Study to map the key environmental considerations and mineral resources in Northumberland

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1. Introduction

Purpose of this study

1.1 The purpose of this study is to provide a high level assessment of the extent and distribution of the environmental considerations that could affect the location of future minerals extraction in Northumberland.

Background

1.2 Northumberland is rich in a number of mineral deposits. Where these minerals are of economic interest for extraction or may become of economic interest, then they can be considered as a mineral resource. The Northumberland Local Development Framework needs to consider how to plan for the extraction of the mineral resources needed by society and the economy whilst minimising the potential impacts of extraction on local communities and the environment.

1.3 To inform policy development in the Local Development Framework, and in particularly the strategic approach to planning for future mineral development in the Core Strategy Development Plan Document, work is required to understand the environmental constraints that exist within Northumberland and how these could influence the location of future minerals extraction. This study will, therefore, map the environmental constraints and known mineral resources in Northumberland. The study is a 'high-level' desktop study using a Geographical Information System (GIS) to map the location and extent of the environmental constraints in relation to the location and extent of the mineral resource areas. This will assist in understanding the considerations and the capacity of the environment to accommodate new minerals development.

1.4 This report details the context for this study, its scope and the approach taken. The report also provides maps illustrating the broad extent of the mineral resources and the environmental considerations and provides analysis of their interaction.

2. Policy Context

2.1 The Government's overarching minerals policies are contained in 'Minerals Policy Statement 1: Planning and Minerals'. Paragraph 9 of this document establishes the Government's objectives in relation to minerals planning and provides guidance on the principle of development for mineral extraction. Minerals Policy Statement 1 also sets out polices to achieve the objectives set out in paragraphs 10 to 19. Paragraph 14 identifies a number of policies for the protection of heritage and countryside and how designations such as international, national and local nature conservation designations and landscape designations should be dealt with in relation to the preparation of development plans. This includes policies that seek to protect areas covered by these designations such as not permitting major mineral developments in Areas of Outstanding Natural Beauty unless there are specific circumstances. National planning policy and guidance on Green Belts is contained in 'Planning Policy Guidance 2: Green Belts'. Recognising that minerals extraction is a temporary activity Planning Policy Guidance 2 states that mineral development need not be inappropriate development in a Green Belt nor conflict with the purposes of designating Green Belts provided that the openness of the Green Belt is maintained.

2.2 'Minerals Planning Guidance 3: Coal mining and colliery spoil disposal' and 'Minerals Planning Guidance 13: Guidelines for peat provision in England' also contain policy and guidance to protect areas designated for their nature conservation importance or their landscape (for example Areas of Outstanding Natural Beauty). They also seek to protect archaeological and cultural heritage interests, best and most versatile agricultural land and the openness of Green Belt areas.

2.3 Paragraph 38 of Minerals Planning Guidance Note 3 also requires Minerals Local Plans to identify areas where coal extraction may be acceptable in principle as well as those areas where working is unlikely to be

acceptable. However, local circumstances will determine the extent to which it is possible to identify particular areas where extraction may be acceptable. Paragraph 38 goes on to state that Mineral Planning Authorities "…may therefore wish to indicate:

- broad areas of search
- the extent of the shallow coalfield and the constraints within that area; or
- a combination of the two."

2.4 Within the context of this policy framework it is therefore important to understand where the relevant environmental considerations in Northumberland exist and how they could influence decisions about where future minerals extraction could be acceptable. In addition, to aid an understanding of the feasibility of the potential approaches to planning for coal extraction outlined in Mineral Planning Guidance 3 it is also important to understand where constraints exist and areas where sites would be more acceptably located.

3. Approach

Scope of the study

3.1 In order to inform an approach to planning for and managing future minerals extraction this study takes the form of a desktop study using a Geographical Information System (GIS) to map the location and extent of a range of environmental considerations in relation to the identified mineral resource areas. The environmental considerations are based upon the principles set out in national planning policy. A key output of the study is to identify whether any parts of the mineral resource areas are not subject to key environmental considerations. Such areas could potentially be identified as 'Areas of Search'. It is not within the scope of the study to make assumptions about the mitigation measures that could be employed to address the environmental constraints and make working of the mineral resources acceptable. The presence of an environmental designation, for example, does not necessarily preclude mineral extraction as there is no absolute presumption against mineral working in designated areas.

Geographical coverage of the study

3.2 The study covers the area of Northumberland outside of the Northumberland National Park and focuses on those areas where mineral extraction is taking place or where it could potentially take place. The area covered by this study is consistent with the area covered by the Northumberland Local Development Framework, which is the responsibility of Northumberland County Council.

Minerals to be covered by the study

3.3 This study does not include all of the mineral resources known to exist in Northumberland. The minerals that will be covered by this study include

coal (and associated clays) as well as Carboniferous Limestone, igneous rock and sand and gravel which are predominantly extracted in Northumberland for aggregate uses. These are the most significant minerals resources in Northumberland in terms of the tonnages of the minerals that are extracted, their contribution to the economy and impact on the environment and local communities.

Environmental features to be considered

3.4 The next stage of the study involved identifying the environmental features that should be mapped and taken into consideration in this study. At this point, it is important to recognise that the study is limited by the information that is available and which can be used in the GIS. There are likely to be other environmental features that are not included in this study, particular those that are more local and site specific in nature. These are issues that will need to be considered when allocating specific sites or where planning applications are being determined. The environmental considerations covered in this study are listed below in Table 3.1. Annex D details the key national planning policy reference to the environmental considerations mapped in the study and the source of data used to map the extent of these features.

Table 3.1: Environmental considerations by theme

Theme	**Designation**
Biodiversity and Geological Conservation	• Special Protection Areas (SPAs) • Special Area of Conservation (SACs) • Ramsar sites • Sites of Special Scientific Interest (SSSI) • National Nature Reserve (NNR) • Ancient Woodland • Local Nature Reserve (LNR) • Local wildlife and geological sites

Theme	Designation
Landscape	• National Park • Areas of Outstanding Natural Beauty (AONBs) • Heritage coast • Landscape Character Areas assessed as having high sensitivity to mineral development
Archaeology and Cultural Heritage	• World Heritage Sites • Scheduled monuments • Registered battlefields • Registered Parks and Gardens • Listed buildings • Conservation Areas
Water Environment	• Flood Risk Zone 3b
Land use	• Green Belt • High grade agricultural land
Human features	• Buildings

3.5 The environmental considerations have been identified on the principles and requirements set out in national planning policy, the availability of the environmental information for use in GIS and the features that are appropriate to the level of the study.

Study Approach

Stage 1: Gathering of the information required for the mapping

3.6 The first stage of the study involved gathering data on the environmental considerations and the minerals information that were to be mapped in this study.

3.7 The minerals information mapped in this study is the extent of the mineral resource areas for coal (and the associated clays), Carboniferous Limestone, igneous rock and sand and gravel. Licensed digital data from British Geological Survey was used to map the location of the resource areas for Carboniferous Limestone, igneous rock and sand and gravel and licensed digital data from the Coal Authority was used to map the extent of the shallow coal resource in Northumberland. In addition, the study maps the location of existing extraction sites (i.e. those with valid planning permissions) and sites where there are planning applications awaiting determination. It does not include older sites that have not been completed. This information was sourced from planning application records held by Northumberland County Council.

3.8 The environmental features and designations mapped are detailed in Table 3.1. Data on the location and extent of these are available to Northumberland County Council for use in GIS. The source of the data used in the study is detailed in Appendix D. To map the location of clusters of buildings, information derived from the Historic Landscape Characterisation to identify where there are clusters of buildings greater than one hectare in size. Digital data on the broad extent of Best and Most Versatile Agricultural Land (Grades 1, 2 and 3a) is not available as the data does not spilt Grade 3 into sub-grades 3a and 3b. The Study therefore maps only the higher quality agricultural land in Grades 1 and 2. Grade 3 is not mapped as it is too extensive to be able to identify where the higher quality agricultural land is located for the purposes of this study. The information on the Landscape

Character Areas that have been assessed as having a high sensitivity to mineral extraction is taken from the 'Northumberland Key Land Use Impact Study' (September 2010). The Northumberland key Land Use Impact Study focussed on key 'pressure areas' for minerals extraction in Northumberland and assessed the sensitivity of the landscape character areas to mineral extraction within these key pressure areas only. This study therefore only shows the extent of the landscape character areas that have a high sensitivity to mineral extraction on the maps that focus on the key pressure areas and not those showing the whole of Northumberland as the landscape character area sensitivity assessment has not been done across the wider area. Information on the extent of Flood Zones in Northumberland is taken from the Strategic Flood Risk Assessment for Northumberland. Only Flood Zone 3b is mapped in the study because 'Planning Policy Statement 25: Development and Flood Risk' identifies that minerals workings and processing (with the exception of sand and gravel workings) as less vulnerable development that is compatible with Flood Zones 1, 2 and 3a but is incompatible with Flood Zone 3b. The exception to this is sand and gravel workings which are identified in Planning Policy Statement 25 as water compatible development that are appropriate development in Flood Zone 3b.

Stage 2: Production of maps showing the broad location of the mineral resources and the environmental considerations in Northumberland

3.9 The second stage of the study involved the production of maps showing the extent of the mineral resources in Northumberland and a series of maps which show and build up the extent of the environmental features. For this stage the maps illustrate the extent of each of the mineral resources and considerations at the County level. A commentary on the location of the designations/features and how these interact with the mineral resource areas at a strategic level is provided. This is presented on a theme-by-theme basis which builds up the considerations shown.

3.10 Maps were produced showing:

- the extent of each of the mineral resources included in this study;
- the extent of each of the mineral resources with the environmental considerations mapped on a theme-by-theme basis as detailed in Table 3.1
- the extent of each of the mineral resources with all of the environmental features overlain

Stage 3: Production of maps showing the key mineral resource areas and the environmental considerations

3.11 The third stage of the study focused in more detail on the key mineral resource areas in Northumberland and the environmental considerations present within these areas. These are the resource areas where there is known pressure for minerals developments (i.e. there are existing active extraction sites and proposals for new sites). The key areas are detailed by mineral resource in the table below (Table 3.2).

Table 3.2: Key resource areas studied in further detail

Mineral	**Key resource areas**
Coal	• South East Northumberland Coalfield (area from Amble in the north to the boundary with Tyne and Wear in the south) • Tyne/Derwent Watershed (area to the south of Prudhoe around Whittonstall and Hedley on the Hill) • Outlying areas of the principal coal resource at Midgeholme, Plenmeller and Stublick
Sand and Gravel	• Coquet valley • Breamish, Glen and Till valleys • Tyne valley, including the Derwent, North Tyne and South Tyne
Carboniferous Limestone	• Great Limestone
Igneous rock	• Whin Sill

3.12 For each of the areas detailed above, maps were produced showing the location of the environmental considerations and the mineral resources. As detailed in Paragraph 3.10 for Stage 2, maps were produced for each of the themes detailed in Table 3.1. For each of the key resource areas a commentary is provided on the location of the designations/features and

broadly how these interact with the areas containing a known or potential mineral resource.

4. Analysis

4.1 This section presents a commentary and analysis of the environmental considerations and how these relate to each of the coal, hard rock and sand and gravel resource areas in Northumberland. The maps are provided separately in the figures that are presented in Appendices A, B and C.

a) Coal

4.2 Information provided by The Coal Authority shows that shallow coal resources cover extensive areas of Northumberland (Figure A.1). Much of this resource is unlikely to support modern extraction due to the quality and characteristics of the coal and the coal seams being thin and widely-spaced. However, Northumberland does still have significant areas of closely-spaced coal seams that are capable of supporting modern extraction and which contain coals with the characteristics that are appropriate for current markets. The British Geological Survey mineral resource maps identify these as 'principal resource areas'. The principal coal resource areas include:

- 'Main Northumberland Coalfield' from Amble in the north to the Northumberland-Tyne and Wear boundary in the south, including the Tyne/Derwent watershed area to the south of Prudhoe.
- Smaller outlying areas of resource at Midgeholme, Plenmeller and Stublick in the south west of Northumberland.

4.3 These 'principal resource areas' represent the key areas where future pressure for extraction is most likely to occur during the Core Strategy plan period. This section firstly summarises the considerations across the coal resource areas in Northumberland and secondly focuses on the considerations in the key coal resource areas identified (i.e. the 'principal resource areas').

The coal resource across Northumberland (Figures A.1 to A.7)

Biodiversity and Geological Conservation:

4.4 There are a number of designations along the Northumberland coast. In north Northumberland these include the Berwickshire and North Northumberland Coast SAC, Lindisfarne Ramsar site, Northumbria Coast Ramsar site, Lindisfarne SPA and the Northumbria Coast SPA. In North Northumberland these only interact with very small, isolated areas of coal resource. Within the North Pennines area much of the coal resource either overlaps with the designations or is close to the designated areas. This includes the North Pennine Moors SPA and North Pennine Moors SAC. The areas covered by these designations are also designated as SSSIs. The Midgeholme, Plenmeller and Stublick coal resource areas have some overlap with the designations and are located adjacent to them. Within the Tyne/Derwent watershed area there are no international designations but there are some areas of ancient woodland and local wildlife sites. In the remainder of the South East Northumberland coal resource area, which covers the area from Amble to the boundary of Northumberland and Tyne and Wear, the designations are more scattered and isolated. There is, however, a concentration of these designations along the valleys of the River Wansbeck, the River Blyth and the River Coquet and along the Northumberland coast.

Landscape:

4.5 Northumberland has two Areas of Outstanding Natural Beauty (AONBs), the Northumberland Coast AONB and the North Pennines AONB. The Northumberland Coast AONB covers an area of coast between Berwick-upon-Tweed in the north and Amble in the south. This area is located to the north of the main Northumberland coalfield. There are coal resources within the area covered by the Northumberland Coast AONB but these are relatively small and isolated resource areas. The North Northumberland Heritage Coast designation extends southwards from Amble and overlaps with a small part of the south east Northumberland coal resource area along Druridge Bay. The North Pennines AONB covers an area of the south west of Northumberland. The North Pennines AONB contains a number of small, isolated coal resource

areas. Most significantly the Stublick coal resource area is located within the AONB. The Midgeholme coal resource area is adjacent to the AONB and the Plenmeller coal resource area partly within the AONB. There is also a small area of overlap between the south western part of the Tyne/Derwent watershed coal resource area and the North Pennines AONB in the area near Derwent Reservoir.

Archaeology and Cultural Heritage:

4.6 There are Scheduled Monuments and listed buildings throughout the coal resource areas in Northumberland. The Hadrian's Wall World Heritage Site overlaps with the coal resource area to the north of Heddon on the Wall in the area between Ponteland and Prudhoe. Within the main Northumberland coalfield area there are Registered Parks and Gardens at Seaton Delaval Hall, Blagdon Hall near Stannington and St Mary's Hospital near Stannington. To the north of Alnwick the Registered Park and Garden at Hulne Park overlaps with an area of coal resource. The area to the east of Seaton Delaval around Delaval Hall is covered by a large Conservation Area. There are other Conservation Areas within the coal resource areas but these are smaller and tend to be located within settlements.

Water environment:

4.7 The main interactions between the coal resource areas and the flood risk zones are along the river valleys and are confined to relatively small areas of the coal resource areas (Figure A.5). There are also flood risk areas along the coast, particularly in the Druridge Bay area.

Land use and human features:

4.8 The most significant interactions between settlements and the coal resource areas is where the south east Northumberland coal resource area and the main settlements in south east Northumberland overlap. There are also a number of large villages in the area between Morpeth, Ashington and Amble. In the south west of the main Northumberland coalfield Prudhoe and the neighbouring settlements overlap with the resource area.

4.9 The Green Belt covers large parts of the main south east Northumberland coalfield outside of the main settlements. The Green Belt also overlaps with the coal resource area to the south west of Ponteland and Prudhoe. The majority of high grade agricultural land in Northumberland is within the river valleys of the Tyne and Tweed (Figure A.6). The only location where there is any significant overlap between the known areas of high grade agricultural land and coal resource is in the Tyne Valley around Prudhoe.

South east Northumberland coal resource area (Figures A.8 to A.13)

4.10 The south east Northumberland coal resource area covers an area in east Northumberland from Amble in the north to the boundary of Tyne and Wear in the south and extends southwards along the western edge of Newcastle-upon-Tyne to the east and south of Ponteland and across the Tyne Valley to the Tyne/Derwent watershed area. The Tyne/Derwent watershed area is discussed separately below (paragraphs 4.18 to 4.21).

4.11 In the northern part of the south east Northumberland coal resource area, taken to be the area from Amble in the north to Morpeth and Ashington in the south, there is a concentration of environmental considerations along the Druridge Bay area. This includes SSSIs at Cresswell Ponds, Hadston Links and Low Hauxley Shore. Part of the Northumberland Shore SSSI is also located in this area. There are also Northumberland Wildlife Trust Reserves at these locations. The Northumberland Heritage Coast designation extends south from Amble along Druridge Bay to beyond Cresswell. The Druridge Bay Landscape Character Area is also assessed as having a high sensitivity to coal extraction. The Northumberland Coast AONB is located to the north of this area. With the exception of the wooded valley of the River Wansbeck to the south of this area there are only scattered fragments of ancient woodland. Outside of the Druridge Bay area the main consideration within this area is the settlements, many of which have developed principally around the coal industry. There are a number of villages which include:

- Broomhill

- Ellington
- Hadston
- Linton
- Longhirst
- Lynemouth
- Pegswood
- Red Row
- Ulgham
- Widdrington Station

4.12 Within this area there are currently active coal extraction sites and sites that are undergoing restoration. There have been surface coal sites in this area throughout the last 40 to 50 years and in recent decades the surface coal sites in this area have tended to be large-scale. The active sites are Steadsburn located to the west of Widdrington and Potland Burn located to the north west of Ashington. The Stobswood site (west of Widdrington Station) and the Maidens Hall site (west of Red Row) are currently undergoing restoration. There also continues to be interest in developing further sites within this area. An additional site at the Butterwell Disposal Point (west of Linton) gained planning approval in May 2011. Works on site commenced in 2011 and it is anticipated that coal extraction will commence in 2012.

4.13 The southern part of the south east Northumberland coal resource area is taken to be the area from Morpeth and Ashington in the north to the border with the administrative areas of Newcastle-upon-Tyne and North Tyneside in the south. The coalfield extends around the western side of Newcastle-upon-Tyne to the east of Ponteland. This area has larger-scale settlements in comparison to the area of the south east Northumberland to the north of Morpeth and Ashington. These larger-scale settlements include Ashington, Bedlington, Blyth, Cramlington and Seaton Delaval.

4.14 Within this area the Seaton Delaval, Seaton Dunes and Ashington, Blyth and Cramlington Landscape Character Areas have been assessed as

having a high sensitivity to surface coal extraction. This covers much of the eastern part of this area and the open countryside between Ashington, Bedlington, Blyth and Cramlington. The area to the east of Seaton Delaval around Seaton Delaval Hall is covered by a large Conservation Area and a a Registered Park and Garden. There are other Conservation Areas within the coal resource area but these are smaller and tend to be located within settlements. Parts of the Northumbria Coast SPA and Ramsar site are located along the coastal areas in the east. There are SSSIs at New Hartley Ponds near Seaton Delaval, Willow Burn Pasture near Choppington, Arcott Hall near Cramlington and Prestwick Carr near Ponteland. With the exception of the wooded valley of the River Blyth and to a lesser extent the Seaton Burn there are only a few, small scattered fragments of ancient woodland in this area.

4.15 The western part of this area is less densely populated. There is currently an operational surface coal site at Shotton, located between Cramlington and Stannington. The Delhi site, located to the south of Stannington, is now undergoing restoration. To the south east of Ponteland is the Prestwick Pit site. Planning permission has been granted for the further extraction of coal at this site but extraction has yet to commence. In addition, there is the Brenkley site. The Brenkley site is located within the administrative area of Newcastle-upon-Tyne City Council but is immediately to the south of the Northumberland and Newcastle-upon-Tyne boundary.

4.16 Within the area south of Morpeth and Ashington the Green Belt covers much of the area south of Blyth, Cramlington, Stannington and to the east of Ponteland. It is proposed to extend the Green Belt northwards around Morpeth to lie to the west of Netherwitton, Hartburn and Belsay, north of Longhorsely and west of Widdrington Station, east of Pegswood, west of Ashington, Guide Post and Bedlington and east of Bothal, Hepscott, Nedderton and Hartford Bridge. The extent of this Green Belt extension has been defined within the former Wansbeck to the west of Ashington, Guide Post, Bedlington and around Bothal, Nedderton and Hartford Bridge but the

Green Belt extension has not yet been defined in the areas outside of the former Wansbeck District.

4.17 In summary, and as illustrated in Figure A.13, within the main south east Northumberland coalfield area there is a concentration of environmental considerations in the Druridge Bay area and within the most densely populated areas in south east Northumberland around the settlements of Ashington, Bedlington, Blyth, Cramlington and Seaton Delaval. The remaining areas are, however, where there has been most extraction activity in recent years. Also there are considerations in these areas but they are not as concentrated as the areas mentioned above.

Tyne/Derwent watershed coal resource area (Figures A.14 to A.19)

4.18 The Tyne/Derwent watershed coal resource area is part of the main Northumberland coalfield and refers to the area south of Prudhoe and Stocksfield between the valleys of the River Tyne and the River Derwent (Figure A.14). Within Northumberland the coal resource area extends north to the north of Prudhoe and to the south east of Ponteland and Darras Hall. The resource area also extends to the east into Gateshead and County Durham. There are currently no surface coal mines in the Tyne/Derwent watershed area but there has been extraction from this area in the past and the industry have expressed interest in extracting the coal resource from within this area. A planning application was submitted to Northumberland County Council in November 2010 for surface coal extraction from a proposed site to the east of Whittonstall. This application is currently under consideration. Figures A.15 to A.19 show the environmental considerations in the resource area around the Tyne/Derwent watershed in more detail.

4.19 The settlements of Prudhoe and Stocksfield are located to the north of the Tyne/Derwent watershed area. Key settlements within the Tyne/Derwent watershed area are Hedley on the Hill and Whittonstall. There is a Conservation Area around Shotley Hall which is located in the south east of Tyne/Derwent watershed area. The northern part of the Tyne/Derwent

watershed is defined as Green Belt. This is the area to the north of Whittonstall and includes the area around Hedley on the Hill.

4.20 The Tyne/Derwent watershed area is made up of principally of four Landscape Character Areas: Kiln Pit Hill Hinterland, Prudhoe Hinterland, Derwent Valley and Healey. The Prudhoe Hinterland Landscape Character Area, located to the south of Prudhoe and Stocksfield and north of Whittonstall, has been identified as a Landscape Character Area that has a high sensitivity to surface coal extraction. This high sensitivity Landscape Character Area is shown on Figure A.15. The other Landscape Character Areas in the Tyne/Derwent watershed has been assessed as having moderate sensitivity to surface coal extraction. In addition, the North Pennines AONB is located to the south of the Tyne/Derwent watershed area and to the north of Derwent Reservoir there is a small area of overlap between the resource in this area and the AONB.

4.21 When these considerations in the Tyne/Derwent watershed resource area are overlain on the same map (see Figure A.19), it shows that there is a concentration of the environmental considerations in the northern part of the Tyne/Derwent watershed area. This is due to the settlement pattern in this part of the Tyne/Derwent Watershed area as well as the presence of areas of ancient woodland, local wildlife sites, the Green Belt and a Landscape Character Area that is considered to have a high sensitivity to surface coal extraction. There is also a concentration of considerations in the Derwent Valley and the southern part of the Tyne/Derwent Watershed area is close to the North Pennines AONB.

Midgeholme, Plenmeller and Stublick coal resource areas (Figures A.20 to A.25)

4.22 The outlying principal coal resource areas in the south west of Northumberland (the Stublick, Midgeholme and Plenmeller coal resource areas) are within or are on the fringes of the North Pennines area of

Northumberland. These resource areas are either within the North Pennines Area of Outstanding Natural Beauty or in close proximity to it.

4.23 The Midgeholme coalfield area lies to the north of the North Pennines AONB. Part of the coalfield extends westwards into Cumbria. The majority of the Midgeholme coalfield is located within the Lower South Tyne Landscape Character Area and this area has been identified as having a high sensitivity to surface coal extraction. Halton Lea Gate, Lambley, Coanwood and Burnfoot are located within the Midgeholme coal resource area. To the south and the east of the Midgeholme coalfield are SSSI, SAC and SPA designations. The SPA and SSSI designation overlaps with this coalfield area in its eastern part. There are areas of ancient woodland along the valley of the River South Tyne.

4.24 The Plenmeller coal resource area is partly within and partly outside of the North Pennines AONB. The Northumberland Landscape Character Assessment indicates that the Plenmeller coal resource area has the same landscape character as the landscape within part of AONB as it is within the same Landscape Character Area (Whitfield Moor Landscape Character Area). This Landscape Character Area has also been identified as having a high sensitivity to surface coal extraction. Most of the Plenmeller coal resource area is not within the designated areas but there is some overlap on the eastern and western part of the area and the area is also surrounded by SSSI and SPA designations with a SAC designation to the north and south. There are no settlements within this coal resource area or within close proximity to it.

4.25 The Stublick coal resource area is located to the south of Haydon Bridge. There are no settlements within the resource area but the small settlement of Langley is located to the north-west. The Stublick coal resource area is located within the North Pennines AONB and within a Landscape Character Area that is identified as having a high sensitivity to surface coal extraction. SPA and SSSI designations overlap with the Stublick coal resource area and the area is adjacent to a SAC. Within the Stublick coal

resource area is the Langley Chimney and lead smelting flue which is a Scheduled Monument.

4.26 As illustrated in Figure A.25, there are significant landscape and nature conservation considerations within and adjacent to the Midgeholme, Plenmeller and Stublick coal resource areas. This includes internationally important nature conservation designations and, with the North Pennines AONB, a nationally important landscape designation.

B) Hard Rock

4.27 Igneous rock and Carboniferous Limestone are the two principal hard rock resources in Northumberland. These resources are extracted principally for aggregate uses.

4.28 The Whin Sill is an important resource of igneous rock in Northumberland. The Whin Sill is a tabular, sheet-like intrusive body of quartz dolerite. This quartz dolerite is known locally as 'whinstone'. The Sill has an average thickness of 25 to 30 metres and a maximum thickness of up to 70m thick in the south of Northumberland. The extent of this resource is shown in Figure B.1. In the north of Northumberland the resource areas for igneous rock are concentrated around Belford and to the north east and south west of Alnwick. There are two quarries with active planning permissions to the north and east of Belford (Belford and Cragmill) and two quarries to the north east of Alnwick (Howick and Longhoughton). In the south west of Northumberland the main resource area for igneous rock is in the area north of Hexham around Humshaugh, Barrasford and Colwell. There are four quarries with active planning permissions in this area (Barrasford, Divethill, Keepershield and Swinburne).

4.29 The Great Limestone is the main Carboniferous Limestone resource in Northumberland. This resource is sufficiently thick (up to 20 metres), extensive and consistent in quality to form a workable resource. This resource

is also shown in Figure B.1. There are two quarries with active planning permissions for the extraction of Carboniferous Limestone from the Great Limestone (Mootlaw Quarry and Brunton and Cocklaw Quarry). The other limestone in Northumberland is not considered to be sufficiently thick to support modern extraction. The exception to this is where the resource is closely associated with the Whin Sill. This resource is also shown in Figure B.1 and is currently extracted with whinstone at Barrasford and Keepershield quarries in the south west of Northumberland.

4.30 The limestone and whinstone resource in Northumberland is generally located where the population density is sparse. In the north and east of Northumberland the main settlements in and around the whinstone resource include Belford, Bamburgh, Craster, Longhoughton and Alnwick. In the south and west of Northumberland the main settlements in and around the whinstone resource include Kirkwhelpington, Barrasford, Gunnerton and Greenhead. For the limestone resource, the main settlements in the south and west of Northumberland include Haydon Bridge, Fourstones, Wall, Great Whittington and Kirkheaton. In the north and east of Northumberland the limestone resource is more fragmented and less extensive and is found mostly around the same settlements as the whinstone resource.

4.31 Areas of Carboniferous Limestone resource occur within the North Pennines AONB and, as illustrated in Figure B.3, the resource area runs north from an area to the north Hexham to the south of Rothbury and then north east to the south of Alnwick. There are also areas of limestone resource to the east of the A1 road north of Alnwick and in the area between Belford and Berwick-upon-Tweed. In parts the limestone resource is also closely associated with the Whin Sill.

4.32 To the north east of Alnwick around Craster and Embleton parts of the whinstone resource are located within the Northumberland Coast AONB. Likewise the eastern part of the whinstone resource area around Belford is located within this AONB. These areas also overlap with the North Northumberland Heritage Coast. In the north east of Northumberland, the

whinstone resource that is outside the Northumberland Coast AONB is nonetheless close to it. There are also some areas of limestone resource within the Northumberland Coast AONB. Within the North Pennines AONB there are areas of limestone resource and in two small, isolated locations near Lambley and Slaggyford an igneous rock resource is present.

4.33 The hard rock resource within the Northumberland Coast AONB has some overlap with the SPA, SAC and Ramsar designations that are present along this area of coast. There are also a number of local wildlife site designations which have some overlap with areas of hard rock within this area. Within the North Pennines area, the limestone resource overlaps or is located close to SAC, SPA and SSSI designations. Greenleighton Quarry (a historic quarry south of Rothbury) is designated a SSSI. This is located within the limestone resource area.

4.34 Between Wall and Humshaugh the Hadrian's Wall World Heritage Site overlaps with the limestone resource area. At Capheaton, Kirkharle and Wallington Hall there are Registered Parks and Gardens that have some overlap with the limestone resource.

4.35 In summary, Figure B.7 illustrates that there is a concentration of the environmental considerations that overlap with the hard rock resource along the Northumberland coast in the area between Longhoughton and Bamburgh and in the North Pennines area. Across the remaining resource area the considerations mapped in this study are not as extensive and the overlap is not as significant.

C) Sand and Gravel

4.36 The sand and gravel resource in Northumberland is made up of superficial (drift) deposits and consists of:

- River sand and gravel

- Glacial sand and gravel
- Marine and estuarine sand and gravel
- Beach and blown deposits

4.37 The extent of the sand and gravel resource in Northumberland is shown in Figure C.1. The key areas where extraction is currently taking place and where there is pressure for future extraction have been identified as:

- Coquet valley
- Breamish, Glen and Till valleys area
- Tyne valley, including the Derwent, North Tyne and South Tyne areas

4.38 Outside of the areas identified above there has been little pressure for extraction and there are currently no active sites. The only exception to this is Druridge Bay where a site (Hemscott Hill) currently has a valid planning permission for the extraction of beach sand. Extraction at this site is intermittent and is takes place on a small-scale. Extraction elsewhere in the Druridge Bay area has ceased. The Druridge Bay area has a number of designations including Cresswell Ponds SSSI, Northumberland Shore SSSI, Hadston Links SSSI, Low Hauxley Shore SSSI and parts of the Northumbria Coast SAC and Northumbria Coast Ramsar. The Heritage Coast designation also extends along Druridge Bay.

Breamish, Glen and Till valleys (Figures C.8 to C.13)

4.39 Extraction of sand and gravel in the Breamish, Glen and Till area has been taking place for a number of years and there are currently sites at Lanton, Hedgeley and Wooperton with planning permission. Extraction at the Woodbridge site near Milfield has recently ceased and the site has been restored. Other sites in this area that have been recently restored include the Low Hedgeley and Branton sites near Powburn. The density of built development within this area is sparse. The main population centre is Wooler with a number of smaller settlements scattered across the resource area.

Powburn in the south of the resource area and Milfield in the north of the resource area are located close to the existing sites and the sites that have recently been restored.

4.40 The Rivers Breamish, Glen and Till which are located within this resource area are designated as a SAC (River Tweed) and a SSSI (Tweed Catchment Rivers – Till Catchment). Figure C.12 shows that there is high grade agricultural land present in this resource area. The larger patches of this are located to the north of Milfield. There are also patches in the Milfield Plain area to the north of Wooler and along the Breamish between Bewick Bridge and Beanley. In terms of archaeology and cultural heritage there are two Registered Battlefields that overlap with the sand and gravel resource in this area. These are the site of the Battle of Flodden Field near Braxton and the site of the Battle of Homildon Hill near Wooler. There is also some concentration of scheduled monuments in the Milfield Plain area. The resource area is not covered by any specific landscape allocations but the resource area is close to the Northumberland National Park and some of the resource is actually within the boundary of the National Park.

Coquet Valley (Figures C.14 to C.19)

4.41 Extraction of sand and gravel in the Coquet valley currently takes place from a single site at Caistron near Thropton. There are no other active sites within the Coquet valley and no recent extraction has occurred at other sites in this area. Rothbury is the main settlement along the Coquet valley where the sand and gravel resource occurs. Thropton and a number of smaller settlements are located along the valley to the west of Rothbury. In the area to the east of Rothbury, Felton is the most significant settlement along the area of Coquet valley where there is overlap with the sand and gravel resource.

4.42 The River Coquet is a SSSI (River Coquet and Coquet Woodlands SSSI) and a local wildlife site is present on part of the site at Caistron which has now been restored. Other local wildlife sites include the River Coquet at Felton Park west of Felton and Mouldshaugh to the east of Felton on the

south side of the River Coquet. There are areas of ancient woodland along the Coquet valley between Rothbury, Felton and Warkworth. These areas of ancient woodland are mostly adjacent to the resource area and are located on the steep valley sides associated with the River Coquet. Some of the areas of woodland are included in the River Coquet and Coquet Woodlands SSSI. The Upper Coquet and Coquetdale Landscape Character Areas, which cover the area between Rothbury and Hepple where the Caistron site is located, were assessed for their sensitivity to sand and gravel extraction. The Coquetdale Landscape Character Area has been assessed as having a high sensitivity to the extraction of sand and gravel. It is also noted that the resource area to the west of Rothbury is located adjacent to the Northumberland National Park. No areas of higher grade agricultural land have been identified in this area. Conservation Areas are present at Rothbury, Whitton, Felton, Guyzance and Warkworth.

Tyne Valley (Figures C.20 to C.25)

4.43 Within the catchment of the River Tyne the sand and gravel resource is present along the valley of the River Tyne, River Derwent, River North Tyne, River South Tyne, River Rede and River Allen. Currently there is sand and gravel extraction taking place at Broadoak and Hollings Hills in the Derwent valley and at Haughton Strother in the North Tyne valley. In recent year sites have been restored at Haltwhistle in the South Tyne valley and at Farnley Haughs north west of Riding Mill, Thornbrough to the east of Corbridge and Bywell Bridge near Stocksfield. A further site at Merryshields near Stocksfield has planning permission for extraction and has been worked in the past but is not currently operational.

4.44 There are a number of settlements in the Tyne Valley that overlap with the sand and gravel resource (Figure C.21). The settlements include Haltwhistle, Bardon Mill, Haydon Bridge, Hexham, Riding Mill, Stocksfield, Prudhoe, Humshaugh, Wark and Bellingham. The sand and resource overlaps with the Green Belt in the area east Haydon Bridge and around Hexham, Stocksfield and Prudhoe. In the Derwent valley the sand and gravel

resource overlaps with the Green Belt to the north of Newlands. Figure C.24 shows that there are significant areas of high grade agricultural land in the Tyne valley between Haltwhistle in the west and Prudhoe in the east. There is also an area of high grade agricultural land to the north of Humshaugh in the North Tyne valley. The North Pennines AONB is located to the south of the main part of the resource area (Figure C.21) and where recent extraction has taken place. There is some overlap between the sand and gravel resource area and the North Pennines AONB near Allen Banks at confluence with between the River Allen and River South Tyne. The sand and gravel resource in the upper part of the River South Tyne to the south of Lambley and the rivers Allen, East Allen and West Allen are located with the North Pennines AONB. Parts of the sand and gravel resource area in the Tyne valley overlap with areas that have biodiversity and geological designations (Figure C.20). This includes the Tyne and Allen River Gravels SAC, Tyne Watersmeet SSSI, Beltingham River Single SSSI, Burnfoot River Shingle and Wydon Nabb SSSI, River Tyne at Ovingham SSSI and River West Allen at Blackett Bridge SSSI. There are also a number of areas of Ancient Woodland and local wildlife designations.

Summary for key sand and gravel resource areas

4.45 As illustrated in Figures C.7, C.13, C.19 and C.25, within the resource areas for sand and gravel discussed above, the key environmental considerations are associated with the rivers. For example, in the Breamish, Glen and Till area the rivers are designated as a SAC and a SSSI, the River Coquet is a SSSI and in the Tyne area there are various SSSI associated with the river. In the Breamish, Glen and Till area the other key considerations are the archaeological features (particularly in the Milfield area) and the proximity of the resource area to the Northumberland National Park (Figure C.13). The key area of pressure in the Coquet Valley is also close to the Northumberland National Park and the landscape has a high sensitivity to sand and gravel extraction (Figure C.19). In the Tyne Valley area, there are significant areas of high grade agricultural land that overlap with the sand and gravel resource in the lower part of the Tyne Valley (Figure C.25). In addition, there is a

concentration of environmental considerations in the Druridge Bay area which is an area where sand and gravel has previously taken place and is still taking place, albeit on a small-scale.

5. Key Findings

5.1 This study mapped the extent of the shallow coal, hard rock and sand and gravel resources in Northumberland and a number of key environmental considerations. The intention of this was to indicate which parts of the mineral resource areas have environmental considerations present within them and indicate those parts of the mineral resource areas that are subject to environmental considerations. The aim of this was to give some understanding of those locations where extraction is likely to be acceptable or unacceptable in principle in order to aid the development of the approach to planning for mineral extraction in the Core Strategy.

5.2 For coal, in the northern part of the south east Northumberland coal resource area, taken to be the area from Amble in the north to Morpeth and Ashington in the south, there are a number of environmental considerations found in close proximity along the Druridge Bay coastal strip. Due to the presence of these environmental considerations it is considered that extraction in the Druridge Bay coastal strip is unlikely to be acceptable in principle and consideration should not be given to identify this part of the coal resource area as an area of search. The mapping work indicates that some consideration should be given to extraction within the following locations (shown in Figure 5.1) in this northern part of the south east Northumberland coal resource area as areas of search because these are locations where the environmental considerations are less numerous and more scattered and where the shallow coal resource is not known to have been worked extensively using modern surface mining techniques:

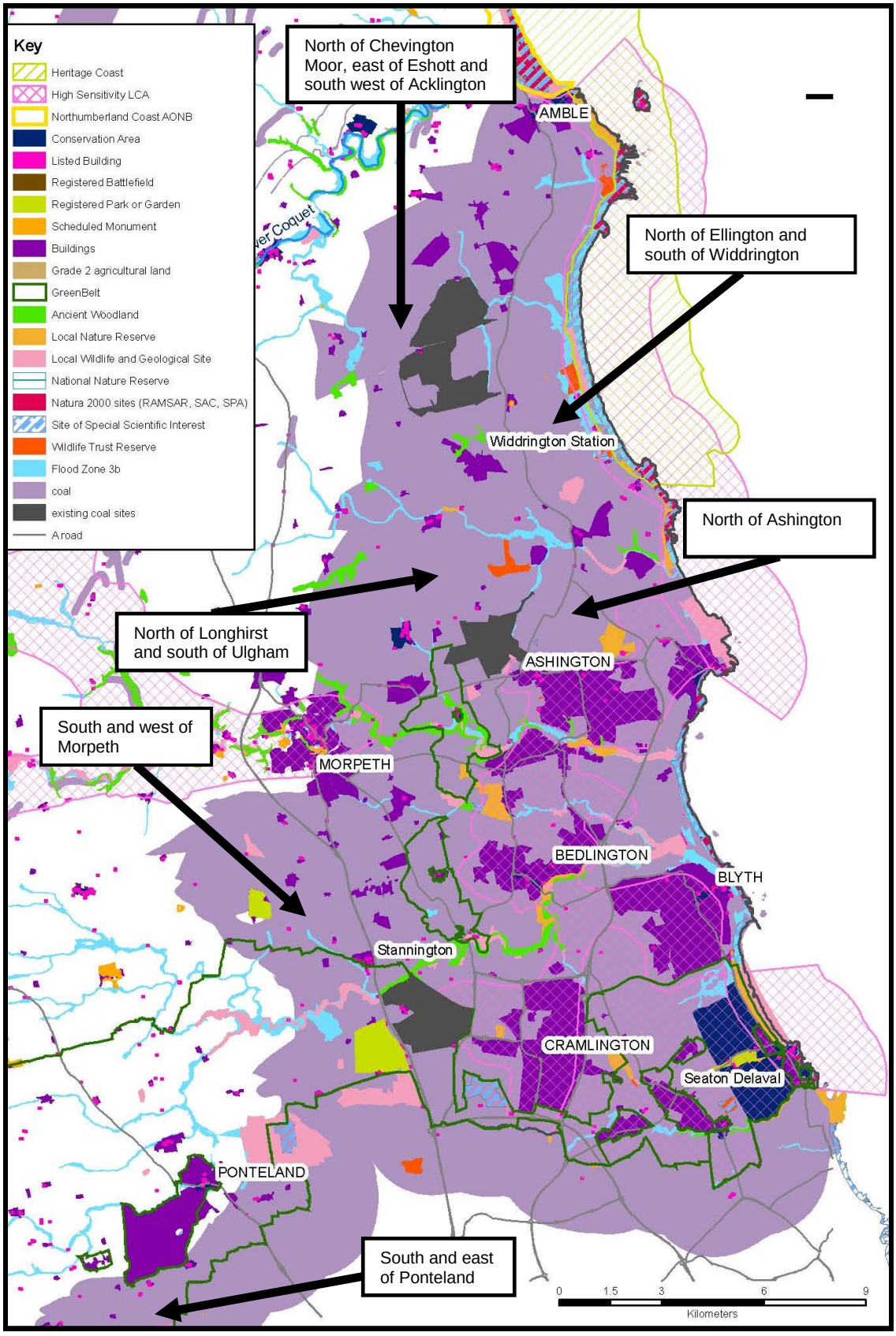
- North of Chevington Moor, east of Eshott and south west of Acklington;
- North of Ellington and south of Widdrington;
- North of Ashington; and
- North of Longhirst and south of Ulgham.

In the southern part of the south east Northumberland coal resource area, taken to be the area from Morpeth and Ashington in the north to the border

with Newcastle-upon-Tyne and North Tyneside in the south, the environmental considerations are concentrated in the most densely populated areas in south east around the settlements of Ashington, Bedlington, Blyth, Cramlington and Seaton Delaval. Within the southern part of the south east Northumberland coal resource area the presence of these environmental considerations means that it would be difficult to identify broad locations where surface coal extraction could be acceptable in principle. In addition, most of this part of the coal resource area is identified as a 'subsidiary resource area' on the British Geological Survey mineral resources map due to the coals being more widely-spaced in that area. This subsidiary resource area covers an area that includes Ellington, Ashington, Bedlington, Bedlington Station, Blyth and Seaton Delaval. As this area is a subsidiary resource area the pressure for surface coal extraction has and is lower than that experienced in the remainder of the south east Northumberland coal resource area. Away from the eastern area of the south east Northumberland coal resource area, the mapping work shows that the environmental considerations are less numerous and some consideration could be given to extraction in the following broad locations that are illustrated in Figure 5.1:

- South and west of Morpeth; and
- South and east of Ponteland.

Figure 5.1: Map of the south east Northumberland coal resource area showing broad locations where some consideration should be given to the acceptability of surface coal extraction based on the environmental considerations mapped



5.3 In the Tyne/Derwent Watershed coal resource area the mapping shows that there are a number of environmental considerations in the northern part of this area around the settlement of Hedley on the Hill (see Figure A.19). This relates to the presence of areas of ancient woodland, a local wildlife site and the Landscape Character Area being assessed as having a high sensitivity to surface coal extraction. Due to the presence of these environmental considerations it is considered that extraction in this part of the Tyne/Derwent Watershed is unlikely to be acceptable in principle. In addition, there are a number of environmental considerations close to the River Derwent and the south western part of the Tyne/Derwent Watershed area is close to and has some overlap with the North Pennines AONB so it is, therefore, considered that surface coal extraction in these parts of the Tyne/Derwent watershed area is not likely to be acceptable in principle. The mapping work highlights that the environmental considerations are less numerous outside of the parts of the Tyne/Derwent watershed discussed above. It is, therefore, considered that surface coal extraction could be acceptable in principle in this part of the Tyne/Derwent watershed subject to the environmental considerations that are present and consideration could be given to identifying this part of the Tyne/Derwent watershed as an area of search.

5.4 The outlying principal coal resource areas at Midgeholme, Plenmeller and Stublick in the south west of Northumberland are within or are on the fringes of the North Pennines AONB, a nationally important landscape designation. The mapping work shows that there are a number of environmental considerations within or adjoining these resource areas. This includes internationally important nature conservation designations and the Landscape Character Areas that cover these coal resource areas have been identified as having a high sensitivity to surface coal extraction. Based on the environmental considerations mapping undertaken here it is clear that there are a number of environmental considerations that occur within and around these resource areas. The presence and nature of these environmental considerations means that it will be difficult to identify areas where surface

coal extraction is likely to be acceptable in principle within these resource areas.

5.5 In relation to the hard rock resources, there are a number of environmental concentrations considerations that overlap with these resources in the North Pennines area and along the north Northumberland coast. Based on the environmental considerations mapped in this study, these are the areas where future extraction of hard rock is least likely to be acceptable in principle. It would be more appropriate to seek to direct future extraction to the hard rock resource areas located outside of the areas identified above.

5.6 Within the key resource areas for sand and gravel the designations associated with the rivers represent some of the key environmental considerations. However, on their own these designations are unlikely to make extraction within the wider resource area unacceptable as they cover only a small part of the overall resource area. This is partly demonstrated through there being existing extraction sites present in the resource areas in question. In the Breamish, Glen and Till area the other key considerations are the archaeological features (particularly in the Milfield area) and the proximity of the resource area to the Northumberland National Park. The key area of pressure in the Coquet Valley is also close to the Northumberland National Park and the Landscape Character Area has been identified as having a high sensitivity to sand and gravel extraction. In the Tyne Valley area, there are significant areas of high grade agricultural land that overlap with the sand and gravel resource areas in the lower part of the Tyne Valley. Within these resource areas any proposals for extraction would, amongst other things, need to take account of the environmental considerations identified. This includes, for example, high grade agricultural land in parts of the Tyne Valley, the designations associated with the rivers and the sensitive nature of the landscape where it is close to the Northumberland National Park. At a strategic level, due to the distribution and extent of the environmental considerations in these key sand and gravel resource areas, the environmental considerations present are unlikely to be sufficient to mean that

future sand and gravel working would be unacceptable, especially given there are existing sand and gravel workings in these areas. Consideration should, therefore, be given to future sand and gravel extraction in these areas, with the locations and likely acceptable of development guided by the environmental considerations mapped in this study. Outside of the key resource areas for sand and gravel included in this study (e.g. Breamish, Glen and Till area, Coquet Valley and Tyne Valley) it was identified that some sand and gravel extraction does take place in the Druridge Bay area albeit on a small-scale and intermittent basis. It is considered that due to the environmental considerations that overlap with the sand and gravel resource in the Druridge Bay area further sand and gravel extraction in the Druridge Bay area is unlikely to acceptable in principle.

5.7 It must be acknowledged that there are certain limitations associated with this study and its findings due to the high level nature of the assessment and the features that can be mapped as a result of the approach taken. Any findings are based on what is mapped in the study and there are other factors that will need to be considered when determining the acceptability of an area for mineral extraction. There are some features that it was not possible to map as the information was not available in a format that could be used in GIS or for which it was not possible to include due to level of detail in the study. This includes, for example, individual dwellings/properties, archaeological remains, wildlife habitat and soil/agricultural land quality. Some of these features can be better considered at a more local level or as part of more detailed site specific proposals. There are also some considerations that the study does not take account of that could have implications for the acceptability of a proposal in an area. This includes, for example, the issue of transport and access. In drawing conclusions about where extraction may or may not be acceptable in principle based on the environmental considerations mapped, the study does not take account of the mitigation measures that could be employed to make proposals acceptable where they overlap with these environmental considerations or are located within reasonable proximity to them.

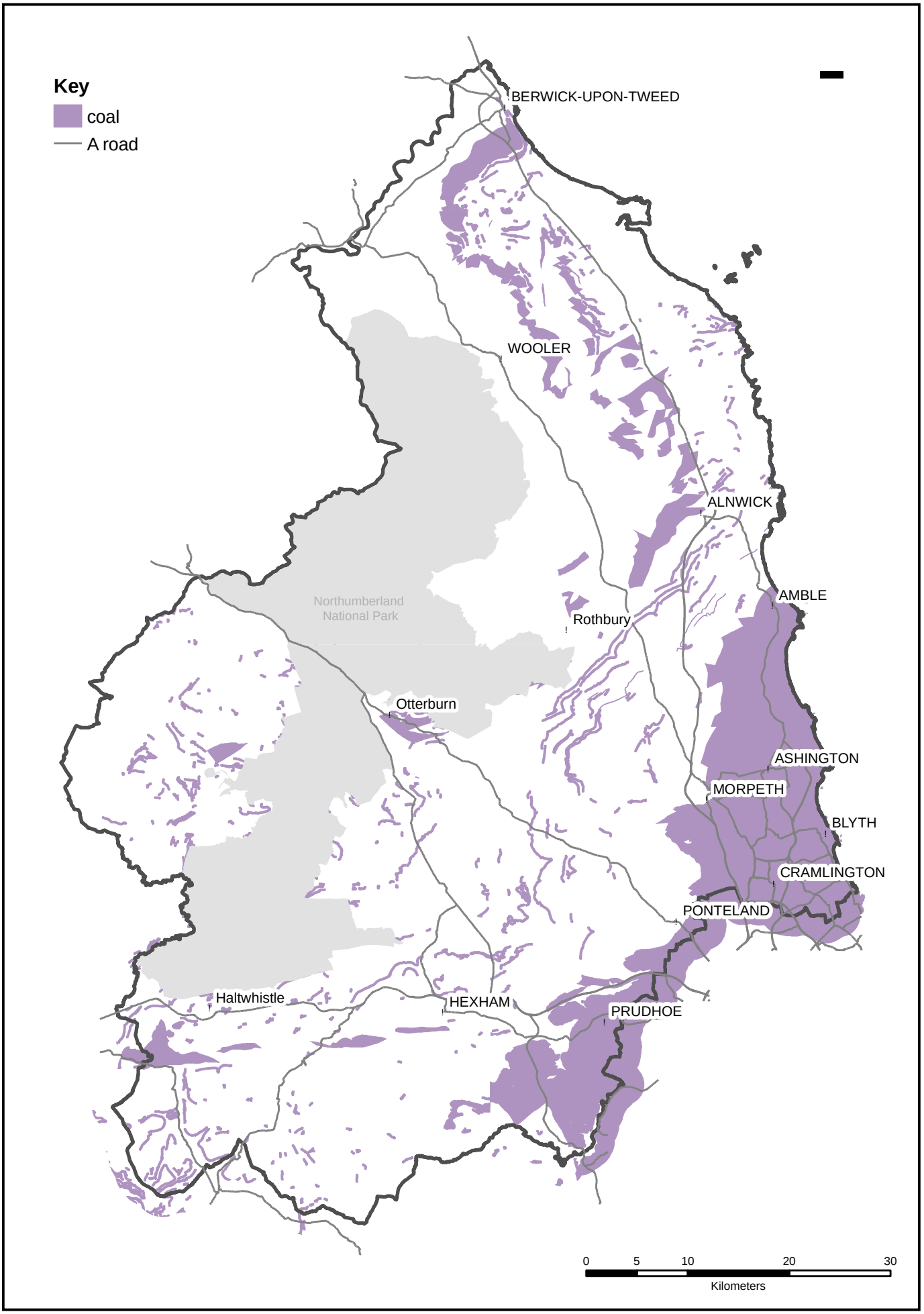


Figure A.1 Coal resource areas

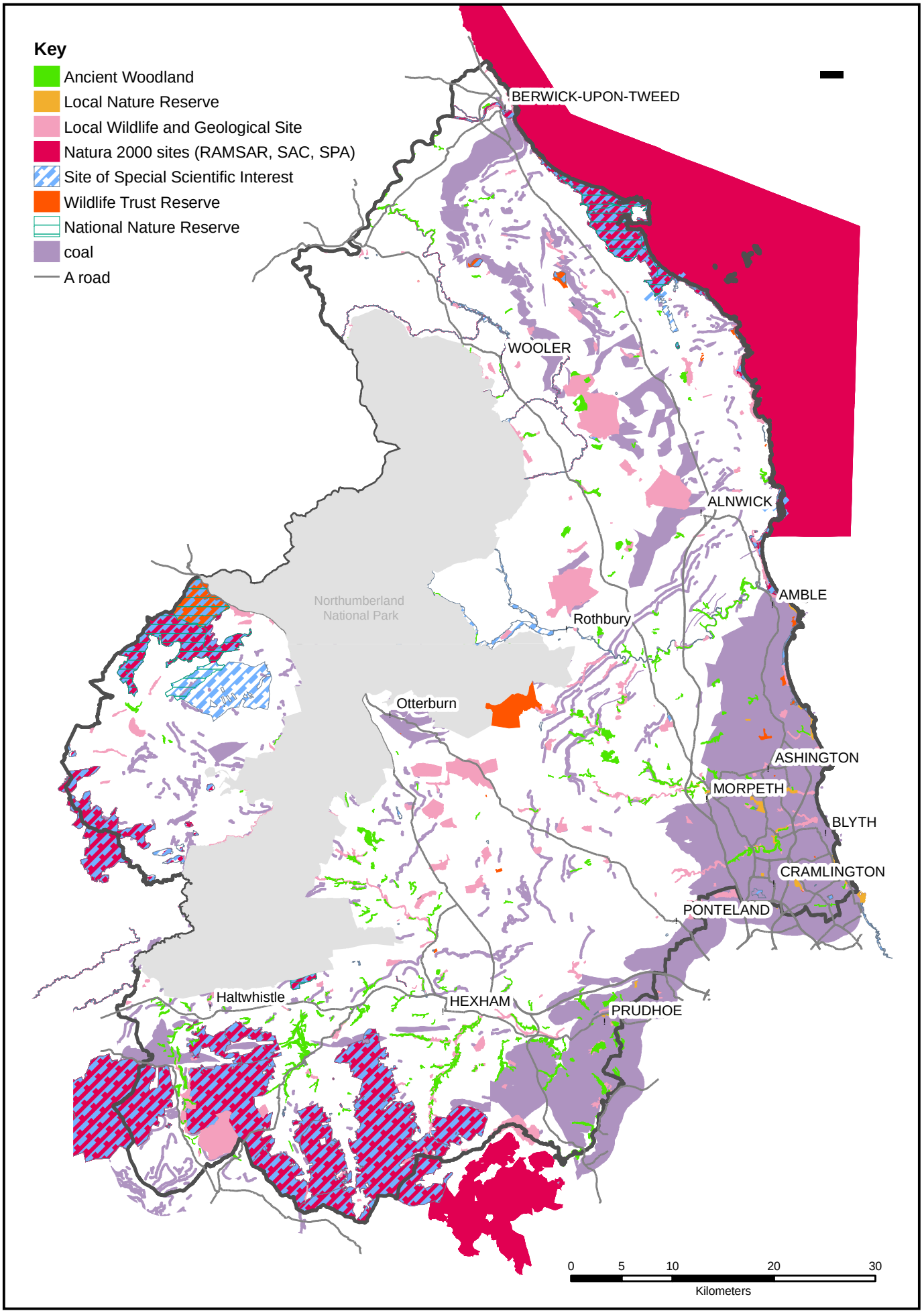


Figure A.2 Coal resource areas and biodiversity and geological conservation considerations

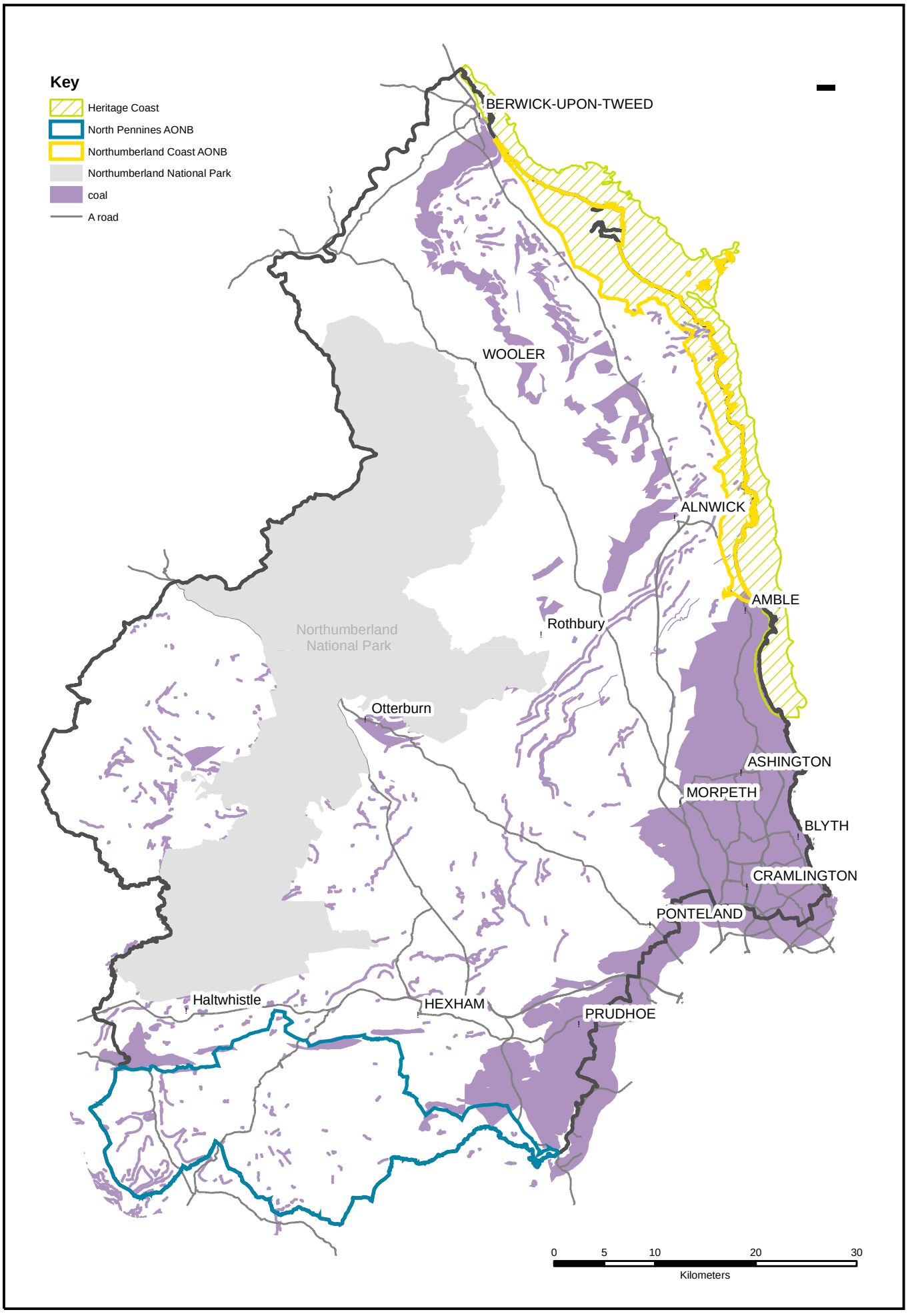


Figure A.3 Coal resource areas and landscape considerations

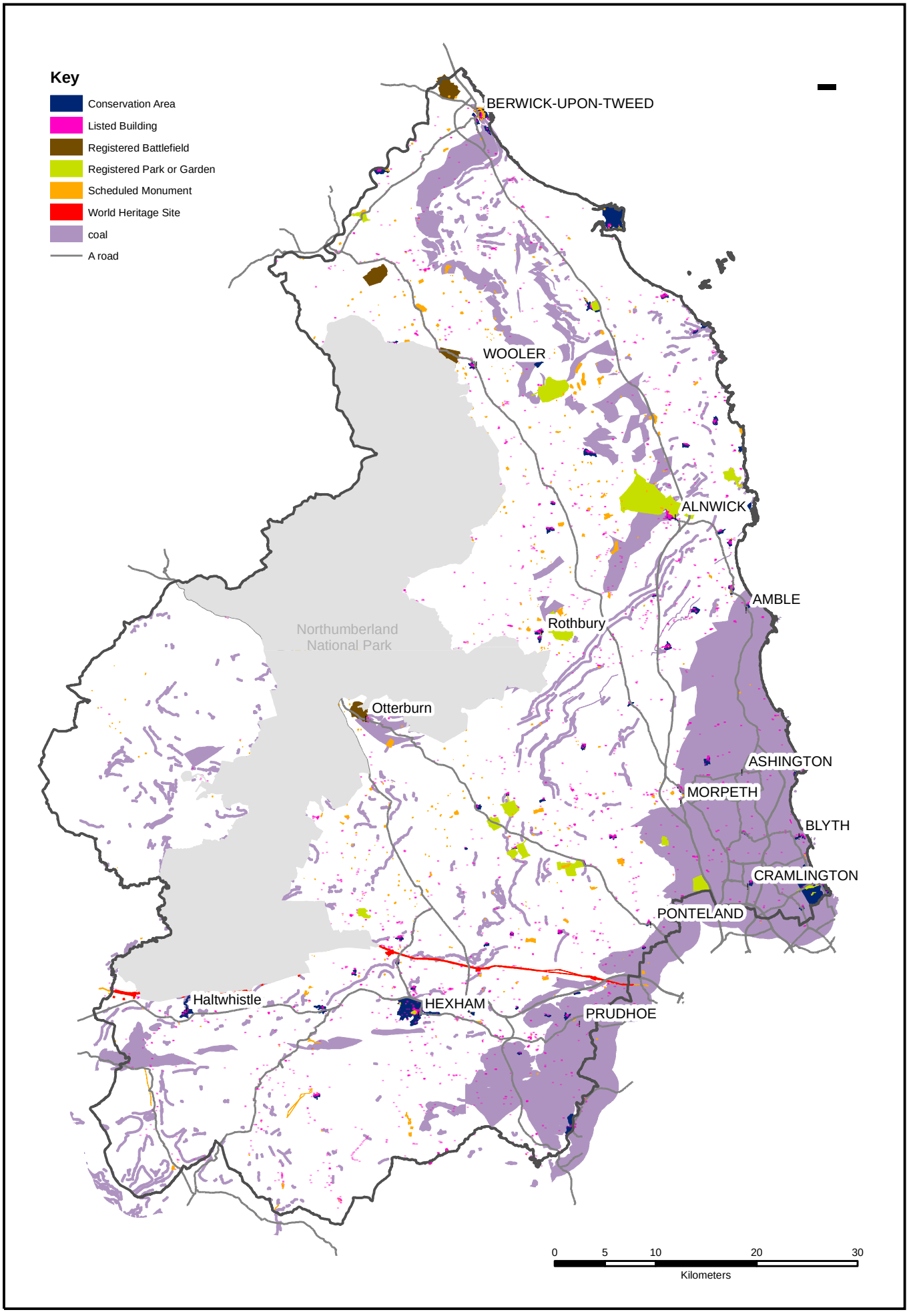


Figure A.4 Coal resource areas and archaeology and cultural heritage considerations

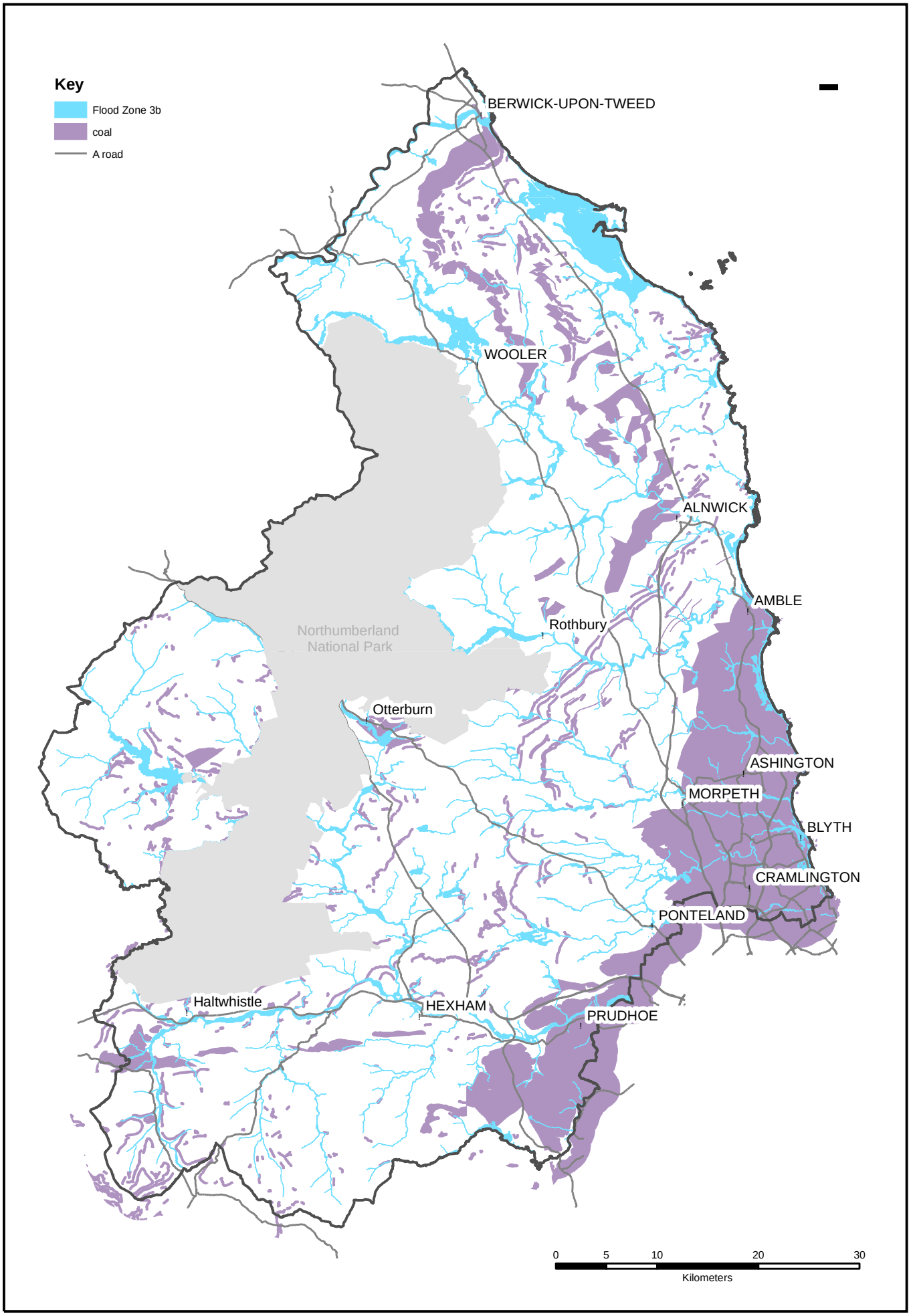


Figure A.5 Coal resource areas and water environment considerations

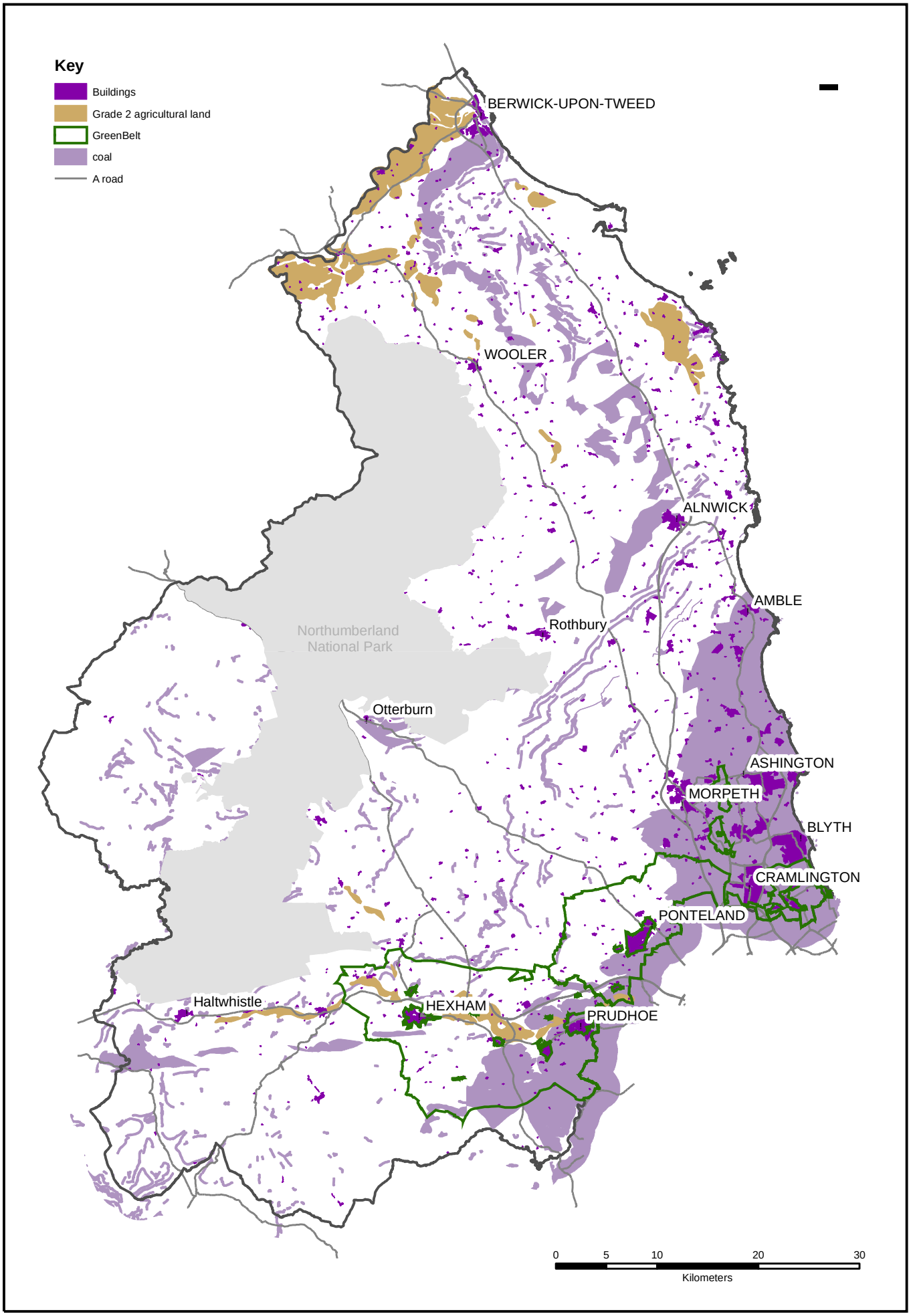


Figure A.6 Coal resource areas and land-use and human features considerations

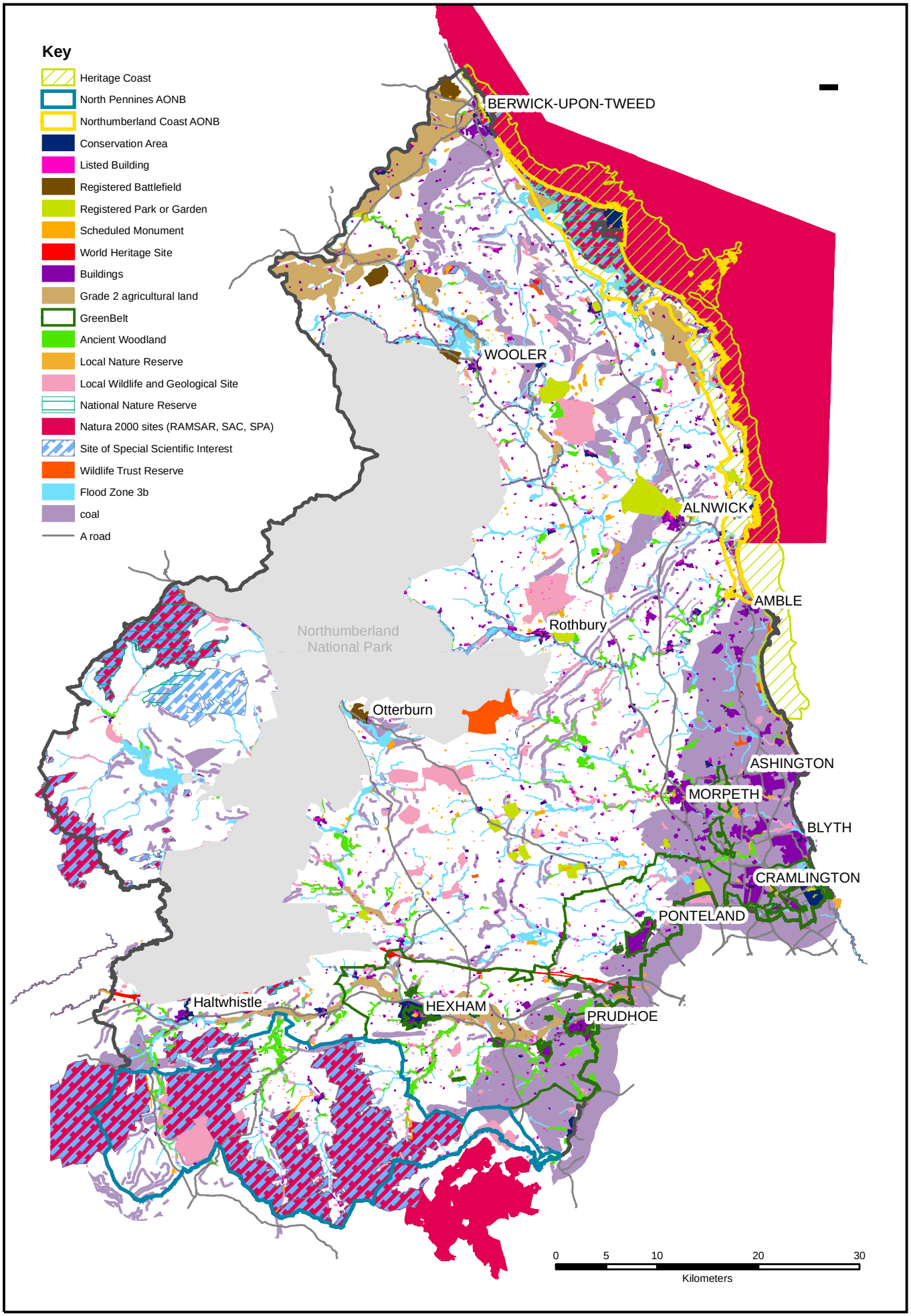


Figure A.7 Coal resource areas and all environmental considerations

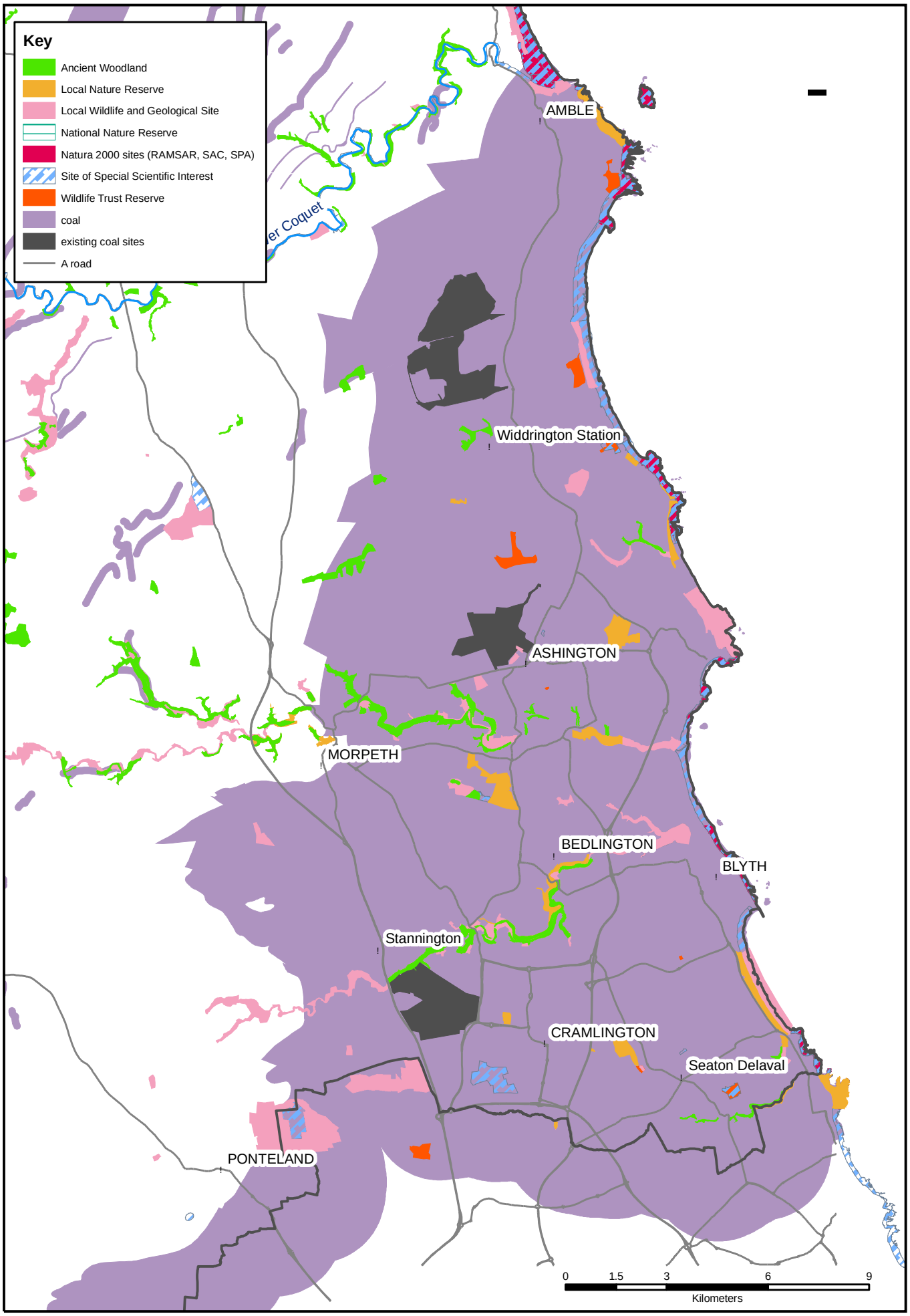


Figure A.8 Main south-east Northumberland coalfield area and biodiversity and geological conservation considerations

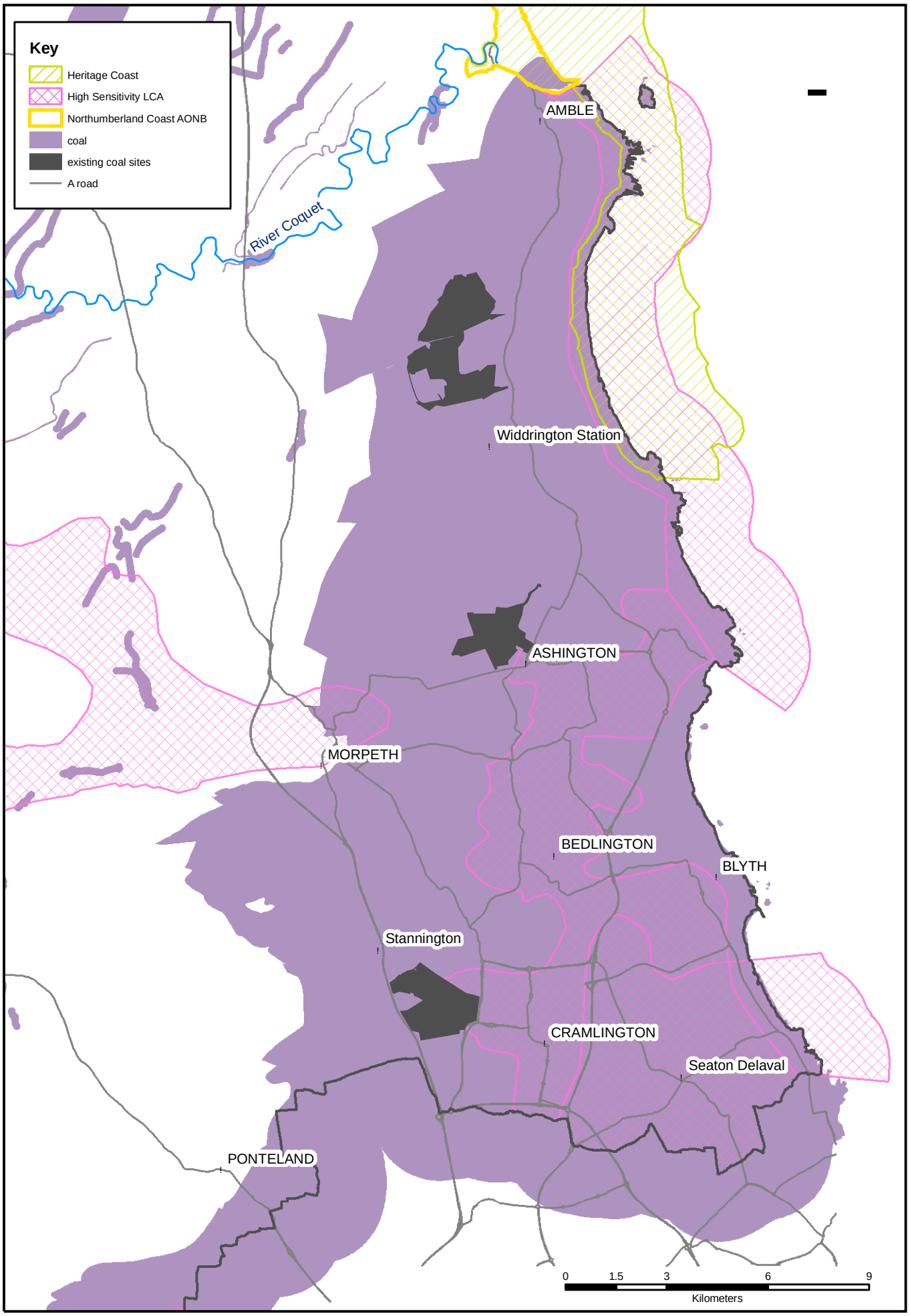


Figure A.9 Main south-east Northumberland coalfield area and landscape considerations

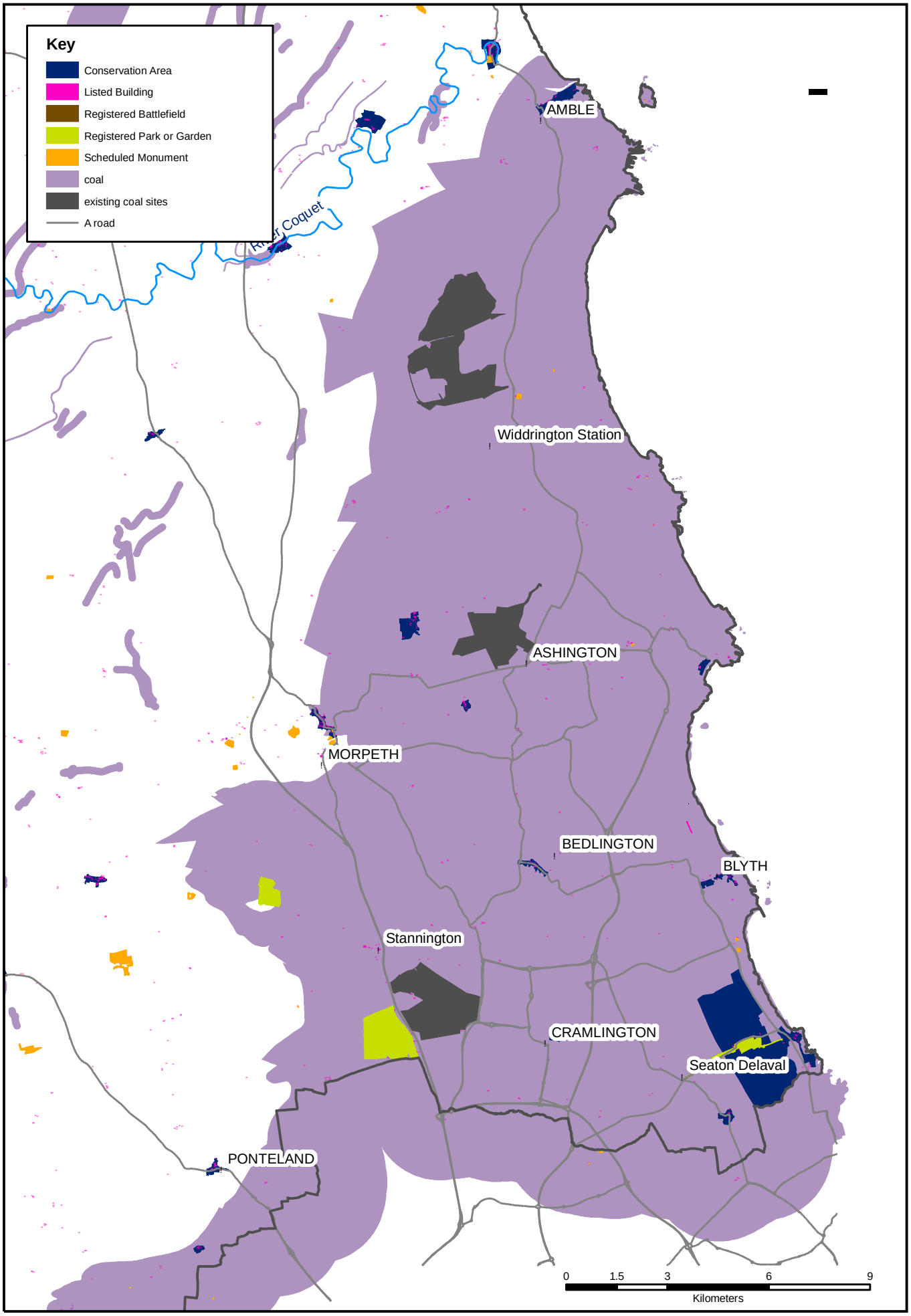


Figure A.10 Main south-east Northumberland coalfield area and and archaeology and cultural heritage considerations

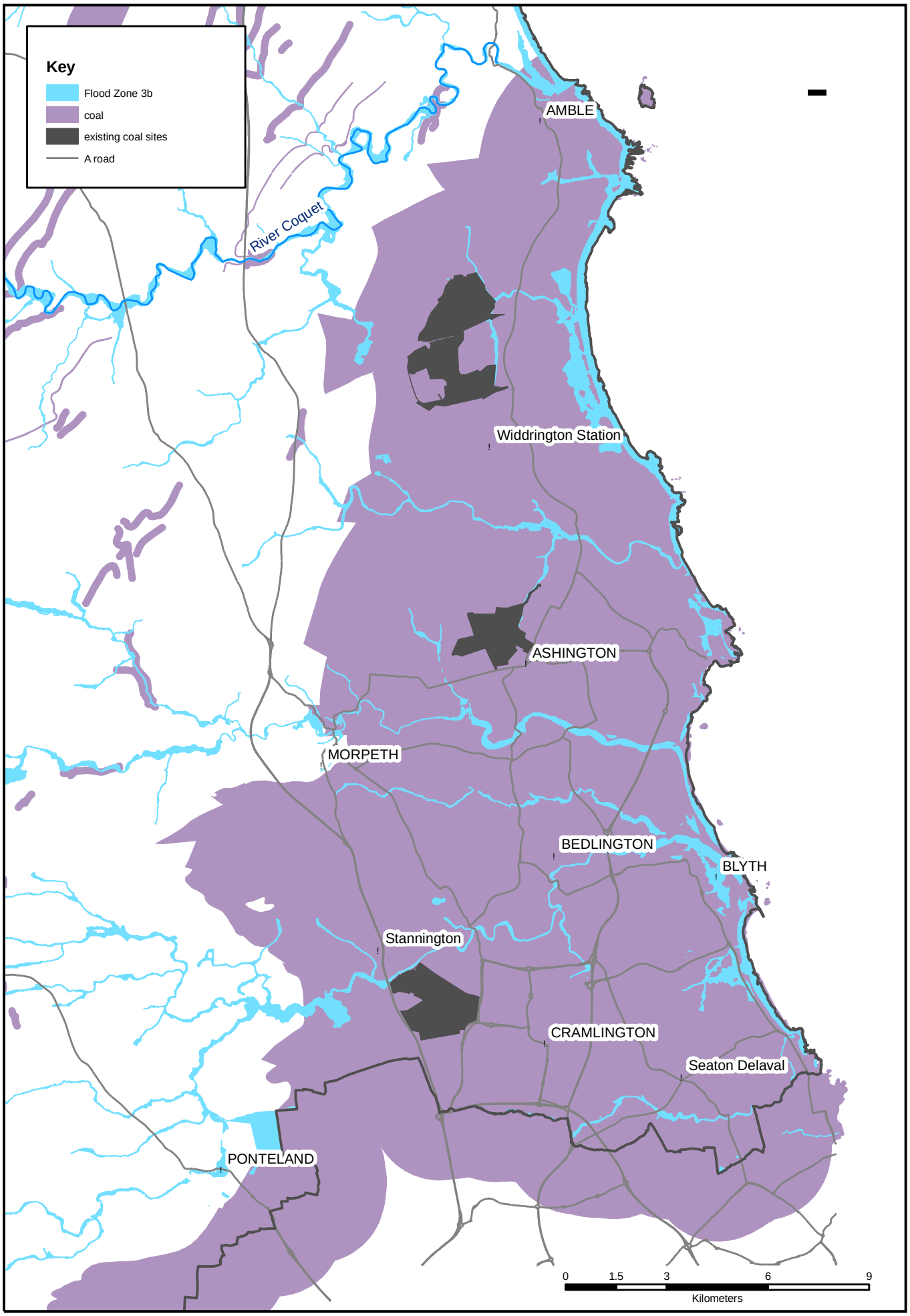


Figure A.11 Main south-east Northumberland coalfield area and and water environment considerations

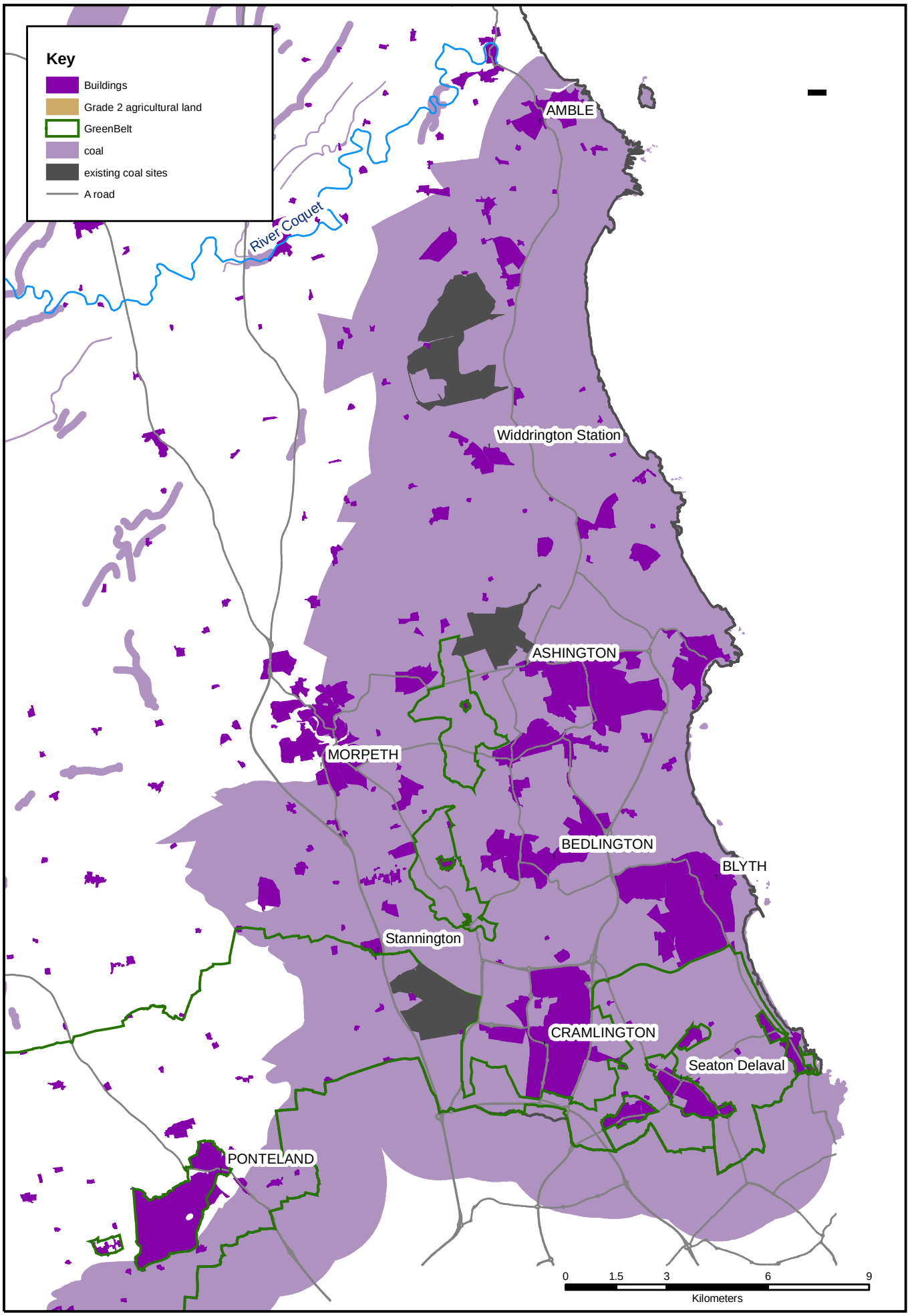


Figure A.12 Main south-east Northumberland coalfield area and and land-use and human features considerations

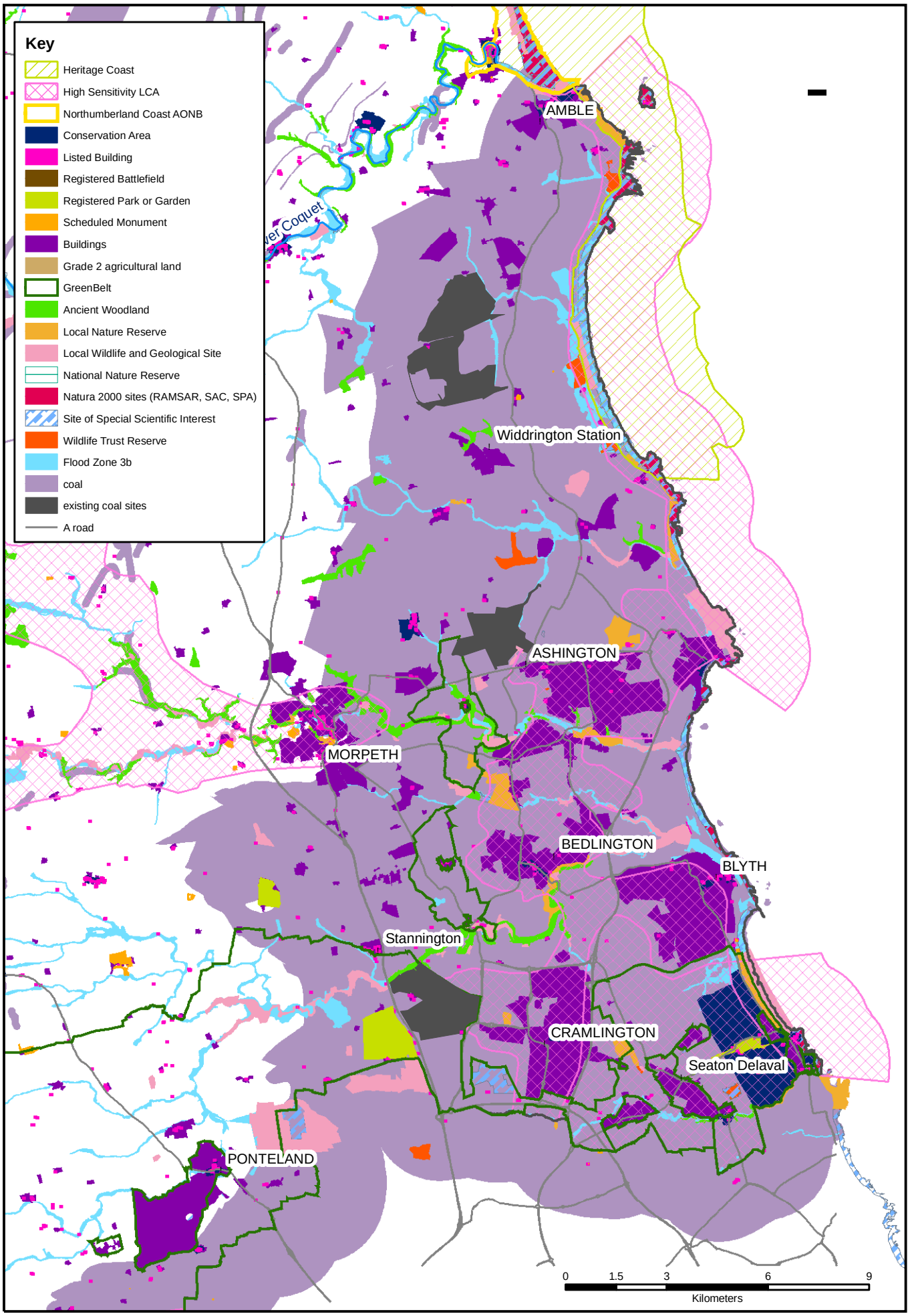


Figure A.13 Main south-east Northumberland coalfield area and all environmental considerations

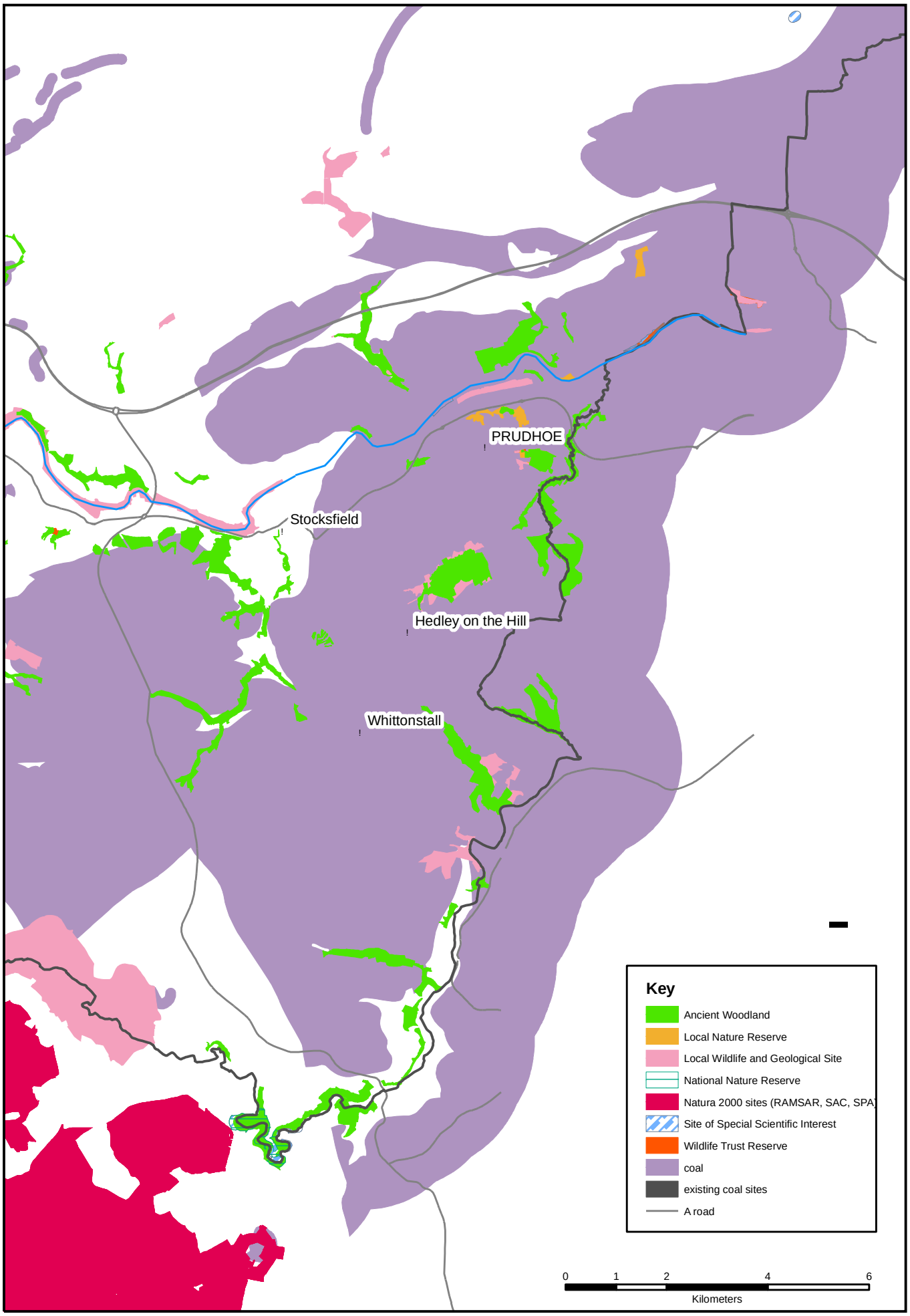


Figure A.14 Tyne/Derwent watershed coal resource areas and biodiversity and geological conservation considerations

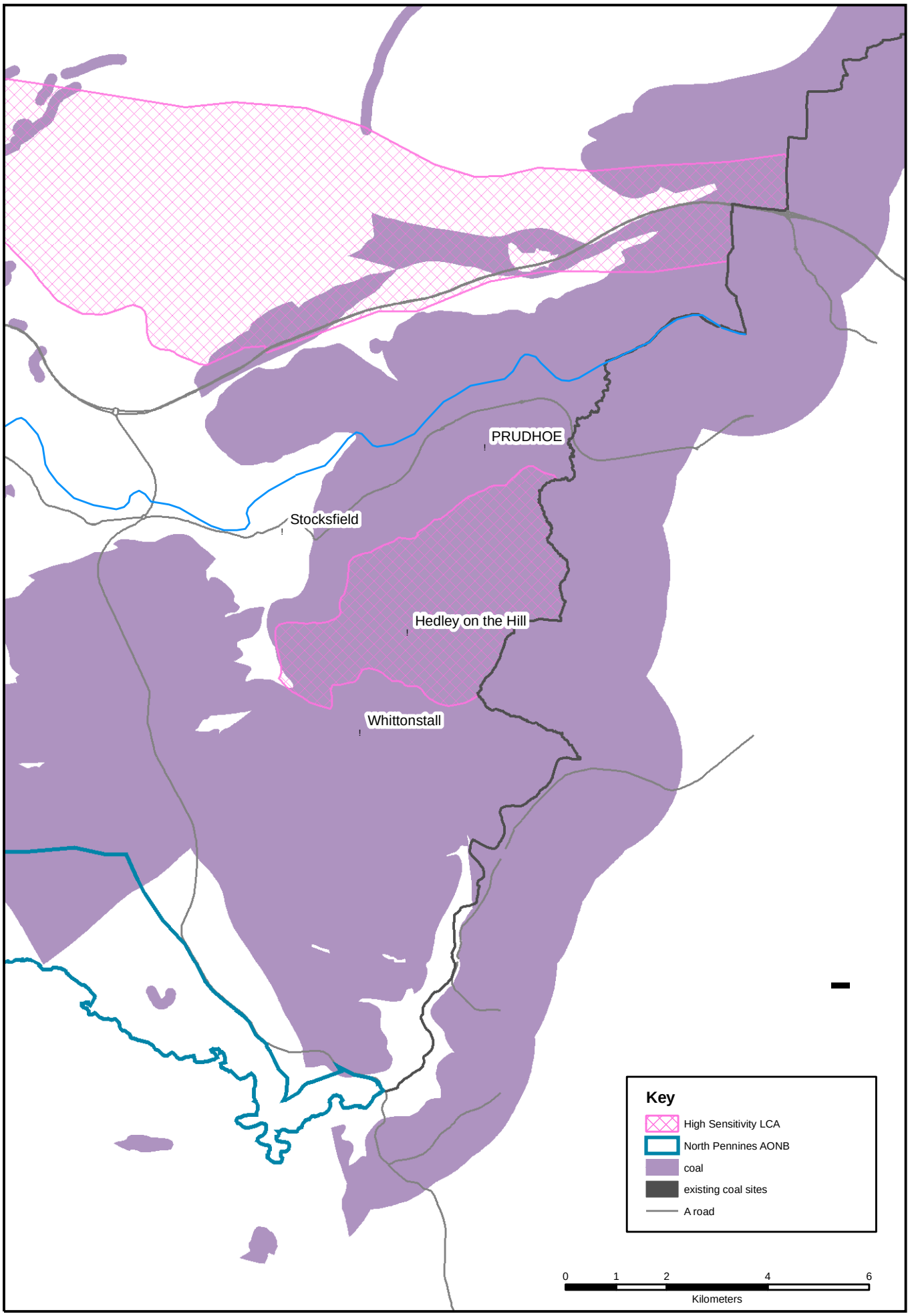


Figure A.15 Tyne/Derwent watershed coal resource areas and landscape considerations

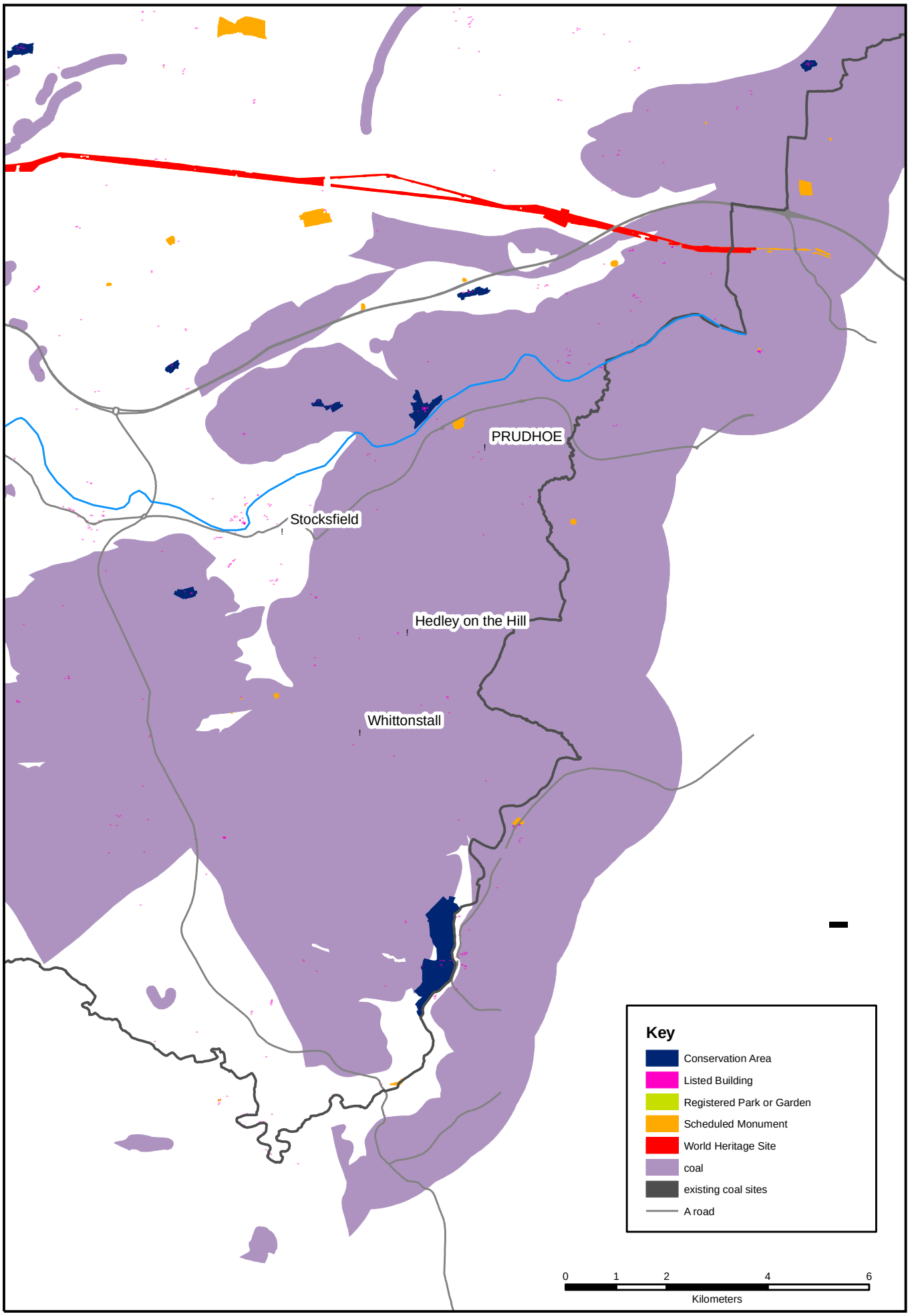


Figure A.16 Tyne/Derwent watershed coal resource areas and archaeology and cultural heritage considerations

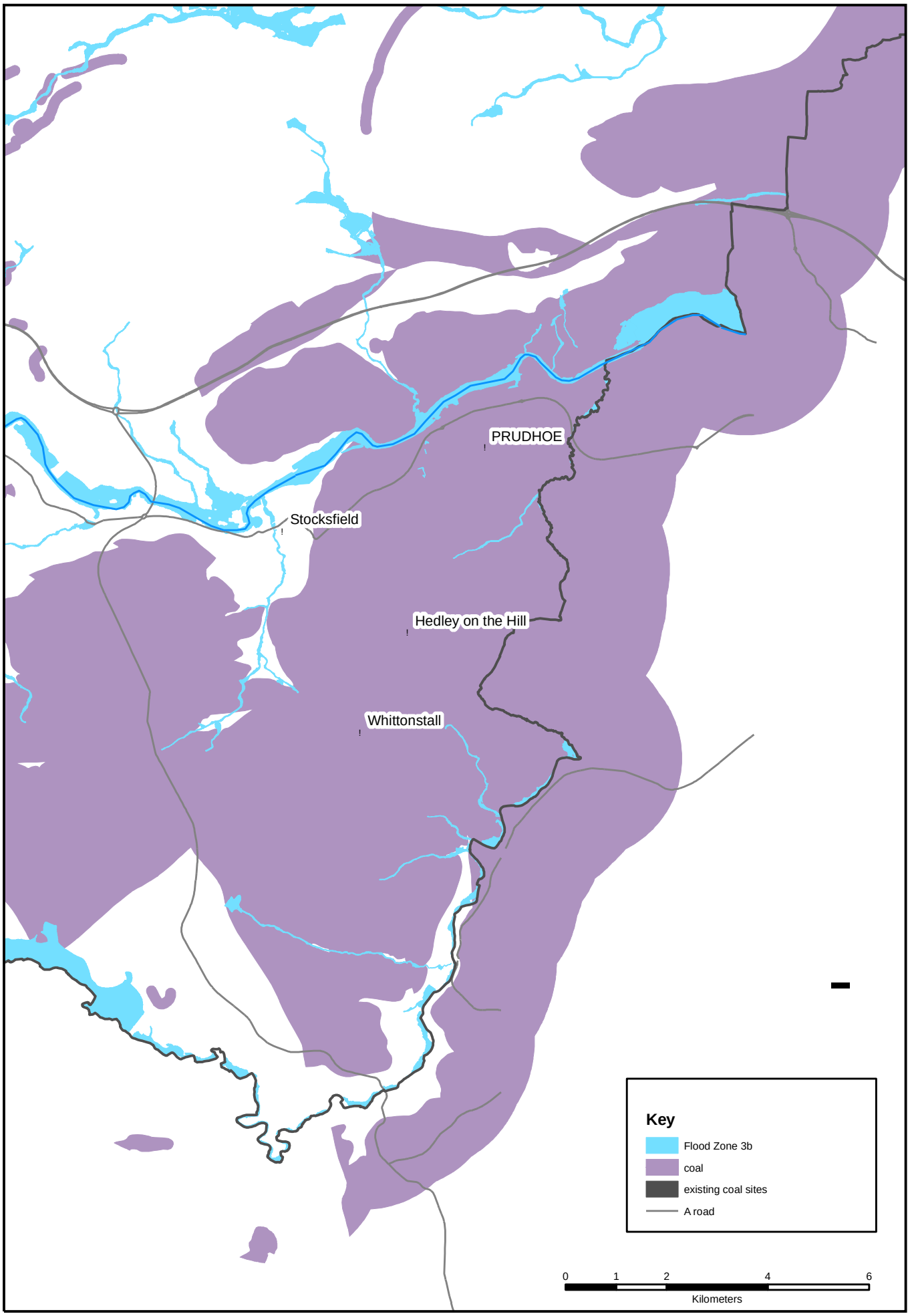


Figure A.17 Tyne/Derwent watershed coal resource areas and water environment considerations

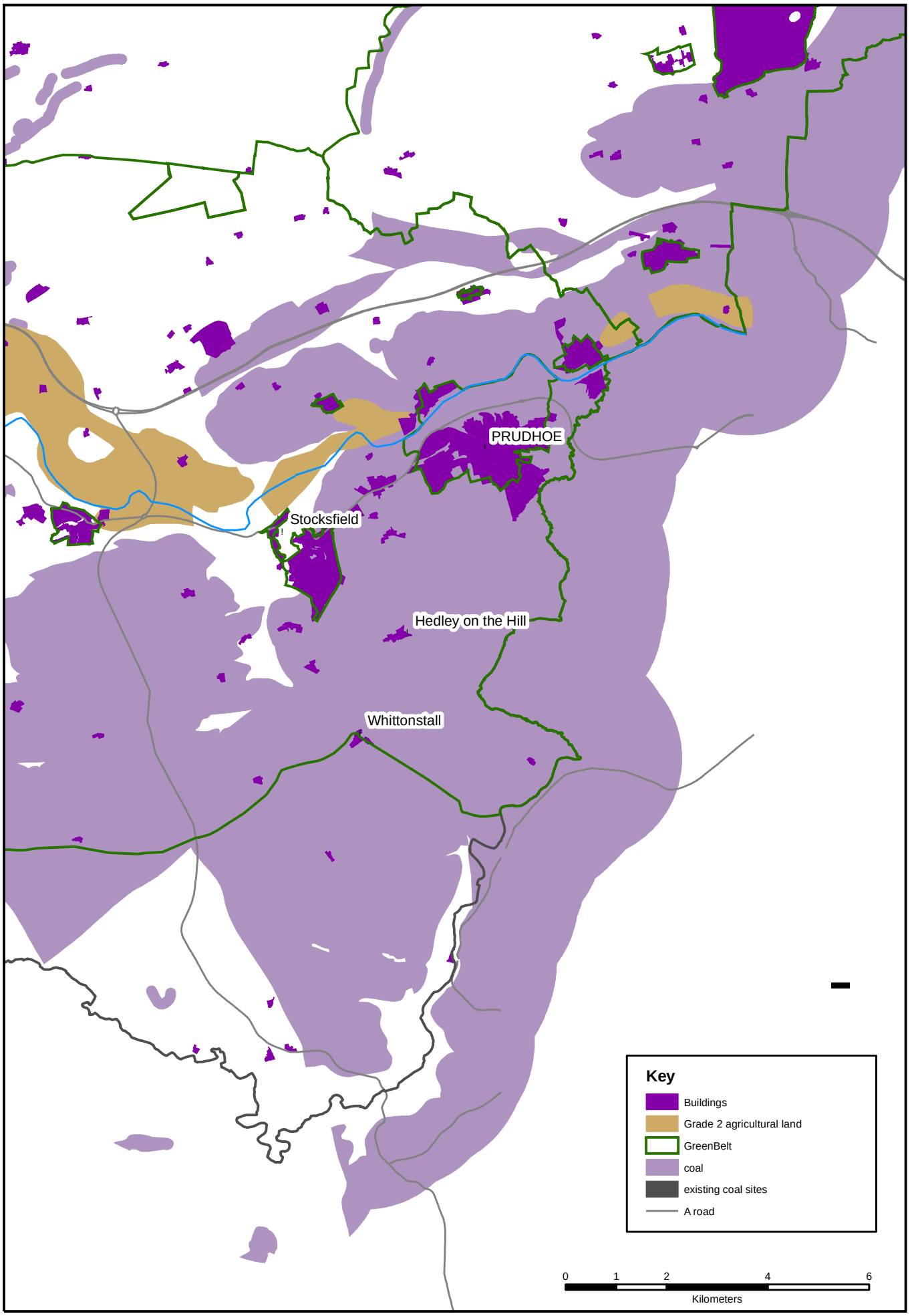


Figure A.18 Tyne/Derwent watershed coal resource areas and land-use and human features considerations

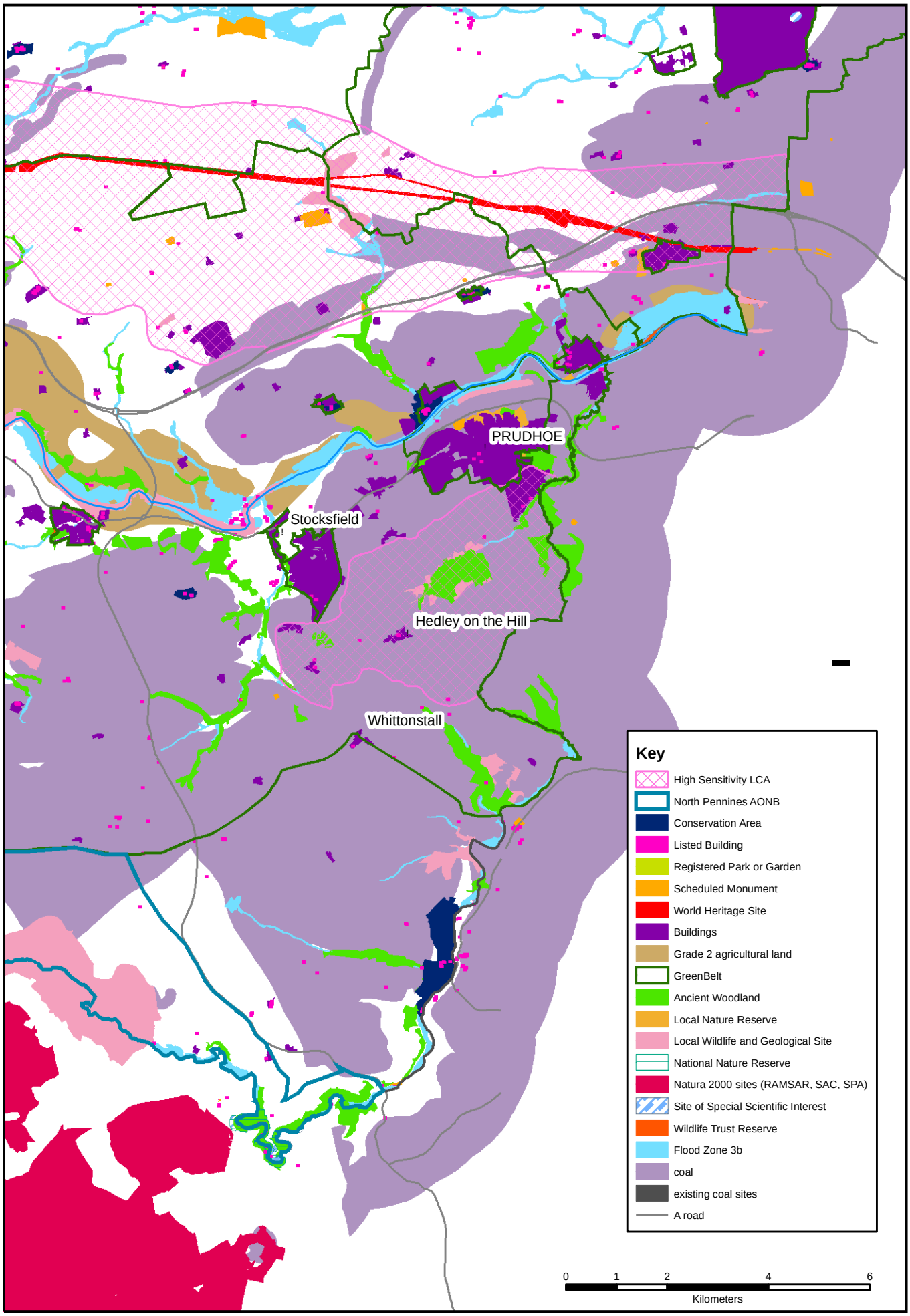


Figure A.19 Tyne/Derwent watershed coal resource areas and all environmental considerations

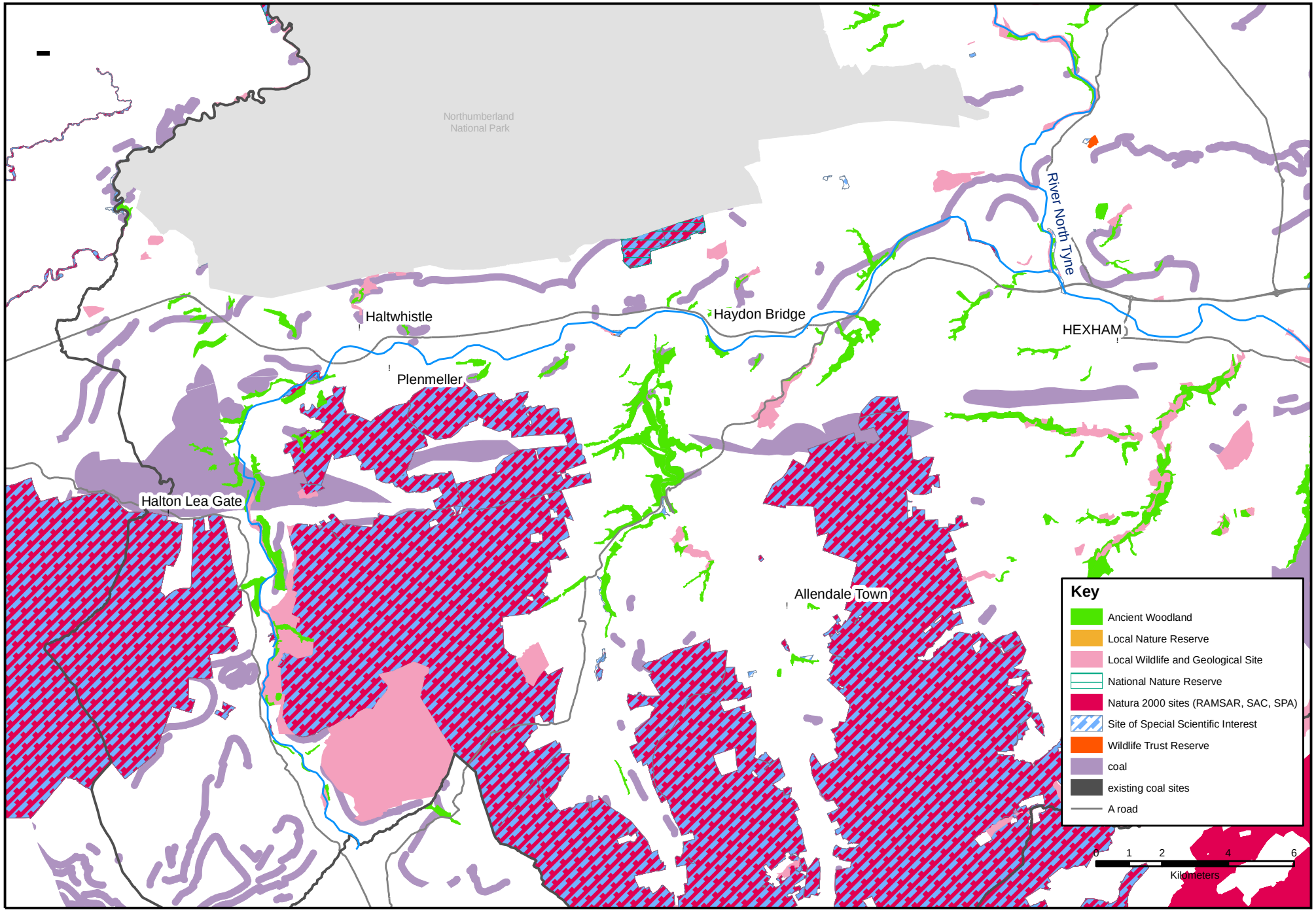


Figure A.20 Midgeholme, Plenmeller and Stublick coalfield areas and biodiversity and geological conservation considerations

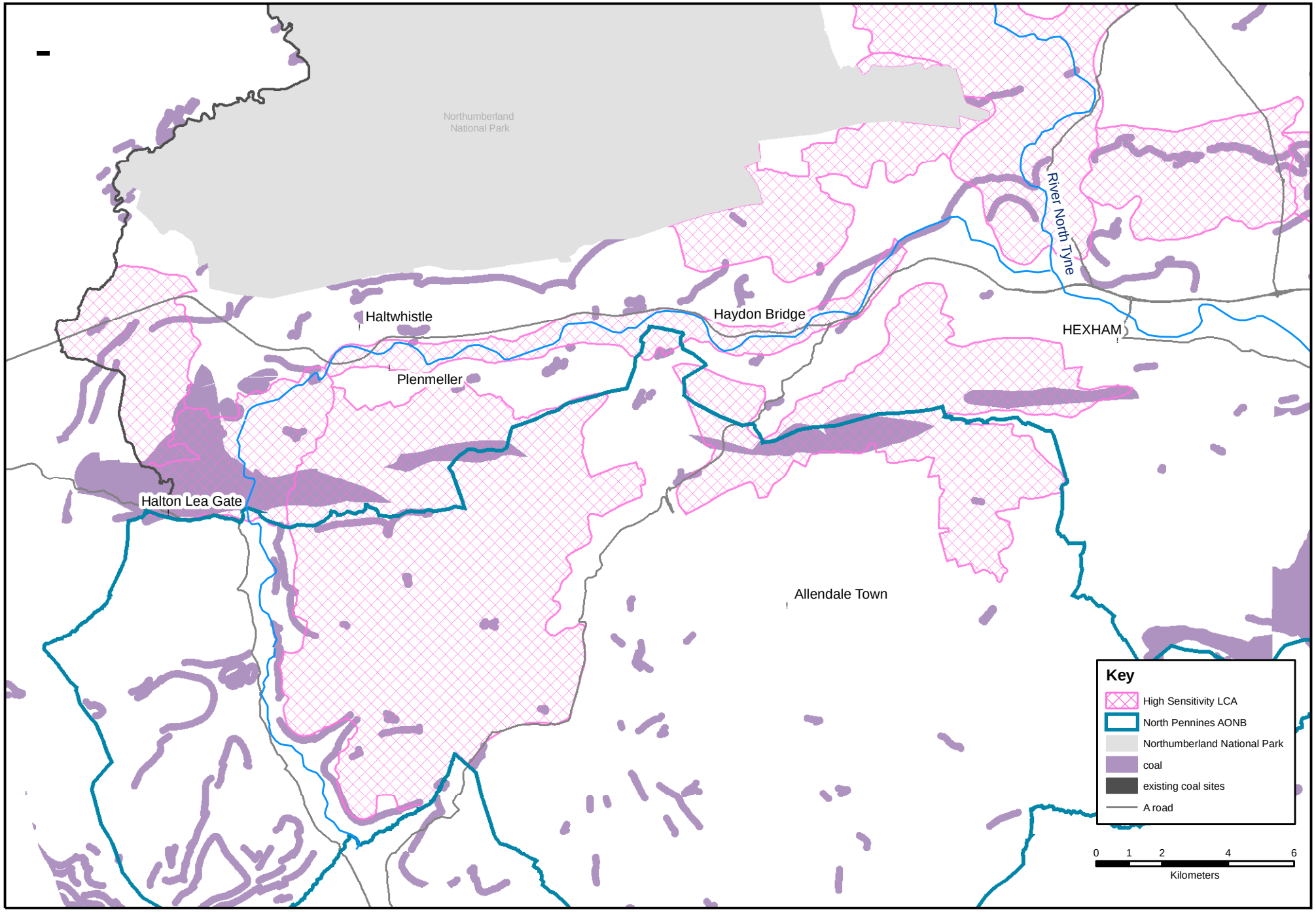


Figure A.21 Midgeholme, Plenmeller and Stublick coalfield areas and landscape considerations

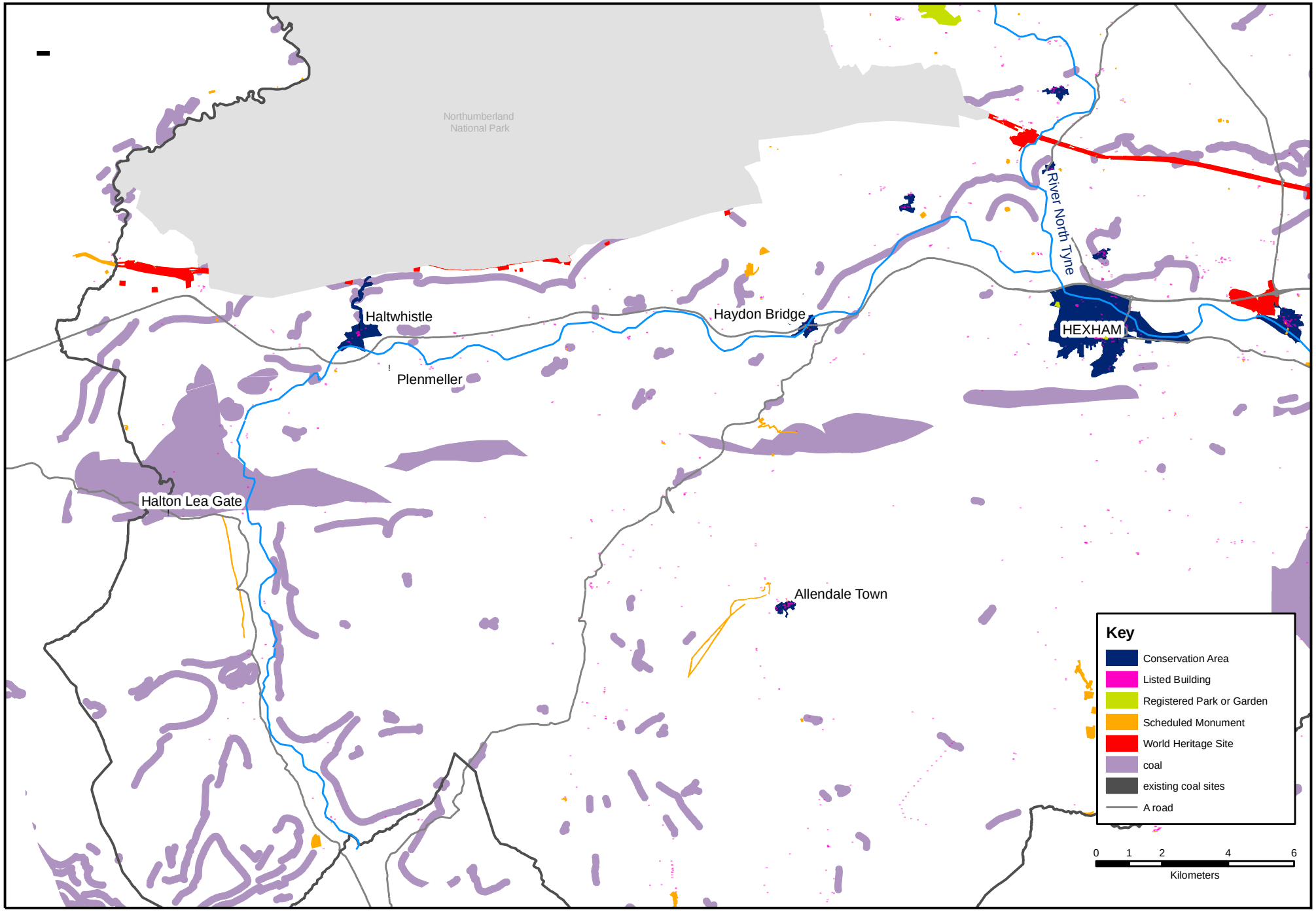


Figure A.22 Midgeholme, Plenmeller and Stublick coalfield areas and archaeology and cultural heritage considerations

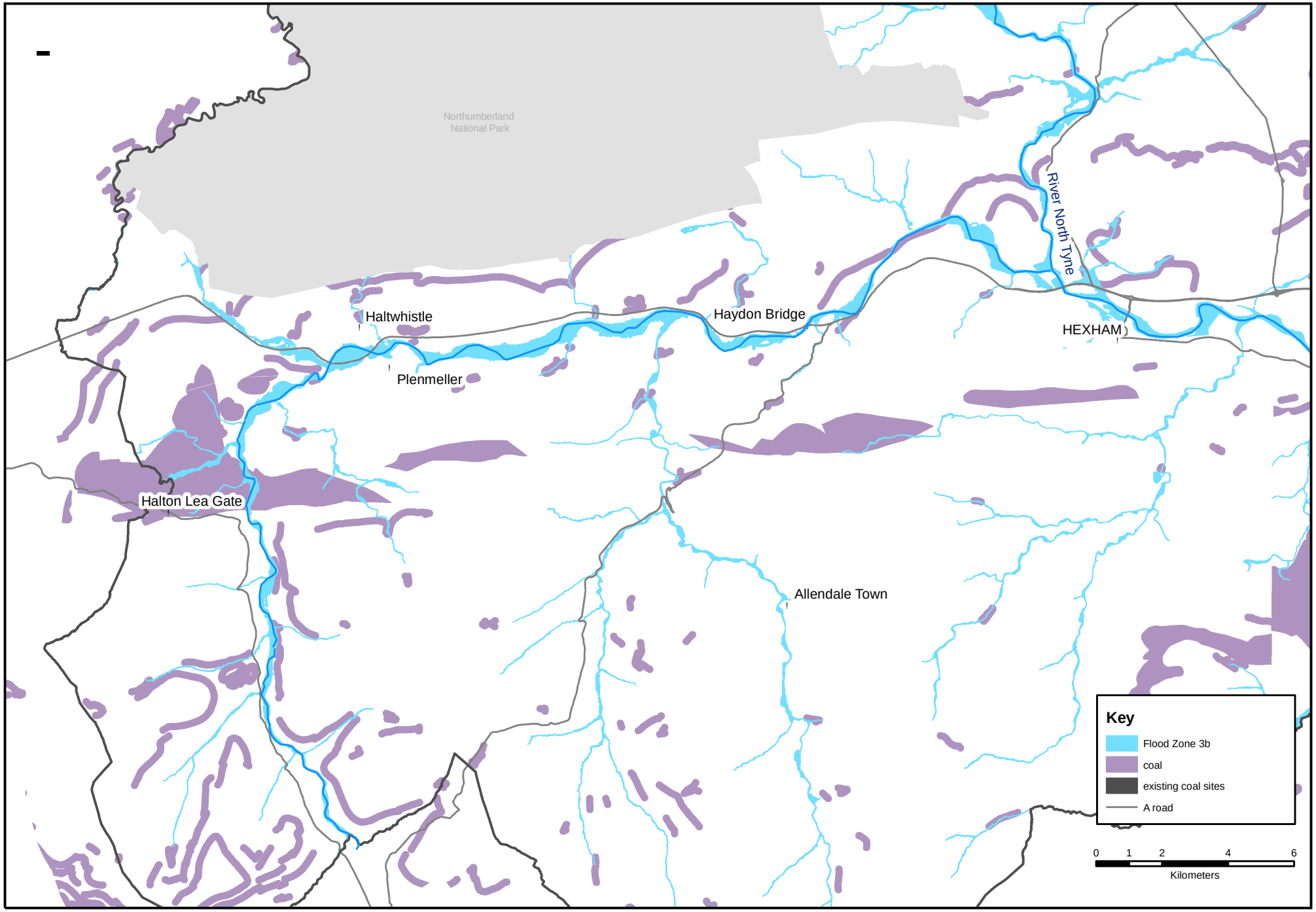


Figure A.23 Midgeholme, Plenmeller and Stublick coalfield areas and water environment considerations

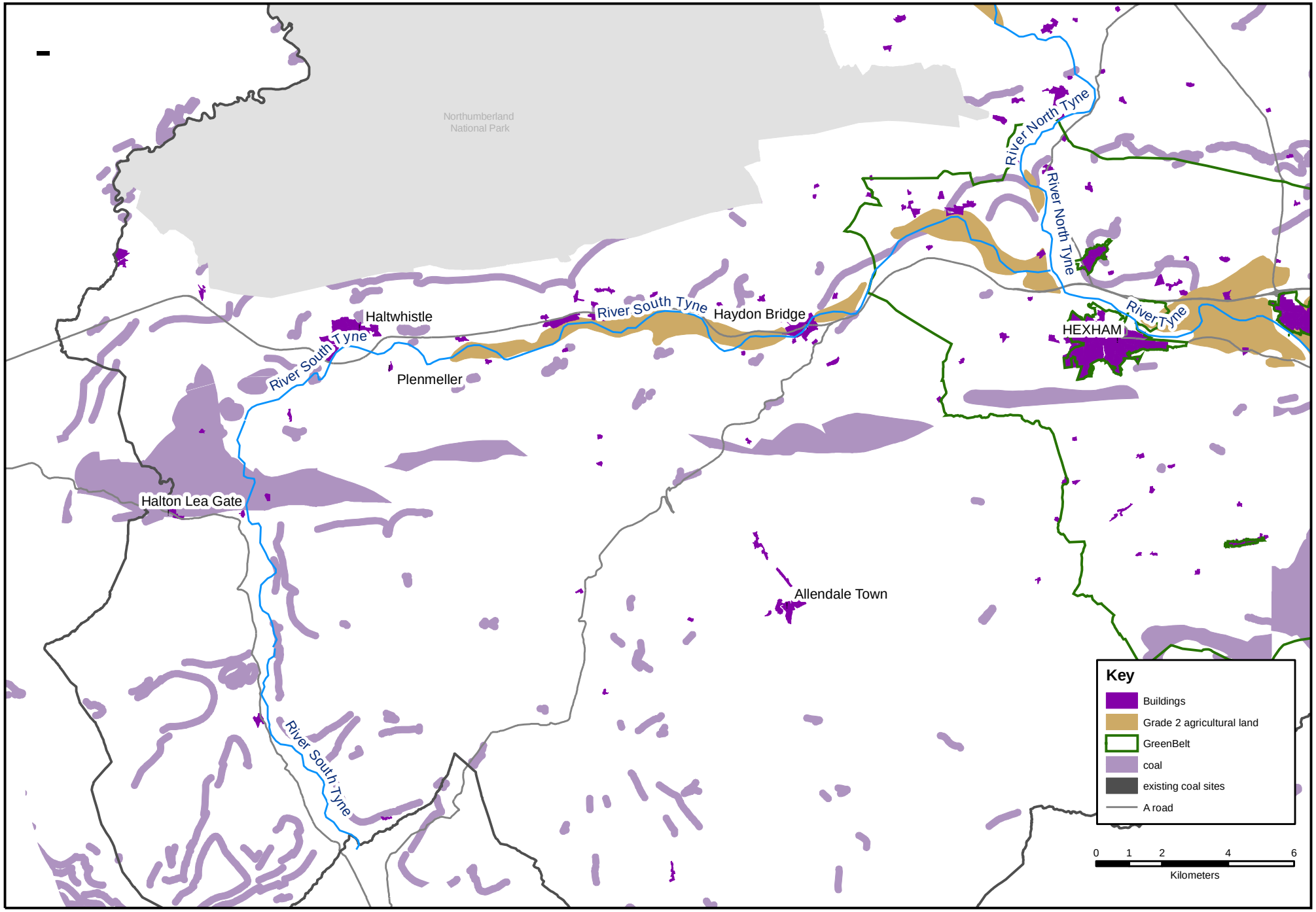


Figure A.24 Midgeholme, Plenmeller and Stublick coalfield areas and land-use and human features considerations

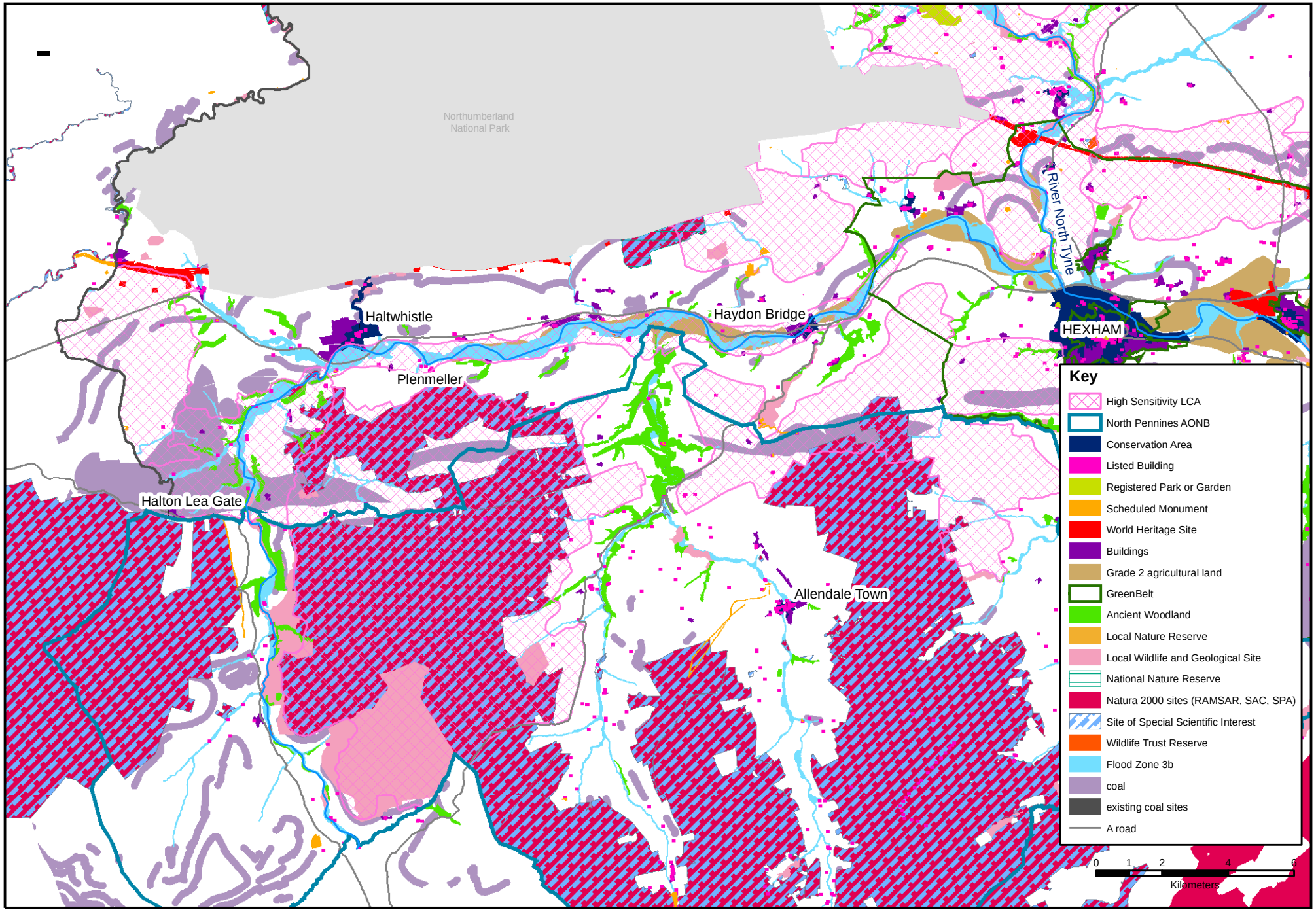


Figure A.25 Midgeholme, Plenmeller and Stublick coalfield areas and all environmental considerations

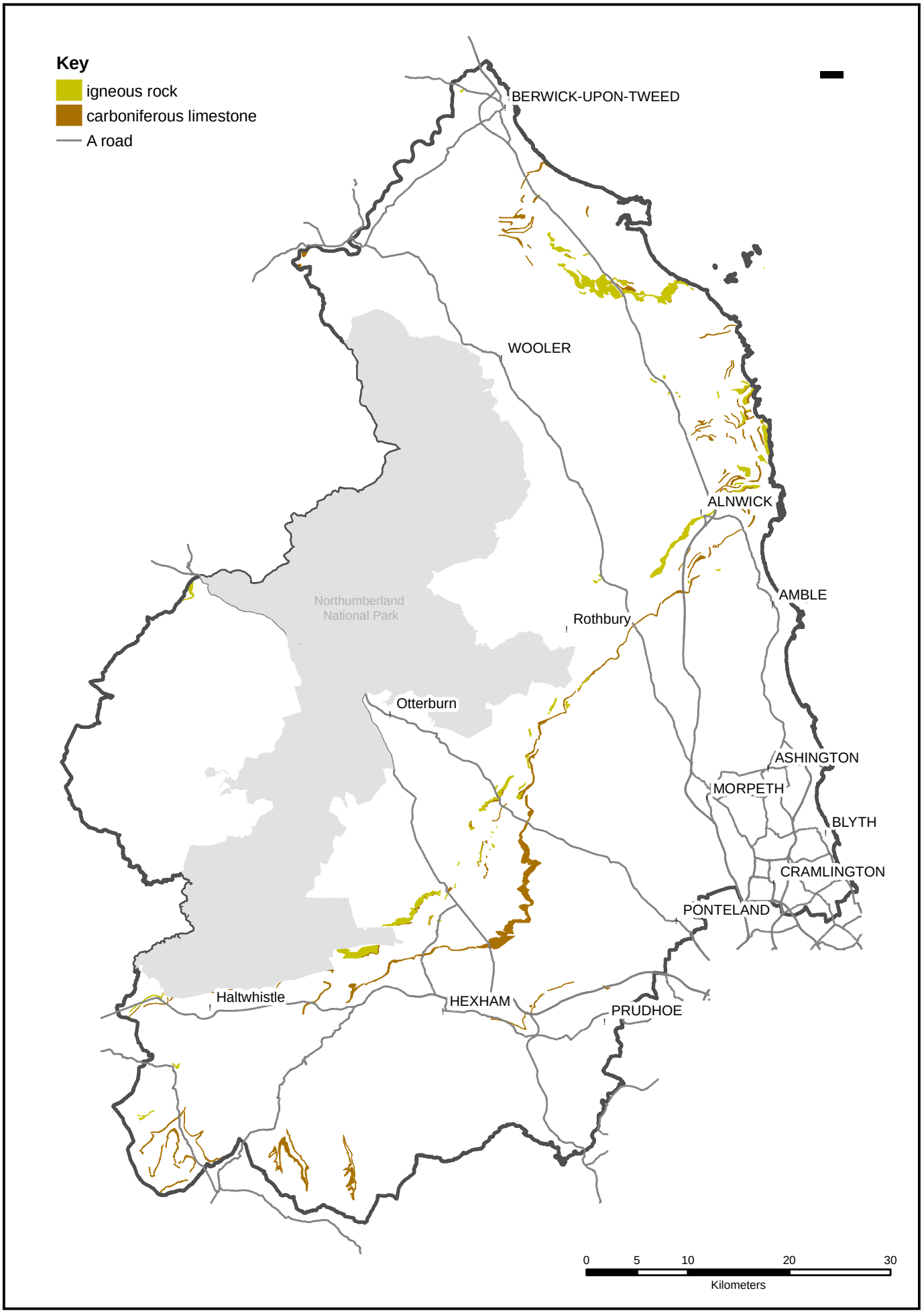


Figure B.1 Carboniferous limestone and igneous rock resource areas

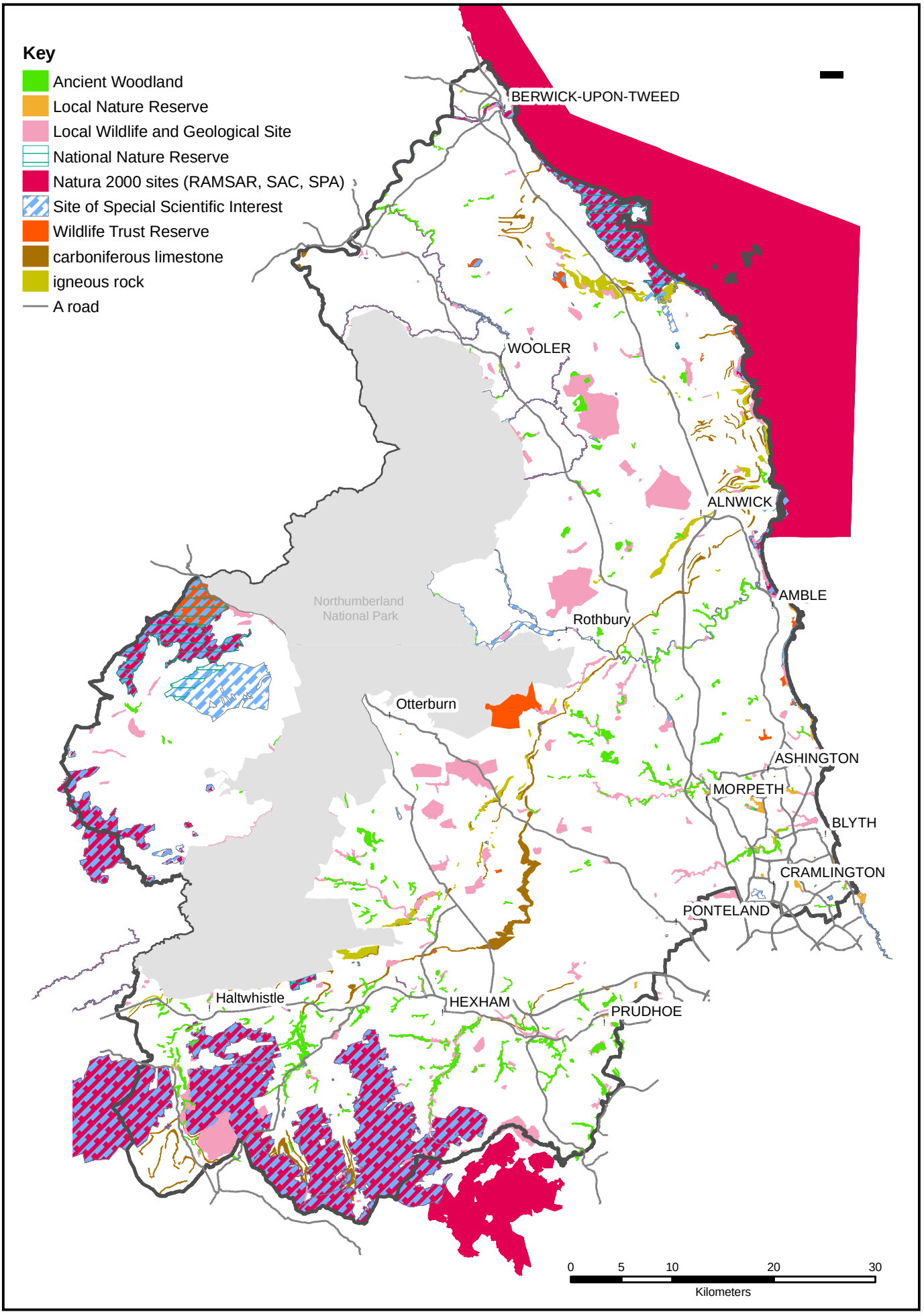


Figure B.2 Carboniferous limestone and igneous rock resource areas and biodiversity and geological conservation considerations

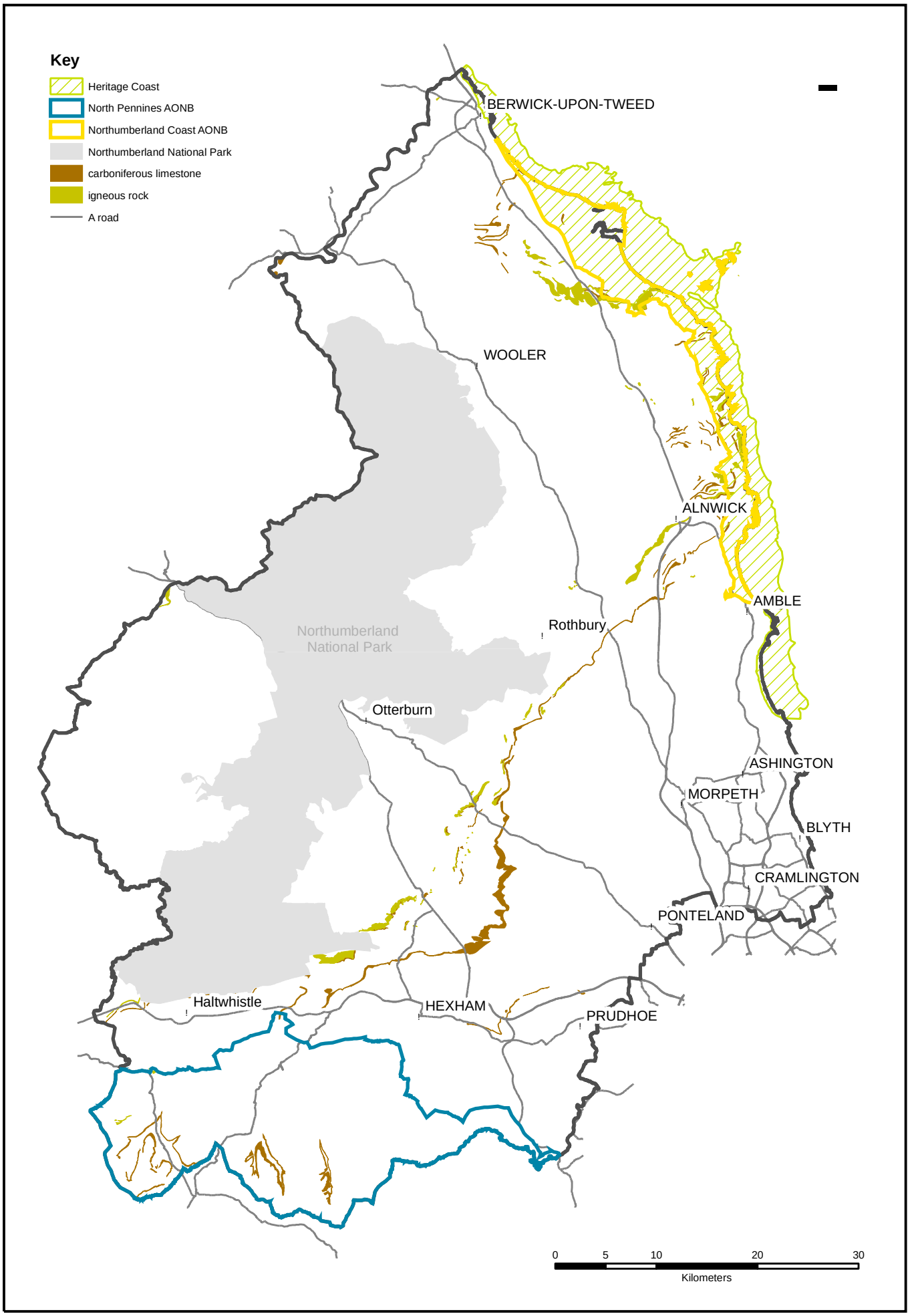


Figure B.3 Carboniferous limestone and igneous rock resource areas and landscape considerations

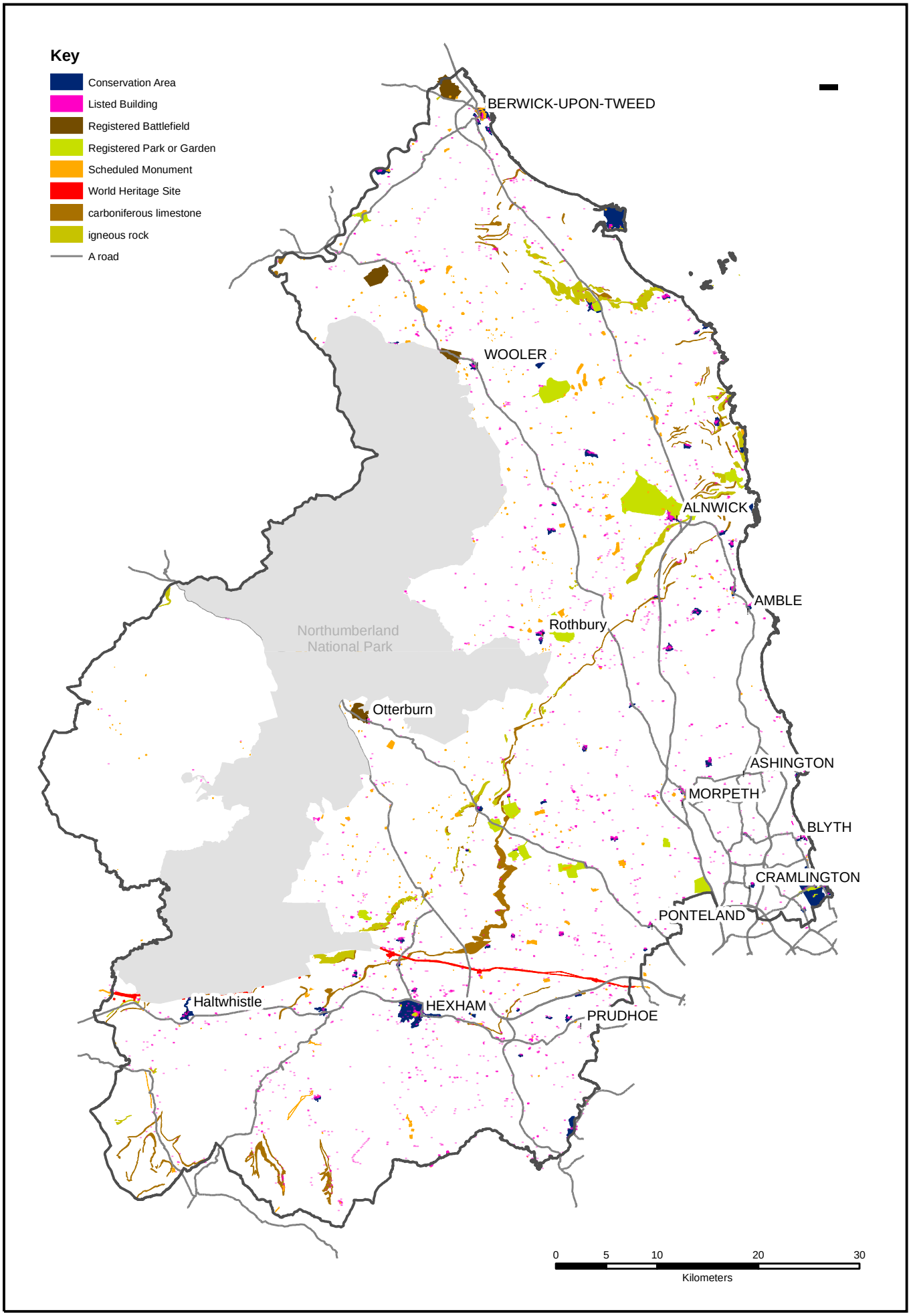


Figure B.4 Carboniferous limestone and igneous rock resource areas and archaeology and cultural heritage considerations

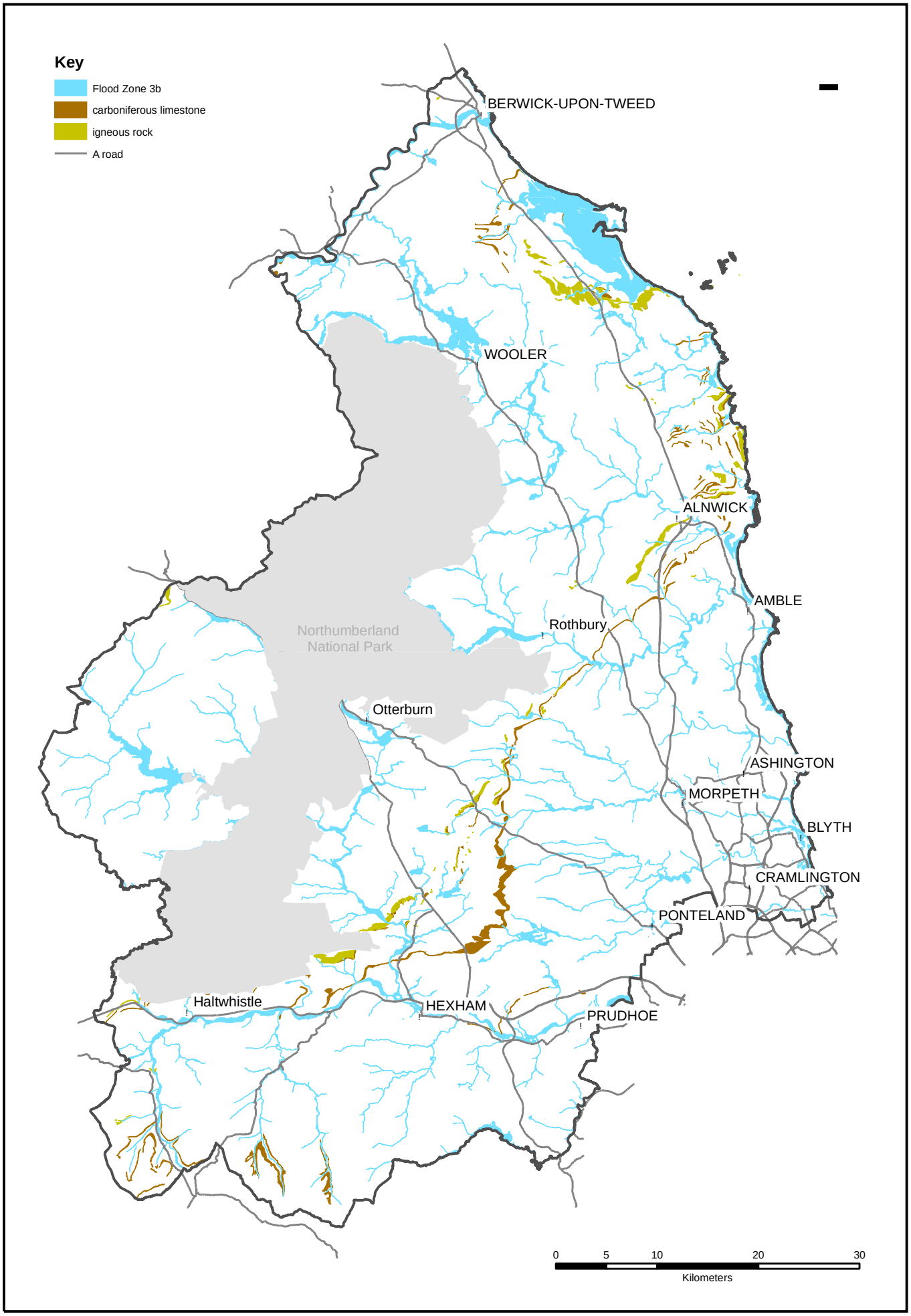


Figure B.5 Carboniferous limestone and igneous rock resource areas and water environment considerations

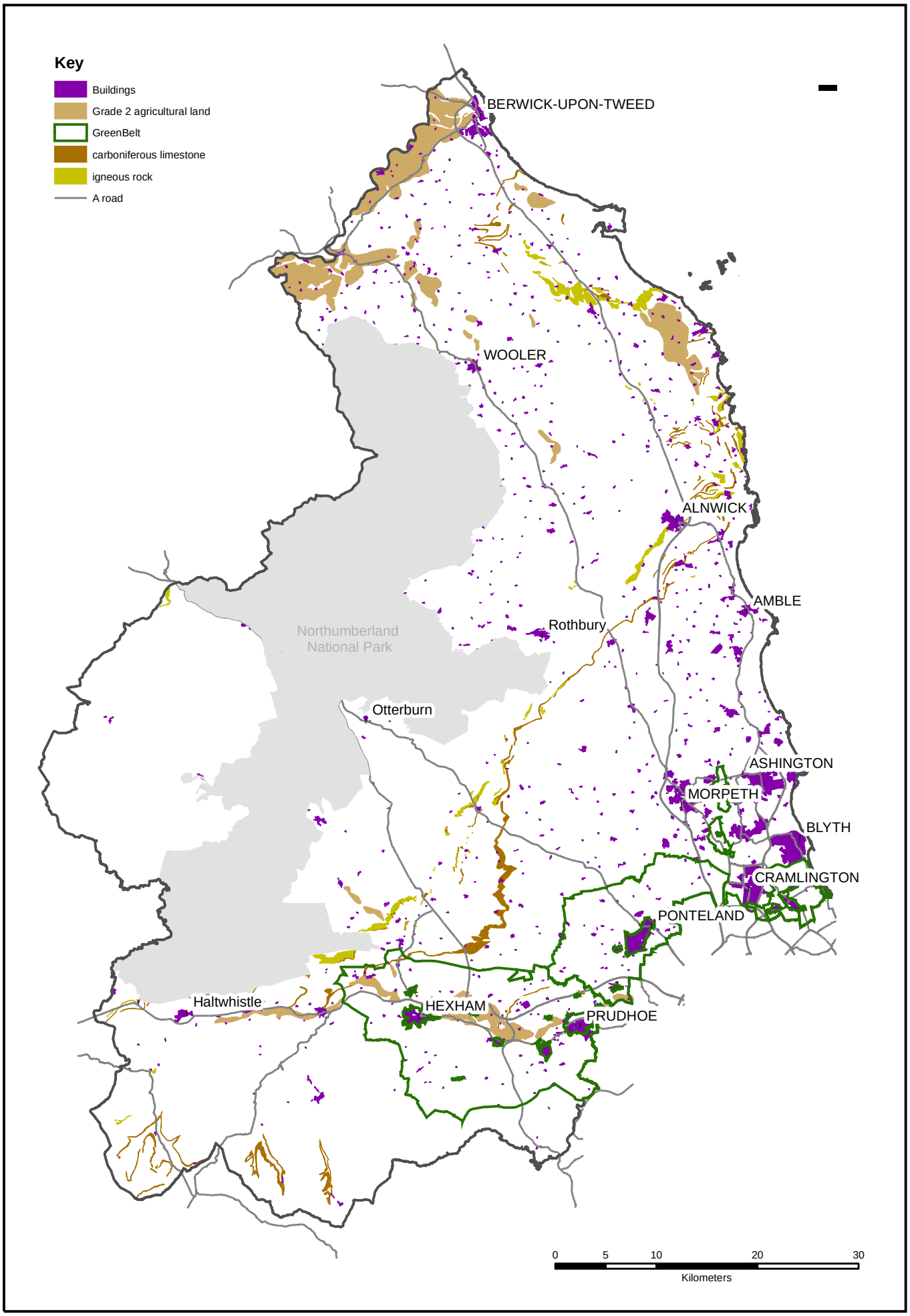


Figure B.6 Carboniferous limestone and igneous rock resource areas and land-use and human features considerations

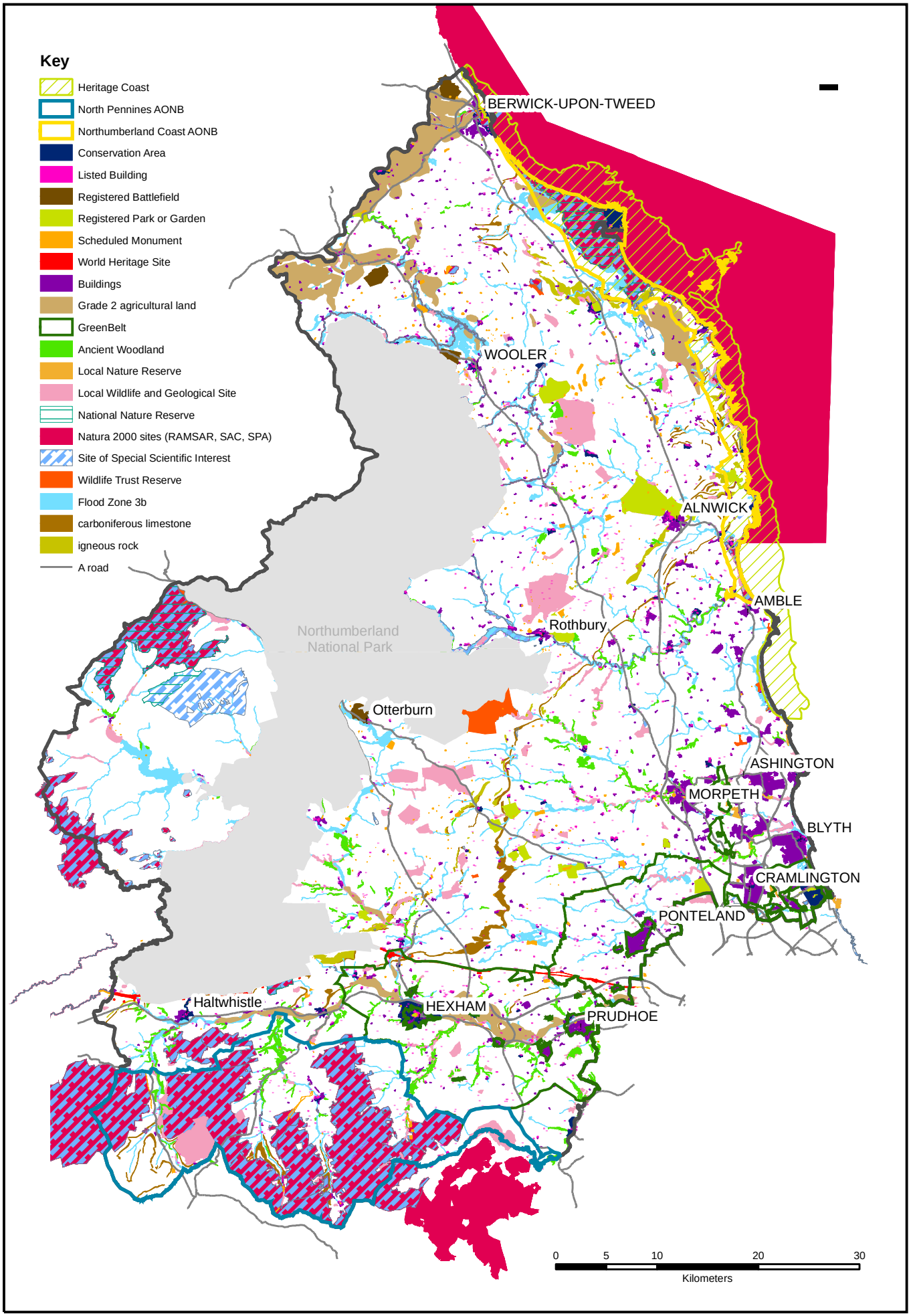


Figure B.7 Carboniferous limestone and igneous rock resource areas and all environmental considerations

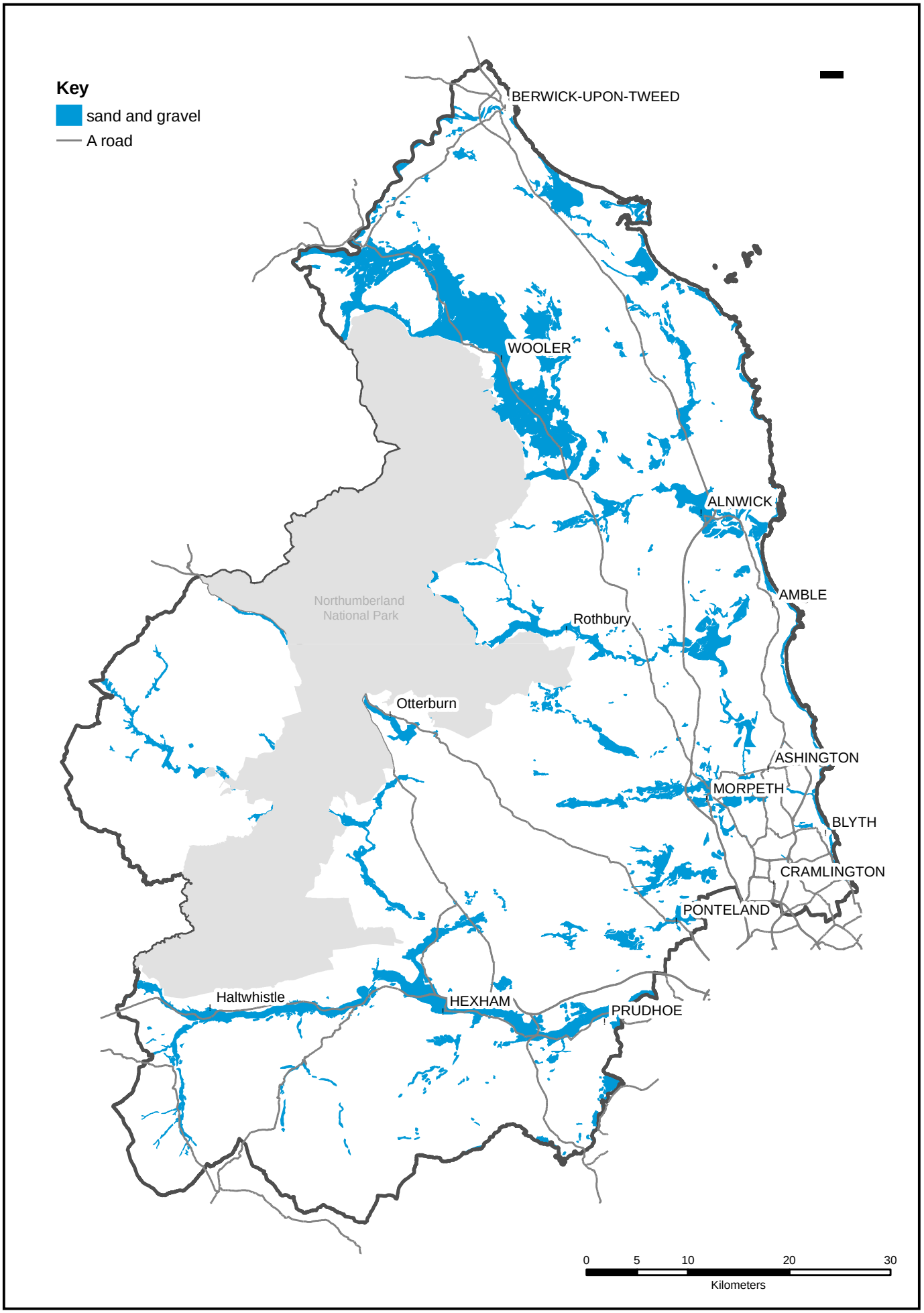


Figure B.1 Sand and gravel resource areas

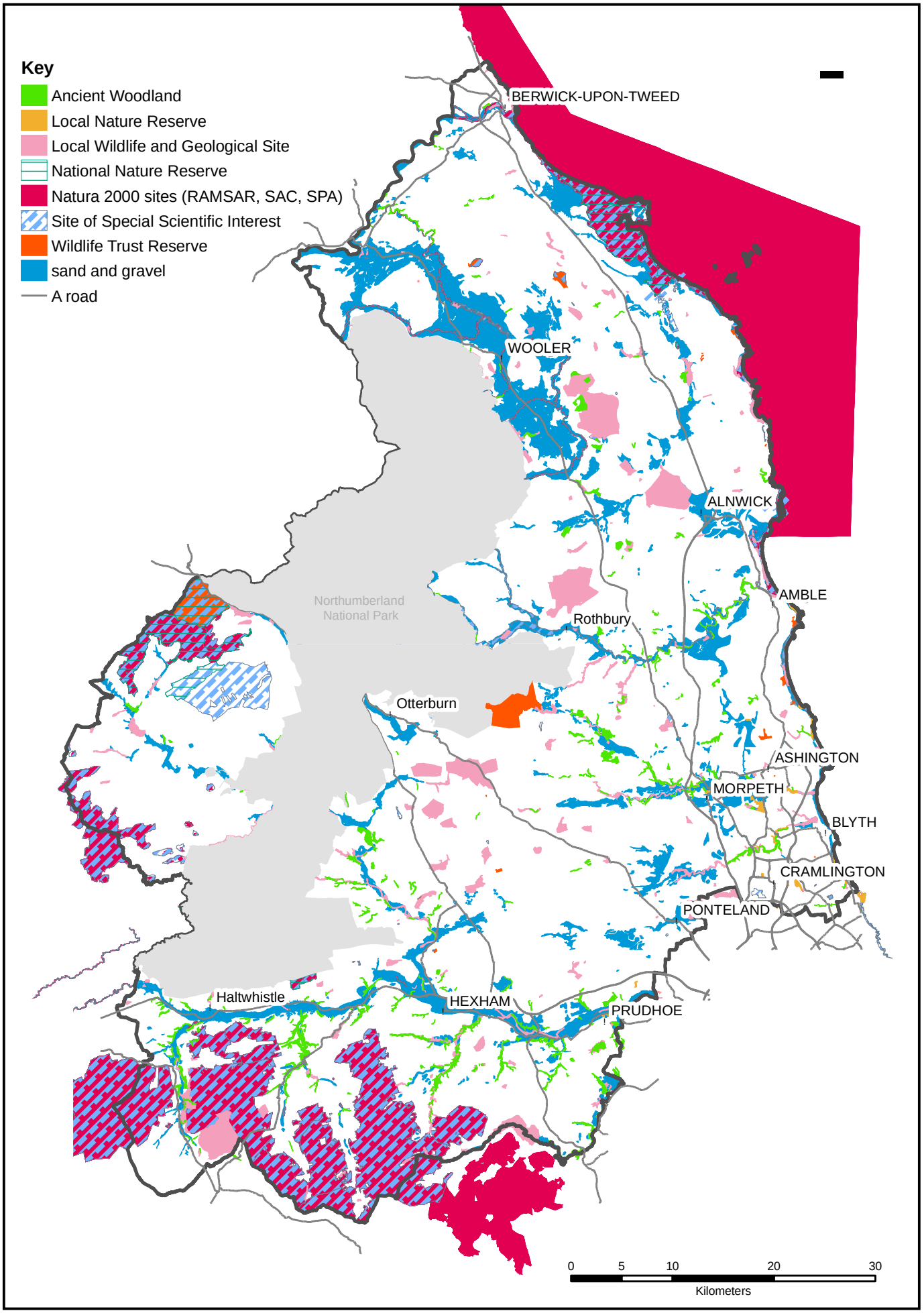


Figure C.2 Sand and gravel resource areas and biodiversity and geological conservation considerations

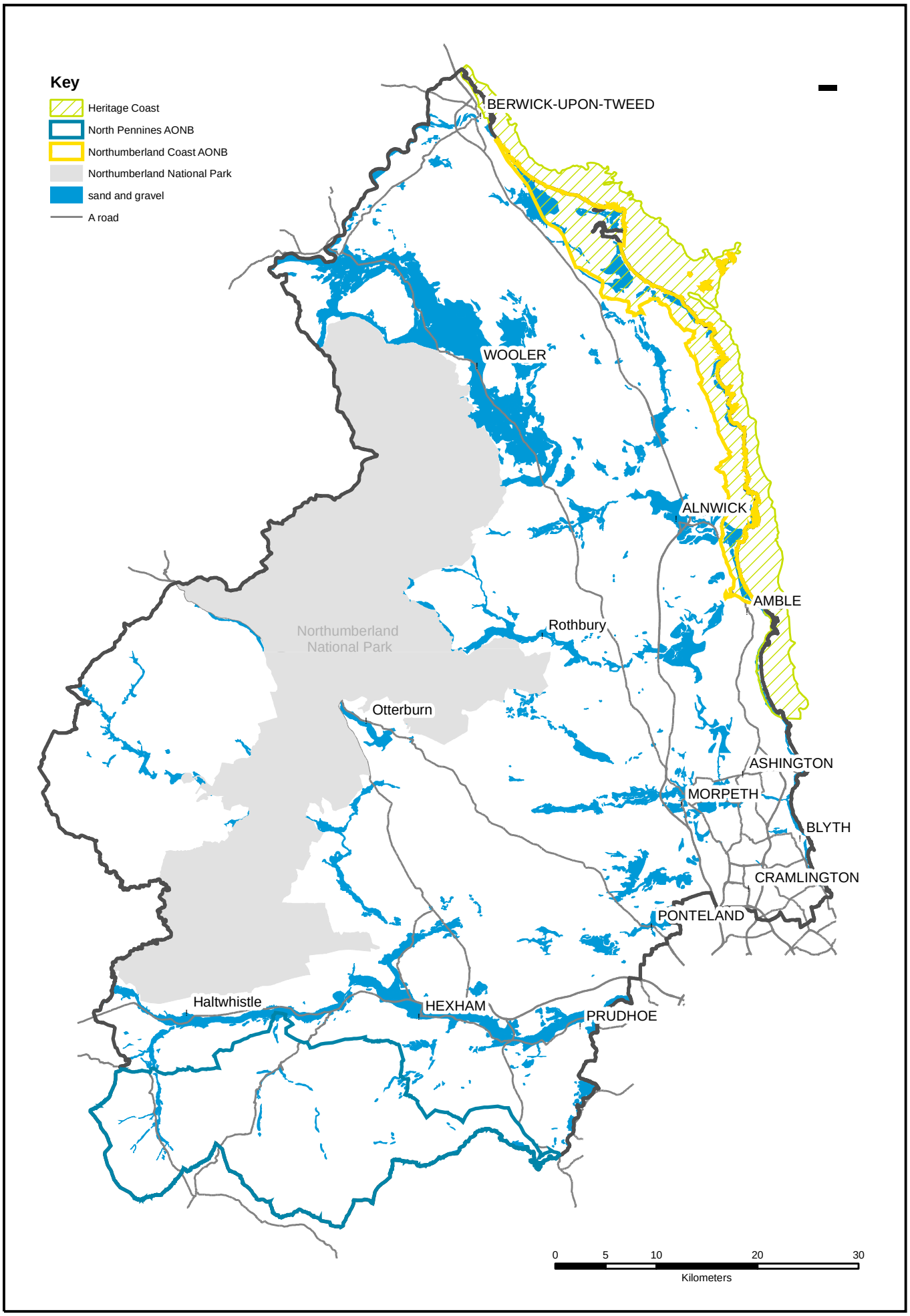


Figure C.3 Sand and gravel resource areas and landscape considerations

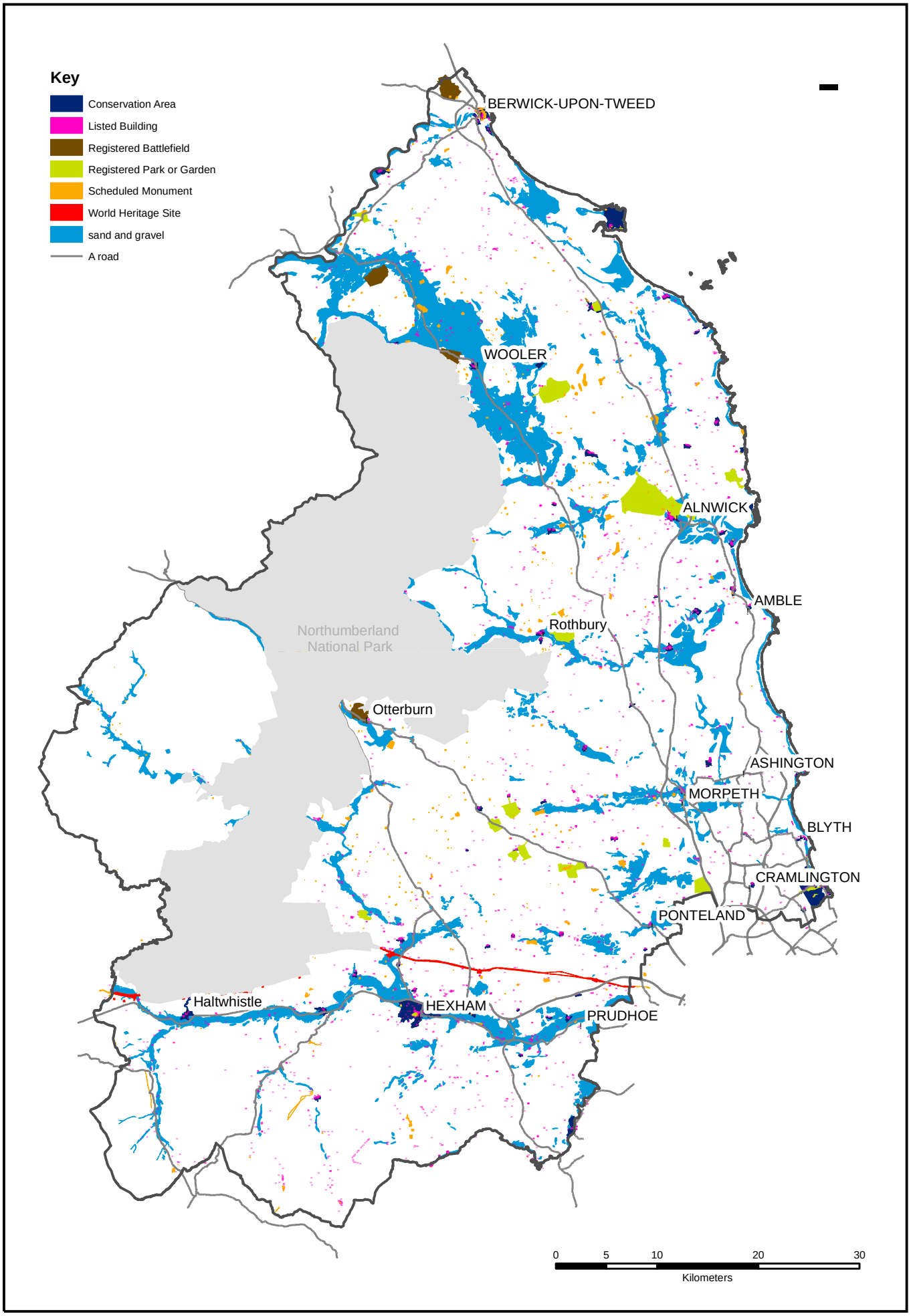


Figure C.4 Sand and gravel resource areas and archaeology and cultural heritage considerations

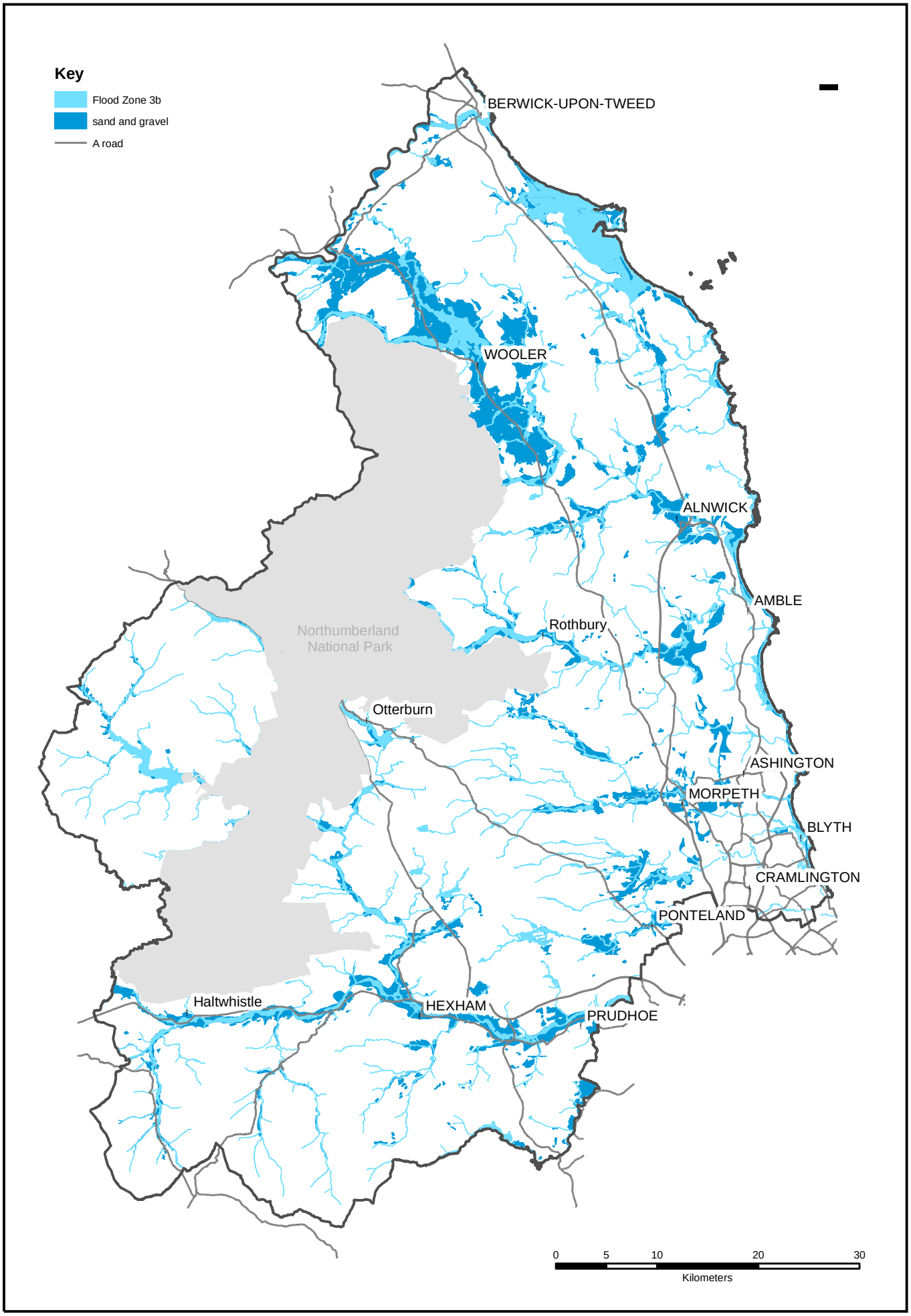


Figure C.5 Sand and gravel resource areas and water environment considerations

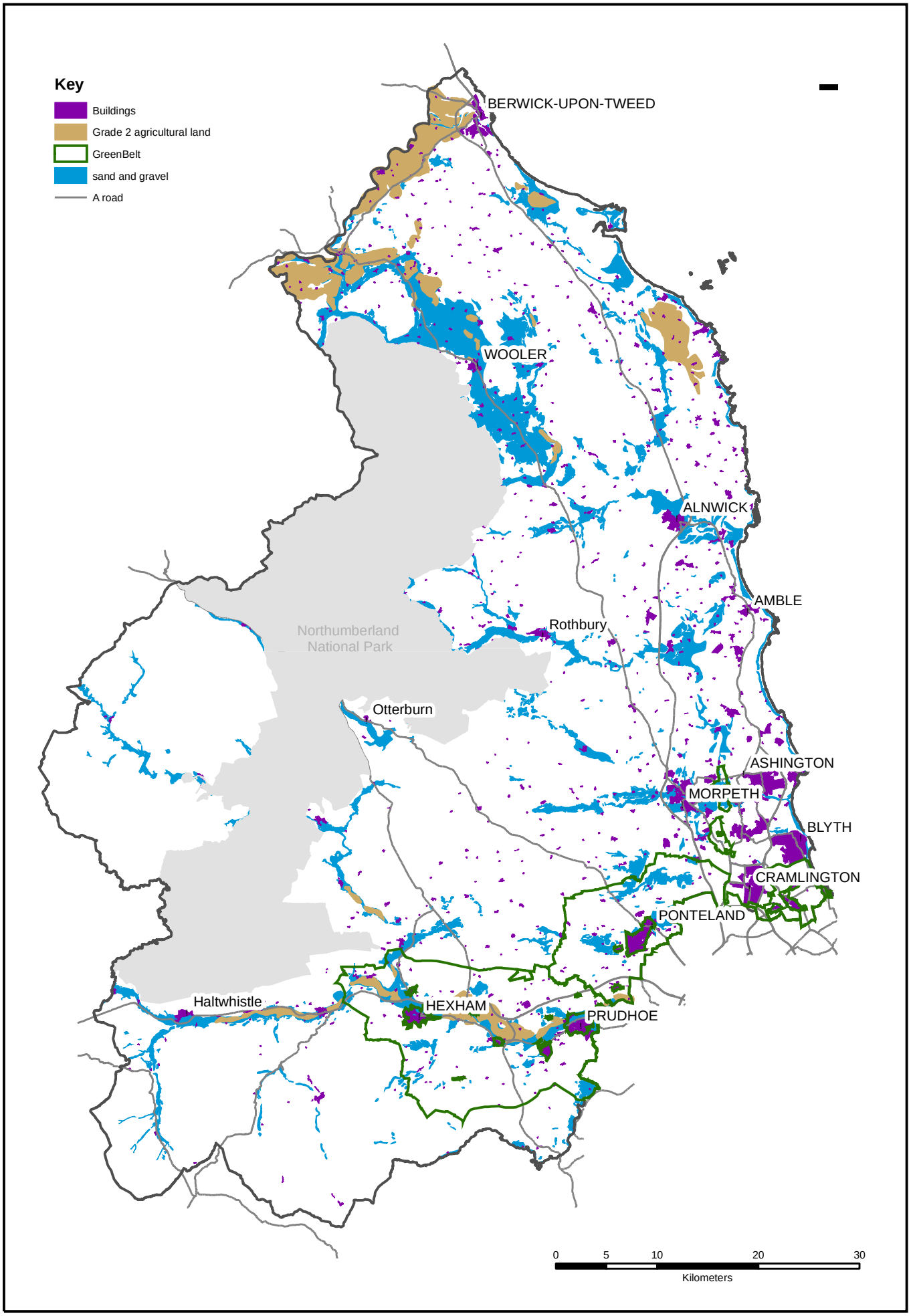


Figure C.6 Sand and gravel resource areas and land-use and human features considerations

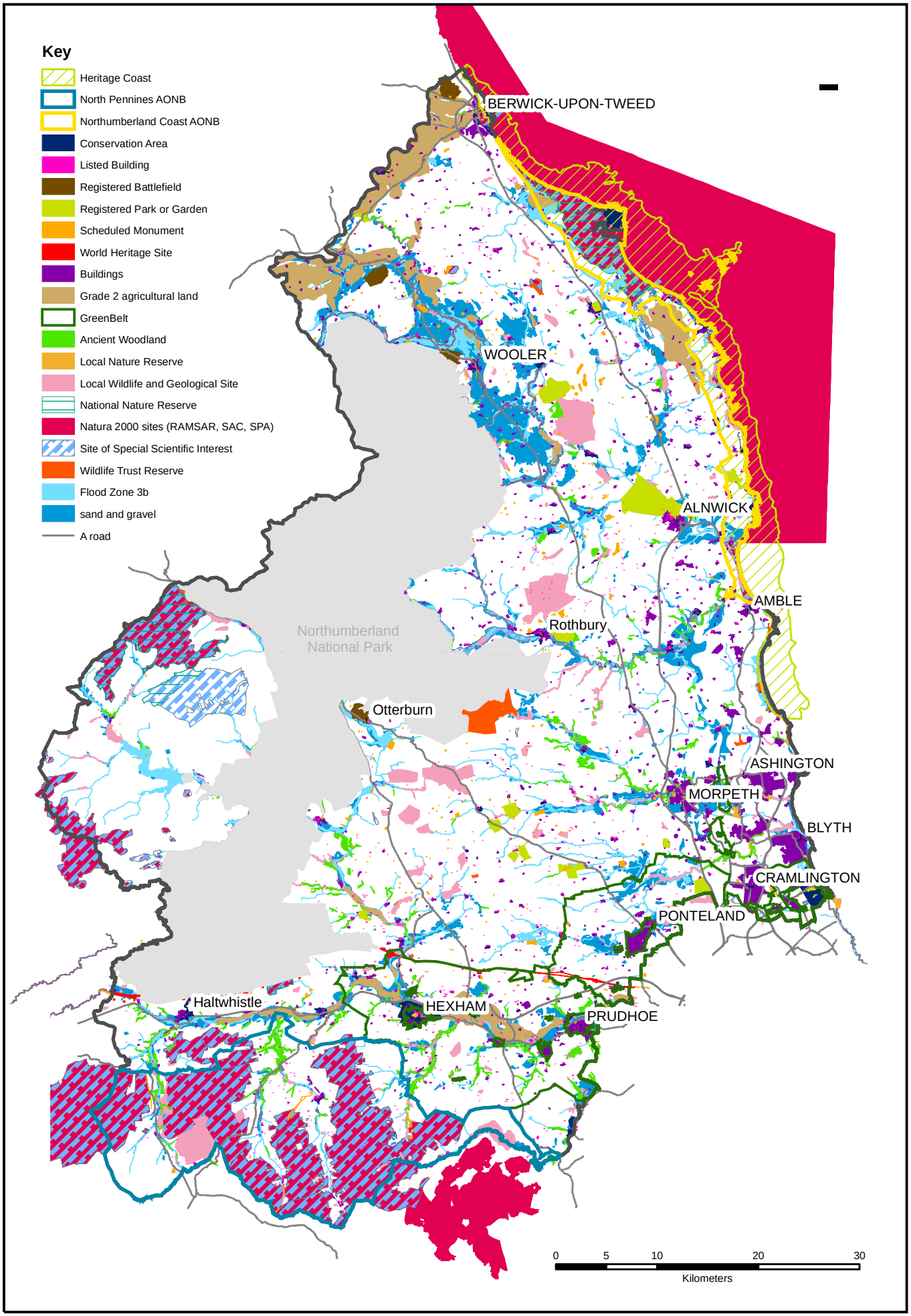


Figure C.7 Sand and gravel resource areas and all environmental considerations

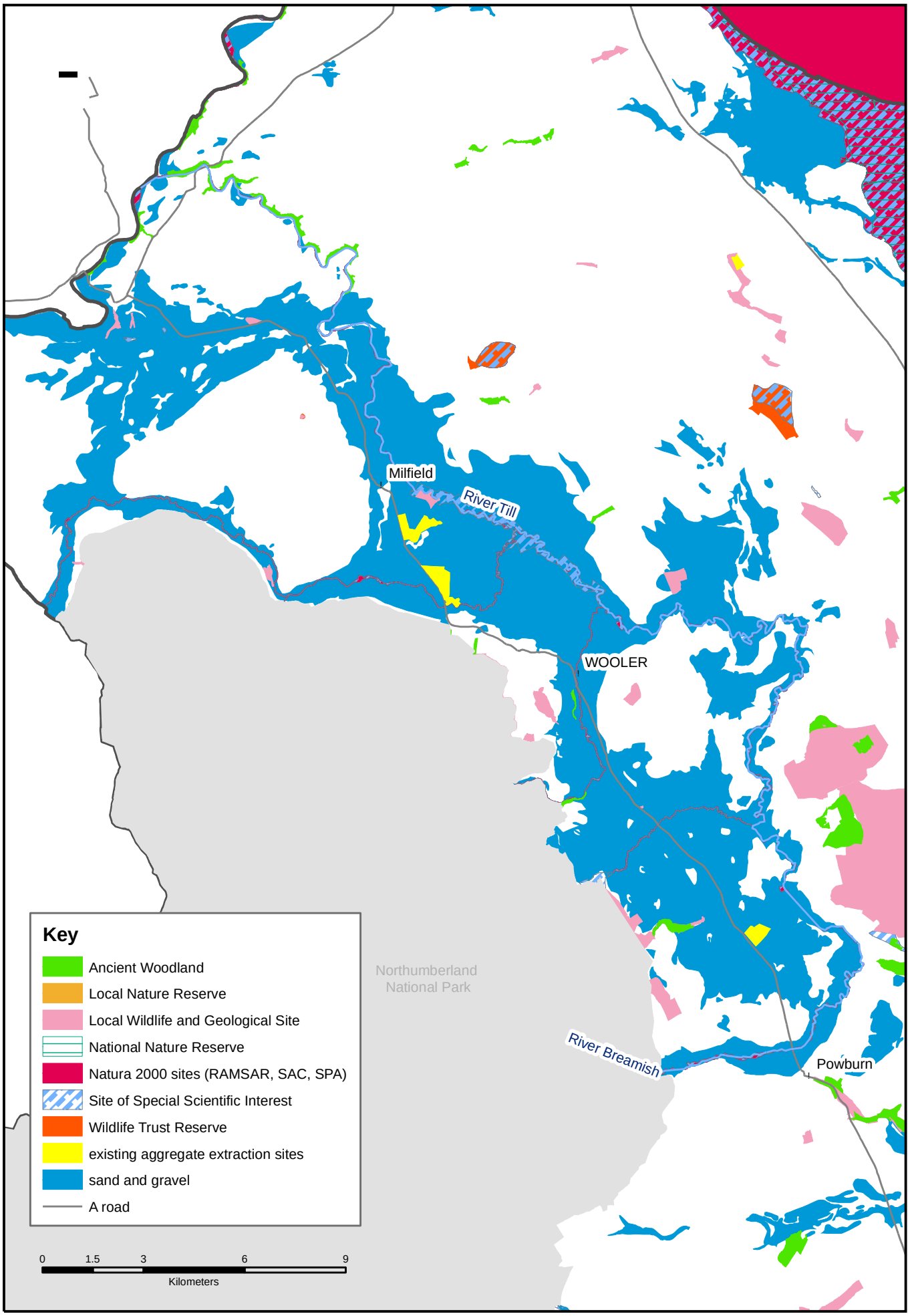


Figure C.8 Breamish, Glen and Till sand and gravel resource area and biodiversity and geological conservation considerations

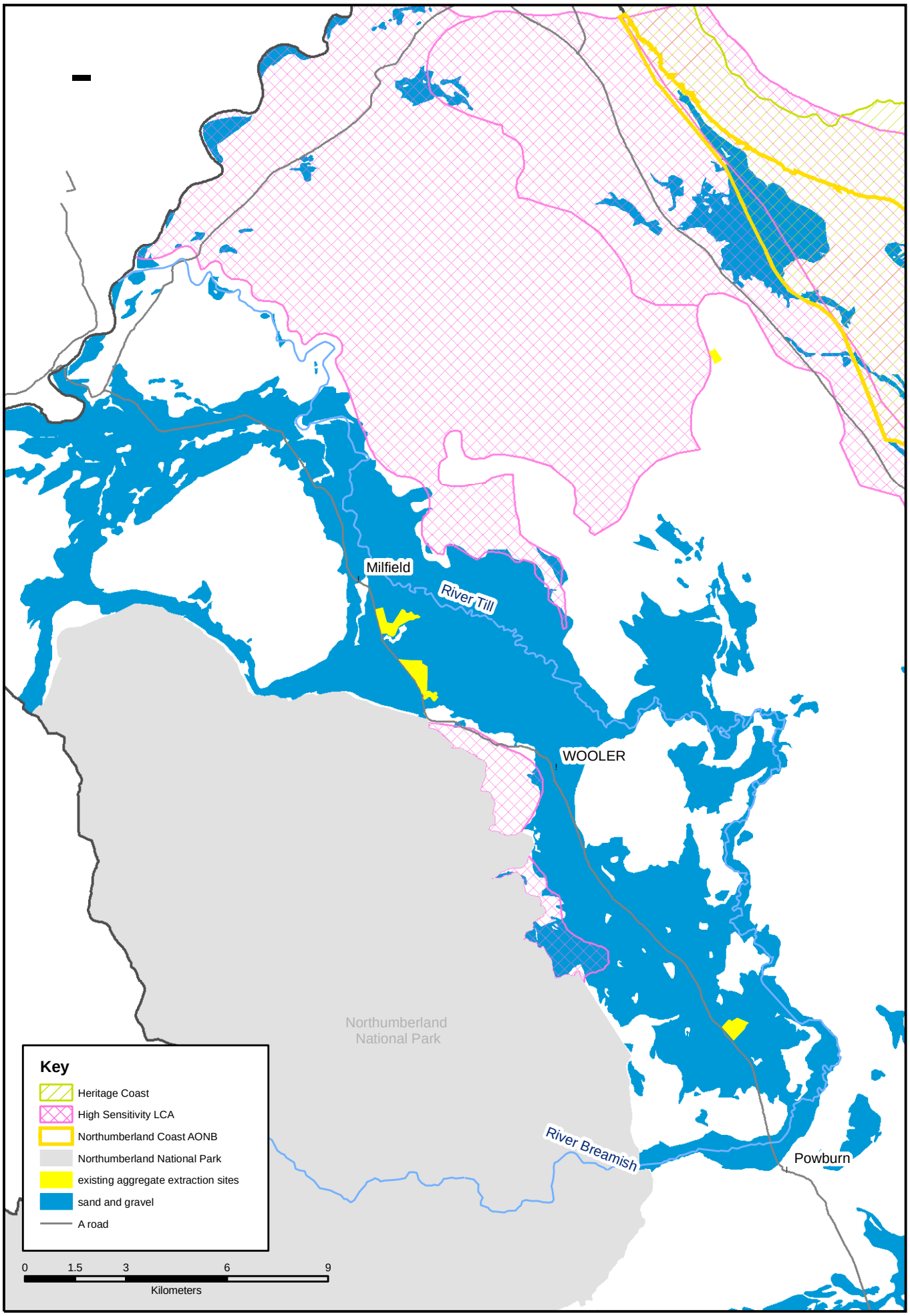


Figure C.9 Breamish, Glen and Till sand and gravel resource areas and landscape considerations

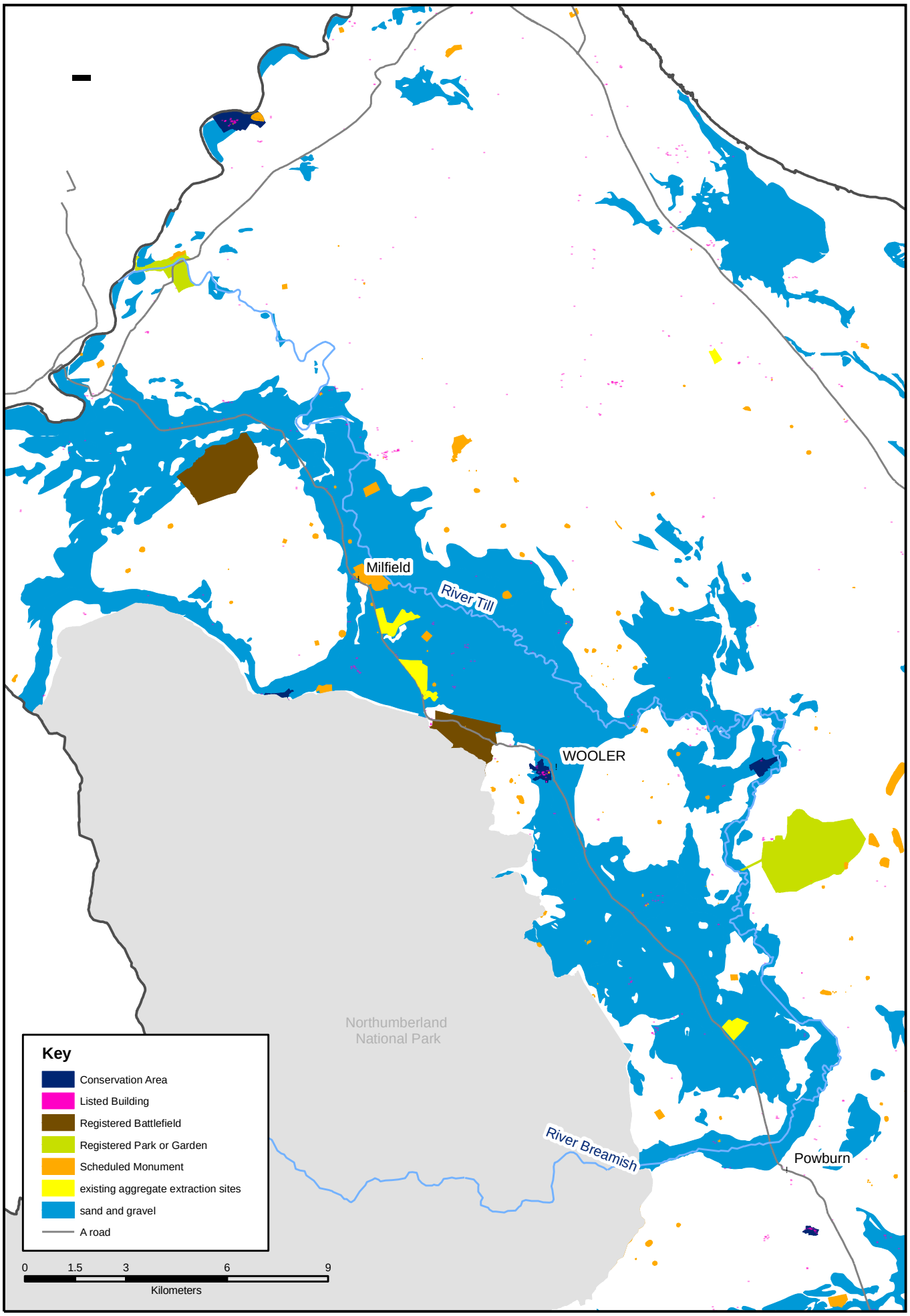


Figure C.10 Breamish, Glen and Till sand and gravel resource areas and archaeology and cultural heritage considerations

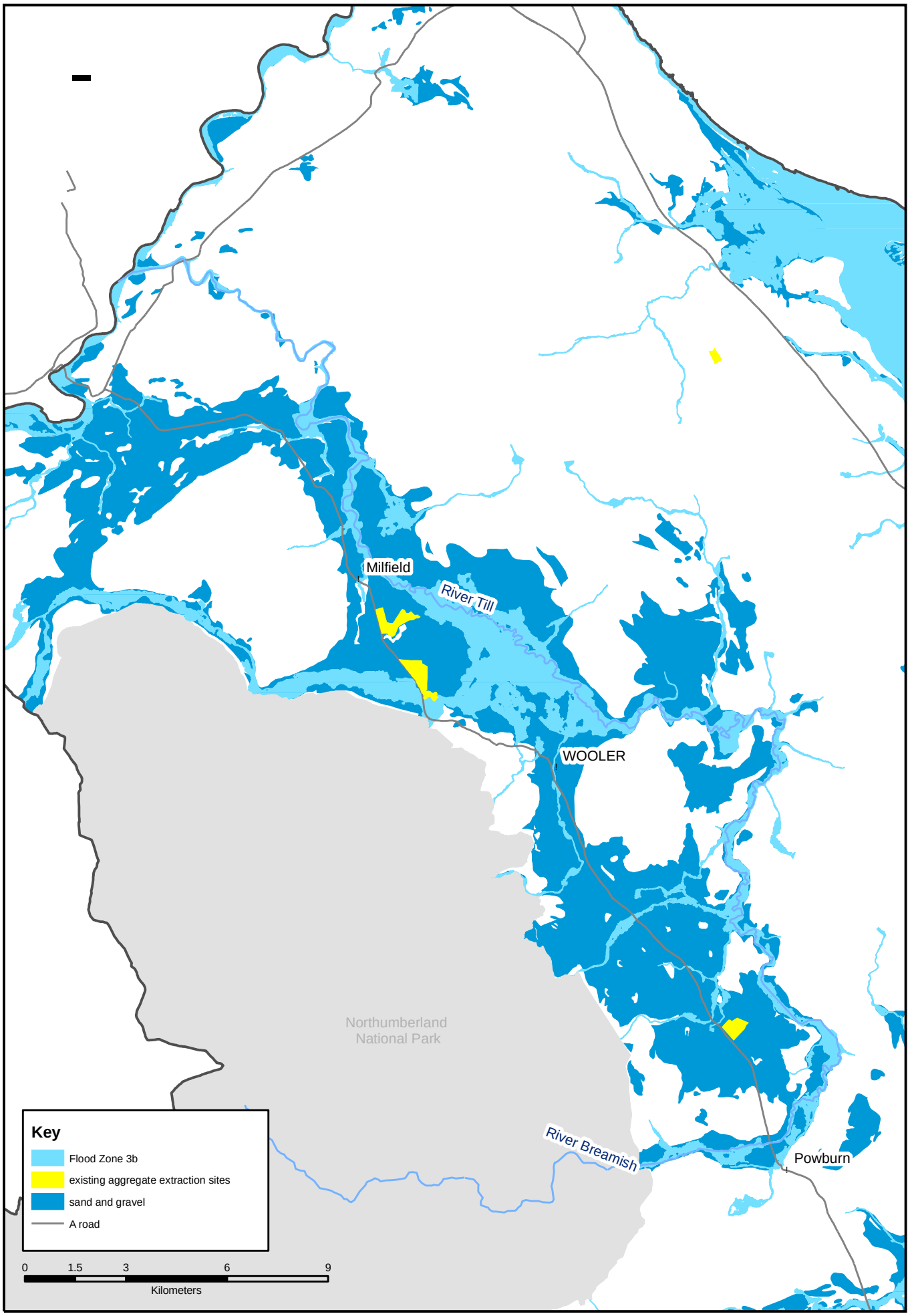


Figure C.11 Breamish, Glen and Till sand and gravel resource areas and water environment considerations

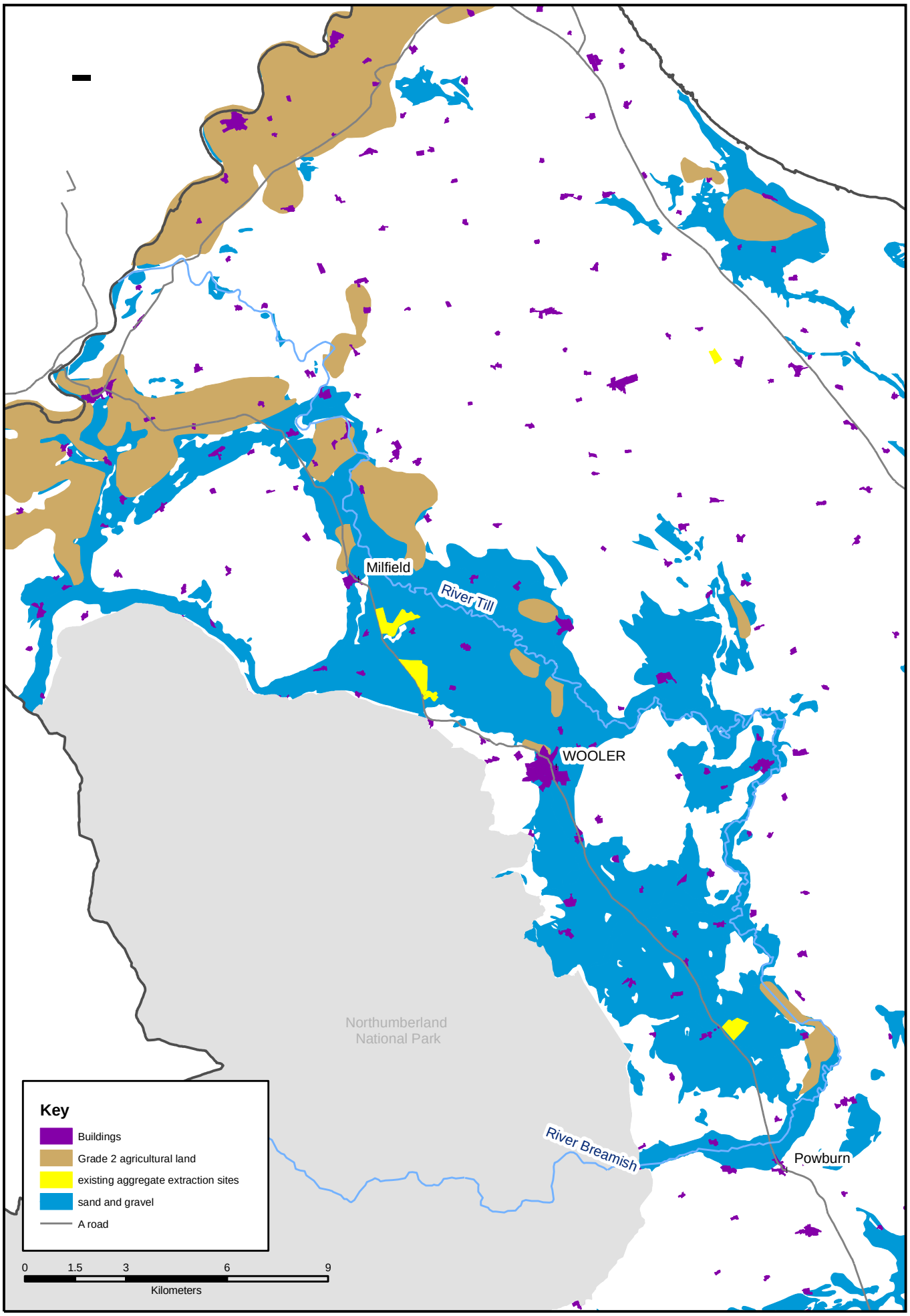


Figure C.12 Breamish, Glen and Till sand and gravel resource areas and land-use and human features considerations

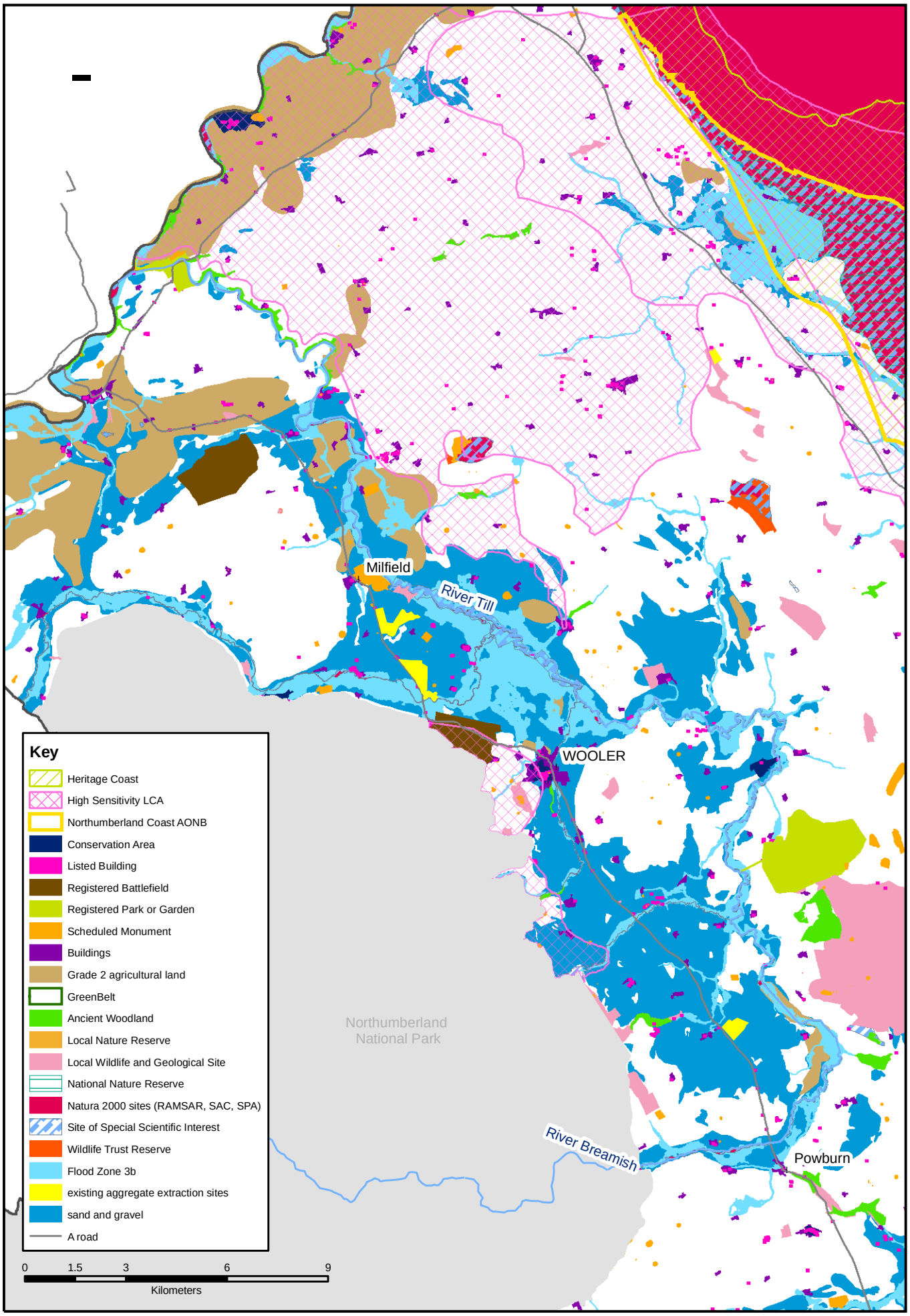


Figure C.13 Breamish, Glen and Till sand and gravel resource areas and all environmental considerations

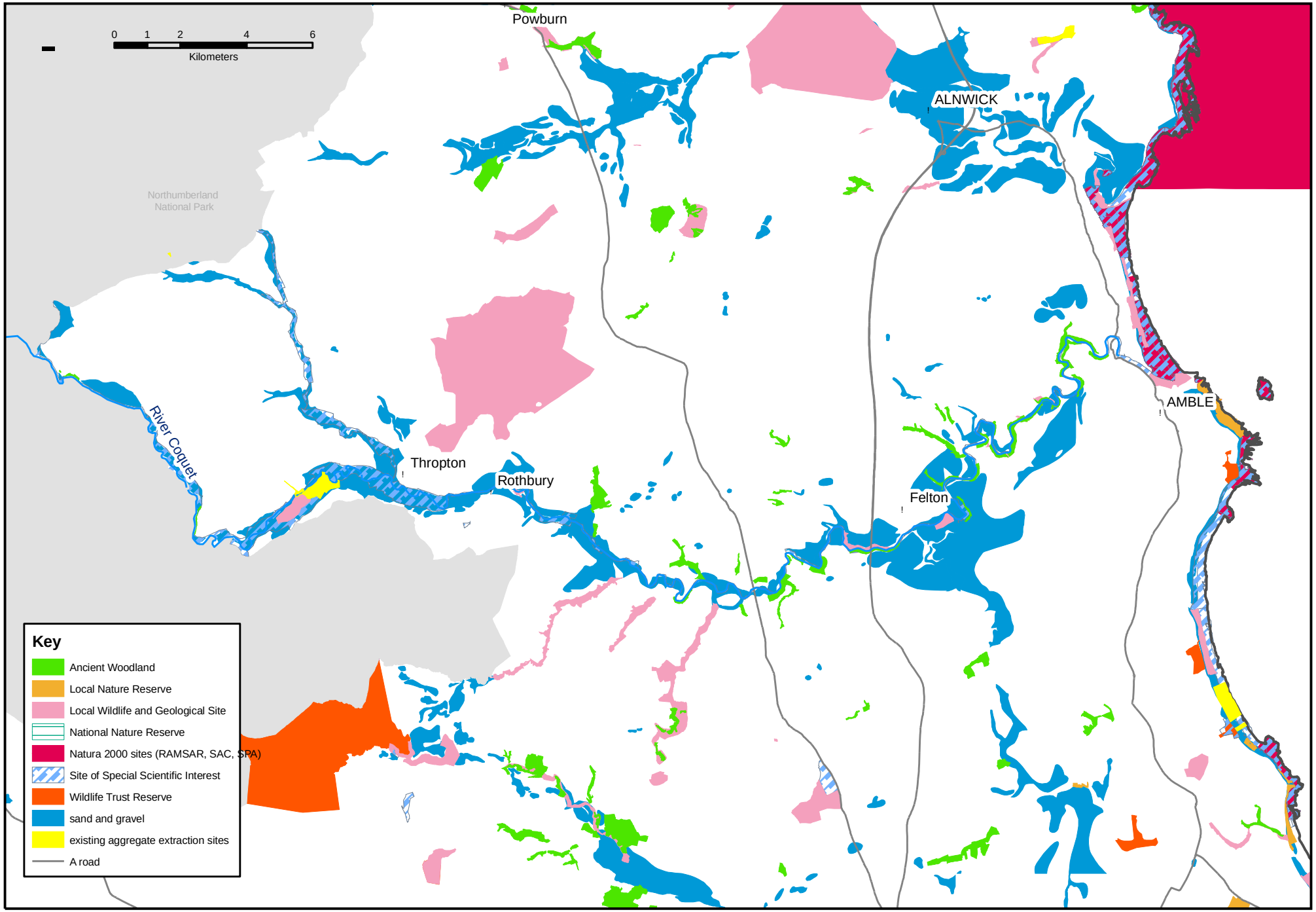


Figure C.14 Coquet valley sand and gravel resource areas and biodiversity and geological conservation considerations

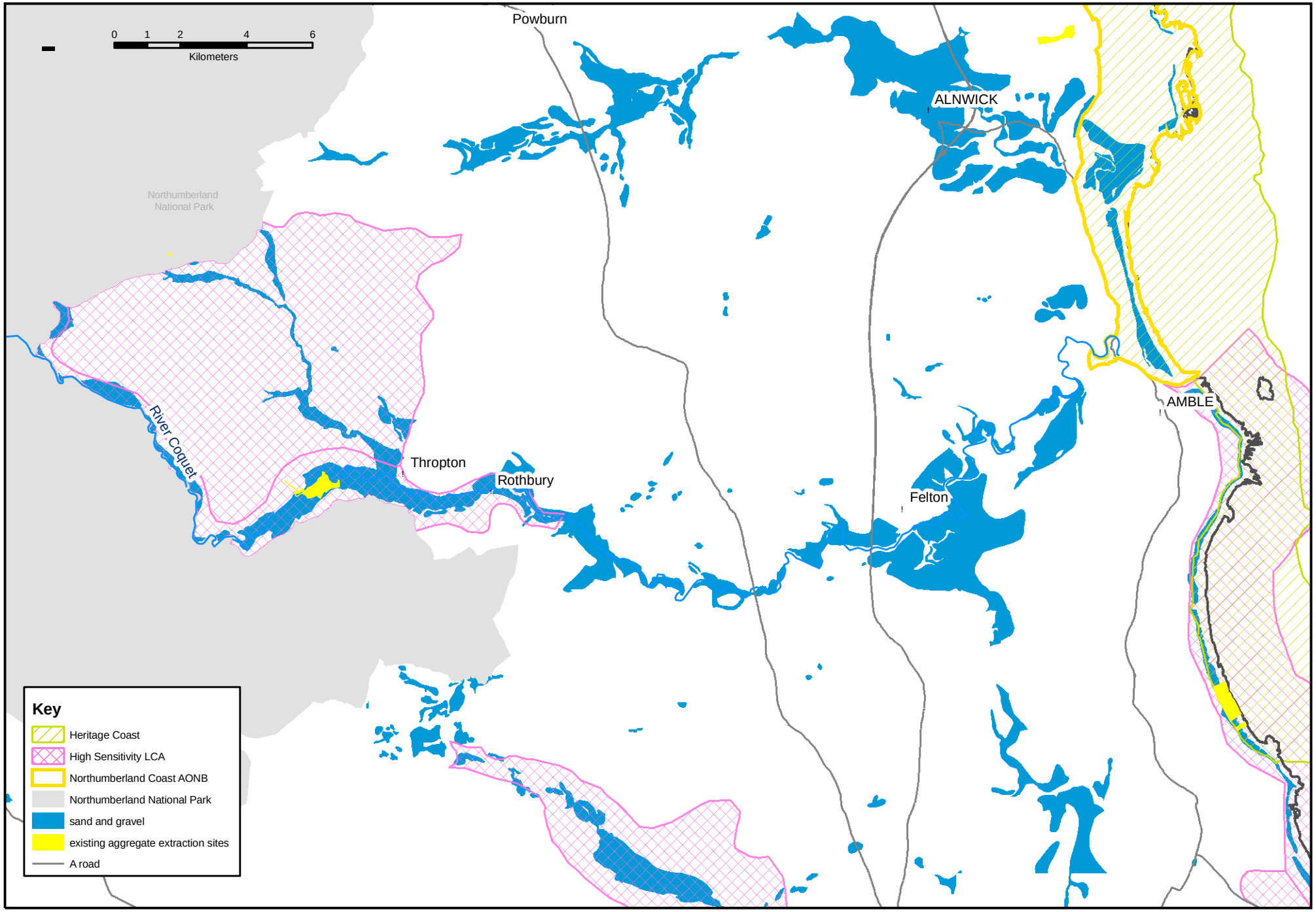


Figure C.15 Coquet valley sand and gravel resource areas and landscape considerations

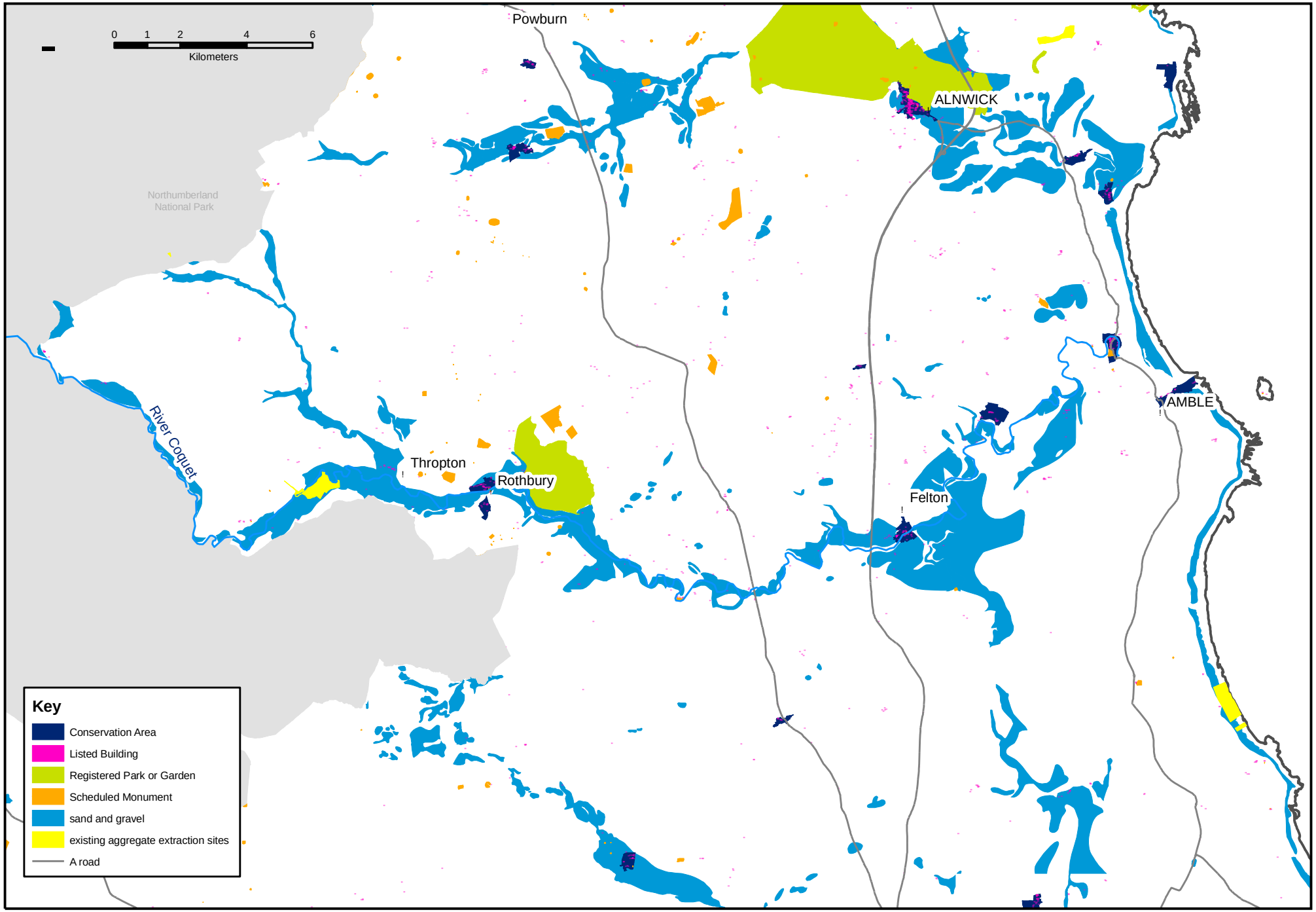


Figure C.16 Coquet valley sand and gravel resource areas and archaeology and cultural heritage considerations

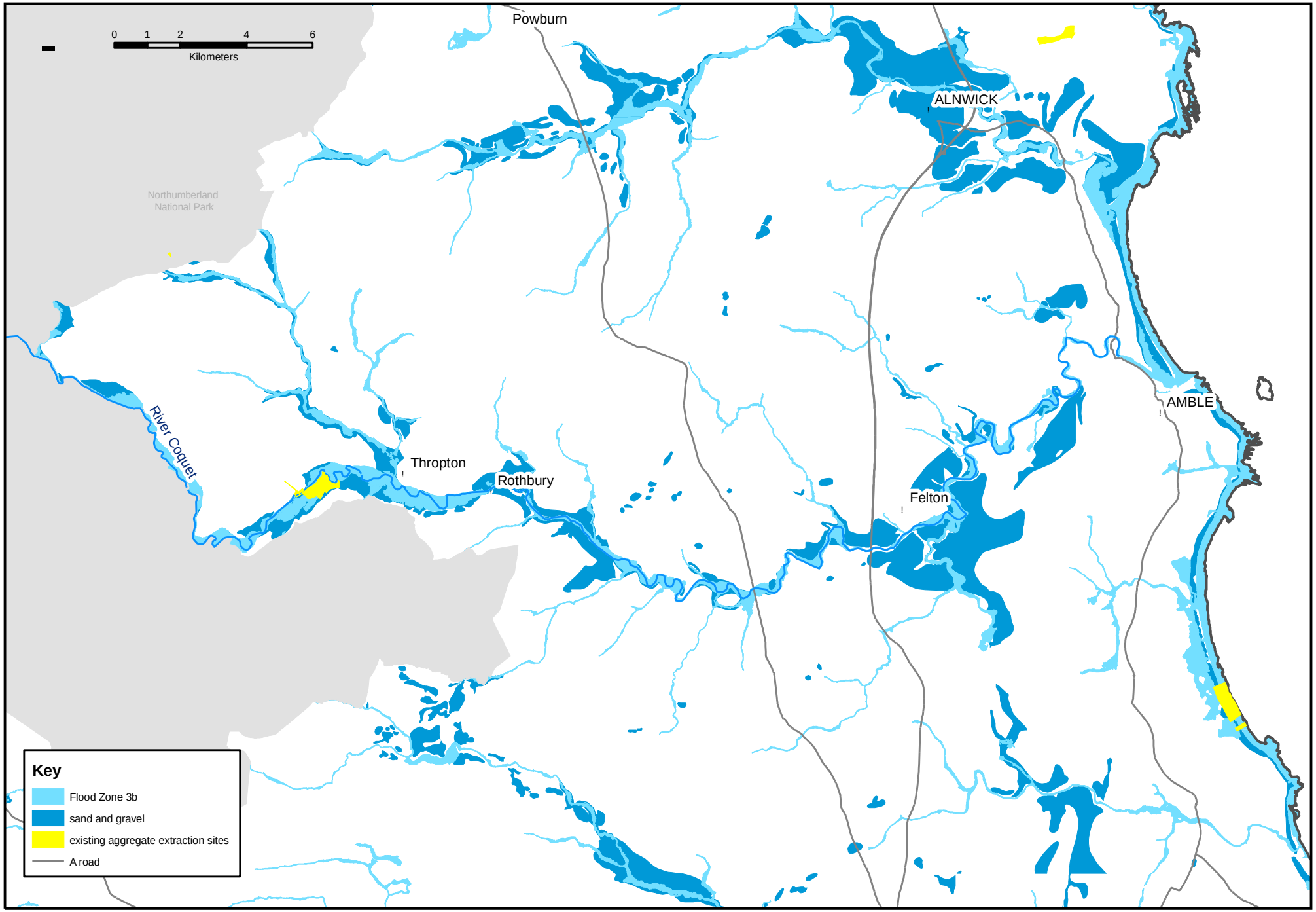


Figure C.17 Coquet valley sand and gravel resource areas and water environment considerations

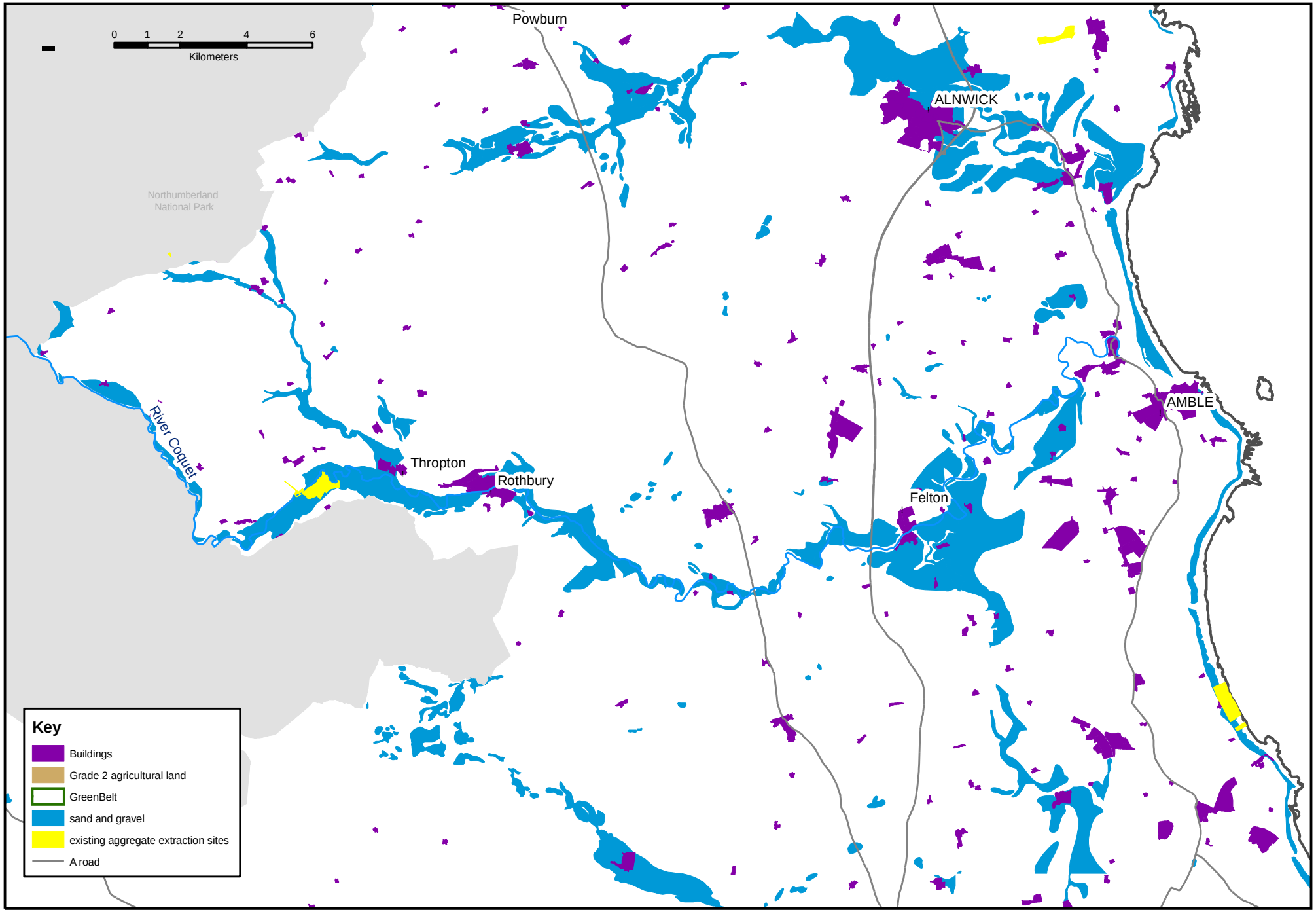


Figure C.18 Coquet valley sand and gravel resource areas and land-use and human features considerations

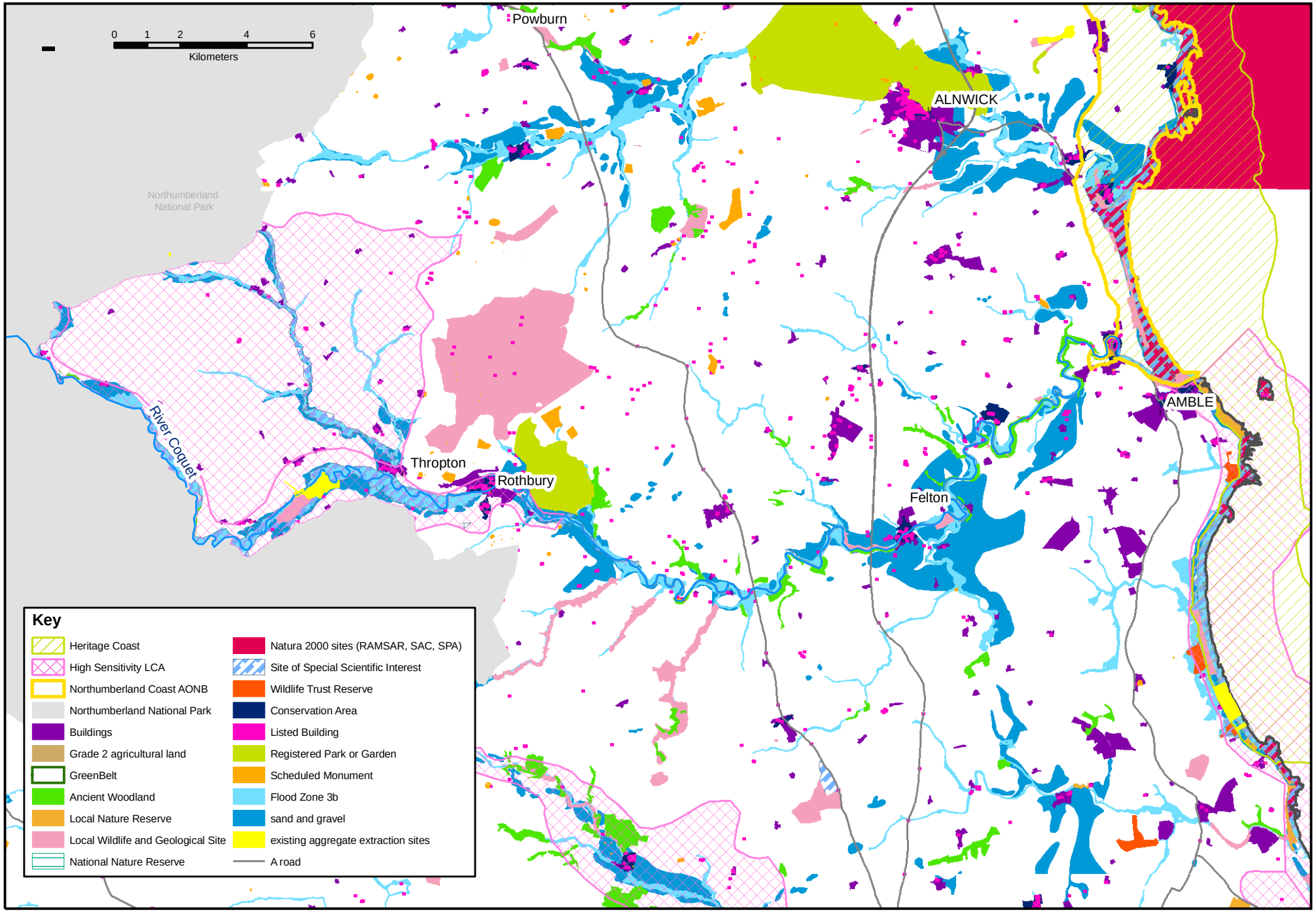


Figure C.19 Coquet valley sand and gravel resource areas and all environmental considerations

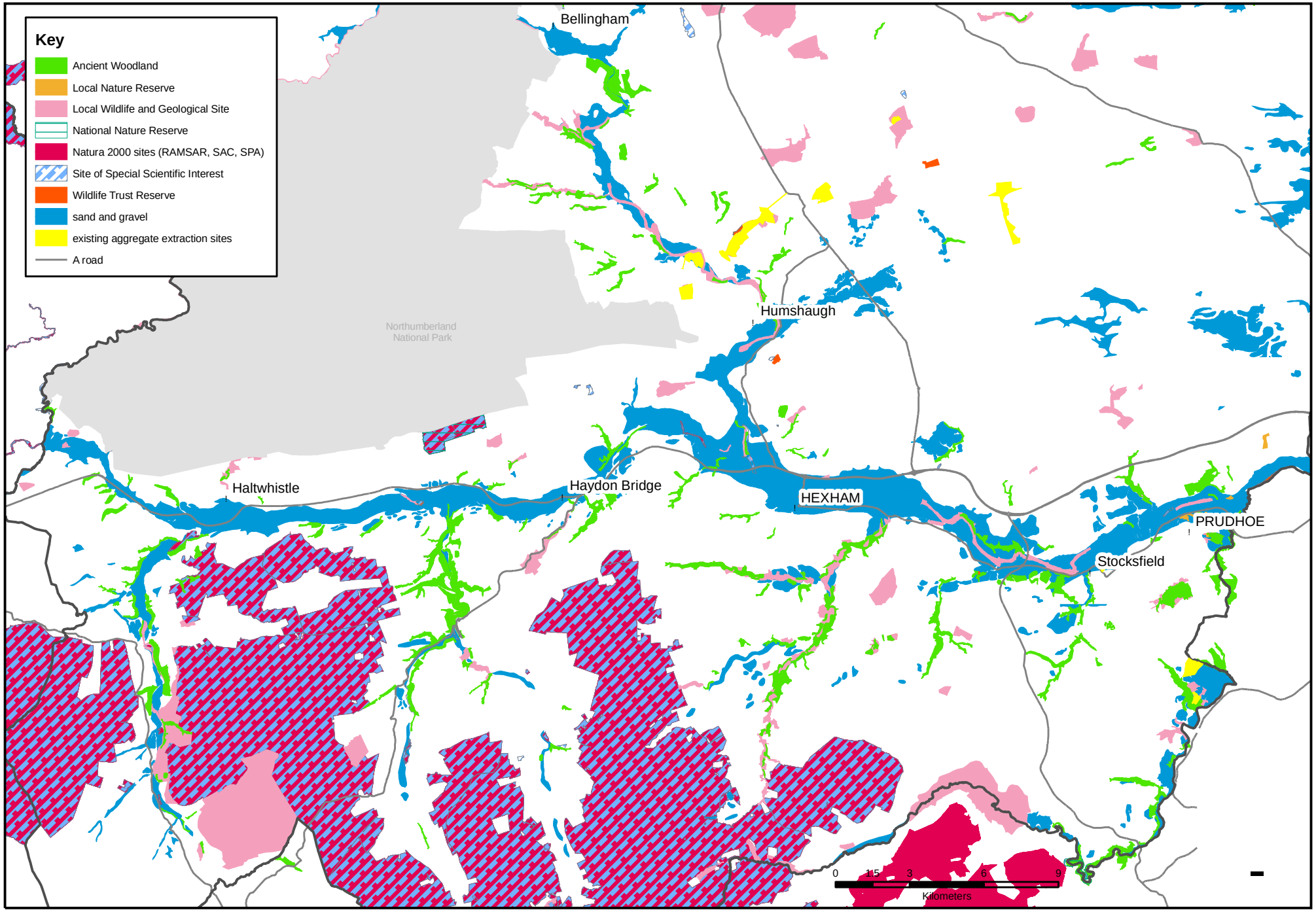


Figure C.20 Tyne valley area sand and gravel resource areas and biodiversity and geological conservation considerations

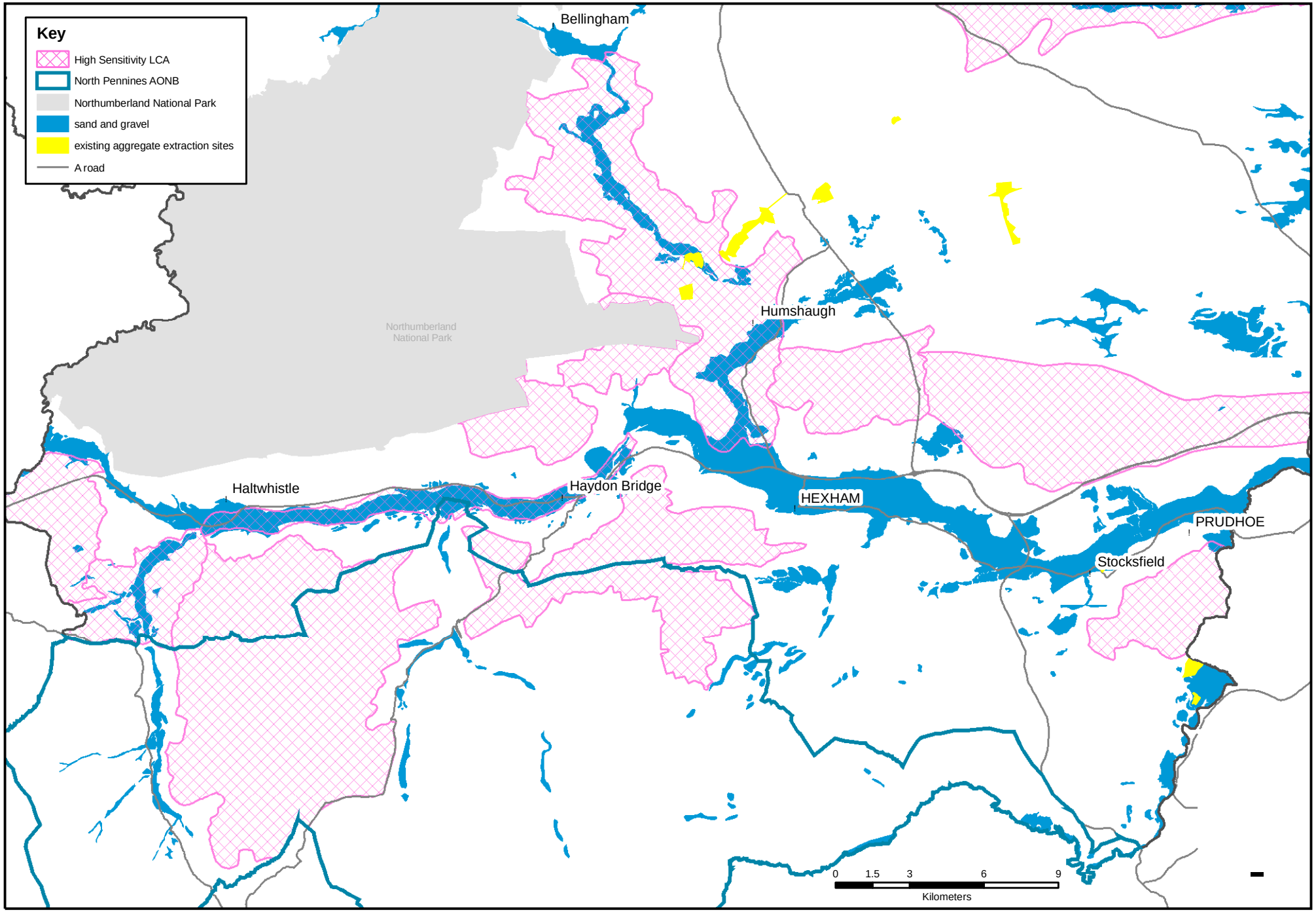


Figure C.21 Tyne valley area sand and gravel resource areas and landscape considerations

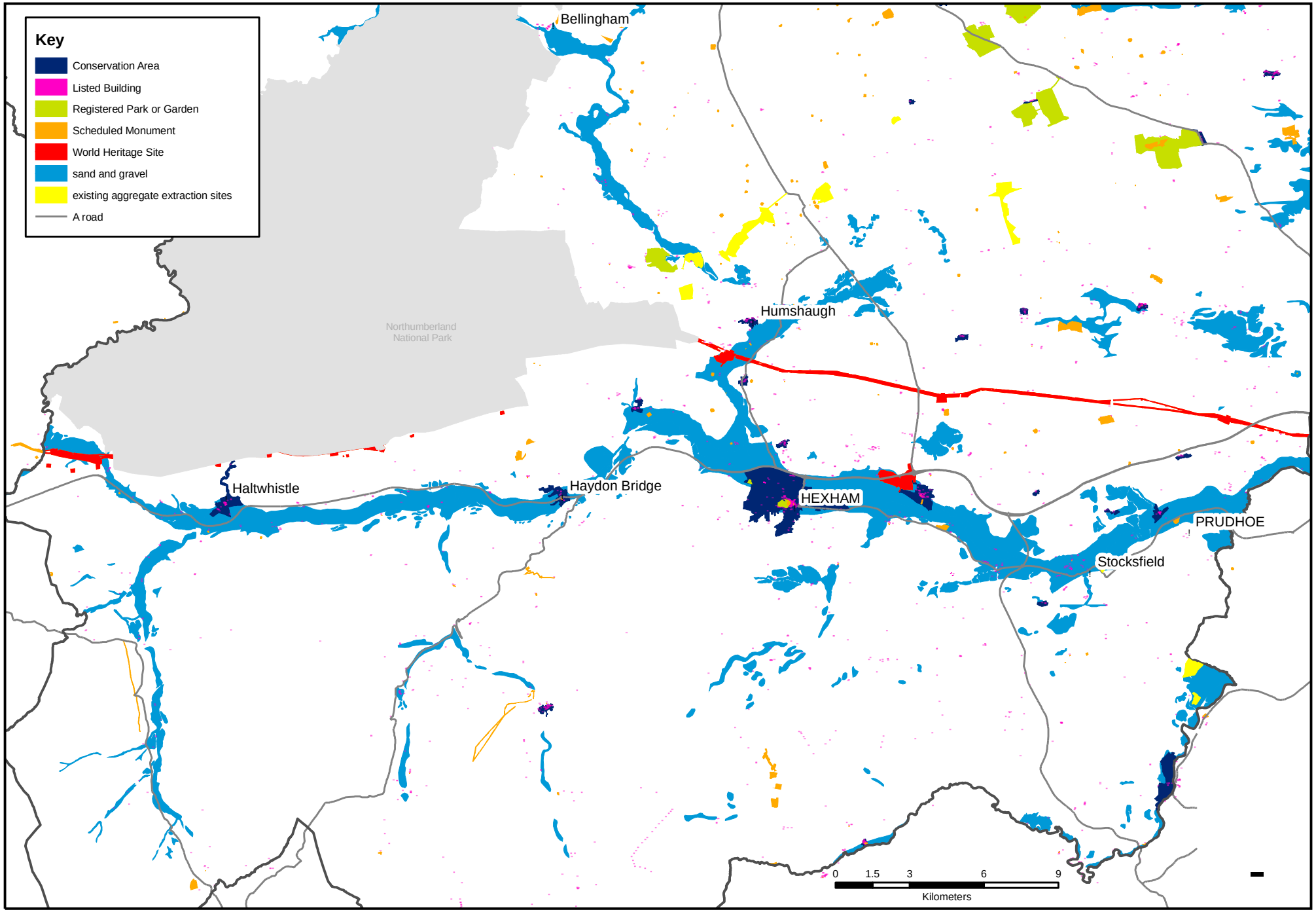


Figure C.22 Tyne valley area sand and gravel resource areas and archaeology and cultural heritage considerations

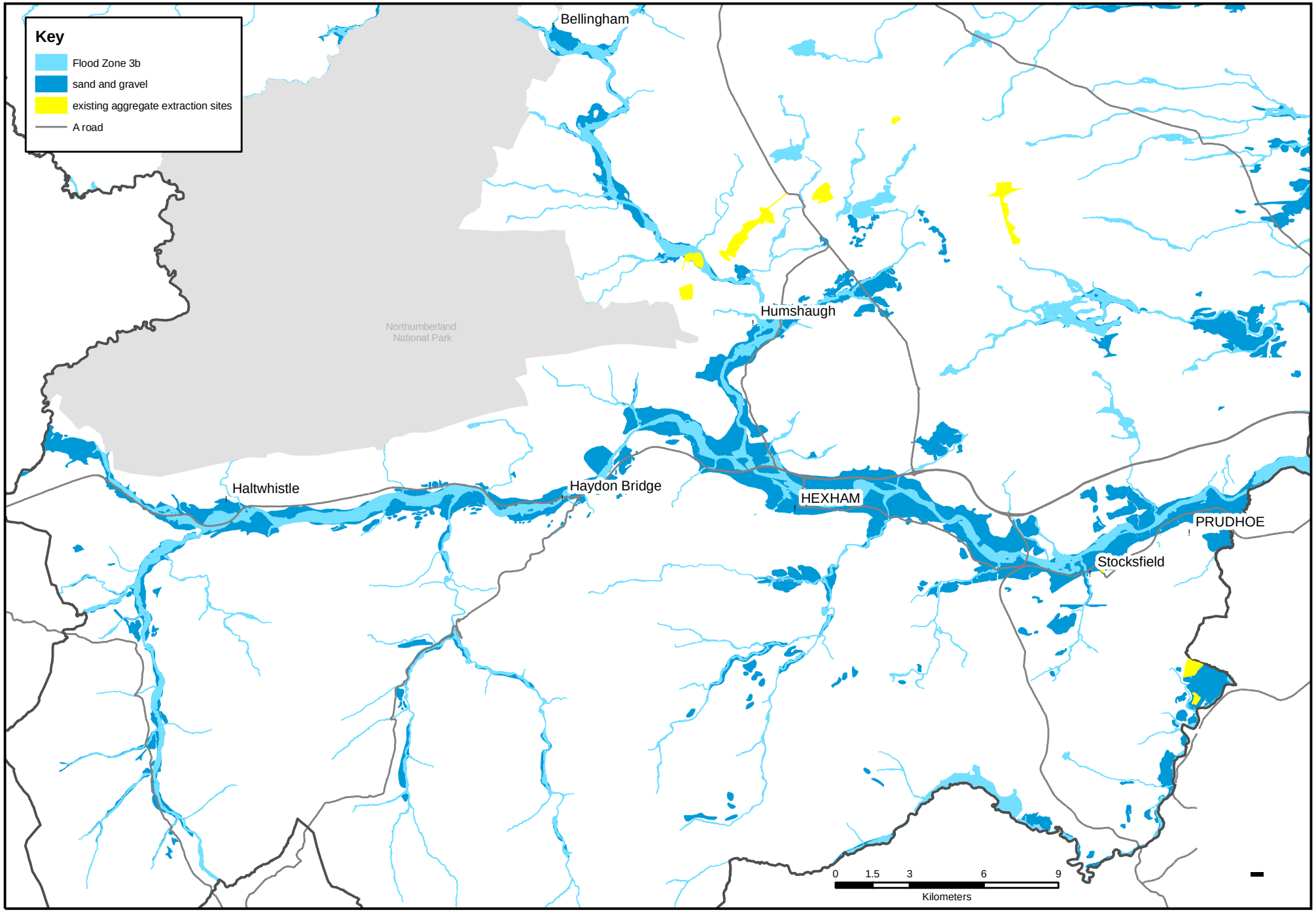


Figure C.23 Tyne valley area sand and gravel resource areas and water environment considerations

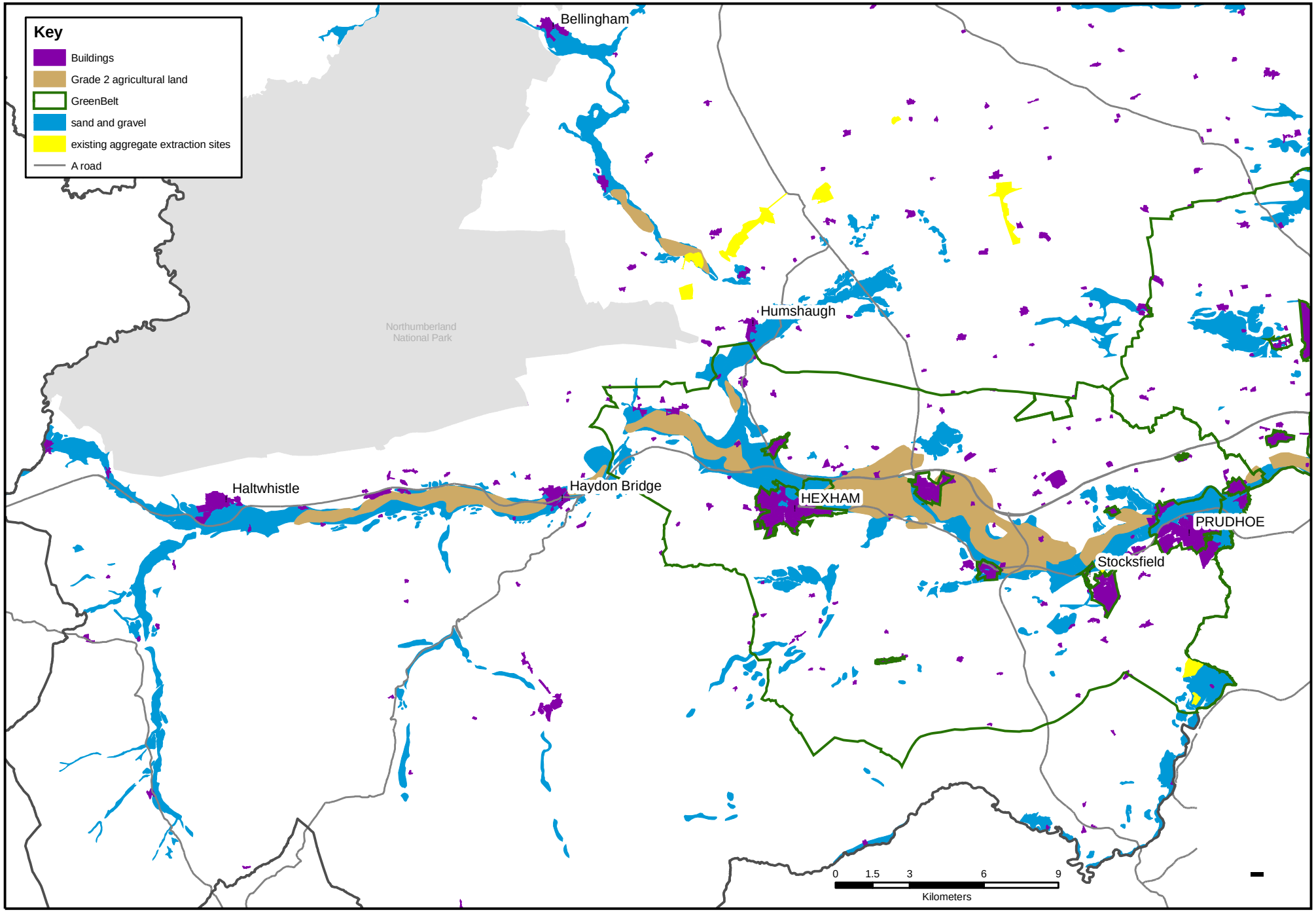


Figure C.24 Tyne valley area sand and gravel resource areas and land-use and human features considerations

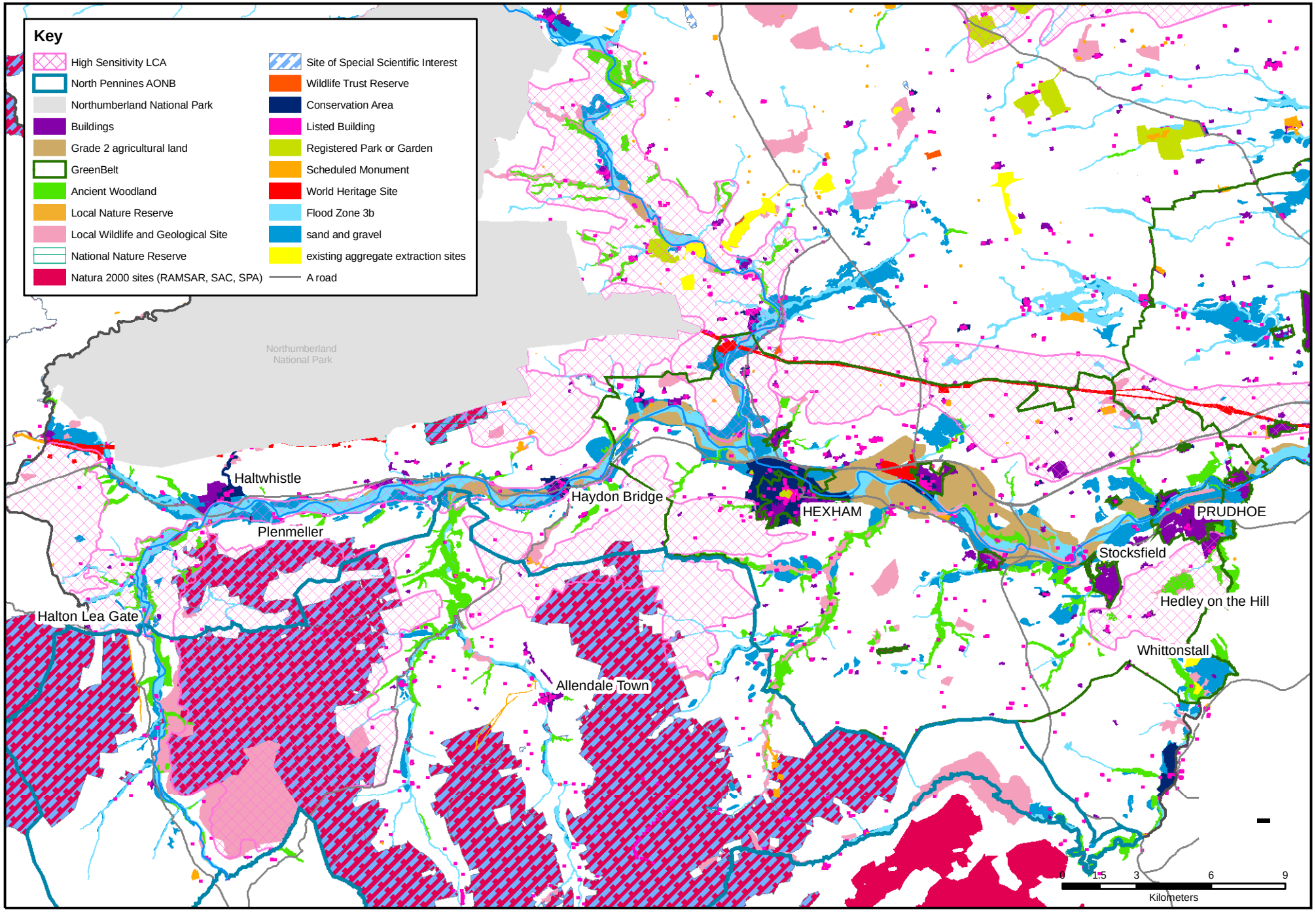


Figure C.25 Tyne valley area sand and gravel resource areas and all environmental considerations