quality by absorbing pollutants. Tree roots and peats absorb rainwater and slow water flow, helping to regulate downstream flooding.</p> <p>Plants provide habitats for pollinating insects.</p>	<p>Future management of woodland and plantations can enhance biodiversity and contribute to Natural Flood Management. Felling practices should minimise runoff of water and soils.</p> <p>Promote habitats for pollinating insects.</p>
Supporting Services	<p>Trees and peat soils contribute to soil formation, and photosynthesis by plants supports life through the production of oxygen. Evapotranspiration from leaves is an essential part of the water cycle.</p> <p>The LCT provides habitats and habitat links for a range of species, particularly along river valleys.</p>	<p>Seek opportunities to expand and link habitats, including through natural colonisation of trees where appropriate.</p>

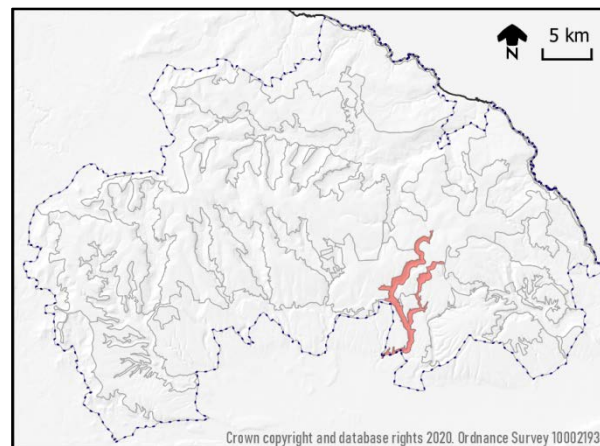
## Landscape Character Area Descriptions

There are two distinctive Landscape Character Areas (LCAs) within the Glacial Channels LCT. These are described on the following pages.

## Landscape Character Area 6a: Newtondale and Hole of Horcum



Fig.101 The Newtondale Valley from the road to Levisham Station



Map showing the location of LCA 6a within the National Park

This LCA is located in the south of the National Park, to the north-east of Pickering. It comprises two valleys which join south of Levisham.

The western valley is Newtondale, one of the best examples of a glacial meltwater channel in the country, and contains a rich diversity of habitats. It is also the setting for one of the country's best known steam railways. The trains, stations and trackside features, as well as the sounds and smells of the steam trains, add to the character of the Dale. At its lower end the valley is lined by woodlands (including Ancient Woodlands and Plantations on Ancient Woodland Sites) and small fields including damp hay meadows, with a winding tree-lined stream running alongside the railway track on the valley floor. The central section of the valley is dominated by 20<sup>th</sup> Century plantation on the western side, including Douglas fir and Norway and Sitka spruce. There are also patches of broadleaved woodland, herb-rich grassland and scrub, and areas of felled plantation. The northern part of the valley has fewer trees and is dominated by grassland, bracken and scrub vegetation. It has more of a moorland feel, with crags lining the upper valley sides, lumpy glacial moraine landforms, and the distinctive vegetation of Fen Bog on the broad valley floor.

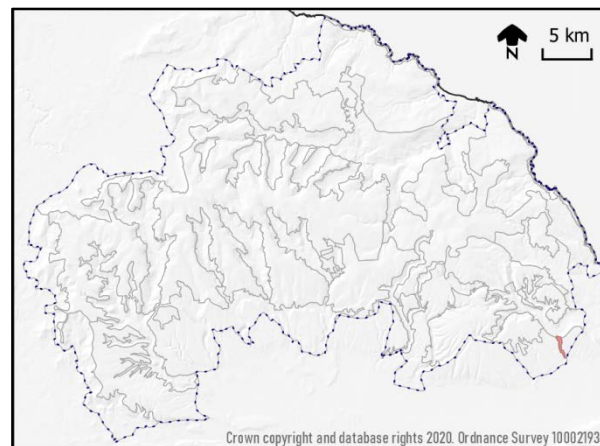
The eastern valley is the Levisham Beck Valley, which has several smaller tributary valleys. These steep V-shaped valleys are known as griffs, and are lined with extensive areas of deciduous woodland, much of it ancient. Near the top of the Levisham Beck Valley is the dramatic Hole of Horcum – a huge and impressive bowl-shaped landform caused by springs dissolving the limestone rock and eroding it backwards. The villages of Levisham and Lockton sit above the Levisham Beck valley on either side of it. The road between the villages crosses the valley in a series of hair-pin bends. At the base of the valley is a former mill, and the ruins of Levisham church.

Its popularity with tourists visiting the North Yorkshire Moors Railway, and its frequent use as a film set, means that Newtondale is one of the most recognised areas of the National Park, despite its lack of roads or settlements.

## Landscape Character Area 6b: Forge Valley



Fig.102 Forge valley, seen from Mowthorpe to the north



Map showing the location of LCA 6b within the National Park

Forge Valley is the smallest of all the LCAs, and is located in the south-east of the National Park, north of East Ayton. It comprises the deep tree-lined valley of the River Derwent between the broad valley containing Mowthorpe, and East Ayton village.

The gorge was created in glacial times by water cascading out of Lake Hackness, as ice and rock blocked its natural route to the sea. The power of the water eroded a deep, steep sided gorge which formed a route to Lake Pickering. Today it is a big valley containing a small river and a series of petrifying tufa springs.

Ancient Woodland thought to be at least 6000 years old covers the valley sides, and is one of the best examples of mixed deciduous woodland in north-east England. Tree species and ground flora reflect the different underlying geological and soil conditions. Alder and willow trees dominate on the valley bottom, with ash and wych elm on the middle slopes, and oak, rowan and holly nearest the top of the valley. Ground flora is also very varied, and the woodland and river are home to many different birds, fish, insects and mammals (including otters). Forge Valley is a National Nature Reserve. A boardwalk enables easy access along the valley floor, and there are other footpaths through the woodland on the valley sides. Small patches of calcareous grassland occur on limestone outcrops, and there are cliffs and small quarries hidden in the valley-side woodland.

The steepness of the valley sides, and the density of tree cover, mean that there are few views out. Although a road runs through the valley, the trees form natural noise masking and block views of traffic, so the sense of tranquillity is still present, particularly away from the road. There are no settlements within the LCA, although East Ayton village adjoins its southern boundary.



## Forces for Change acting on Glacial Channels LCT

Issue/ Force for Change	Landscape sensitivities and potential impacts	LCAs affected
Introduction of modern structures	New structures, including buildings and telecommunications masts, would introduce modern elements into the landscape. This would impact on its strongly historic character and sense of place. The impacts would be exacerbated at night if structures were lit.	All
Tree disease and invasive species	Species such as Rhododendron can outcompete native ground flora species and prevent new trees from becoming established. Ash dieback is already present in the National Park, and will spread in coming years. The loss of ash trees will have both visual and ecological impacts. Other tree diseases and invasive species also pose a threat to woodland and river ecosystems.	All
Biodiversity loss	<p>The 20<sup>th</sup> Century saw extensive planting of Plantations on Ancient Woodland Sites within this LCT, and a decline in the traditional management (such as coppicing) of surviving Ancient Woodlands. This resulted in the loss of some Ancient Woodland, and also changes to ground flora in some remaining woodlands. In some areas, bracken is becoming established on valley sides, which can result in a decline in biodiversity as it smothers other plants. Today work is underway to restore woodland habitats and increase biodiversity (see ‘changing forest management practices’ below).</p> <p>Newtondale is home to several niche habitats such as wet hay meadow, neutral grassland and grazed marshes which have survived here because of the continuation of traditional management. Historically these types of habitats would have been much more common across the National Park.</p>	All
Changing forest management practices	20 <sup>th</sup> Century forestry practice saw planting of non-native conifer plantations in sensitive locations such as Newtondale. A positive change is the move towards restoration of semi-natural habitats (including Ancient Woodland) which were previously planted with non-native trees; the promotion of increased biodiversity in forested areas, and a greater degree of consideration of the visual impacts of plantations in the landscape.	All
Additional tree cover	<p>Within this LCT there are opportunities for reversion of Plantations on Ancient Woodland Sites to native woodland, and also for increasing tree cover through planting and natural recolonisation.</p> <p>When thinking of increasing tree cover, it is important to consider any potential impacts on sensitive habitats within this LCT which could potentially be damaged by tree growth. These include fen, flushes, damp hay meadow and flower-rich grassland. All provide niche habitats for plants, insects and birds and this biodiversity could be lost if trees become established here. Any new woodland within this LCT should sit sympathetically in the landscape.</p>	6a
Loss of tranquillity and	The southern ends of both LCAs are adjacent to settlements and therefore experience greater disturbance to tranquillity and loss of	

Issue/ Force for Change	Landscape sensitivities and potential impacts	LCAs affected
dark skies	dark skies. There are also some impacts from the A169 above the Hole of Horcum. However, the northern parts of the LCAs are more tranquil and experience darker skies. Loss of these would have a significant impact because the levels are currently very high, particularly in Newtondale which has no through roads and very few buildings.	
Management of visitor facilities	A lack of management is evident in some parts of Forge Valley, with closed parking area, poorly-maintained interpretation, and viewpoint obscured by vegetation.	All
Changes in adjacent LCTs	The character of the Glacial Channels LCT is potentially affected by changes in adjacent LCTs which would affect views and ecology, including LCT 1 Moorland, LCT 3 Forest, LCT 5 Limestone Hills, and LCT 7 Limestone Dales.	
Climate change	Increased temperatures, higher concentrations of nitrogen and longer growing seasons may enable more vigorous tree growth, potentially impacting on the balance of trees currently growing in Ancient Woodland. Other climate-related factors, such as new pests and diseases, stress from drought, and damage from more intense storms, will also impact on Ancient Woodland and other trees. Increased intensity of storms will lead to an increased flood risk. Steep valleys have fast run-off times, increasing the risk of downstream flooding.	All

## Landscape Guidelines for the Glacial Channels LCT

### Protect

- Protect the strong historic character and lack of modern buildings and structures.
- Protect open skylines on valley sides.
- Protect dark night skies.
- Protect the sense of tranquillity, enclosure, and detachment from the outside world.

### Manage

- Manage conifer plantations, seeking to restore native woodland on former Ancient Woodland Sites, and create a more naturalistic feel within the landscape, including through natural regeneration where appropriate.
- Encourage active management of broadleaved woodlands where it will provide clear landscape and biodiversity benefits alongside production of wood products, where appropriate. Create a range of woodland habitats, including glades and woodland edges, to maximise biodiversity.
- Actively remove non-native invasive species where necessary.
- Manage other semi-natural habitats such as herb-rich grasslands and peat fen in accordance with SSSI Management Plans. Seek opportunities to expand and further connect habitats.
- Consider opportunities for dynamic boundaries between farmland, trees, scrub and moorland where this LCT adjoins other LCTs.
- Manage visitor facilities, and keep viewpoints clear of vegetation.

- Seek to manage Scheduled Monuments and other significant heritage sites sensitively and wherever possible in an integrated way with wider farming, landscape and conservation interests.

## Plan

- Consider allowing tree planting and natural colonisation of scrub and trees on valley sides (particularly in areas where bracken is spreading). However great care must be taken that existing habitats important for biodiversity are not lost through scrub or tree growth. Before commencing any tree planting or allowing natural colonisation, professional advice should be sought to ensure that there will be no negative effects on the historic environment, ecology or access.
- There should be a presumption against development (including new communications masts) within this LCT. Proposed developments or changes associated with existing buildings (for example isolated farms) should be evaluated on a case-by-case basis.
- Avoid siting telecommunications masts where they would overlook this LCT or be visible from it.
- Seek opportunities to undertake both LiDAR and walkover surveys of woodland to identify currently unknown archaeological features such as woodbanks, charcoal platforms, etc.
- Work collaboratively with other relevant organisation such as the North Yorkshire Moors Railway and Forest England to agree a shared vision to protect and enhance Newtondale's landscape, biodiversity and heritage.